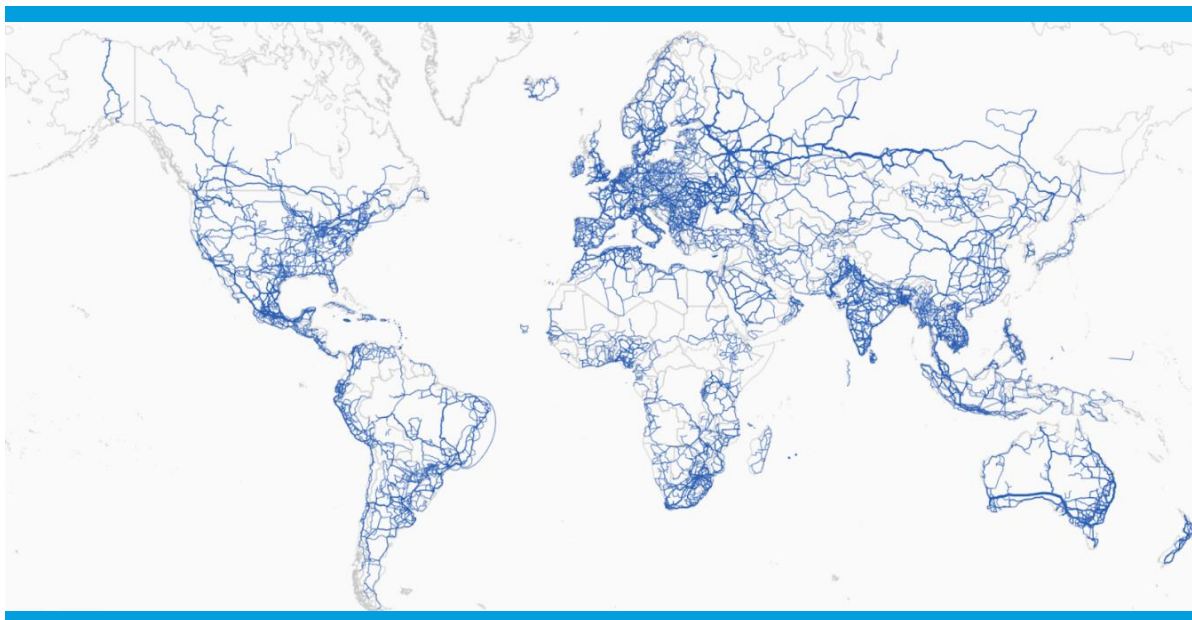# Global Gap analysis on National Broadband Mapping Systems Initiatives

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Acknowledgments

Executive Summary

The "New Graphical Interface of the Interactive Transmission Mapping Map" is a Global Service effort that aims at building a new layer on the ITU Transmission maps from June to September 2021, displaying ITU member states practices in the field of broadband mapping systems. This new layer complements the existing and on-going collecting effort on ICT Data that that has enabled the establishment of the ITU's data platform since 2012.

In terms of overall involvement across all ITU Regions, participation in the first phase of the project was positive, with 19 e-meetings held (19/147), accounting for 13% of the total number of nations contacted (especially given the nature of this project and the challenges that operating on a global scale entailing both in terms of management and coordination with all interested stakeholders).

Thanks to the global dataset, the global repository and the first body knowledge, this appears to be a solid foundation for continuing from where this report currently stands, at least until the end of 2021, and possibly beyond. Far from being the perfect setup, this first initiative at the global level on the topic of broadband mapping systems is consolidating strong pillars that will allow ITU to reap the benefits of the rigorous work done in the near future, not to mention the opportunity to establish a robust body of knowledge in the field of broadband mapping systems.

This global outreach on the subject of broadband mapping systems demonstrated how different parts of the world are equipping themselves for broadband mapping system activities, but it appears that this heterogeneity in this field is an extremely promising avenue for ITU to establish itself as the global actor on the broadband landscape, shaping its future development.

Introduction: Context and Objective

Context

Since 2012, ITU has been collecting, organizing, updating, and displaying ICT data on the ITU Interactive Transmissions Maps. This platform, designed for both public and private TIES accounts, is ITU's "ICT-data mapping system that collects various types of data and pieces of information on national backbone connectivity (optical fibers, microwave links, and satellite Earth stations, etc.), as well as other key metrics of the broadband landscape, such as access information." ITU is continuously updating the map, and reassessing its structure for new potential integrations and indicators.
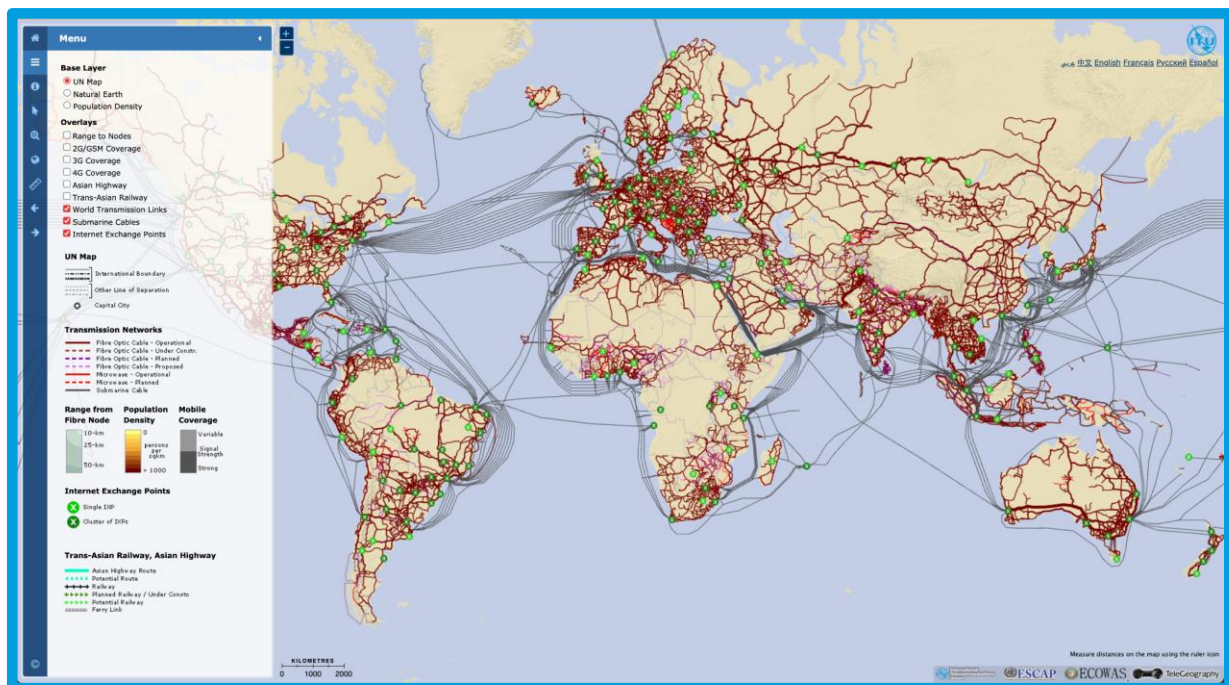
ITU Interactive Transmission Maps, Retrieved 27 August 2021 via https://www.itu.int/itu-d/tnd-map-public/

Objective

From June to September 2021, the "New graphical interface of the ITU Interactive Transmission Maps" increased its scope with the aim of improving ITU's overall knowledge of each country's capacity on mapping systems by adding a new level of information on the various existing methods in place that are used to map the broadband landscape, such as identifying the broadband infrastructure, the level of coverage, the internet service provided to its citizens, and finally the mapping of investments in various parts of the country. As a reference for this report, broadband mapping systems is defined, within the lexicon of ITU, as "any digitized information system that gathers, structures and represents georeferenced data about the reach or quality of telecommunication networks in a given geographical area. A broadband mapping system may include an infrastructure, service or investment layer, or a combination of those."

This work had a global outreach across all ITU regions and was based on the European Region's work of 2020, when all EU countries were evaluated in relation to their broadband mapping systems practices. This activity resulted in the identification of 35 mapping systems, a community of mapping systems expert focal points, and led to the organization of a regional workshop for Europe where knowledge and best practices from various countries were exchanged and presented to other member states from Europe region. Finally, letters of engagement (LoEs) were signed to facilitate ITU's work on backbone data collection and validation, as this new method would see countries supporting this effort and validating data at the national level rather than ITU submitting information requests and carrying out research at its own expense.

ITU Member State	Organisation Name	City	Description
Albania	Electronic and Postal Communications Authority (AKEP)	TIRANA	National Regulatory Authority of Albania in charge of broadband infrastructure
Andorra	Andorra Telecom, S.A.U.	SANTA COLOMA	National Regulatory Authority of Andorra in charge of broadband infrastructure
Austria	Federal Ministry for Transport, Innovation and Technology	WIEN	Government Ministry of Austria in charge of broadband infrastructure mapping
Austria	Austrian Regulatory Authority for Broadcasting and Telecommunications	WIEN	National Regulatory Authority of Austria in charge of official broadband Speed
Belgium	Institut Belge des Services Postaux & des Télécommunications (IBPT)	BRUXELLES	National Regulatory Authority of Belgium in charge of broadband infrastructure
Belgium			
Bosnia and Herzegovina	Communications Regulatory Agency (RAK)	SARAJEVO	National Regulatory Authority of Bosnia and Herzegovina in charge of broadband infrastructure mapping systems in the Country
Bulgaria	Ministry of Transport, Information Technology and Communications	SOFIA	Government Ministry of Bulgaria in charge of broadband infrastructure mapping
Croatia	Croatian Regulatory Authority for Network Industries (HAKOM)	ZAGREB	National Regulatory Authority of Croatia in charge of official broadband Speed
Croatia	Croatian Regulatory Authority for Network Industries (HAKOM)	ZAGREB	National Regulatory Authority of Croatia in charge of broadband infrastructure
Cyprus	Office of the Commissioner of Electronic Communications & Postal Regulation	NICOSIA	National Regulatory Authority of Cyprus in charge of broadband infrastructure
Cyprus	Office of the Commissioner of Electronic Communications & Postal Regulation	NICOSIA	National Regulatory Authority of Cyprus in charge of official broadband speed
Czech Republic	Czech Telecommunication Office	PRAHA	National Regulatory Authority of Czech Republic in charge of official broadband
Czech Republic	Czech Telecommunication Office	PRAHA	National Regulatory Authority of Czech Republic in charge of broadband
Denmark	Danish Energy Agency	COPENHAGEN	National Regulatory Authority of Denmark in charge of broadband infrastructure
Estonia	Estonian Consumer Protection and Technical Regulatory Authority	TALLINN	National Regulatory Authority of Estonia in charge of broadband infrastructure
Finland	Finnish Transport and Communications Agency (TRAFICOM)	HELSINKI	National Regulatory Authority of Finland in charge of broadband infrastructure
Finland	Finnish Transport and Communications Agency (TRAFICOM)	HELSINKI	National Regulatory Authority of Finland in charge of broadband infrastructure
France	Autorité de Régulation des Communications électroniques et des Postes (ARCEP)	PARIS	National Regulatory Authority of France in charge of broadband infrastructure
France	Autorité de Régulation des Communications électroniques et des Postes (ARCEP)	PARIS	National Regulatory Authority of France in charge of official broadband speed
Georgia	Georgian National Communications Commission	TBILISI	National Regulatory Authority of Georgia in charge of broadband infrastructure
Germany	Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway	MAINZ	National Regulatory Authority of Germany in charge of broadband infrastructure
Germany	Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway	MAINZ	National Regulatory Authority of Germany in charge of official broadband speed
Germany	Federal Ministry for Economic Affairs and Energy	BERLIN	Government Ministry of Germany in charge of broadband infrastructure mapping
Greece	Ministry of Digital Policy, Telecommunications & Media	ATHENS	Government Ministry of Greece in charge of broadband infrastructure mapping
Greece	Ministry of Digital Policy, Telecommunications & Media	ATHENS	Government Ministry of Greece in charge of official broadband speed testing in
Hungary	Governmental Information-Technology Development Agency	BUDAPEST	N/A
Hungary	National Media and Infocommunications Authority	BUDAPEST	National Regulatory Authority of Hungary in charge of official broadband speed
Iceland	Post and Telecom Administration	REYKJAVIK	National Regulatory Authority of Iceland in charge of broadband infrastructure
Ireland	Department of Communications, Climate Action and Environment	DUBLIN	Government Ministry of Ireland in charge of broadband infrastructure mapping
Israel	Ministry of Communications	JERUSALEM	Government Ministry of Israel in charge of broadband infrastructure mapping

Screenshot of the Europe region database, retrieved 27 August 2021.

Approach

This first segment of the project is divided into two phases: the first one delivering the autonomous desk research; whereas the second one pertained to the validation of the information retrieved via e-meeting with the relevant stakeholders of the countries considered.

The project's initial phase necessitated thorough desk research, followed by a vast outreach to all 193 countries. The first part of this work consisted of autonomous work from the part of ITU: a global desk-research was conducted by visiting the websites of national regulatory organizations (NRAs) or ministries. The Information on ITU focal points, as well as links to ministries' or NRAs' websites, was acquired from the ITU website's "Member states list" page to the extent the information was valid and up to date. It should be highlighted that only ITU staffs have access to such information. Although some of the information was out of date, most of it was correct and fit for purpose.

ITU List of Member States screenshot sample, Retrieved 27 August 2021 via https://www.itu.int/online/mm/scripts/gensel8

The dataset's structure was critical to this project: it needed to be clear, easy to navigate, and simple for anyone to outsource the information to build the new layer of the ITU map. To accomplish this, the European Excel dataset was used as a starting point, with, however, new columns added - such as "office area coordinator," "source of information," and "mapping system number" as new parameters given the activity's global reach, as well as a new way of organizing the information. Several iterations were necessary before finalizing an optimal Excel dataset. This type of dataset is now being developed in such a way that data and information for all broadband mapping systems can be updated and maintained in the future, allowing this first experimental endeavour to expand. It is in ITU's best interests to continue from where this first exploratory project ends, viewing it as the starting point for a long-term operational plan. In the long run, such foresight, as well as a first-mover attitude, can leverage ITU in establishing itself as a global leader in the broadband mapping systems landscape.

For the second phase of the study, the data acquired through desk research had to be approved by a member of the NRA or the ministry of telecommunication (or equivalent), in each country. This equates to theoretically 147 calls or e-meetings in the best-case scenario. Initially, it appeared that the only option to schedule such meetings was to contact the ITU TIES focal points and then collaborate with them to contact the NRA. However, this was not the case. Differing from the European experience, the most convenient way to proceed was to get in contact with the respective ITU regional offices, before engaging the different national organizations.

This took longer than expected because the proposal had to be resubmitted not only to the various regional offices, but also to the numerous area coordinators. However, it should be emphasized that all regional offices provided full support and cooperation to the activity (and have confirmed to continue doing so in the future, even at the end of this first phase of the project), advising on the most effective approaches to participate in successful discussions with the various countries, thus resulting in very good support. The diverse methods of operation in the different regional offices indicated that no "one size fits all" method can succeed, and that this global work must be planned in close coordination with the regional offices, since each regional office is best positioned and has the most understanding of the geographical area in which ITU seeks to operate.

The various regional offices not only advised on which avenues to pursue in order to be effective in achieving the outcome, but also actively participated in a variety of ways; for example, the Africa

Regional Office's issued an official "Request for Information" letter to each country for its supervises; the Americas Regional Office has provided support during the e-meetings with the member states; and the Commonwealth of Independent States (CIS) regional office engaged in internal desk-research to overcome the language barrier problems this project had initially faced. Furthermore, the Asia and the Pacific (ASP) Region has actively participated in different e-meetings and has carefully intervened and advised if this activity could be carried out in countries in which legal sanctions from the international community is in place. Finally, the Arab states (ARB) Region has shown interest in supporting this project as a new revived interest in backbone data collection within its areas of supervision is taking place nowadays. In other words, this type of worldwide outreach activity would not have been possible without the important assistance and coordination of the various regional offices.

Methodology

This work was based on the ITU document "ITU Broadband Maps: Identity. Build. Connect"[1] as well as a number of other documents published by the ITU Office for Europe, including "Infrastructure sharing and co-deployment in Europe: good practices based on collaborative regulation," and "Broadband Mapping Systems in Europe and the Status of Harmonization in the Region"[2], "The European Commission's "Broadband Cost Reduction Directive Review"[3] and "Eu4Digital 'broadband Strategies In The Eastern Partnership Region' Technical Assistance- Project Report 3- Broadband Mapping Recommendations"[4] publications were also analyzed. These documents were useful since they allowed positioning this activity taking into consideration other ongoing actions. The European Commission's "Study on Broadband and Infrastructure Mapping"[5] to conclude, was an important reference that served as a foundation for the development of a generalized methodology that would accompany and support all of the operations.

As a matter of fact, the methodology was created by first determining the objective of the work and by giving a definition of what would be investigated. It was critical to first understand what was being sought, as well as how to express and communicate it. As a result, it was decided to provide as broad a description of broadband mapping systems, and then more specific definitions for infrastructure mapping systems, the service mapping systems, and, finally, investment mapping systems. The three types of proposed mapping system initiatives outlined in the European Commission's report were chosen because they were deemed most suited to the diverse regional settings of the other continents. Demand mapping, on the other hand, was excluded because, of the four categories articulated by the European Commission, demand mapping is still in the consolidation phase at the European level and there are very few examples of digitized demand mapping systems observed.

Once the knowledge had been aggregated and both the methodology and the action plan had been defined, an excel document was prepared that followed the dataset of the European experience, merging it with some additional information in light of the global context in which operations would

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[1] ITU BB Transmission Map Report _- V3_2_EUR.pdf
[2] BACKGROUND PAPER
[3] Public consultation on the review of the Broadband Cost Reduction Directive | Shaping Europe's digital future
[4] Report 3_Broadband Mapping EU4Digital.pdf
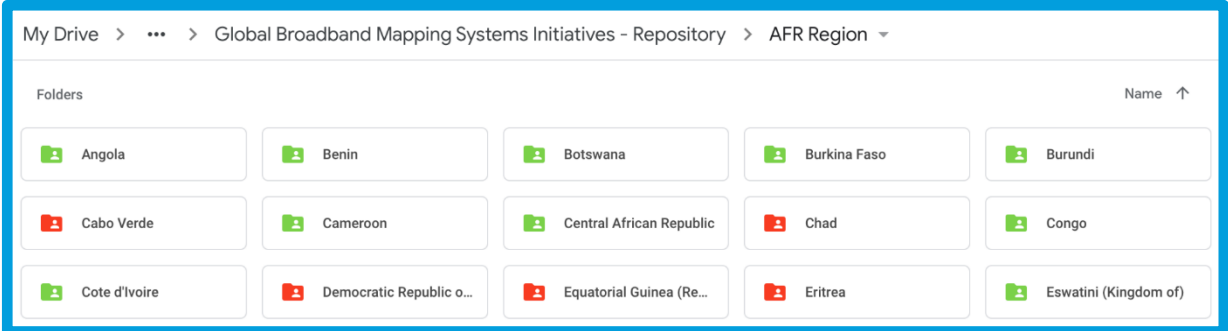[5] Study on broadband and infrastructure mapping - Publications Office of the EU

take place. To better organize the data collection, a repository, i.e., a folder in which the data collection was organized by levels and categories, was also developed.
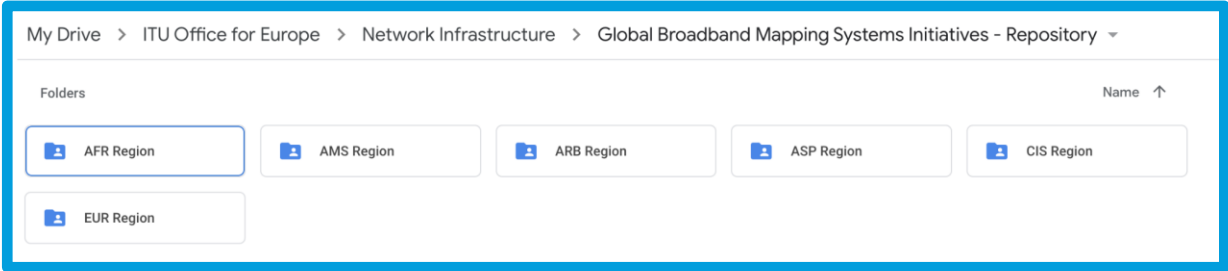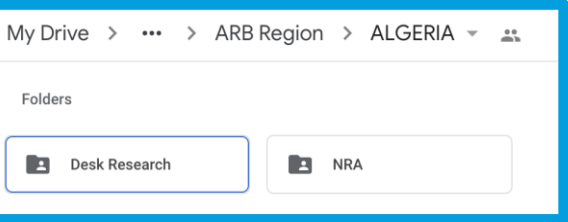

ITU Global Broadband Mapping Systems Initiatives - Repository, sample screenshot. Retrieved 7 September 2021.
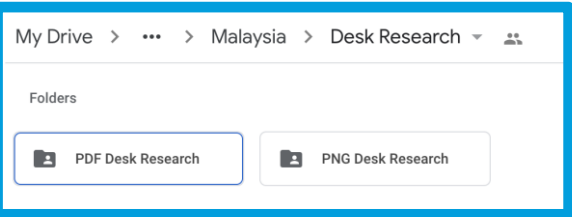

ITU Global Broadband Mapping Systems Initiatives - Repository, sample screenshot of the AFR Region. The countries in red are those in which no data collection is available. The countries in green are those countries for which some sort of data collection is available now. Retrieved 7 September 2021.

In terms of levels, this repository descends to three levels, beginning with the ITU region to which the country belongs, then to the folder linked to the country itself, and finally to the data collection folder, which is divided into data collected through desk-research or delivered ex-post by the national organization.

ITU Global Broadband Mapping Systems Initiatives - Repository, sample screenshot of the ARB Region. Within the country folder, the information has been divided depending on the origin of the information: it either resulted from the internal desk research or it was sent by the NRA. Retrieved 7 September 2021.

Regarding the categories, having established the heterogeneity of the practices that may be encountered, it was determined to categorize the collection of documents in the following formats: link, pdf, word, excel, ppt, png, kml, and kmz.

ITU Global Broadband Mapping Systems Initiatives - Repository, sample screenshot of the ASP Region. The information is divided into the different typologies, i.e pdf, word, excel, ppt, png, kml, and kmz. Retrieved 7 September 2021.

The EUR Region landscape

The first region in which ITU has run the exercise of researching and establishing the different types of national broadband mapping systems was the Europe Region. Indeed, this activity, which took place in 2020 is the foundation for this same exercise replicated and scaled at the global level, focusing on all the other ITU Regions. The Europe experience resulted in the deliverable titled: "**Broadband Mapping Systems in Europe and Regional Harmonization Initiatives**"[6]. Overall, what appears in this research is that the Europe region is at the forefront when it comes to broadband mapping systems, with thirty-eight (38) countries possessing a viable digital map (either focusing on the infrastructure mapping systems, or the service mapping systems or even the investment mapping systems); and eight (8) countries for which no information is available on this field.

ITU Member State	Organisation Name	City	Description
Albania	Electronic and Postal Communications Authority (AKEP)	TIRANA	National Regulatory Authority of Albania in charge of broadband infrastructure
Andorra	Andorra Telecom, S.A.U.	SANTA COLOMA	National Regulatory Authority of Andorra in charge of broadband infrastructure
Austria	Federal Ministry for Transport, Innovation and Technology	WIEN	Government Ministry of Austria in charge of broadband infrastructure mapping
Austria	Austrian Regulatory Authority for Broadcasting and Telecommunications	WIEN	National Regulatory Authority of Austria in charge of official broadband Speed
Belgium	Institut Belge des Services Postaux & des Télécommunications (IBPT)	BRUXELLES	National Regulatory Authority of Belgium in charge of broadband infrastructure
Belgium			
Bosnia and Herzegovina	Communications Regulatory Agency (RAK)	SARAJEVO	National Regulatory Authority of Bosnia and Herzegovina in charge of broadband infrastructure mapping systems in the Country
Bulgaria	Ministry of Transport, Information Technology and Communications	SOFIA	Government Ministry of Bulgaria in charge of broadband infrastructure mapping
Croatia	Croatian Regulatory Authority for Network Industries (HAKOM)	ZAGREB	National Regulatory Authority of Croatia in charge of official broadband Speed Testing in the Country
Croatia	Croatian Regulatory Authority for Network Industries (HAKOM)	ZAGREB	National Regulatory Authority of Croatia in charge of broadband infrastructure
Cyprus	Office of the Commissioner of Electronic Communications & Postal Regulation	NICOSIA	National Regulatory Authority of Cyprus in charge of broadband infrastructure
Cyprus	Office of the Commissioner of Electronic Communications & Postal Regulation	NICOSIA	National Regulatory Authority of Cyprus in charge of official broadband speed
Czech Republic	Czech Telecommunication Office	PRAHA	National Regulatory Authority of Czech Republic in charge of official broadband
Czech Republic	Czech Telecommunication Office	PRAHA	National Regulatory Authority of Czech Republic in charge of broadband
Denmark	Danish Energy Agency	COPENHAGEN	National Regulatory Authority of Denmark in charge of broadband infrastructure
Estonia	Estonian Consumer Protection and Technical Regulatory Authority	TALLINN	National Regulatory Authority of Estonia in charge of broadband infrastructure
Finland	Finnish Transport and Communications Agency (TRAFICOM)	HELSINKI	National Regulatory Authority of Finland in charge of broadband infrastructure
Finland	Finnish Transport and Communications Agency (TRAFICOM)	HELSINKI	National Regulatory Authority of Finland in charge of broadband infrastructure
France	Autorité de Régulation des Communications électroniques et des Postes (ARCEP	PARIS	National Regulatory Authority of France in charge of broadband infrastructure
France	Autorité de Régulation des Communications électroniques et des Postes (ARCEP	PARIS	National Regulatory Authority of France in charge of official broadband speed
Georgia	Georgian National Communications Commission	TBILISI	National Regulatory Authority of Georgia in charge of broadband infrastructure
Germany	Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railv	MAINZ	National Regulatory Authority of Germany in charge of broadband infrastructure
Germany	Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railv	MAINZ	National Regulatory Authority of Germany in charge of official broadband speed
Germany	Federal Ministry for Economic Affairs and Energy	BERLIN	Government Ministry of Germany in charge of broadband infrastructure mapping
Greece	Ministry of Digital Policy, Telecommunications & Media	ATHENS	Government Ministry of Greece in charge of broadband infrastructure mapping
Greece	Ministry of Digital Policy, Telecommunications & Media	ATHENS	Government Ministry of Greece in charge of official broadband speed testing in
Hungary	Governmental Information-Technology Development Agency	BUDAPEST	N/A
Hungary	National Media and Infocommunications Authority	BUDAPEST	National Regulatory Authority of Hungary in charge of official broadband speed
Iceland	Post and Telecom Administration	REYKJAVIK	National Regulatory Authority of Iceland in charge of broadband infrastructure
Ireland	Department of Communications, Climate Action and Environment	DUBLIN	Government Ministry of Ireland in charge of broadband infrastructure mapping
Israel	Ministry of Communications	JERUSALEM	Government Ministry of Israel in charge of broadband infrastructure mapping systems in the Country

Screenshot of the Europe region database, retrieved 27 August 2021.

ITU EUR Region		
Country with minimum viable Digital Maps	Countries with minimum documentation	Countries with no available information
38	0	8

[6] https://www.itu.int/en/ITU-D/Regional-Presence/Europe/Documents/Events/2020/RRF/20-11-26%20Background%20Paper_Broadband%20Mapping%20Systems%20in%20Europe%20and%20Regional%20Harmonization%20Initiatives_final.pdf
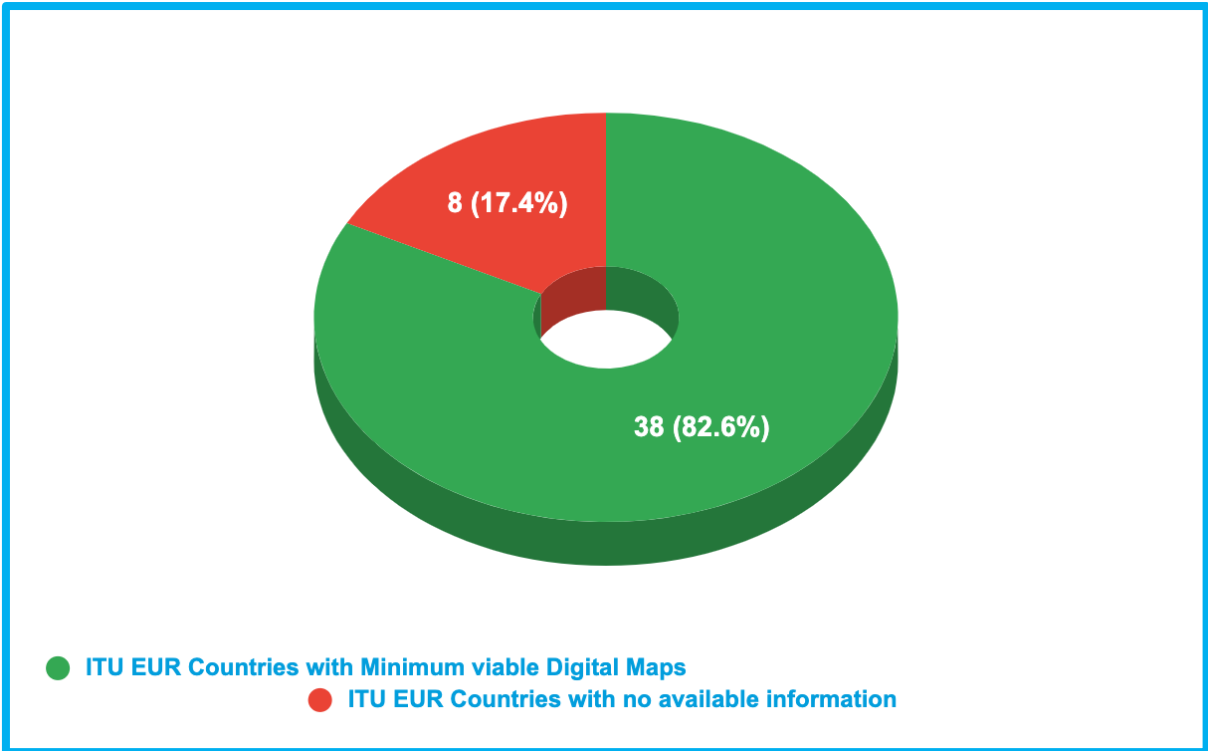
Table and Pie chart showing the number of Countries with Minimum viable Digital Maps, Countries with Minimum documentation and Countries with no available documentation respectively in the EUR Region. Retrieved 20 January 2022.

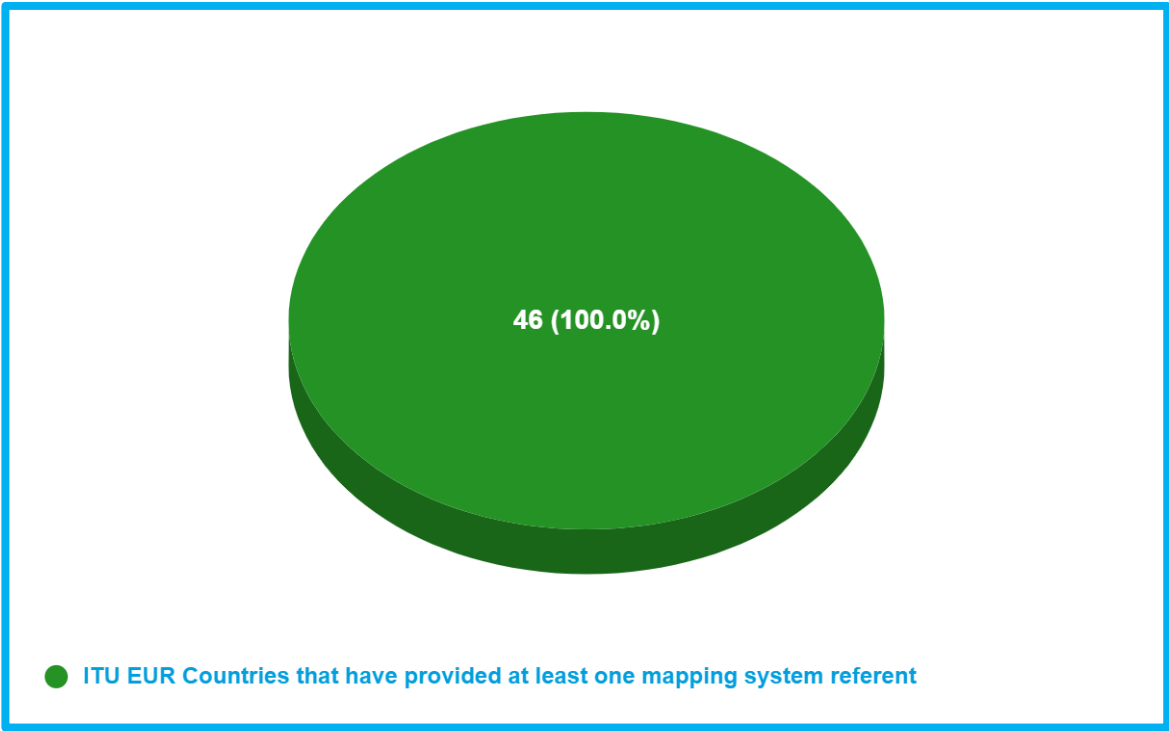| ITU EUR Region	
Countries that have provided at least one mapping system referent	Countries that have not provided a mapping system referent
46	0

Table and Pie chart showing the number of Countries that have and have not provided at least one mapping system referent respectively in the EUR Region. Retrieved 20 January 2022.

The AFR Region landscape

The ITU AFR Region is made up of 44 member countries, with the main headquarters in Addis Ababa, Ethiopia; and three offices of varying competence in Dakar, Senegal; Harare, Zimbabwe; and Yaoundé, Cameroon. Existing work carried out in the context of the PRIDA Project aided the activity "New graphical interface of the ITU Interactive Transmission Maps" in the African region. The PRIDA project, which stands for "Policy and Regulation Initiative for Digital Africa," is one of the initiatives carried out under the supervision of ITU-D, the African Union, and the European Union. These three actors are the primary actors who intend to "encourage universally accessible and inexpensive broadband across the continent in order to unlock future benefits of internet-based services."

The existing work was presented through the project's presentation to the African Regional Office, which shared the various information already existing and acquired through surveys in 2020 during the PRIDA consultancy work. The PRIDA initiative had resulted in the collection of information from 24 countries concerning the collection of backbone data; it had received commitments from 10 countries to submit the needed information, while the remaining ten countries had not responded. This work is expanded upon in the project "New graphical interface of the ITU Interactive Transmission Maps." After a series of meetings to define the activities in the Africa continent and what method to follow, the Africa Regional Office officially sent out a Letter of Request for Information, a type of letter that is delivered officially by ITU in order to receive official information from the national agencies. This decision was governed by the desire to improve the chance of participation by the countries on this activity, as it appears that countries are more inclined to devote more of their resources and energy and commitment if the request comes from an official organizational body rather than a person.

Flag	Country code	Country	Institution in charge of broadband mapping	Office area coordinator	number	Mapping Systems projects in place?	Map Name	Other form of information on mapping systems initiatives?	Source of information	Institution contacted?	Information validated?	Broadband Mapping System Expert	Mapping System Expert(
	AGO	Angola (Republic of)	Angolan Institute of Communications (INACOM)	CHALI TUMELO	0	Not Found	N/A	EXCEL Documents	Desk research	YES	NO	Not Established	
	AGO	Angola (Republic of)	Angolan Institute of Communications (INACOM)	CHALI TUMELO	0	Not Found	N/A	PDF Documents	Desk research	YES	NO	Not Established	
	BEN	Benin (Republic of)	HAAC - Haute Autorité de l'Audiovisuel et de la Communication	ALI DRISSA BADIEL	1	Infrastructure Mapping	PDITT project	<-	Desk research	YES	NO	Not Established	
	BEN	Benin (Republic of)	HAAC - Haute Autorité de l'Audiovisuel et de la Communication	ALI DRISSA BADIEL	1	Infrastructure Mapping		->	PDF Documents	Desk research	YES	NO	Not Established
	BEN	Benin (Republic of)	HAAC - Haute Autorité de l'Audiovisuel et de la Communication	ALI DRISSA BADIEL	1	Infrastructure Mapping		->	PNG Documents	Desk research	YES	NO	Not Established
	BWA	Botswana (Republic of)	Botswana Communications Regulatory Authority (BOCRA)	CHALI TUMELO	4	INF-SER Mapping	BoFiNet Map	<-	Desk research	YES	NO	Not Established	
	BWA	Botswana (Republic of)	Botswana Communications Regulatory Authority (BOCRA)	CHALI TUMELO	4	INF-SER Mapping		->	PDF Documents	Desk research	YES	NO	Not Established
	BWA	Botswana (Republic of)	Botswana Communications Regulatory Authority (BOCRA)	CHALI TUMELO	4	INF-SER Mapping		->	PNG Documents	Desk research	YES	NO	Not Established
	BFA	Burkina Faso	Ministère du Développement de l'Economie numérique et des Postes	ALI DRISSA BADIEL	1	Infrastructure Mapping		->	KMZ Documents	PRIDA	YES	NO	Not Established
	BFA	Burkina Faso	Ministère du Développement de l'Economie numérique et des Postes	ALI DRISSA BADIEL	1	Infrastructure Mapping		->	PNG Documents	Desk research	YES	NO	Not Established
	BDI	Burundi (Republic of)	ARCT - Agence de Régulation et de Contrôle des Télécommunications	JEAN-JACQUES MASSIMA	1	Infrastructure Mapping		->	PDF Documents	PRIDA	YES	NO	Not Established
	CPV	Cabo Verde (Republic of)	Agência Reguladora Multissectorial da Economia (ARME)	ALI DRISSA BADIEL	0	Not Found	N/A	Not Found	Desk research	YES	YES	Ms. Jandira Sanches	jandira.sanches@arm
	CMR	Cameroon (Republic of)	ART - Agence de Régulation des Télécommunications	JEAN-JACQUES MASSIMA	4	INF-SER Mapping		->	EXCEL Documents	PRIDA	YES	NO	Not Established
	CMR	Cameroon (Republic of)	ART - Agence de Régulation des Télécommunications	JEAN-JACQUES MASSIMA	4	INF-SER Mapping		->	WORD Documents	PRIDA	YES	NO	Not Established

ITU AFR Region Dataset sample screenshot, Retrieved 28 August 2021 via the New graphical interface of the ITU Interactive Transmission Maps Dataset. For internal use only.
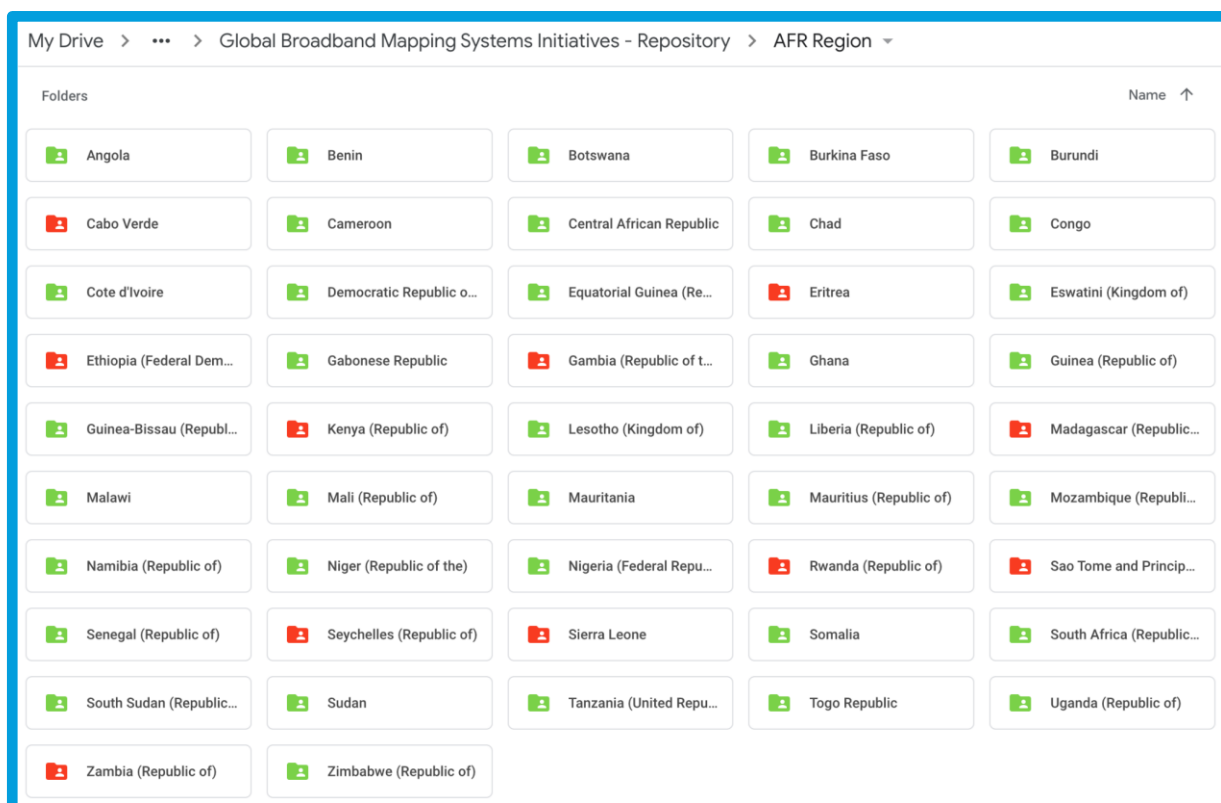
AFR Folder within the Global Broadband Mapping Systems Initiatives - Repository. When information is found, the countries' folders are coloured green; when no information is found, they are colored red. Retrieved 7 September 2021.

In general, the desk research does not reveal the existence of any broadband digital maps in African countries (0/44), but it is replete with rich and various other forms of documentation demonstrating the growing commitment of regulatory agencies or various ministries to engage in the practice of mapping their respective country's Broadband Landscape. Many countries issue information on their broadband mapping systems initiatives under the guise of PDF reports, with a total of 17 PDF documents found; others have published WORD documents: the desk research has collected 7 documents in this format. Furthermore, the use of EXCEL files is a preferred way of collecting data, both for the infrastructure as well as for the service mapping systems, with a total number of fourteen EXCEL sheets collected. In addition to the most conventional forms of documentations, three presentations in PPT format were also found; and nineteen images in PNG or JPG format were retrieved. Finally, two files in KML, five files in KMZ format and one file in MAP were also collected.

In other words, though no digital maps exist in any of the countries investigated in the AFR Region, the desk research revealed that African countries conduct systematic data collection activities, particularly for infrastructure mapping and service mapping. There was no documentation collection identified in the African region from the standpoint of investment mapping.

Format	n of documents	n of countries
Digital maps	0	0
Pdf	17	17
Word	7	7
Excel	13	13
Ppt	3	3
Png	18	18
Kml	2	2
Xlm	1	1
Jpg	1	1
Kmz	5	5
MAP	1	1
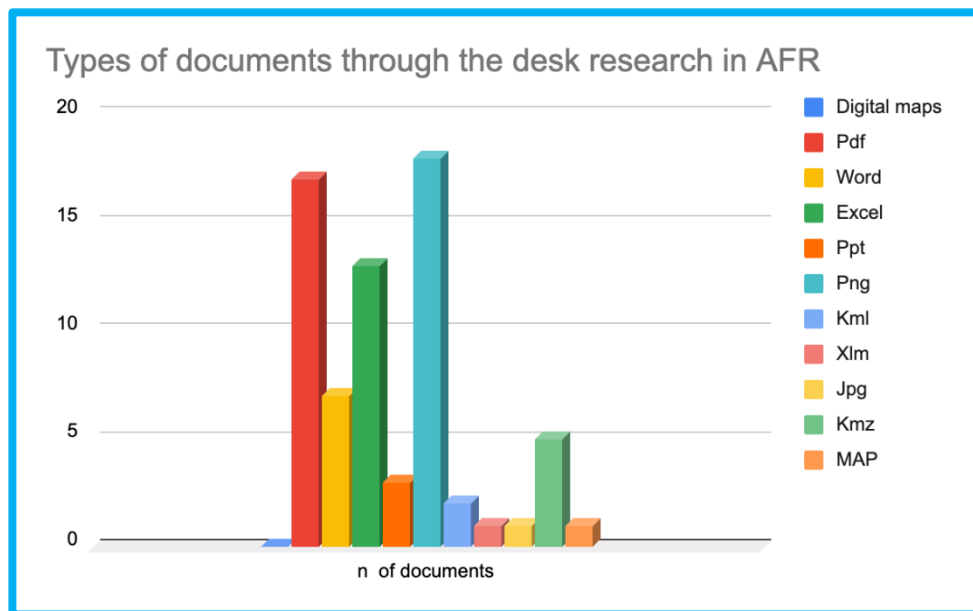
Table and Bar chart showing the number of documents collected and organized for the AFR Region. Retrieved 20 January 2022.

ITU AFR Region		
ITU AFR Countries with Minimum viable Digital Maps	ITU AFR Countries with Minimum Documentation	ITU AFR Countries with no available information
0	34	10
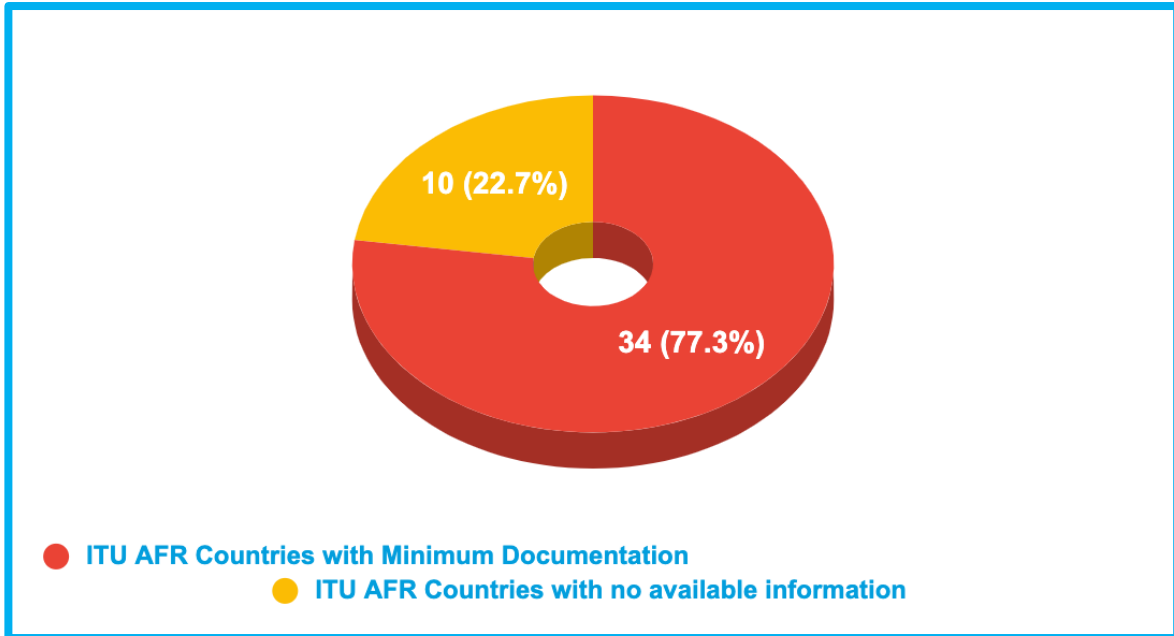
Table and Pie chart showing the number of Countries with Minimum viable Digital Maps, Countries with Minimum documentation and Countries with no available documentation respectively in the AFR Region. Retrieved 20 January 2022.

In terms of the establishment of mapping system referents or experts in the AFR Region, this activity established 14 **mapping system referents** representing 11 African countries via both e-meetings as well as offline discussions by emails, namely Cabo Verde, Central African Republic, Kingdom of Swaziland, Federal Democratic Republic of Ethiopia, Republic of Mali, Republic of Mozambique, Republic of Rwanda, Republic of Senegal, Republic of Uganda, Republic of Zambia, and Republic of Tanzania.

ITU AFR Region	
Countries that have provided at least one mapping system referent	Countries that have not provided a mapping system referent
11	33
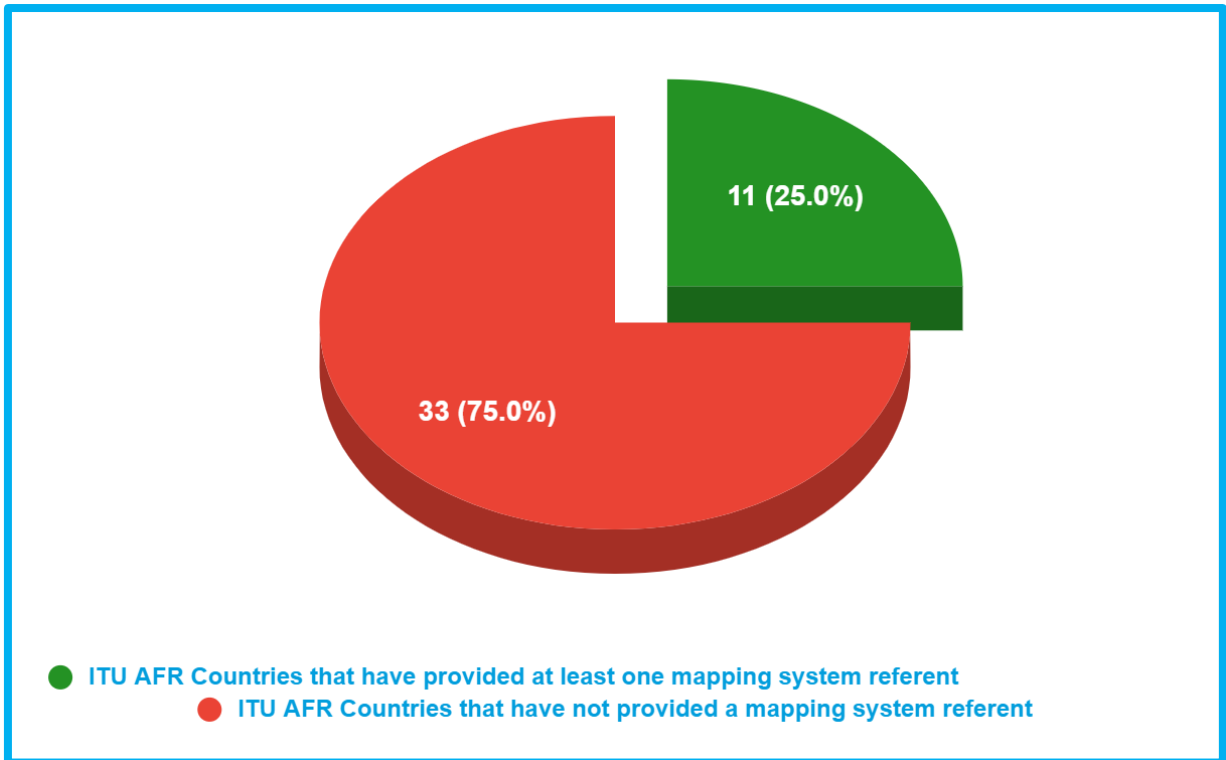
Table and Pie chart showing the number of Countries that have and have not provided at least one mapping system referent respectively in the AFR Region. Retrieved 20 January 2022.

In relation to the main challenges encountered, the primary issue found in the AFR Region was the large number of nations to engage with (44) in comparison to other ITU Regions, which have fewer countries under their control, as well as the quantity of material on their website. Despite having fewer nations than other ITU Regions, the AFR countries provided little clear information and ease of access to their broadband mapping system activities and strategies on their website, but redirected and displayed such information in their reports, thus necessitating in-depth examination of the different texts that were made available to the public.

The AMS Region landscape

The Americas Region has 35 member countries with a central office in Brasilia, Brazil; as well as three area offices in Tegucigalpa, Honduras; Bridgetown, Barbados; and Santiago, Chile. Activities in the Americas region necessitated a debrief with the regional headquarters. Once the aim of the work was determined, the activities were carried out by emailing the focal points of the various countries and coordinating the work with the relevant country's area coordinator.

AMS REGION

Flag	Country code	Country	NRA (National Regulatory Authority)	Office area coordinator	number	Mapping Systems projects in place?	Map Name	Other form of information on mapping systems initiatives?	Source of information	NRA Contacted?	Information validated?	Broadband Mapping System Expert	Mapping System Expert Email
	ARG	Argentina	ENACOM - Ente Nacional de Comunicaciones	SERGIO SCARABINO	7	All-mapping	Conectividad Nacional Argentina - IDE ENACOM	<-	Desk research	YES	NO	Not Established	
	BRB	Barbados	The Mission of the Telecommunications Unit	CLEVELAND THOMAS	2	Service Mapping	ICT STATISTICS For Barbados	<-	Desk research	NO	NO	Not Established	
	BRB	Barbados	The Mission of the Telecommunications Unit	CLEVELAND THOMAS	2	Service Mapping	ICT STATISTICS For Barbados	<-	Desk research	NO	NO	Not Established	
	BRA	Brazil	Anatel - Agência Nacional de Telecomunicações	Regional Office	2	Service Mapping	Plano Cobertura Móvel	<-	Desk research	YES	YES	Humberto Bruno Pontes Silva	humbertobruno@anatel
	CAN	Canada	CRTC - Canadian Radio-Television and Telecommunications Commission	Regional Office	4	INF-SER Mapping	Broadband Internet Coverage Canada	<-	Desk research	YES	NO	Not Established	
	CHL	Chile	Subtel - Subsecretaría de Telecomunicaciones	SERGIO SCARABINO	2	Service Mapping	Mapa Zonas Wifi	<-	Desk research	YES	NO	Not Established	
	CHL	Chile	Subtel - Subsecretaría de Telecomunicaciones	SERGIO SCARABINO	1	Infrastructure Mapping	Mapa Todo Chile	<-	Desk research	YES	NO	Not Established	
	COL	Colombia	CRC - Comisión de Regulación de Comunicaciones	SERGIO SCARABINO	1	Infrastructure Mapping	Proyecto Nacional de fibra óptica	<-	Desk research	YES	NO	Not Established	
	CRI	Costa Rica	SUTEL - Superintendencia de Telecomunicaciones	MIGUEL ALCAINE	1	Infrastructure Mapping	Sistema de Información Georreferenciada	<-	NRA	YES	YES	Juan Gabriel García (Team leader)	juangabriel.garcia@sute
	CRI	Costa Rica	SUTEL - Superintendencia de Telecomunicaciones	MIGUEL ALCAINE	2	Service Mapping	MAPAS DE CALIDAD-SUTEL	<-	NRA	YES	YES	Leonardo Steller	leonardo.steller@sutel.go
	CRI	Costa Rica	SUTEL - Superintendencia de Telecomunicaciones	MIGUEL ALCAINE	2	Service Mapping	Visor Calidad Sutel	<-	NRA	YES	YES	Not Established	

ITU AMS Region Dataset sample screenshot, Retrieved 29 August 2021 via the New graphical interface of the ITU Interactive Transmission Maps Dataset. For internal use only.

The desk research shows that the AMS Region, evidenced by Argentina, Brazil, Canada, Chile, Colombia, Costa Rica, Mexico, the United States of America, and Uruguay (9/35), has consolidated skills in establishing public digital broadband maps. Basic data collecting skills, organizational and management procedures, and organizational and managerial processes are also accessible in the other AMS nations, however no public digital map has been identified.
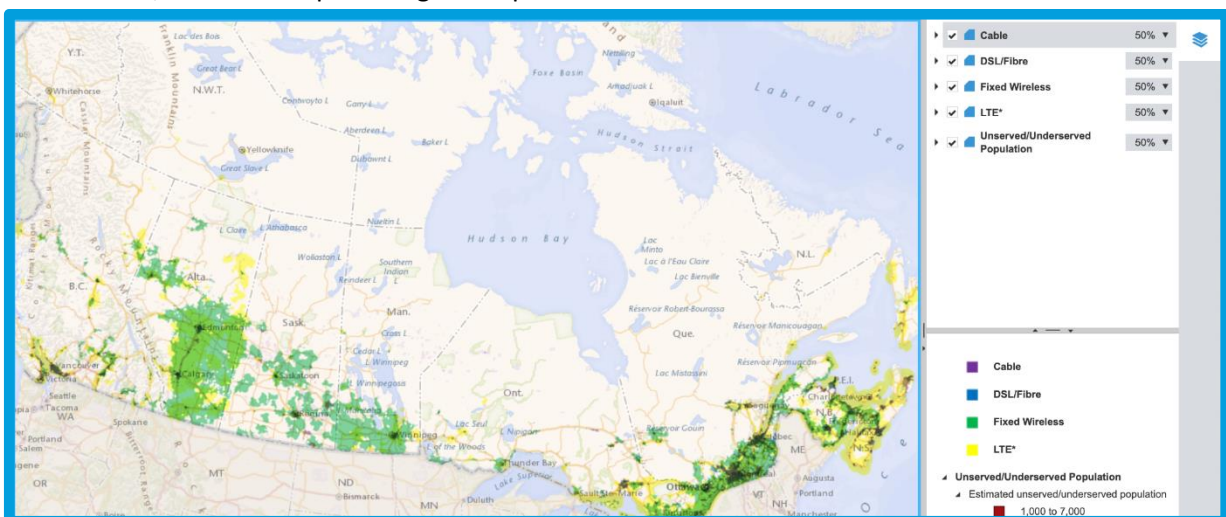
Canada's Broadband Internet Coverage screenshot sample, an example of an INFR-SER Mapping System, a combination of Infrastructure and Service Mapping Systems. Retrieved 29 August 2021 via https://crtc.gc.ca/cartovista/internetcanada-en/

Eighteen digital maps were found across the AMS Region, with a significant number of maps provided by Costa Rica, Mexico and the United States with more than three maps publicly available respectively. Other formats were found too, with a total of six PDF documents and eleven images in PNG retrieved. For the rest, no PPT presentation; no EXCEL; and no file in KML or KMZ format was collected.

Format	n of documents	n of countries
Digital maps	18	9
Pdf	6	5
Word	0	0
Excel	0	0
Ppt	0	0
Png	11	9
Kml	0	0
Kmz	0	0

Types of documents through the desk research in AMS
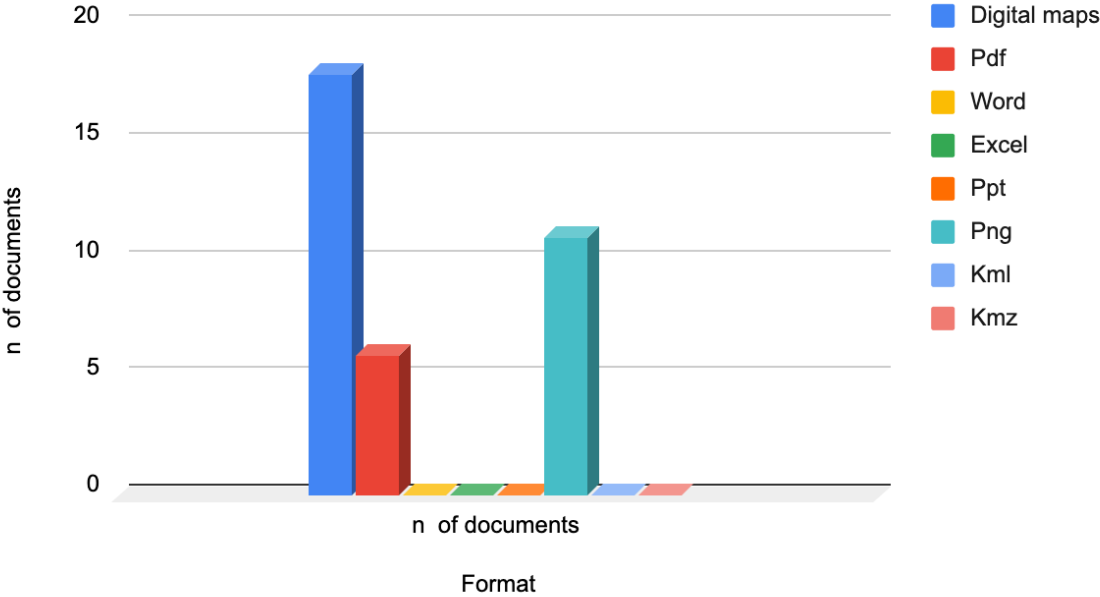
Table and Bar chart showing the number of documents collected and organized for the AMS Region. Retrieved 20 January 2022.

ITU AMS Region		
ITU AMS Countries with Minimum viable Digital Maps	ITU AMS Countries with Minimum Documentation	ITU AMS Countries with no available information
9	6	20
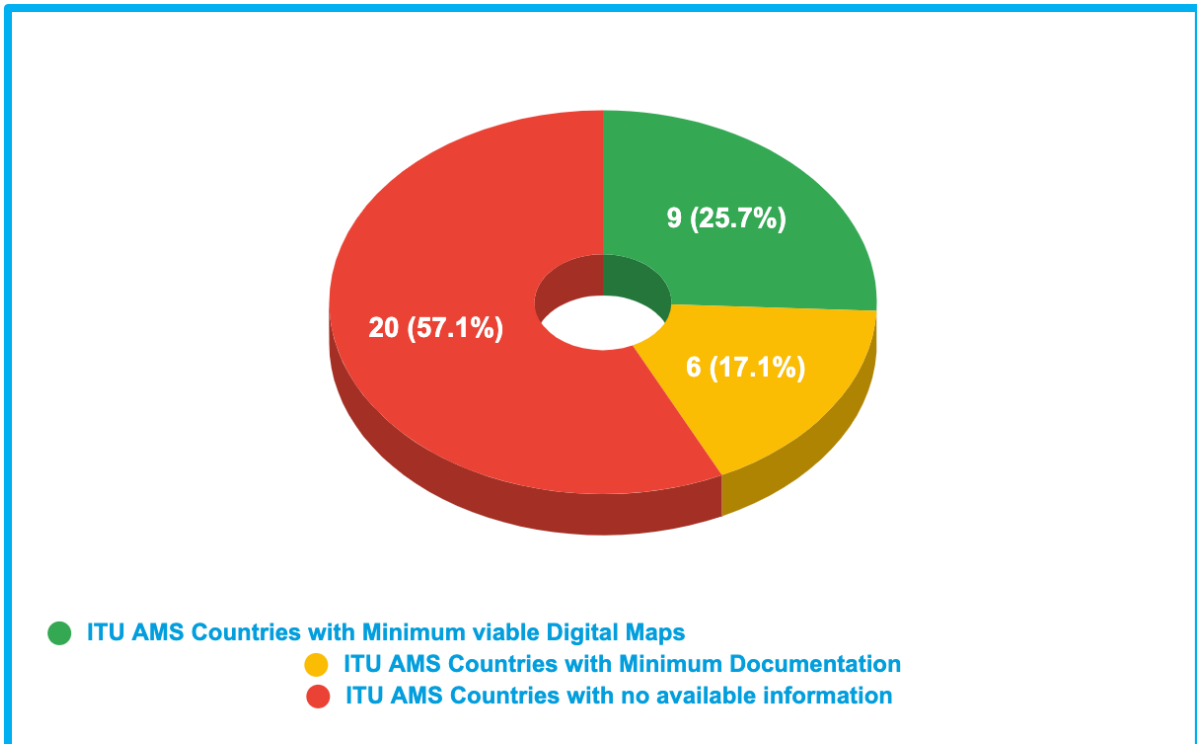
Table and Pie chart showing the number of Countries with Minimum viable Digital Maps, Countries with Minimum documentation and Countries with no available documentation respectively in the AMS Region. Retrieved 20 January 2022
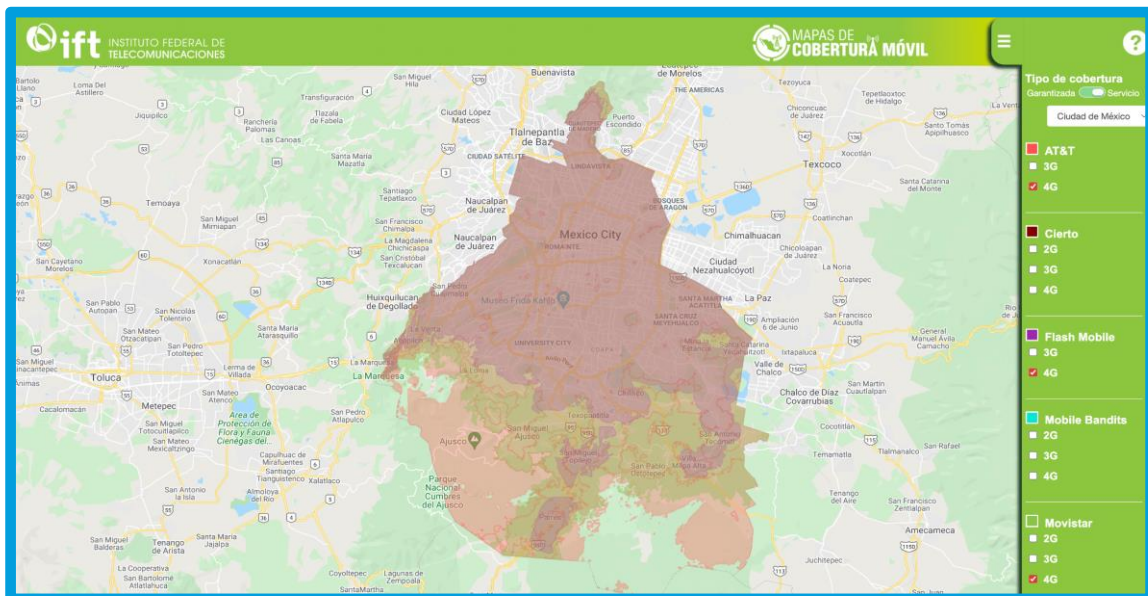
Mexico's Mapas de Cobertura Movil screenshot sample, an example of a mobile Service Mapping System in Mexico City. Retrieved 29 August 2021 via http://coberturamovil.ift.org.mx/
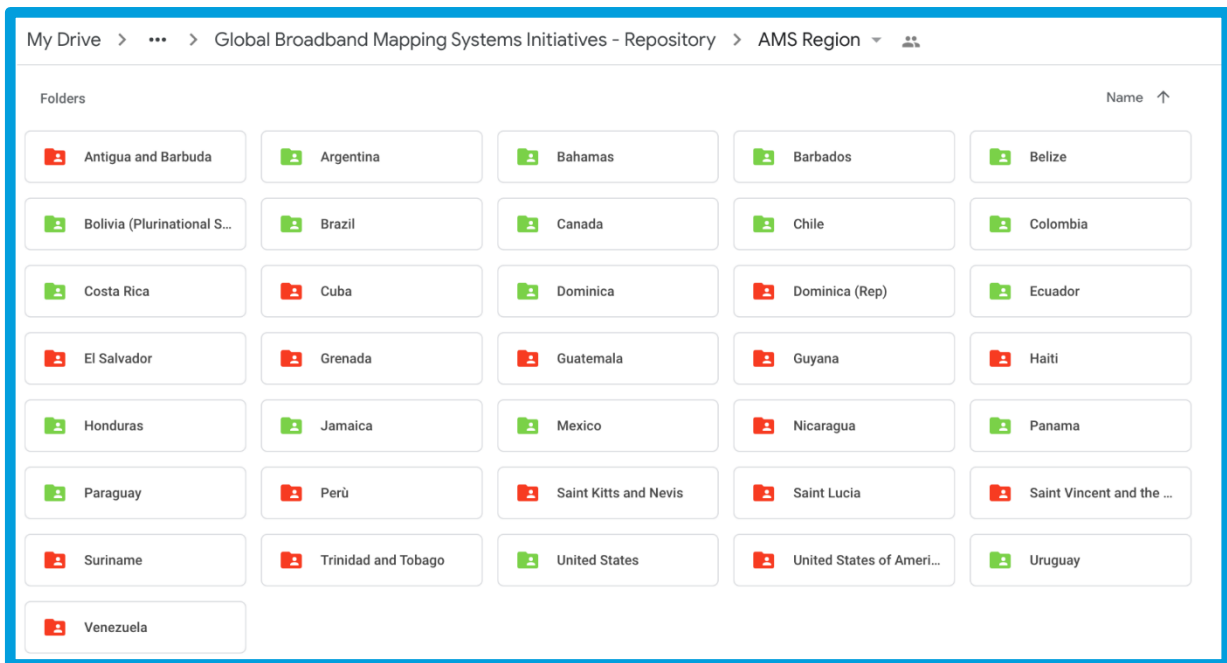
AMS Folder within the Global Broadband Mapping Systems Initiatives - Repository. When information is found, the countries' folders are coloured green; when no information is found, they are coloured red. Retrieved 7 September 2021.

With respect to the engagement in the AMS Region, this activity established 13 mapping system referents or experts in the AMS Region with a total of five e-meetings that took place at the time of writing or via offline discussions by email as well as referential, representing seven Latin American countries, namely Brazil, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, and Nicaragua, with a ratio of 1/5 of the total batch of possible mapping systems experts in the AMS region on board.

ITU AMS Region	
Countries that have provided at least one mapping system referent	Countries that have not provided a mapping system referent
7	28
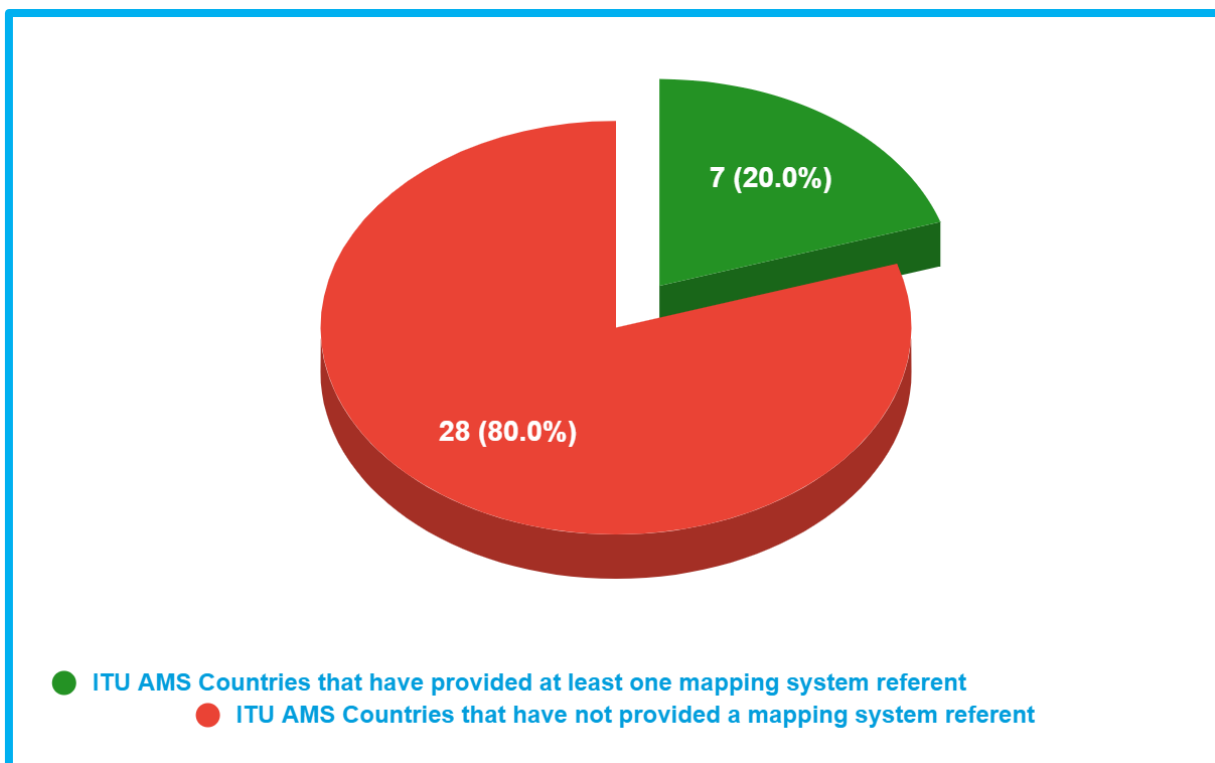
Table and Pie chart showing the number of Countries that have and have not provided at least one mapping system referent respectively in the AMS Region. Retrieved 20 January 2022.

As for the main challenges encountered in this region, the main challenge that needs to be mentioned is the lack of interaction on the part of operators with the national regulatory agencies, owing to their reluctance to provide data both for the broadband infrastructure, as well as for internet coverage offered on the market. The main motivation stems from two factors: first, data ownership: according to the operators, this type of data belongs only to them, so they would feel no obligation to transmit it to regulatory agencies; second, the data they would generate would be potentially vulnerable data of strategic importance from an economic and commercial standpoint, posing a risk of market power being harmed. These two difficulties, particularly in smaller countries, result in a lack of data gathering and broadband mapping development.

The ARB Region landscape

The Arab States Region consists of 22 countries. The regional office's headquarters are in Cairo, Egypt. Based on the desk research, the ARB Region revealed discrepancies between the most prosperous economic countries and other poorer countries, as described for the AMS Region. There are a total of 5 countries out of 22 (5/22) that offer at least one form of Broadband mapping systems to its citizens, namely Algeria, Bahrain, Saudi Arabia, Tunisia, and The United Arab Emirates. Besides Algeria that offers the opportunity to run a speed-test check for its citizens, the other three countries mentioned before showing consolidated skills in service digital broadband maps.

Flag	Country code	Country	NRA (National Regulatory Authority)	Office area coordinator	number	Mapping Systems projects in place?	Map Name	Other form of information on mapping systems initiatives?	Source of information	NRA Contacted?	Information validated?	Broadband Mapping System Expert	Mapping System Expert?
	DZA	ALGERIA	ARPCE - L'Autorité de Régulation de la Poste et des Communications Electroniques	Rouda Alamirali	8	Speed Testing	Jawdati	<-	Desk research	NO	NO	Not Established	N/A
	DZA	ALGERIA	ARPCE - L'Autorité de Régulation de la Poste et des Communications Electroniques	Rouda Alamirali	8	Speed Testing	->	PDF Documents	Desk research	NO	NO	Not Established	N/A
	DZA	ALGERIA	ARPCE - L'Autorité de Régulation de la Poste et des Communications Electroniques	Rouda Alamirali	8	Speed Testing	->	PNG Documents	Desk research	NO	NO	Not Established	N/A
	BHR	BAHRAIN	TRA - Telecommunications Regulatory Authority	Rouda Alamirali	9	Service - Speed Testing Mapping Systems	Coverage Map	<-	Desk research	NO	NO	Not Established	N/A
	COM	COMORES	ANRTIC - Autorité Nationale de Régulation des Technologies de l'Information et de la Communication	Rouda Alamirali	0	Not Found	->	PPTX Documents	PRIDA	NO	NO	Not Established	N/A
	DJI	DJIBOUTI		Rouda Alamirali	N/A	Not Found	Not Found	Not Found	Desk research	NO	NO	Not Established	N/A
	EGY	EGYPT	NTRA - National Telecommunication Regulatory Authority	Rouda Alamirali	4	INF-SER Mapping	->	PNG Documents	Desk research	NO	NO	Not Established	N/A
	IRQ	IRAQ	CMC - Communications and Media Commission	Rouda Alamirali	N/A	Not Found	N/A	Not Found	Desk research	NO	NO	Not Established	N/A
	JOR	JORDAN	TRC - Telecommunications Regulatory Commission	Rouda Alamirali	2	SER Mapping System	->	PDF Documents	Desk research	NO	NO	Not Established	N/A
	KWT	KUWAIT	CITRA - Communication and Information Technology Regulatory Authority	Rouda Alamirali	N/A	Not Found	->	PDF Documents	Desk research	NO	NO	Not Established	N/A

ITU ARB Region Dataset sample screenshot, Retrieved 30 August 2021 via the New graphical interface of the ITU Interactive Transmission Maps Dataset. For internal use only.

Algeria, the United Arab Emirates, Bahrain, Tunisia and Saudi Arabia have respectively published a coverage map that illustrates the various types of internet accessible, including 5G service zones. Other types of documentation were also discovered: nine PDF documents; no WORD document; no EXCEL sheet; one PPT presentation; two images in PNG format were retrieved; and no file in KML or KMZ format.

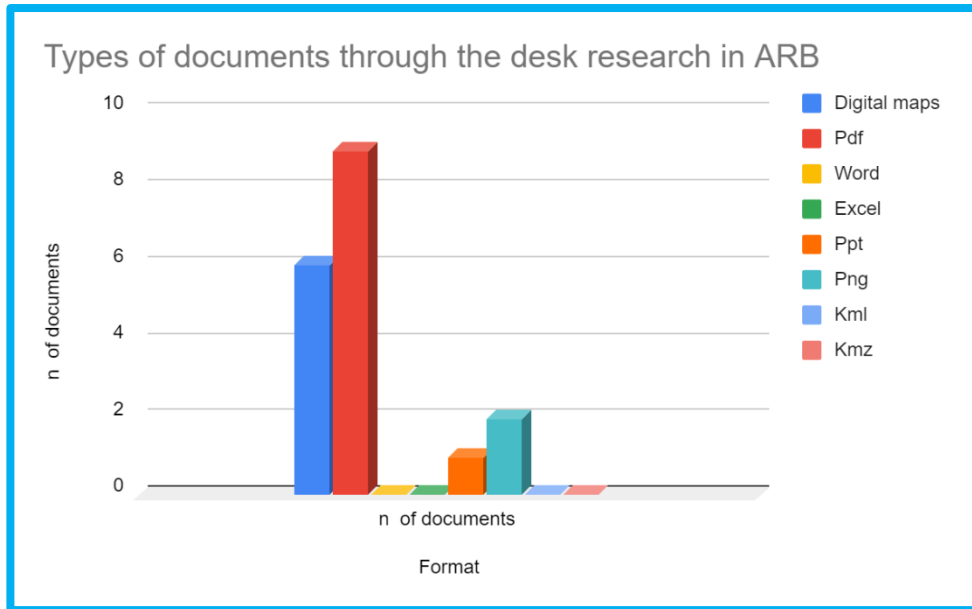| Format	n of documents	n of countries
Digital maps	6	5
Pdf	9	9
Word	0	0
Excel	0	0
Ppt	1	1
Png	2	2
Kml	0	0
Kmz	0	0

Types of documents through the desk research in ARB

Table and Bar chart showing the number of documents collected and organized for the ARB Region. Retrieved 20 January 2022.

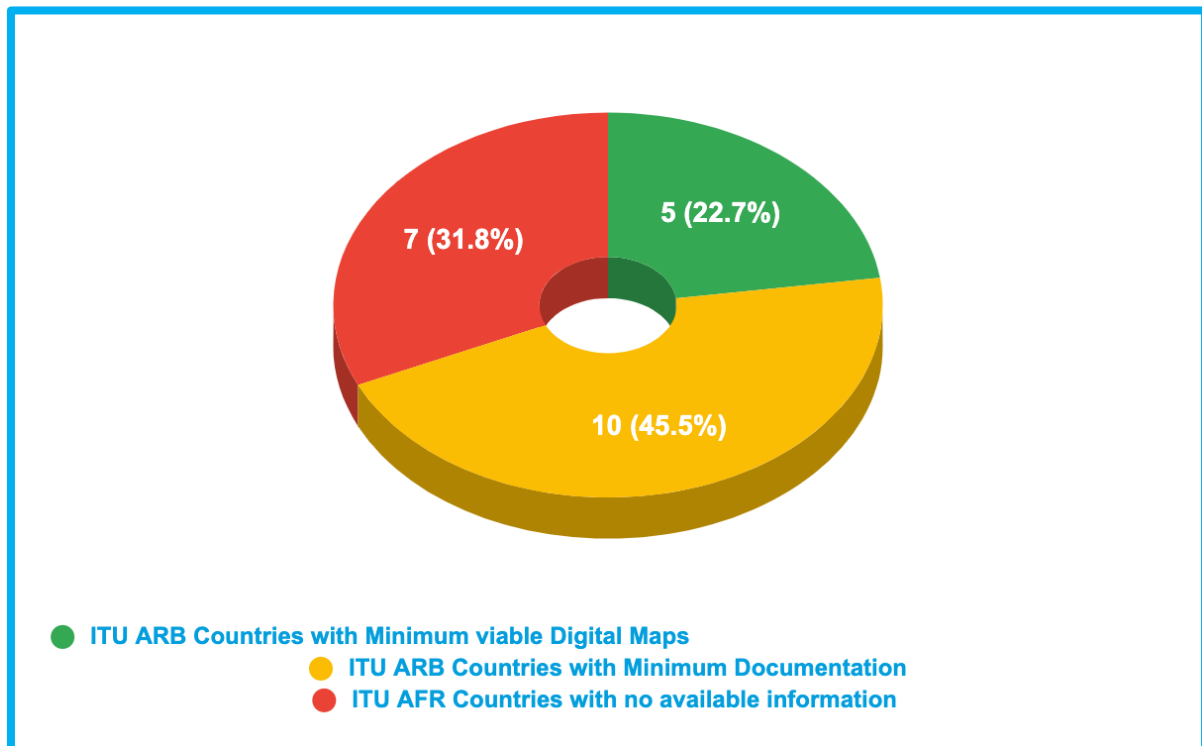| ITU ARB REGION		
ITU ARB Countries with Minimum viable Digital Maps	ITU ARB Countries with Minimum Documentation	ITU AFR Countries with no available information
5	10	7

Table and Pie chart showing the number of Countries with Minimum viable Digital Maps, Countries with Minimum documentation and Countries with no available documentation respectively in the ARB Region. Retrieved 20 January 2022.
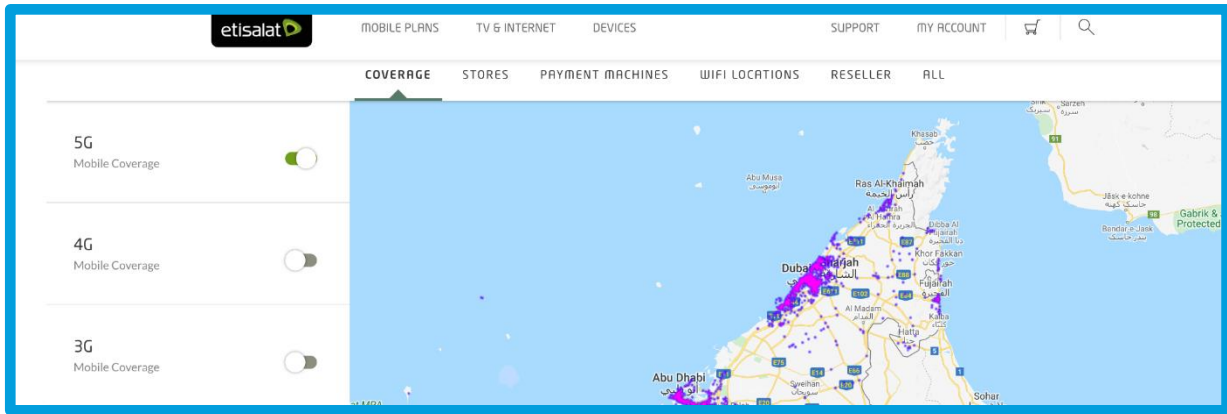
UAE's Etisalat screenshot sample, an example of a mobile Service Mapping System in the United Arab Emirates. Retrieved 30 August 2021 via https://www.etisalat.ae/en/storelocator.jsp#coverage
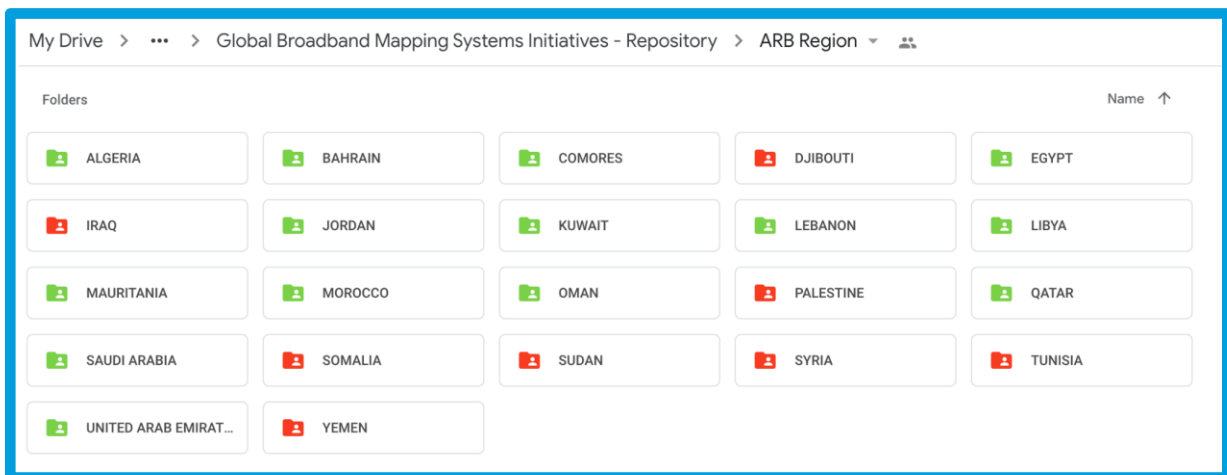
ARB Folder within the Global Broadband Mapping Systems Initiatives - Repository. When information is found, the countries' folders are colored green; when no information is found, they are colored red. Retrieved 7 September 2021.

Within the work of the ARB Region, both the Regional Office and the Global Service cooperated to further pursue the objectives of this initiative, which resulted in the establishment of 6 mapping system focal points out of 22 countries in the region.

ITU ARB Region	
Countries that have provided at least one mapping system referent	Countries that have not provided a mapping system referent
6	16
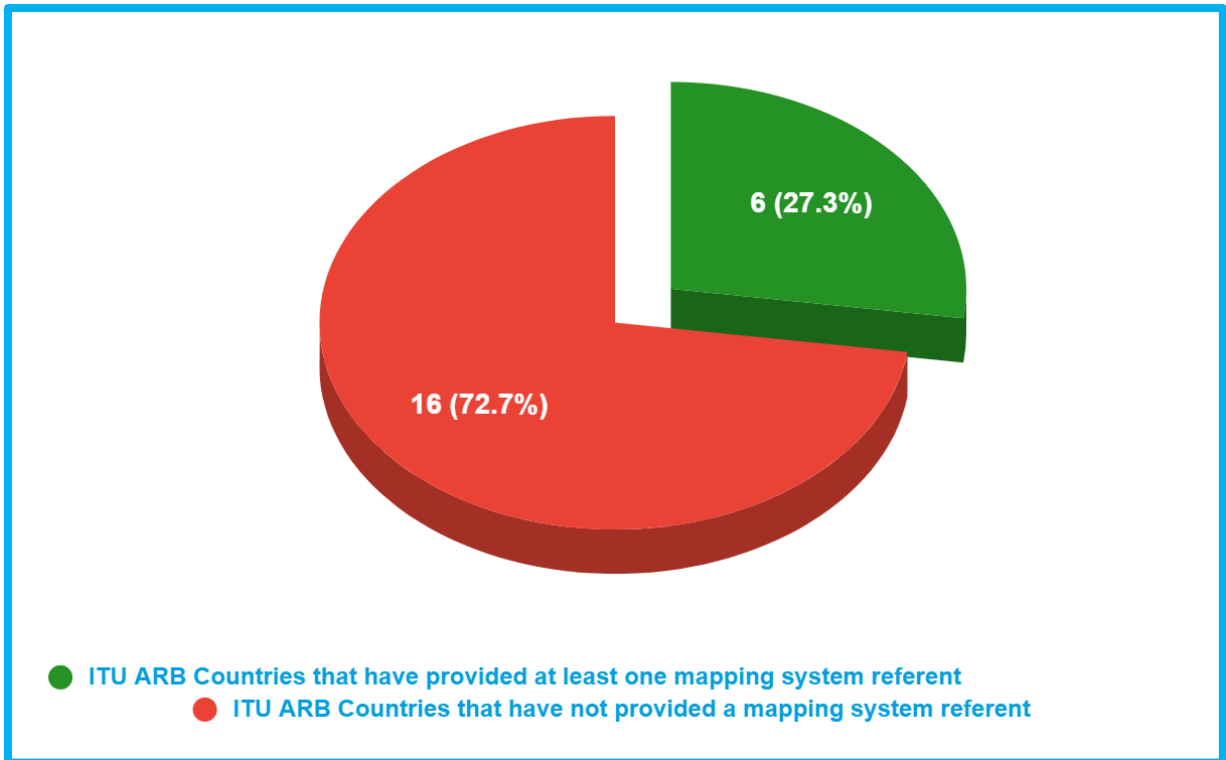
Table and Bar chart showing the number of Countries that have and have not provided at least one mapping system referent respectively in the ARB Region. Retrieved 20 January 2022.

As for the main challenges encountered in this Region, the main challenge experienced in relation to the desk research resides in the language barrier: most of the NRA's websites were in Arabic and did not have an English version, necessitating the use of Google Translate to understand the information present on the webpages. Even then, however, the translation appeared to be occasionally wrong, as numerous paragraphs and web pages displayed information that was unintelligible to an English-speaking person.

The ASP Region landscape

The Asia and Pacific region consists of 38 countries, with a regional office in Bangkok, Thailand; and an area office in Jakarta, Indonesia.

ITU ASP Region Dataset sample screenshot, Retrieved 30 August 2021 via the New graphical interface of the ITU Interactive Transmission Maps Dataset. For internal use only.

Based on the different formats, the desk research showed that three digital maps existed in three different countries (3/35) in the ASP Region, namely Australia, New Zealand and Pakistan. Other forms of documentation were found: nine documents in PDF formats; no document in WORD format; one EXCEL sheet; no PPT presentation; eight images in PNG format; and no file in KML or KMZ format.

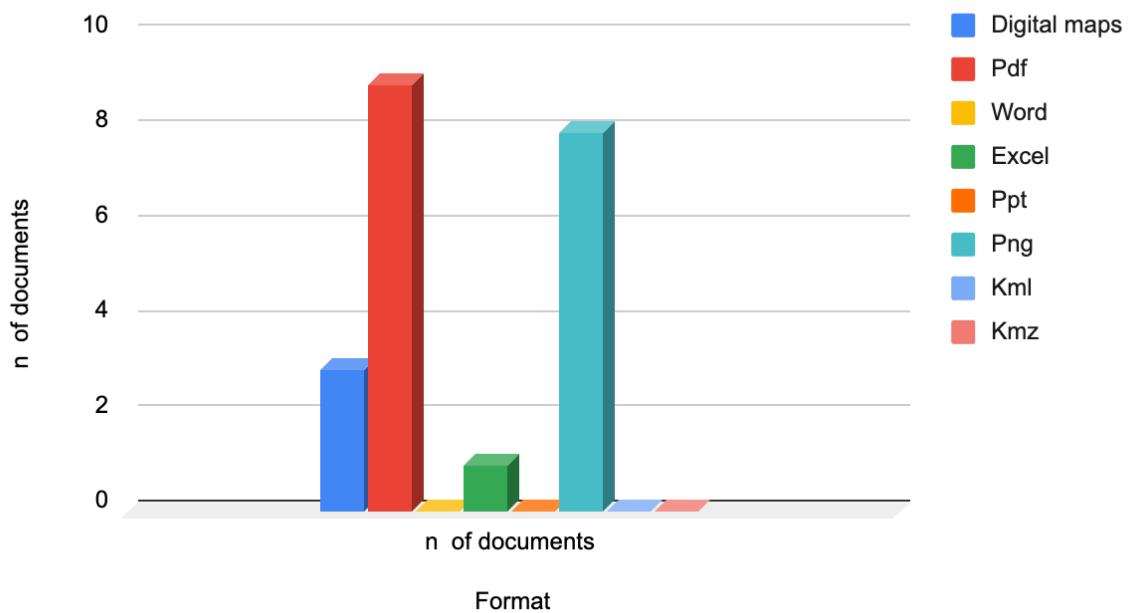| Format	n of documents	n of countries
Digital maps	3	3
Pdf	9	8
Word	0	0
Excel	1	1
Ppt	0	0
Png	8	8
Kml	0	0
Kmz	0	0

Types of documents through the desk research in ASP

Table and Bar chart showing the number of documents collected and organized for the ASP Region. Retrieved 20 January 2022.

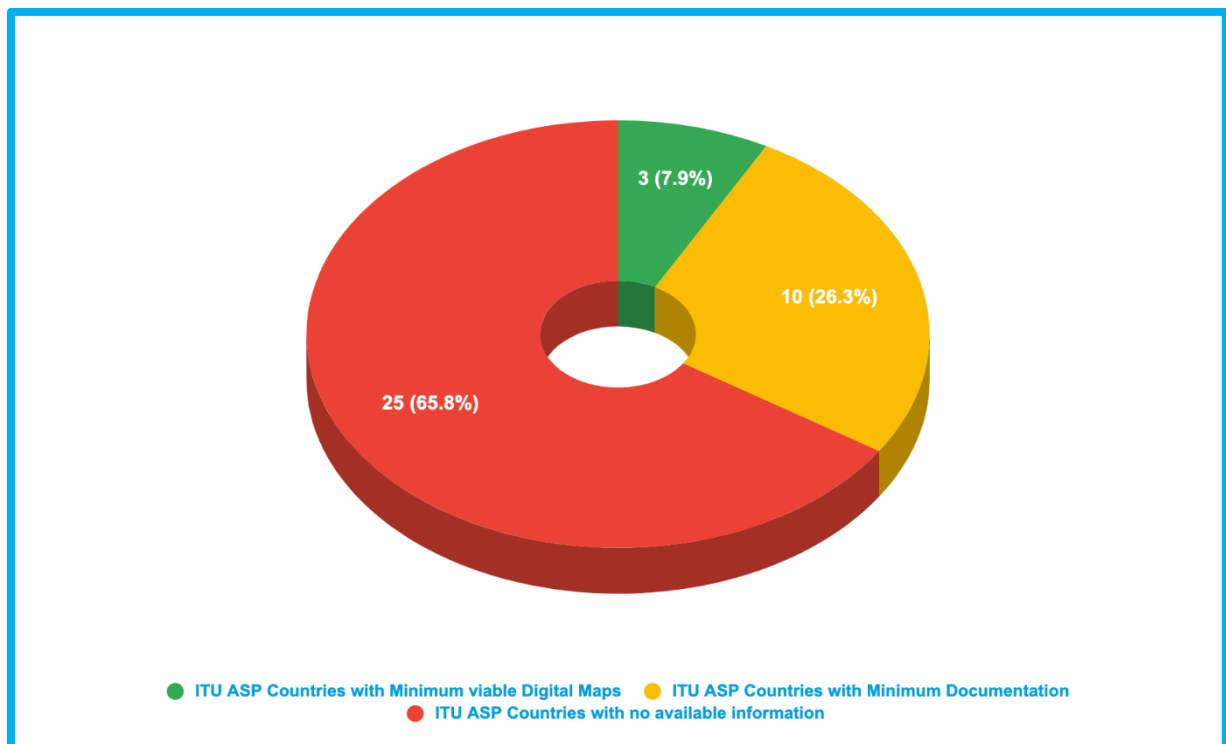| ITU ASP Region		
ITU ASP Countries with Minimum viable Digital Maps	ITU ASP Countries with Minimum Documentation	ITU ASP Countries with no available information
3	10	25

Table and Pie chart showing the number of Countries with Minimum viable Digital Maps, Countries with Minimum documentation, and countries with no available documentation respectively in the ASP Region. Retrieved 20 January 2022.

At the time of writing, a desk-research examination of broadband mapping practices in the ASP region revealed only three examples of public mapping on the internet coverage available: one in Australia, one in New Zealand and one in Pakistan. It is worth mentioning that New Zealand shows a service mapping system with clear information about both fixed (fiber, adsl, copper) as well as mobile internet service, namely 3G, 4G, and 5G.

In the vast majority of situations for the ASP Region, the information discovered was in the form of textual material, such as reports issued by national regulatory bodies and resulting graphs and representations represented as an image. In general, based on meetings with countries, including the Philippines, Malaysia, at the time of writing, the countries confirmed the information gathered and explained that the mapping practices of the national broadband landscape are not typically translated into a digital map for public use.
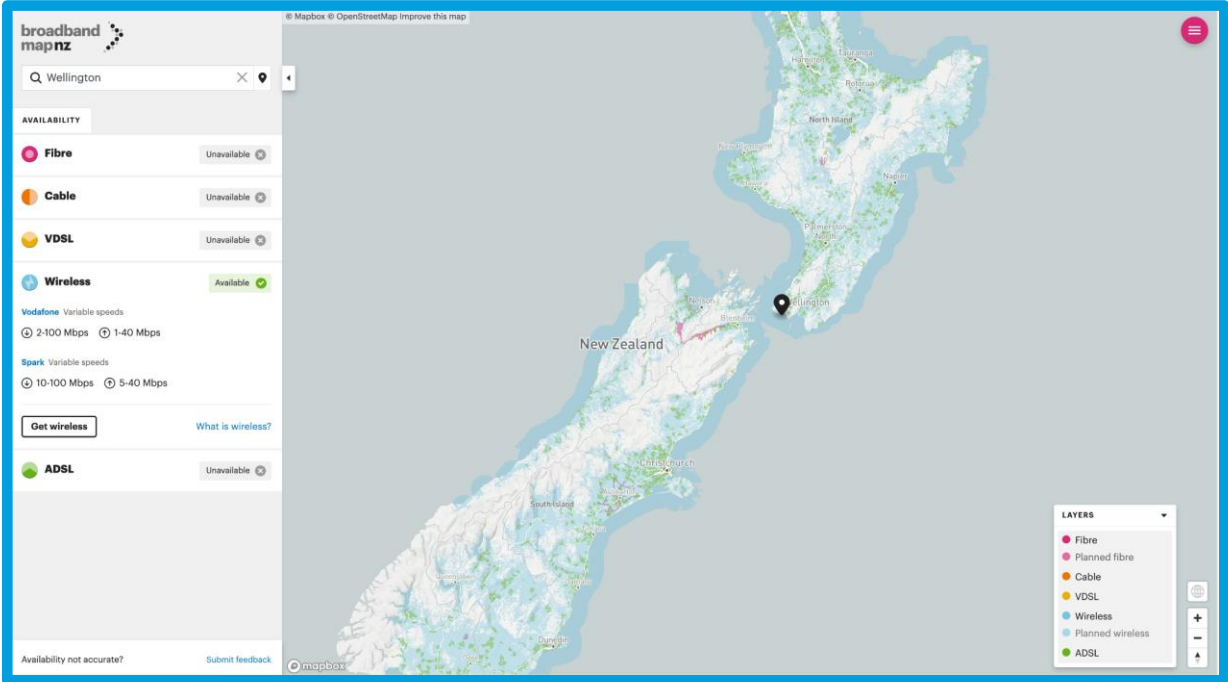
New Zealand's Broadband Map screenshot sample, an example of a Service Mapping System, both for fixed- as well as mobile internet access Retrieved 31 August 2021 via
https://broadbandmap.nz/availability/-41.272263/174.788888?address=Wellington
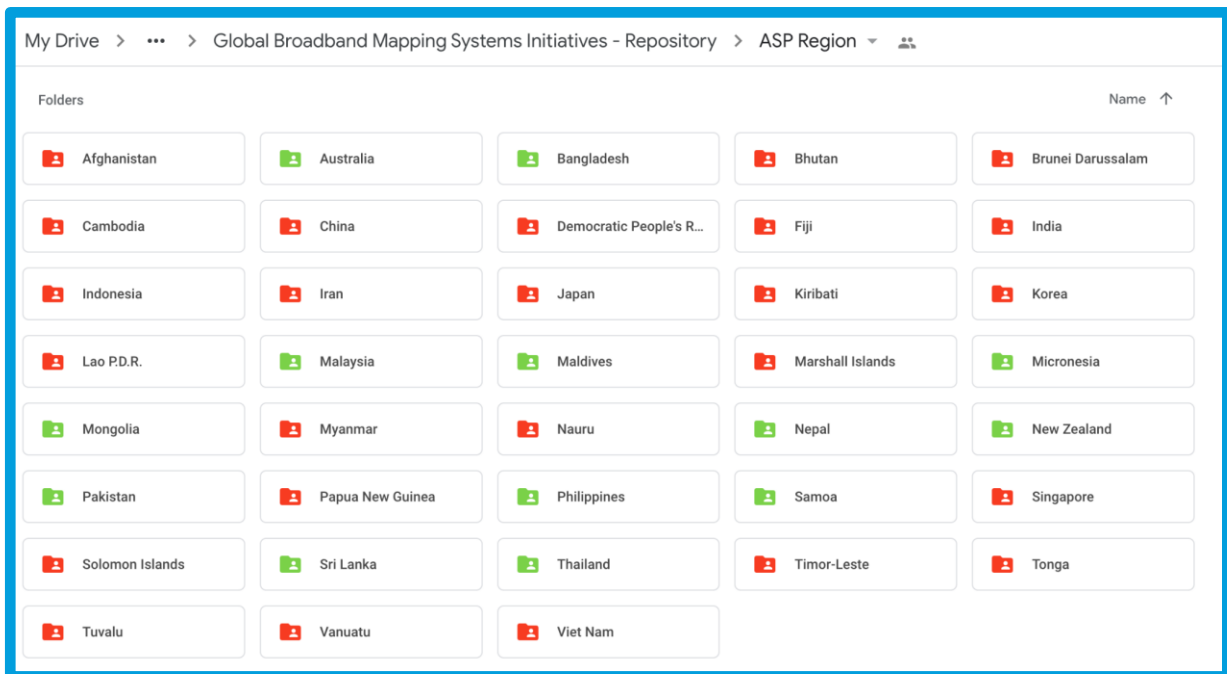
ASP Folder within the Global Broadband Mapping Systems Initiatives - Repository. When information is found, the countries' folders are colored green; when no information is found, they are colored red. Retrieved 7 September 2021.

Within the work of the ASP Region, four e-meetings (4/38) have taken place at the time of writing, namely with Malaysia, the Philippines, Pakistan and New Zealand within the first phase of the project. So far, no mapping system expert and focal point for this activity has been established, though discussions for the designations of those are happening at the moment. Both the Regional Office and the Global Service are ready to further pursue this project in this region.

ITU ASP Region	
Countries that have provided at least one mapping system referent	Countries that have not provided a mapping system referent
0	22
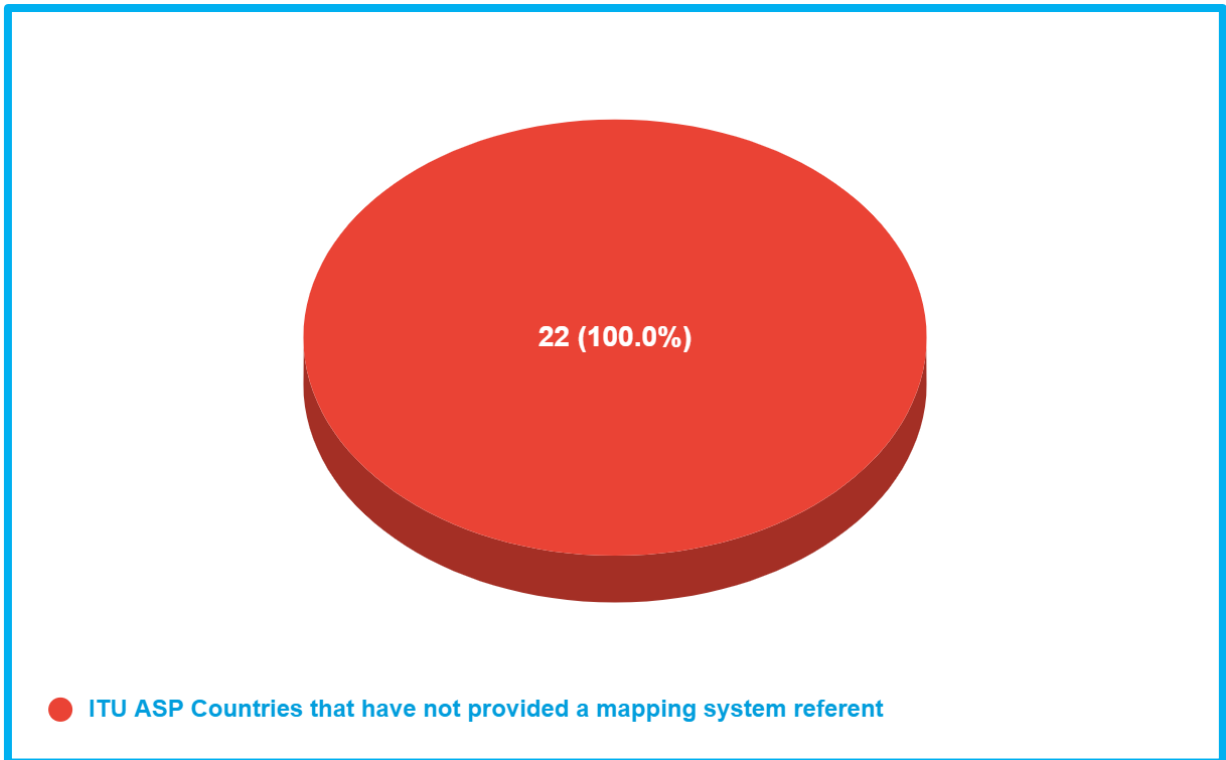
Table and Pie chart showing the number of Countries that have and have not provided at least one mapping system referent respectively in the ASP Region. Retrieved 20 January 2022.

As far as the main challenges for this Region are concerned, the primary issue in the ASP Region was dealing with the political factors that needed to be considered, as certain nations in the region are experiencing internal political difficulties at the time of writing. As a result, the contact process is slowed, and the legal department's assistance of ITU appears to be required to better understand how to intervene.

The CIS Region landscape

The Commonwealth of Independent States region is headquartered in Moscow, Russia, and consists of nine reference countries.

Flag	Country code	Country	NRA (National Regulatory Authority)	Office area coordinator	number	Mapping Systems projects in place?	Map Name	Other form of information on mapping systems initiatives?	Source of information	NRA Contacted?	Information validated?	Broadband Mapping System Expert	Mapping System Expert(
	ARM	Armenia	PSRC - Public Service Regulatory Commission	Farid Nakhli	0	N/A	N/A	N/A	Desk research	NO	NO	Not Established	N/A
	AZE	Azerbaijan	MINCOM - Ministry of Transport, Communications and High Technology	Farid Nakhli	0	N/A	N/A	N/A	Desk research	NO	NO	Not Established	N/A
	BLR	Belarus	BELTELCOM	Farid Nakhli	1	Infrastructure Mapping	Fiber-to-the-home	N/A	Desk research	NO	NO	Not Established	N/A
	BLR	Belarus	BELTELCOM	Farid Nakhli	2	Service Mapping	coverage map	N/A	Desk research	NO	NO	Not Established	N/A
	KAZ	Kazakhstan	Ministry of Digital Development, Innovations and Aerospace Industry	Farid Nakhli	2	Service Mapping	Coverage map	N/A	Desk research	NO	NO	Not Established	N/A
	KGZ	Kyrgyzstan	NAS - State Communications Agency under the	Farid Nakhli	0	N/A	N/A	N/A	Desk research	NO	NO	Not Established	N/A
	RUS	Russian Federation	Ministry of Digital Development, Communications and Mass Media	Farid Nakhli	1	Infrastructure Mapping	Fiber-to-the-home	N/A	Desk research	NO	NO	Not Established	N/A
	TJK	Tajikistan	Communication Service under the Government of the Republic of Tajikistan	Farid Nakhli	0	N/A	N/A	N/A	Desk research	NO	NO	Not Established	N/A
	TKM	Turkmenistan	Ministry of Industry and Communication of Turkmenistan	Farid Nakhli	0	N/A	N/A	N/A	Desk research	NO	NO	Not Established	N/A
	UZB	Uzbekistan	MIITC - Ministry for Development of Information Technologies and Communications of the Republic of Uzbekistan	Farid Nakhli	0	N/A	N/A	N/A	Desk research	NO	NO	Not Established	N/A

ITU CIS Region Dataset sample screenshot, Retrieved 1 September 2021 via the New graphical interface of the ITU Interactive Transmission Maps Dataset. For internal use only.

In terms of document formats, the desk study revealed that three out of nine countries had published at least a digital map, with a total of four maps in the CIS Region, namely Belarus, Kazakhstan and the Russian Federation, and no other documents found.

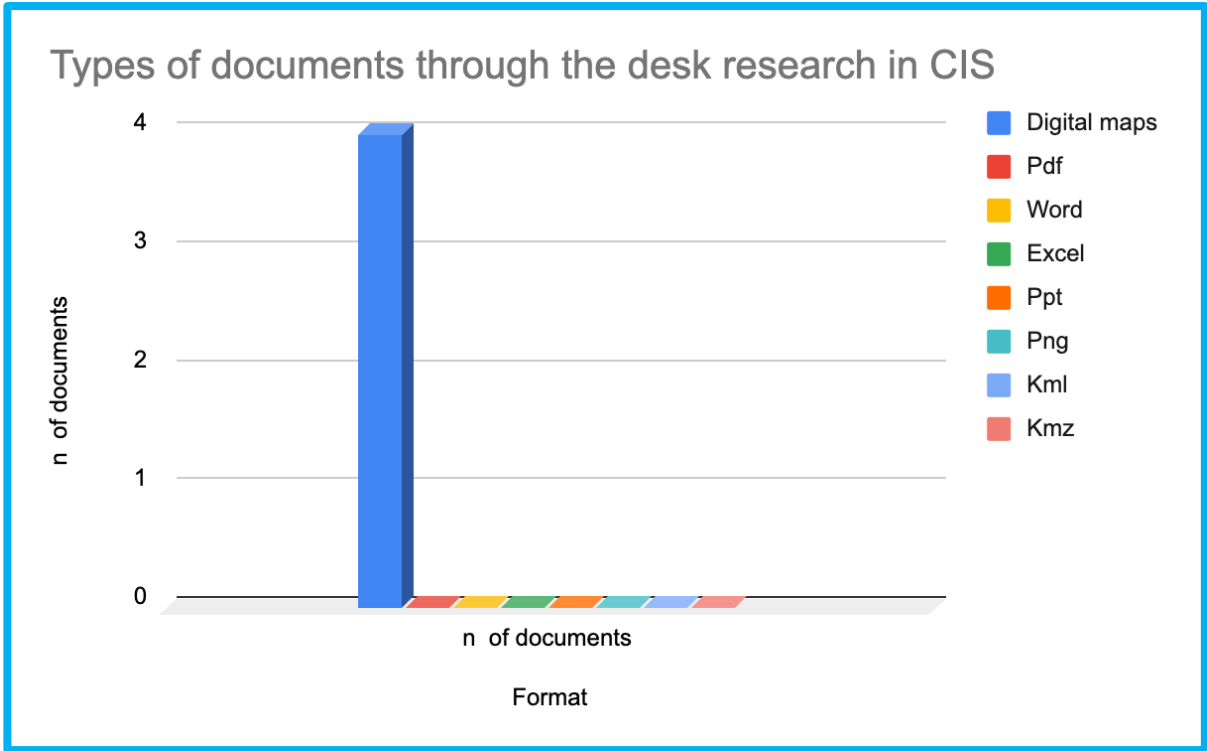| Format	n of documents	n of countries
Digital maps	4	3
Pdf	0	0
Word	0	0
Excel	0	0
Ppt	0	0
Png	0	0
Kml	0	0
Kmz	0	0

Table and Bar chart showing the number of documents collected and organized for the CIS Region. Retrieved 20 January 2022.

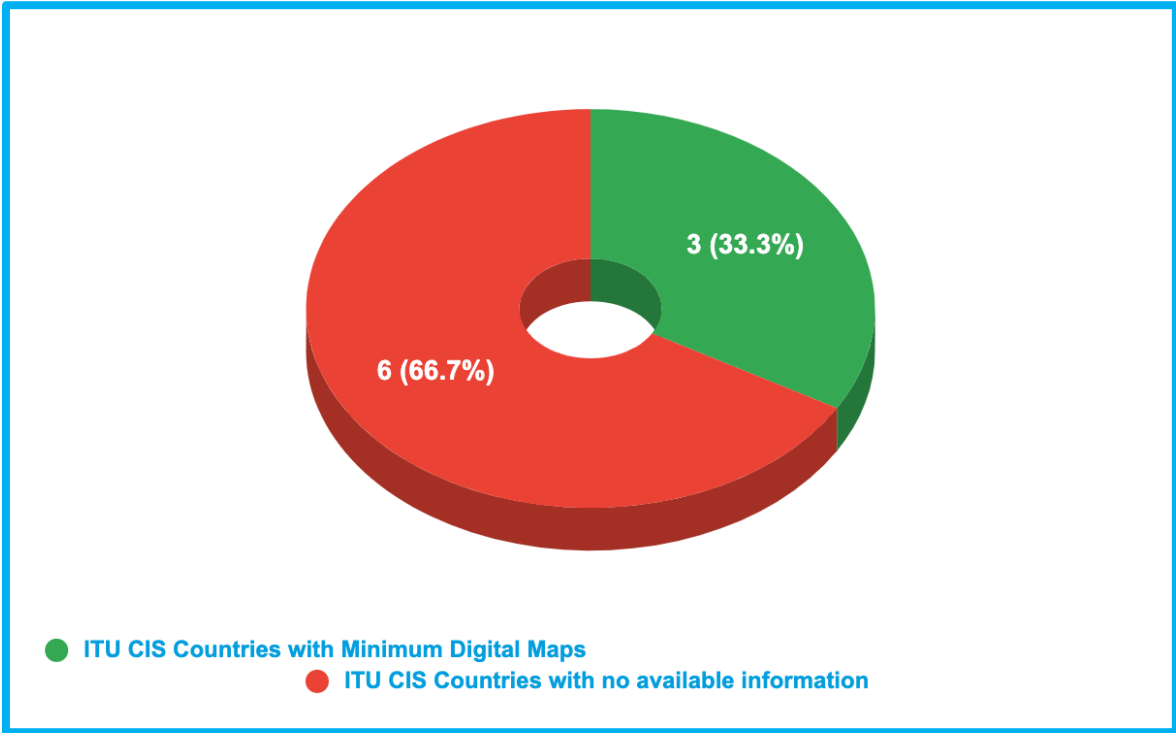| ITU CIS Region		
ITU CIS Countries with Minimum Digital Maps	ITU CIS Countries with Minimum documentation	ITU CIS Countries with no available information
3	0	6

Table and Pie chart showing the number of Countries with Minimum viable Digital Maps, Countries with Minimum documentation and Countries with no available documentation respectively in the CIS Region. Retrieved 20 January 2022

The regional office was critical throughout the information-gathering process, as well as in approaching countries to set up meetings to authenticate the information sought. In this example, the numerous sites searched were entirely in Russian, and the automatic translations performed by Google Translate did not allow for clear navigation of the sites.

The support of the RO was therefore critical, as it enabled the identification of important information on all countries, and particularly useful information on three countries, namely the Russian Federation, Kazakhstan, and Belarus, which have public domain broadband maps for both optical fiber infrastructure (in the case of Belarus) and internet service coverage. In the case of Moscow, Rostelecom was picked as a potential interlocutor since the regional office confirmed the presence of the Russian public component within the company.

In general, the data collected shows that only one-third of the totality of the countries involved have released public information on the websites of the organizations in charge of administering the country's broadband landscape, two of which showcase information on the service mapping systems and one on infrastructure mapping systems.
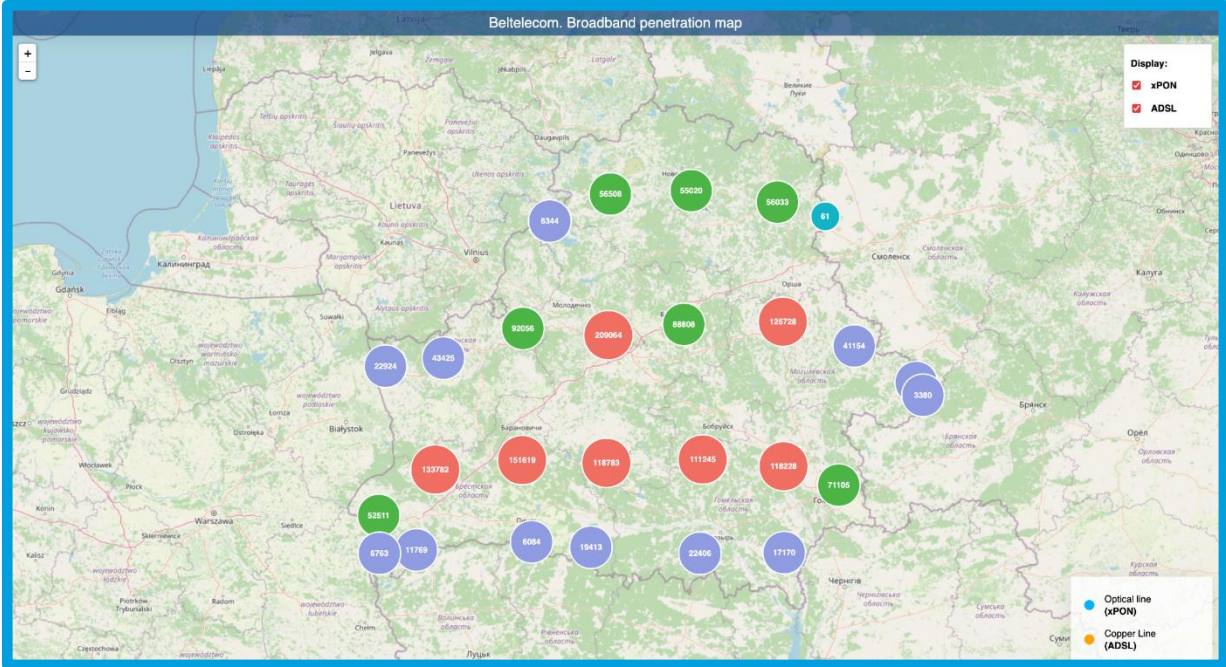

Belarus's Beltelecom Broadband penetration Map screenshot sample, an example of an Infrastructure Mapping System. Retrieved 1 September 2021 via https://beltelecom.by/leaflettest.html
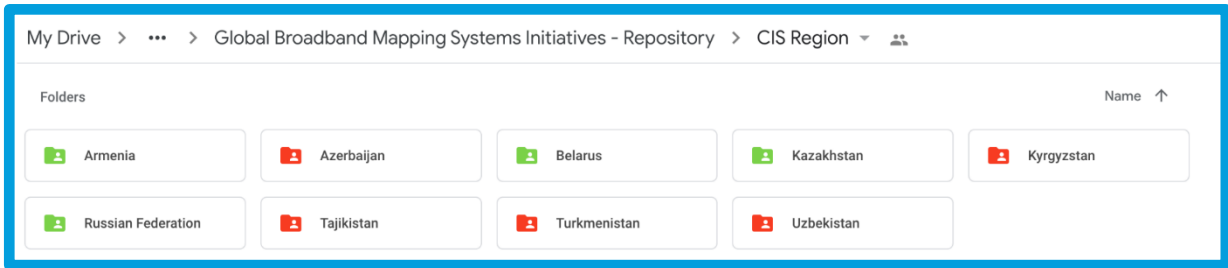
CIS Folder within the Global Broadband Mapping Systems Initiatives - Repository. When information is found, the countries' folders are colored green; when no information is found, they are colored red. Retrieved 7 September 2021

Concerning the engagement aspects of the countries within the CIS Region, both the Regional Office and the Global Service cooperated together to further pursue the objectives of this initiative, which resulted in the establishment of 4 mapping system focal points out of 9 countries in the region.

ITU CIS Region	
ITU CIS Countries that have provided at least one mapping system referent	ITU CIS Countries that have not provided a mapping system referent
4	5
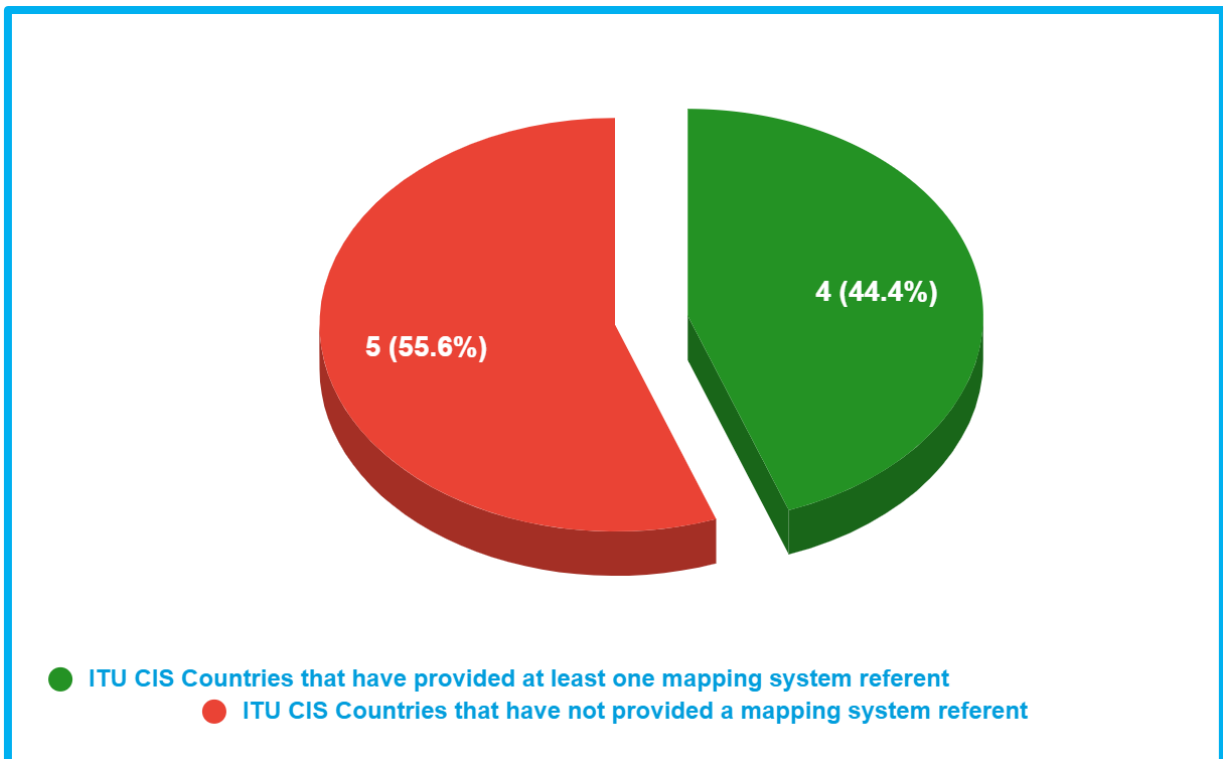
Table and Pie chart showing the number of Countries that have provided at least one mapping system referent respectively in the CIS Region. Retrieved 20 January 2022

The main challenge encountered in the Region was related to languages. Most of the NRA's websites were in Russian and did not have an English translation, forcing the use of Google Translate to understand the content. Even yet, the translation appeared to be occasionally inaccurate, since

numerous paragraphs and web pages contained content that was not clear even after the English translation occurred. As previously stated, strong coordination with the RO office allowed for the smooth completion of a first initial desk-research and scan of the NRA's webpages.

Results and main common challenges

Based on what has been mentioned so far, several results were obtained during the first phase of this three-month project. Firstly, it enabled the development of a methodology and a well-structured work plan to progress and expand the ITU's overall understanding of ITU member states' activities in the field of broadband mapping systems. Secondly, this work allowed to build relationships with Regional Offices to seek help and replicate work that had already been done in the European Region in 2020. Finally, it assessed via the desk research the current practices of each ITU member state in the field of broadband mapping systems.

The results of the desk research have been compiled in the table below. As can be seen, a total of 31 digital maps were discovered across all ITU regions, with forty-one (41) PDF documents and seven (7) WORD documents collected. Furthermore, descriptive information from the countries is integrated with quantitative information thanks to the collection of fifteen (15) EXCEL sheets and four (4) PowerPoint presentations, together with forty (40) images in PNG or JPG format, as well as 2 (two) KLM files, five (5) KMZ files and one (1) MAP file, are collected.

Documents gathered during desk research for all ITU Regions except the EUR region are organized and displayed as follows:

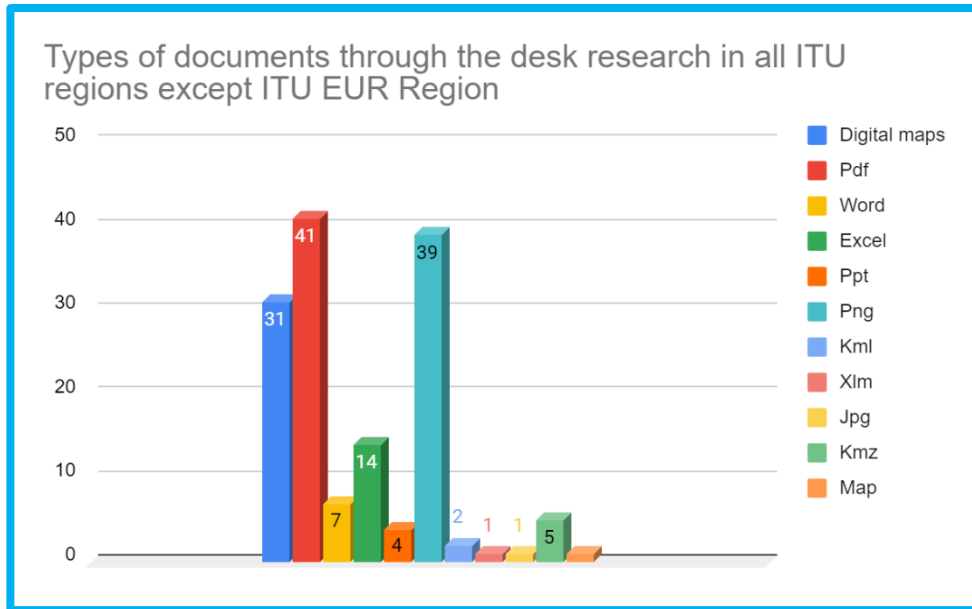| Format	n of documents (except the EUR region)
Digital maps	31
Pdf	41
Word	7
Excel	14
Ppt	4
Png	39
Kml	2
Xlm	1
Jpg	1
Kmz	5
Map	1

Table and Bar chart showing the number of documents collected and organized for all ITU Regions except ITU EUR Region. Retrieved 20 January 2022.

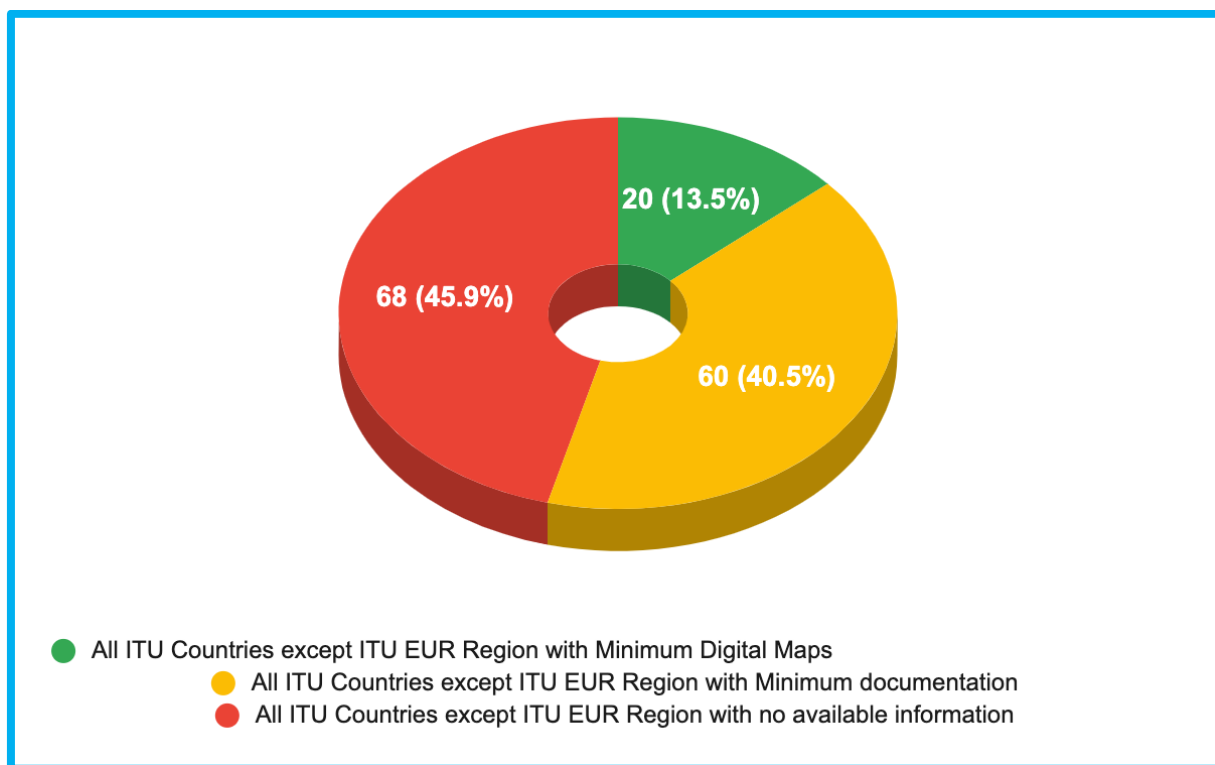| All ITU Regions except ITU EUR Region (148 Countries)		
All ITU Countries except ITU EUR Region with Minimum Digital Maps	All ITU Countries except ITU EUR Region with Minimum documentation	All ITU Countries except ITU EUR Region with no available information
20	60	68

Table and Pie chart showing the number of Countries with Minimum viable Digital Maps, Countries with Minimum documentation and Countries with no available documentation respectively in all ITU Regions except ITU EUR region. Retrieved 20 January 2022

In terms of the engagement results, overall, participation in the first phase of the project was positive, with 19 e-meetings held (19/147), accounting for 13% of the total number of countries contacted (especially given the nature of this project and the challenges that operating on a global scale entail both in terms of management and coordination with all interested stakeholders). All the countries that agreed to an e-meeting validated the desk study, provided further information, or clarified their position and the organization's capabilities at the time.

This appears to be a strong foundation for continuing from where this report currently stands, at least until the end of 2021, and possibly beyond. Far from being the perfect setup, this first initiative at the global level on the topic of broadband mapping systems is consolidating strong pillars that will allow ITU to reap the advantages of the rigorous work done in the near future, not to mention the opportunity to establish a robust body of knowledge in the field of broadband mapping systems.

By trying to replicate and scale up the experience of the ITU Office for Europe of 2020, this global outreach about broadband mapping systems showed how the different regions of the world are equipping themselves when it comes to the subject of broadband mapping systems. Evidence suggests that there are parallels between the various areas, such as the case for the ASP and AMS Regions,

where powerful economies in each region are also better equipped with mapping system tools, whilst least developed nations have just embryonic systems in place.

However, differences can be seen, such as in terms of data collection from some countries and the power they exercise over private operators when it comes to requesting not only data, but actually reliable data: this is the case, for example, with some operators who provide the data on a voluntary basis, whereas others do not share any type of information to the government because no regulation is imposed on them.
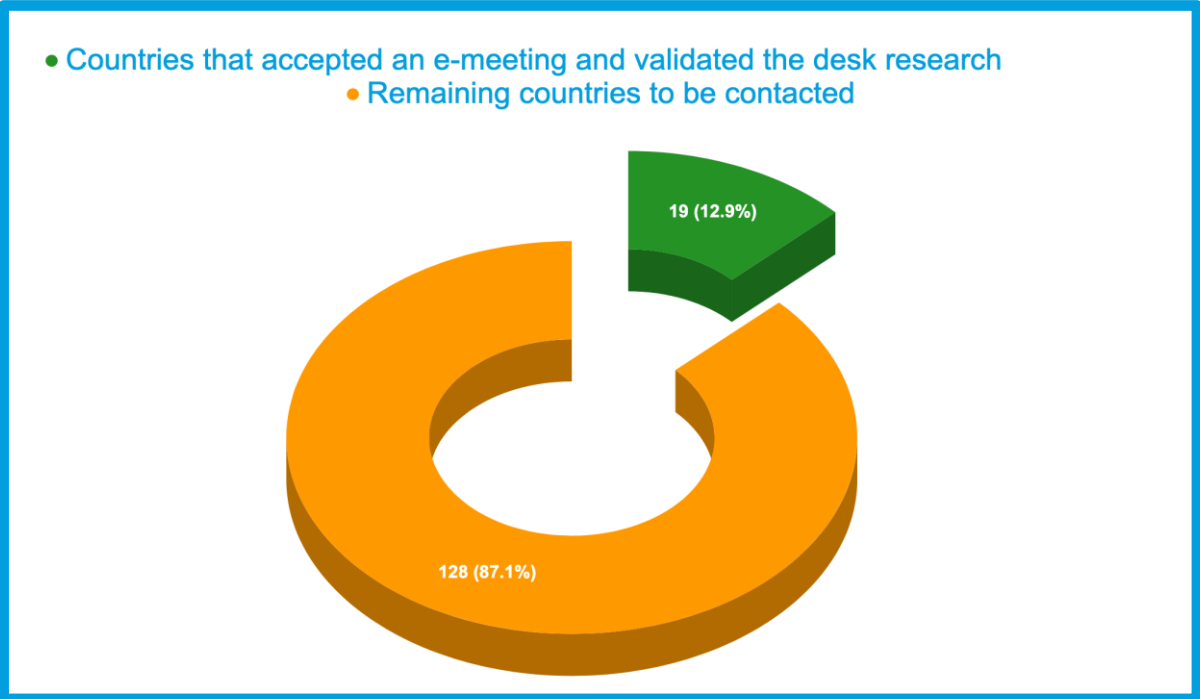
Countries that accepted an e-meeting and validated the desk research	Remaining countries to be contacted
19	128

Table and Pie chart showing the number of Countries that accepted an e-meeting and validated the desk research and the number of remaining countries to be contacted in all ITU Regions. Retrieved 8 September 2021

As far as the overall challenges encountered across all ITU regions, it is possible to divide them into primary common challenges and secondary common challenges. With respect to the primary common challenges, a list is presented below:

- Engagement with the Regional Office, and presentation and validation of the project as well as permission to operate in the region.

- Adapt to the different Regional Offices practices. All ITU Regional Offices have different methods of operation and engagement with the countries they supervise; it was therefore necessary to adapt in every moment.

- Differentiation between already existing projects on mapping that focused on data collection: the "New graphical interface of the ITU Interactive Transmission Maps" does not collect data, but rather assess information. Sometimes the collection of data was a means, and not the objective of the quest, to understand the practices of organization and therefore allowed to infer and assess the country's practices in the field of broadband mapping systems.

With respect to the secondary common challenges:

- Language barrier: In some regions, the work, particularly desk research, was hampered by the language barrier, as some websites only offered content in the national language and did not provide an English translation. Even though Google translation was used to tentatively translate the web pages, the results were poor, and the information was useless for objective evaluation.

- Different time zones: Working on a global scale necessitated adjusting to different time zones, both for members of the project teams (who operated in the CET time zone) and for the national organizations that granted an e-meeting and participated in this project.

Possible Initiatives

The findings from this first part of the project provide insight into future next steps and related activities. They are listed below as follows:

- For 2021, Continue current activities through the end of the year in order to strengthen, update, assess, and revise the work already completed.

- For 2022, consider and plan to deliver capacity building activities to share ITU knowledge and resources with stakeholders at global and regional level (events/workshop) to facilitate the exchange of best practices.

- For 2022, consider and plan to deliver training for public sector officials in this field including GIS, data science, IT project management.

- For 2022, consider and plan to deliver a body of knowledge on establishing/strengthening broadband mapping systems at the national level as a knowledge resource and reference point.

- For 2022, consider and plan to deliver technical assistance to the countries to create an enabling environment for broadband mapping systems to be implemented.

- For 2022, consider and plan to deliver technical assistance to the countries to support the technical elaboration of tenders for broadband mapping systems and setting up bb mapping projects.

- For 2022, consider and plan to attract donor funding for projects on the above.

Conclusion

Since June 2021, ITU has been investigating the existence of established national broadband mapping system initiatives and practices at the national level, working with both the ITU Regional Offices located throughout the world, as well as the National Regulatory Authorities or Ministries in charge of this task. This effort resulted in the establishment of a worldwide dataset on ITU broadband mapping system activities, a global repository, and a first level of body knowledge that will be used to integrate a new layer representing the information on current national broadband mapping system projects on the ITU Interactive Transmission Maps. Far from being concluded, this first phase continued throughout Q4 until the end of 2021, laying important and well-structured groundwork for further actions in 2022.

References and links in alphabetical order:

- [BACKGROUND PAPER](#)

- [Broadband Map NZ](#)

- [Comparador de Coberturas Tecnológicas](#)

- [Etisalat Store Locator](#)

- https://crtc.gc.ca/cartovista/internetcanada-en/

- [ITU BB Transmission Map Report - V3_2_EUR.pdf](#)

- [ITU Interactive Terrestrial Transmission/ESCAP Asia-Pacific Information Superhighway Maps](#)

- [List of Member States](#)

- [Public consultation on the review of the Broadband Cost Reduction Directive | Shaping Europe's digital future](#)

- [Report 3_Broadband Mapping EU4Digital.pdf](#)

- [Study on broadband and infrastructure mapping - Publications Office of the EU](#)

- [карта проникновения ШПД](#)