clisel

METHODOLOGY

Interactive Maps listing existing labour mobility agreements in third countries affected by or at risk of climate change

Contents

Introduction: Overall scope 3
1. Designing the Interactive Maps 4
2. Case studies 7
2.1 Central America 9
2.2 South America 9
2.3 Pacific Region 10
2.4 Western Africa 11
2.5 Horn Africa 11
2.6 South Asia 12
2.7 Europe 12
3. Data visualization 13
CLISEL Data 13
Interactive Maps 18
4. The end-user-centred phase of the Interactive Maps 27
Linking the CLISEL Interactive Maps to other instruments of the CLISEL Tool Box: the Travel App 33
5. Communication and dissemination activities related to the Interactive Maps: reaching out to policy-makers and stakeholders ..... **Error! Bookmark not defined.**
Annex I. ..... **Error! Bookmark not defined.**
Extract from the programme for the conference on “Connecting environmental changes and human mobility as a way to draw new maps of knowledge”, which was held from 3–6 March 2019 at the Congress Centre Monte Verità, Ascona ..... **Error! Bookmark not defined.**
Annex 2. 34
CLISEL poster 34
Annex 3. 35
Questionnaire on the CLISEL Tool Box 35

List of Tables and Figures

Box 1. List of databases and initiatives reviewed 5
Fig 1. Overview of instruments collected 7
Fig. 2 Regional overview 8
Table 1. Central America 9

This Project has received funding from the European Union’s Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors’ view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

Table 2 South America....10
Table 3 Pacific Region....11
Table 4 Western Africa....11
Table 5 Horn Africa....12
Table 6 South Asia....12
Table 7 Europe....13
Fig. 3 - Interface of CLISEL Data....14
Fig. 4 - Technologies used by CLISEL Data....15
Fig. 5 - Relational schema for CLISEL Data....17
Fig. 6 - Flowstrates adaptation prototype....20
Fig. 7 - Circle packing prototype....21
Fig. 8 - Choropleth prototype....22
Figure 9 - Bar charts (left: proportional, right: non-proportional)....23
Figure 10 - The Heatmap....24
Figure 11 - Choropleth map....25
Figure 12- Line charts....25
Figure 13 - Sankey diagram and matrix....26
Figure 14 Section of an instrument....27
Fig.15. Results of the Tool Box questionnaire – question 1....29
Fig.16. Results of the Tool Box questionnaire – question 2....29
Fig.17. Results of the Tool Box questionnaire – question 3....30
Fig. 18. Results of the Tool Box questionnaire – question 4....30
Fig. 20. Pierre Vanhulst presents at the conference in Ascona....32
Fig. 21. Dr Loddo presents at the conference in Ascona....33

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

Introduction: Overall scope

In recent years, the international debate has increasingly focused on cross-border mobility of populations affected by slow-onset or sudden-onset natural hazards. In 2012, States engaged in informal discussions to identify resilience measures, which culminated with the adoption of the 2015 Nansen Initiative Agenda for the Protection of Cross-Border Displaced Persons in the Context of Disasters and Climate Change (the Nansen Agenda) endorsed by around 100 States. In this context, the Nansen Agenda highlighted the potential role of existing migration measures to contribute to enhance "adaptation strategies" and to join the significant efforts being made at international level.

Borrowing the "adaptation" concept from the natural sciences, the international community progressively intensified efforts to identify measures that could increase the protection of environmentally vulnerable populations. Here, it is relevant to recall the adoption of paragraph 14(f) of the 2010 United Nations Framework Convention on Climate Change (UNFCCC) Cancun Adaptation Framework to enhance the adoption of voluntary "measures to enhance understanding, coordination and cooperation with regard to climate change-induced displacement, migration and planned relocation, where appropriate, at national, regional and international levels" (UNFCCC 2010, paragraph 14(f)). Subsequently, the adoption of Paris Agreement in December 2015 paved the way for the creation of a Task Force on Displacement to "develop recommendations for integrated approaches to avert, minimize and address displacement related to the adverse impacts of climate change" (Conference of the Parties 2015, paragraph 50). In December 2018, after two intense years of consultations, the Task Force submitted its recommendations to the Member States, which included a first attempt to undertake a mapping exercise on national policies. More recently, the need to develop adaptation strategies and to build coherent approaches at different levels (objective 2) has been stressed by the adoption of the Global Compact on Safe, Orderly and Regular Migration (GCM).

Our mapping exercise, carefully taking account of the global policy-making processes, aimed to make a significant contribution by closely looking into the existing normative framework. We aimed to identify which existing instruments could play an active role in the legal framework on adaptive strategies.

To this end we identified instruments pertaining to:

i) multilevel migration governance: i.e. the main national legal frameworks, bilateral and regional agreements related to migration, labour migration and trade migration;
ii) humanitarian protection instruments: humanitarian measures, i.e. refugee instruments;
iii) climate change instruments and disaster law instruments;
iv) international cooperation instruments.

As described below we also included a temporal dimension, which offers an original entry point in the visualization to explore the correlation, if any, between the migration domain and the climate change domain and whether the debates in different issue domains influence each other, for instance, by facilitating the adoption of new instruments in the field of climate change law with a link to migration, or the reverse.

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

More generally, our exercise adopted a multilateral approach to the governance of environmentally induced migration, where (1) the international level emerges as a platform for discussion and consultation; (2) the regional level gains a prominent role in framing concrete and operational responses; and (3), at the national level, the States together with local actors are responsible for their implementation.

1. Designing the Interactive Maps

The initial steps taken by UBERN were devoted to the development of the methodology for an innovative mapping of the current legislation and policies worldwide that have an impact on climate change and human mobility.

The methodology was developed in a gradual way by conducting preliminary meetings with key experts working in this context and who had significant experience in this field. The experts consulted were: Prof. Walter Kaelin, co-chair of the Platform on Disaster Displacement; Marine Franck, climate change officer at the United Nations High Commissioner for Refugees; Dr Atle Solberg, head of the Coordination Unit of the Platform on Disaster Displacement; and Ali Anwar, Database Developer of the Internal Monitoring Displacement Centre. In addition, Prof. Fornalé was actively involved, as a member of the Advisory Board of the Platform on Disaster Displacement, in the ongoing mapping exercise conducted by the UNFCCC Task Force on Disaster Displacement. In particular, she interacted with the International Organization for Migration during the implementation of "Mapping Human Mobility and Climate Change in Relevant National Policies and Institutional Frameworks".[1]

These exchanges have been essential for the proper conduct of our mapping exercise. First, they provided crucial feedback on the identification of the geographical areas of interest. We took as a starting point the preliminary results of the Nansen Initiative conducted in South-east Asia, Latin America, Europe, Horn of Africa and the Pacific, adding a European perspective to reflect the specific aims of our project. Secondly we considered a range of instruments (binding and non-binding) with a focus on: 1- migration instruments; 2- refugee instruments; and 3- emergency measures and classified them according to whether they were national, bilateral, regional or international. Third, regular interactions with the experts were ensured for the full duration of the project to carefully complement their work and to avoid any duplication.

Methodology and development

Preliminary research was conducted by the UBERN team to identify significant existing databases that already collected legal instruments. These include the Migration, Environment and Climate Change: Evidence for Policy (MECLEP) project; the Environmental Change and Forced Migration Scenarios (EACH-FOR) project; the CliMig database; the International Organization for Migration (IOM) Migration Law Database; the International Labour Organization (ILO) NORMLEX; the UN Refugee Agency (UNHCR) website; and the website of the Internal Displacement Monitoring Centre (IDMC). They were shared with the UNICA team who contributed to increase the content during the lifecycle of the project.

[1] Available at: https://unfccc.int/sites/default/files/resource/20180917%20WIM%20TFD%20I.1%20Output%20final.pdf.

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

Databases and Initiatives reviewed

- ✓ MECLEP project (http://www.environmentalmigration.iom.int/migration-environment-and-climate-change-evidence-policy-meclep),
- ✓ EACH-FOR project – they developed case studies and EXCLIM Project for the Foresight Report (https://www.gov.uk/government/publications/migration-and-global-environmental-change-future-challenges-and-opportunities)
- ✓ CLIMIG database – a collection of papers and reports (https://www.unine.ch/geographie/climig_database) also for specific countries
- ✓ IOM Migration Law Database (http://imldb.iom.int/_layouts/15/IML.Portal/AppPages/Home.aspx), also IOM Publications (https://www.iom.int/migration-and-climate-change) and IOM tracking matrix (http://www.globaldtm.info/)
- ✓ DEltas, vulnerability & Climate Change: Migration & Adaptation (DECCMA) Project (http://www.deccma.com/deccma/)
- ✓ ILO NORMLEX (http://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:1:0::NO:::)
- ✓ UNHCR (http://www.unhcr.org/climate-change-and-disasters.html)
- ✓ IDMC's country profiles (http://www.internal-displacement.org/countries)
- ✓ Migration Legislation Database (MILEX) (http://www.migracionoea.org/index.php/en/milex-en.html)
- ✓ Latin American Network Information Center (LANIC) (http://lanic.utexas.edu/subject/countries/)
- ✓ UNHCR – Protección de Refugiados en América Latina: Buenas Prácticas Legislativas, (https://www.acnur.org/buenas-practicas.html)
- ✓ Platform on Disaster Displacement's resources, including thematic reports and case studies, (https://disasterdisplacement.org/resourcesInternational)
- ✓ Federation of Red Cross and Red Crescent Societies (IFRC)'s Disaster Law Database (https://www.ifrc.org/publications/disaster-law-database/)
- ✓ EUR-Lex (European Union's legislative database) (https://eur-lex.europa.eu/homepage.html?locale=it)
- ✓ N-Lex (linked to EU countries' national law databases) (http://eur-lex.europa.eu/n-lex/index_en)
- ✓ Task Force on Displacement's outputs of the mapping exercise dealing with the interaction between climate and displacement (https://unfccc.int/wim-excom/sub-groups/TFD#eq-1)
- ✓ South American Network for Environmental Migrations (RESAMA)'s reports on environmental migration in South America (https://resama.net/publications)

Box 1. List of databases and initiatives reviewed

For each geographical region, 2 or 3 countries were identified as the target of our research, leading to a total of 25 case studies. All instruments collected were first "coded" into an Excel sheet that was

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

distributed to all CLISEL partners by UBERN. All team members identified the instruments for their own case study and provided the pdf version, when available.

In November 2018, UBERN carefully reviewed all instruments provided by each team member to identify the relevant instruments for our mapping exercise and to ensure an adequate level of uniformity among the case studies. This intermediary step was essential to revise the data collected and to identify the major challenges and gaps.

After this preliminary screening, the instruments were uploaded by the UBERN team in the CLISEL-Data (https://clisel-data.vanhulst.one) created by Pierre Vanhulst for all CLISEL tools. The creation of this dataset allowed translation of the data collected in our Interactive Maps (see the description below).

Data collection: team effort

UBERN was in charge of collecting data for four case studies: Europe, Central America, South America and the Pacific region. From September 2018, Ximena Montenegro Huerta (UBERN) joined Federica Cristani to assist in completing the data collection and with the uploading of the instruments collected by all team members to the CLISEL Data.

UNICA's contribution to the Interactive Maps focused on the following geographical areas: the Horn of Africa (Ethiopia, Eritrea and Somalia), Western Africa (Ivory Coast, Niger and Nigeria) and Southeast Asia (Bangladesh, Nepal and the Philippines).

Challenges faced during the collection phase

Latin America: Given the lack of a unified database for Latin American countries' legislation and policies related to migration and/or climate change, the relevant information had to be collected through the databases and collections provided by national governments and regional organizations, as well as through secondary sources of law. In some instances, instruments reported in official reports and academic journals could not be found in the government's official online repository.

Africa: The major challenge that emerged during the legal mapping of both African regions was the limited accessibility of the institutional domestic government websites, which caused difficulties in retrieving official legal documents.

South Asia: Although most of the sources of the Asian countries analysed are published online and translated into English, some of them, especially the bilateral agreements and the most recent documents, were not available. In order to overcome these difficulties we made an analysis of the national newspapers. However, local newspapers are not unproblematic sources of information since the countries analysed are not ranked high in the World Press Freedom Index (Nepal is 106th out of 180 countries; Bangladesh 146th out of 180 countries and the Philippines is 133rd out of 180 countries); thus the information gathered from local newspapers is often partial and one-sided.

To surmount the challenges identified above, UBERN devoted substantial effort to involving stakeholders in the field, especially ILO from the Asiaregion, the Economic Community of West African States (ECOWAS) Secretariat, and IOM for Latin America, to identify the missing information.

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

2. Case studies

This section provides in a nutshell some background information concerning our case studies in addition to some details on the number of instruments identified.

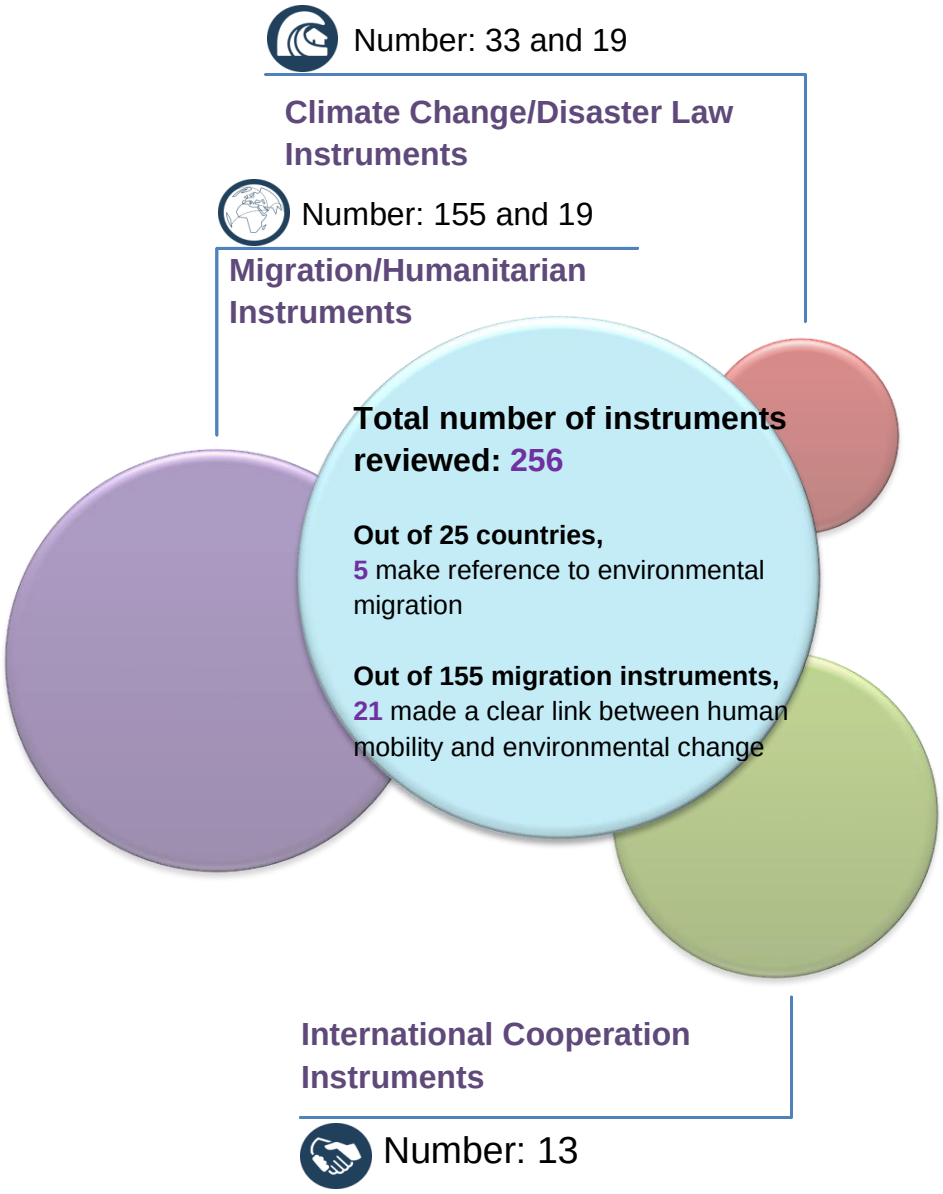


Fig 1. Overview of instruments collected

The international attention being devoted to this topic is continually increasing. As a result, Member States are becoming more involved in various initiatives at the regional, bilateral or national level. Therefore, this mapping exercise cannot be fully comprehensive, but rather is an ongoing living process.

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

After a preliminary review of existing instruments, the following instruments were consulted for each regional case study:

- ✓ 1951 Convention relating to the Status of Refugees and the 1967 Protocol
- ✓ Agenda for the Protection of Cross-Border Displaced Persons in the Context of Disasters and Climate Change (Protection Agenda) 13 October 2015
- ✓ Global Compact for Safe, Orderly and Regular Migration (2018)
- ✓ Sendai Framework for Disaster Risk Reduction 2015
- ✓ Paris Agreement, adopted at the 21st Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC) on 12 December 2015 and entered into force on 4 November 2016
- ✓ United Nations Framework Convention on Climate Change (UNFCCC), adopted on 9 May 1992 and entered into force on 21 March 1994
- ✓ Cancun Agreements (COP – Decision 1/CP.16) – The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention (COP – Decision 1/CP.16), adopted on 15 March 2011.

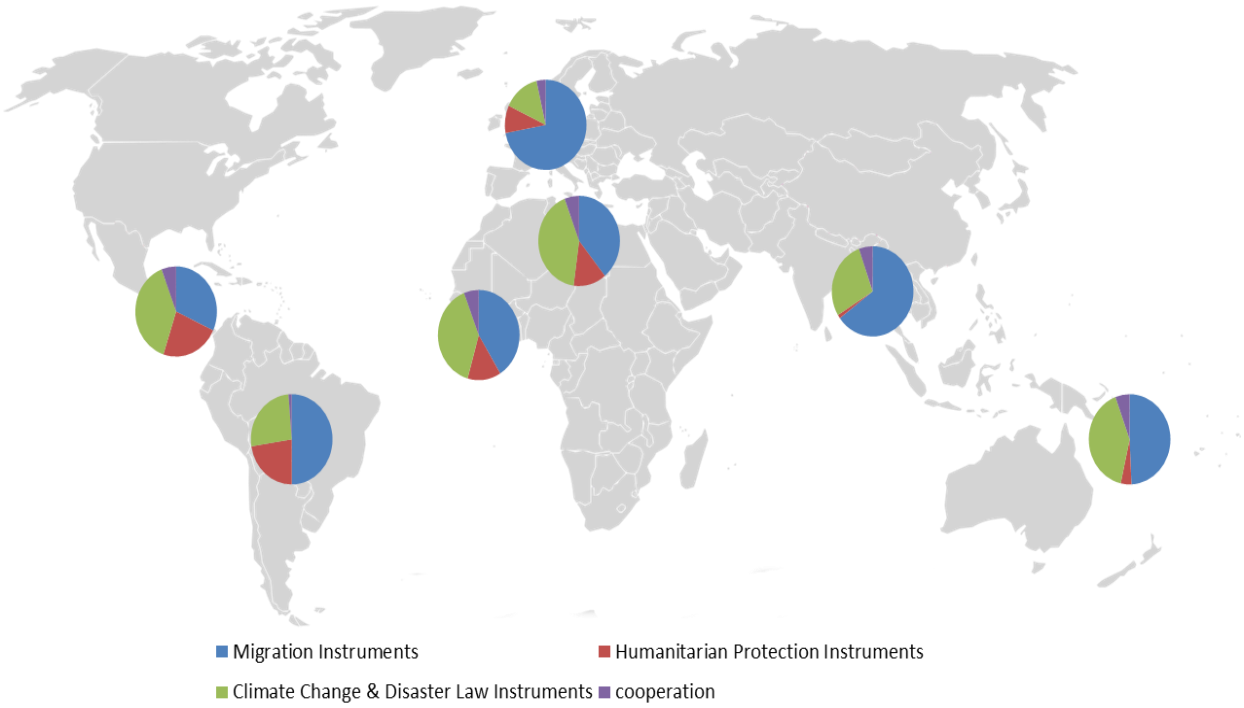


Fig. 2 Regional overview

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

2.1 Central America

	Migration Instrument	Humanitarian Protection Instrument	Climate Change /Disaster Law Instruments	International Cooperation	Constitution
Costa Rica	**7**	**6**	**7**	**0**	**0**
National	2	1	0	0	0
Bilateral	1	0	0	0	0
Regional	1	4	3	0	0
International	3	1	4	0	0
Dominican Republic	**4**	**2**	**9**	**1**	**0**
National	1	0	2	0	0
Bilateral	1	0	0	0	0
Regional	1	1	3	0	0
International	1	1	4	1	0
Haiti	**4**	**3**	**6**	**3**	**0**
National	1	0	2	0	0
Bilateral	0	0	0	0	0
Regional	0	2	0	2	0
International	3	1	4	1	0
Honduras	7	5	5	0	1
National	2	0	0	0	1
Bilateral	0	0	0	0	0
Regional	2	4	2	0	0
International	3	1	3	0	0
Total	**22**	**16**	**27**	**4**	**1**

Table 1. Central America

2.2 South America

	Migration Instrument	Humanitarian Protection Instruments	Climate Change /Disaster Law Instruments	International Cooperation	Constitution
Bolivia	**11**	**3**	**5**	**0**	**1**
National	1	0	1	0	1
Bilateral	3	0	0	0	0
Regional	4	2	0	0	0
International	3	1	4	0	0

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

Brazil	**7**	**5**	**6**	**1**	**1**
National	1	2	2	0	1
Bilateral	2	0	0	0	0
Regional	2	2	0	1	0
International	2	1	4	0	0
Colombia	**11**	**5**	**6**	**0**	**0**
National	1	1	3	0	0
Bilateral	4	0	0	0	0
Regional	3	3	0	0	0
International	3	1	3	0	0
Ecuador	**11**	**5**	**4**	**0**	**1**
National	1	2	0	0	1
Bilateral	4	0	0	0	0
Regional	3	2	0	0	0
International	3	1	4	0	0
Total	**40**	**18**	**21**	**1**	**3**

Table 2 South America

2.3 Pacific Region

	Migration Instrument	**Humanitarian Protection Instruments**	**Climate Change /Disaster Law Instruments**	**International Cooperation**	**Constitution**
Fiji	**7**	**1**	**8**	**1**	**1**
National	1	0	3	0	1
Bilateral	3	0	0	0	0
Regional	1	0	1	0	0
International	2	1	4	1	0
Kiribati	**8**	**0**	**8**	**1**	**1**
National	3	0	3	0	1
Bilateral	3	0	0	0	0
Regional	1	0	1	0	0
International	1	0	4	1	0
New Zealand	**11**	**1**	**5**	**0**	**1**
National	3	0	0	0	1
Bilateral	4	0	0	0	0
Regional	2	0	1	0	0
International	2	1	4	0	0
Tuvalu	**9**	**1**	**8**	**1**	**1**
National	3	0	3	0	1
Bilateral	3	0	0	0	0
Regional	1	0	1	0	0
International	2	1	4	1	0

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.

Total	**35**	**3**	**29**	**3**	**4**

Table 3 Pacific Region

2.4 Western Africa

	Migration Instrument	Humanitarian Protection Instruments	Climate Change /Disaster Law Instruments	International Cooperation	Constitution
Ivory Coast	**6**	**3**	**8**	**5**	**0**
National	0	0	1	0	0
Bilateral	0	0	0	0	0
Regional	3	2	3	4	0
International	3	1	4	1	0
Niger	**9**	**3**	**9**	**6**	**0**
National	0	0	2	0	0
Bilateral	1	0	0	0	0
Regional	4	2	3	5	0
International	4	1	4	1	0
Nigeria	**13**	**3**	**10**	**8**	**0**
National	3	0	3	0	0
Bilateral	2	0	0	2	0
Regional	4	2	3	5	0
International	4	1	4	1	0
Total	**28**	**9**	**27**	**19**	**0**

Table 4 Western Africa

2.5 Horn Africa

	Migration Instrument	Humanitarian Protection Instruments	Climate Change /Disaster Law Instruments	International Cooperation	Constitution
Eritrea	**10**	**2**	**9**	**3**	**1**
National	4	0	2	0	1
Bilateral	0	0	0	0	0
Regional	5	2	4	2	0
International	1	0	3	1	0
Ethiopia	**10**	**3**	**10**	**3**	**1**
National	2	0	2	0	1
Bilateral	0	0	0	0	0
Regional	6	2	4	2	0
International	2	1	4	1	0

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

Somalia	**7**	**4**	**10**	**1**	**1**
National	0	0	2	0	1
Bilateral	0	0	0	0	0
Regional	6	2	4	1	0
International	1	2	4	0	0
Total	**27**	**9**	**29**	**7**	**3**

Table 5 Horn Africa

2.6 South Asia

	Migration Instrument	**Humanitarian Protection Instruments**	**Climate Change /Disaster Law Instruments**	**International Cooperation**	**Constitution**
Bangladesh	**20**	**0**	**7**	**1**	**1**
National	8	0	3	0	1
Bilateral	8	0	0	1	0
Regional	1	0	0	0	0
International	3	0	4	0	0
Nepal	**11**	**0**	**6**	**0**	**1**
National	3	0	2	0	1
Bilateral	6	0	0	0	0
Regional	0	0	0	0	0
International	2	0	4	0	0
Philippines	**17**	**1**	**8**	**1**	**1**
National	4	0	3	0	1
Bilateral	8	0	0	1	0
Regional	2	0	1	0	0
International	3	1	4	0	0
Total	**48**	**1**	**21**	**2**	**3**

Table 6 South Asia

2.7 Europe

	Migration Instrument	**Humanitarian Protection Instruments**	**Climate Change /Disaster Law Instruments**	**International Cooperation**	**Constitution**
Denmark	**11**	**2**	**4**	**2**	**1**
National	0	0	0	0	**1**
Bilateral	0	0	0	0	**0**

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

Regional	8	1	0	1	**0**
International	2	1	4	1	**0**
France	**25**	**3**	**4**	**2**	**1**
National	1	1	0	0	**1**
Bilateral	13	0	0	0	**0**
Regional	9	1	0	1	**0**
International	2	1	4	1	**0**
Italy	**21**	**4**	**4**	**2**	**1**
National	2	2	0	0	**1**
Bilateral	9	0	0	0	**0**
Regional	9	1	0	1	**0**
International	1	1	4	1	**0**
Spain	**23**	**2**	**4**	**2**	**1**
National	1	0	0	0	**1**
Bilateral	11	0	0	0	**0**
Regional	9	1	0	1	**0**
International	2	1	4	1	**0**
Total	**80**	**11**	**16**	**8**	**4**

Table 7 Europe

3. Data visualization

CLISEL Data

Three of CLISEL's deliverables are powered by the data gathered during the course of this project: namely, the Interactive Maps (Work Package 3), the Geo-Archive and the Travel App (Work Package 5). Among the typical problems posed by such heavy data gathering processes, a few were particularly urgent to address:

- the consistency of the data – in both structure and content
- the ability to collaborate – sharing the current state of the gathered data
- the conversion of the data – formatting them for use in the various deliverables.

We tackled these issues by developing CLISEL Data, a custom web platform for the team to input all their data.

Purpose and design rationale

The initial versions of CLISEL Data were chiefly designed for Work Package 3: the purpose was to simplify the coordination between the various actors involved in gathering law instruments from all over the world. With this aim, we developed a web platform connected to a simple database. The choice of a web platform was obvious, as it is accessible from everywhere, compatible with countless devices, as well as being easy to update and maintain.

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

Step by step, CLISEL Data turned into a common database for the Geo-Archive and the Travel App as well, along with a user management system. The platform now consists of three distinct parts:

- An interface that provides access to the data
- A back-end that handles routing, authentication and database connection
- A collection of front-end components used by all CLISEL's web applications

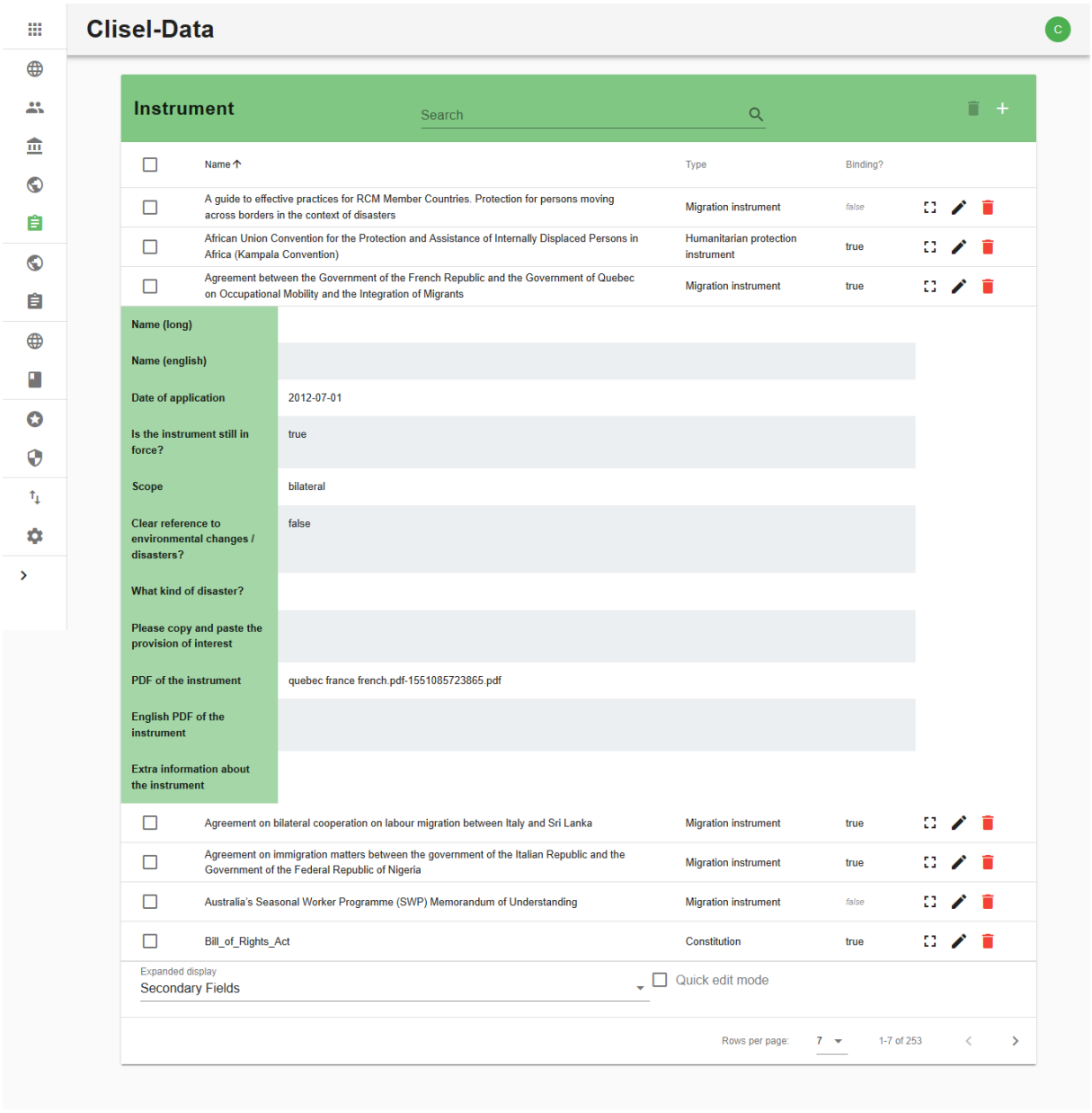


Fig. 3 - Interface of CLISEL Data

Fig. 3 - Interface of CLISEL Data shows the web interface of CLISEL Data used by the team to upload and browse the data during the project. All entities of the CLISEL project – instruments for the Interactive Maps, cases for the Geo-Archive, countries for all deliverables, etc. – are displayed in flexible tables.

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

As these entities are defined through the Sequelize APIs (see section “Back-end technologies” below), the web platform automatically generates the forms for addition of new entities and modification of existing ones.

This automatization offered a welcome flexibility to the team, allowing the members to change the structure of the data during the course of the project without requiring extensive modifications to the CLISEL Data’s code.

Regarding the permission system, each user registered on the platform fits into one specific role among the following:

- **admin**: the administrator of the platform. Has full access to all content of the platform. This role is meant only for the developers of CLISEL.
- **collaborator**: direct collaborator of the CLISEL project. Has access to most data through generic and specific routes (see “Implementation” below), with the exception of the user table.
- **appUser**: regular user of the app. The default role upon registration. Has limited access to generic route and access to a few specific routes.

Other roles exist that are specific to a deliverable. For instance, roles “geoParticipant” and “geoAdmin” were implemented, respectively to allow Geo-Archive users to submit new cases and Geo-Archive administrators to review and validate those cases.

Technology and implementation

CLISEL Data relies on the following technologies, summarized in “Fig. 4 - Technologies used by CLISEL Data”:

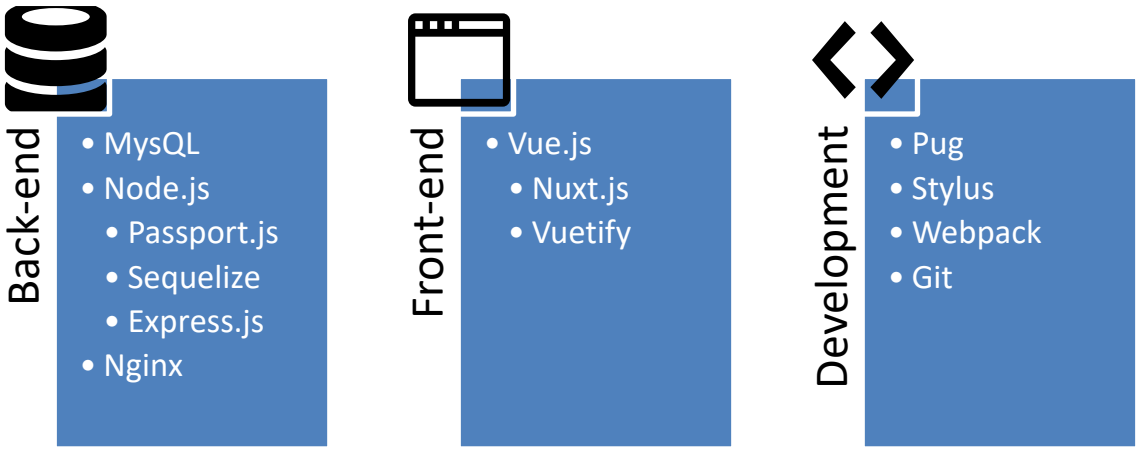


Fig. 4 - Technologies used by CLISEL Data

Back-end technologies

- **MySQL / MariaDB**: the most popular Relational Database Management System (*RDBMS*). It allows storage and retrieval of data through a standardized language called Structured Language Query (*SQL*).

This Project has received funding from the European Union’s Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors’ view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

- **Node.js (Node**): a very popular *JavaScript* runtime that allows quick developments of web applications in a single language, rather than forcing developers to switch between a back-end language (*Python*, *PHP*, *Java*, etc.) and *JavaScript* (the only language that can run in a browser). These applications are then easy to deploy and manage through reverse proxies (see below).
    - **Passport.js**: handles the authentication and permission processes. CLISEL Data uses two strategies: "Local" (through *MySQL*) and "JSON Web Tokens" (*JWT*).
    - **Sequelize**: Object-Relational Mapping (ORM) that handles the connection between *MySQL* and the *Node.js*.
    - **Express.js**: web application framework that handles back-end routing.
- **Nginx**: the actual server that handles all HTTP requests and forwards them to CLISEL Data as a reverse proxy. One of the two most popular web servers along with Apache, it is faster than its competitor.

Front-end technologies

On top of the usual web technologies (HTML, CSS, JavaScript), CLISEL Data uses:

- **Vue.js**: JavaScript library that facilitates the development of responsive, data-powered interfaces. It basically allows the binding of external data to DOM elements and handles the adaptation of the interface as the data are updated. In this respect, it is similar to *React* or *Angular.js*, but it stands out thanks to its syntax, which is closer to HTML and CSS, rather than requiring developers to wrap interface elements within JavaScript objects.
    - **Nuxt.js**: Framework built on top of *Vue.js* to automatically handle server-side rendering (SSR), routing and various tasks.
    - **Vuetify**: *Vue.js* components library packed with interface elements and concepts from Google's *Material Design* language.

Development technologies

- **Pug (formerly Jade)**: template engine for *Node.js* whose syntax is inspired by the *Python* language.
- **Stylus**: preprocessor scripting language meant to compile Cascading Style Sheets (*CSS*). Its syntax is close to the *Python* language.
- **Webpack:** *JavaScript* module bundler used to transpile and merge JavaScript code into optimized chunks meant to offer better performance.
- **Git:** version-control system used to keep track of all the changes to the code and make collaboration between developers easier.

The final database contains 26 relational tables, split into four groups, as shown in Fig. 5 - Relational schema for CLISEL Data.

The Interactive Maps will be made available at www.interactive-maps.clisel.eu

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

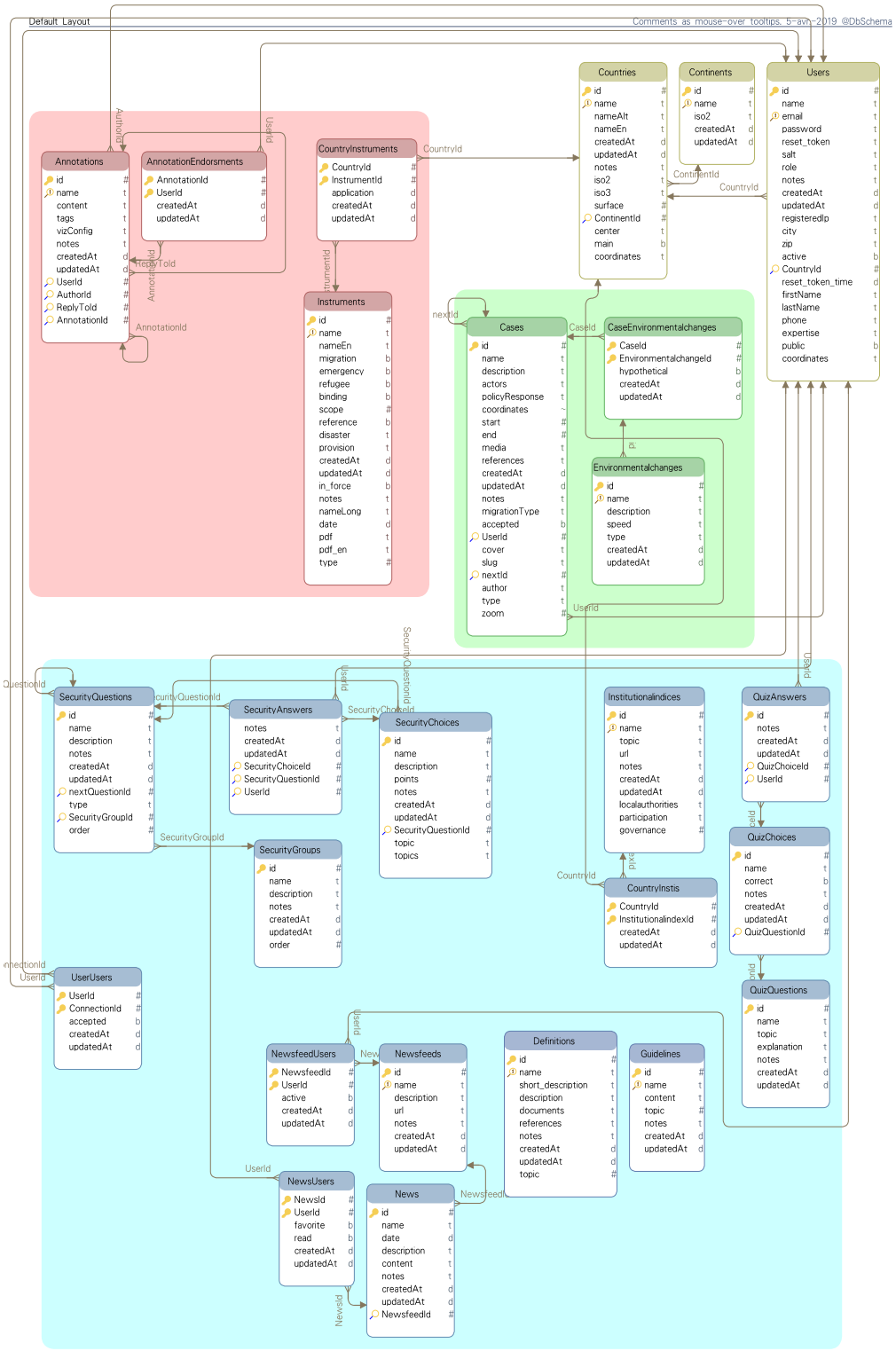


Fig. 5 - Relational schema for CLISEL Data

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

The content of each of these tables can be accessed through two kinds of routes: **generic routes** and **specific routes**. Generic routes are automatically generated by the platform and allow a "raw" access to all properties of the tables without specific computations. For most tables, use of generic routes is only allowed for the *admin* and *collaborator* roles. Specific routes were designed for each platform and generally offer access to a limited set of properties, along with additional computation. For instance, the generic route for users would return all users of the system with all but their private properties, while a specific user route only returns public properties of public users, preventing the disclosure of sensitive information to unapproved users.

Interactive Maps

Design rationale and evolution

The Interactive Maps feature data visualizations whose targets are analysts knowledgeable in the domain of law. While the development of relevant data visualizations is still a highly debated topic, several frameworks and best practices have emerged in the recent years. Among these, Munzner's framework [1] "What-Why-How" roughly served as a basis for our design rationale and we developed several prototypes before the final form of the Interactive Maps was accepted.

What?

The morphology of data being visualized has strong implications for the design of a visualization, as it narrows the range of possible representations. The "What" question seeks to classify what data are being visualized, to provide a relevant choice of possible visualizations. In the case of the Interactive Maps, the data consisted of the following entities, properties and links:

- **Law instruments – discrete entities**
  - *Properties*
    - Date – a date of adoption of the instrument. **Temporal dimension**.
    - Type – a "type" of instrument. **Categorical, exclusive[2] dimension**.
    - Scope – the reach of the instrument. **Ordinal, exclusive dimension**.
    - Binding/non-binding – whether the instrument is binding or not. **Boolean dimension**.
  - *Links*
    - Country – law instruments belong to one or more countries.
- **Countries – discrete entities**
  - *Properties*
    - Coordinates – the position of a country. **Geospatial dimension**.
  - *Links*
    - Law instrument – a country has many instruments.

Initial drafts of the visualizations included other entities and relations – migration flows, disasters, continents, organizations (regional and international) and initiatives. These were progressively filtered out, either because it was impossible to find relevant datasets or because the analysts perceived them as unnecessary. Moreover, the "type" and the "scope" dimensions have not always been considered exclusive, and a few prototypes were thus developed with this particularity in mind.

[2] By "exclusive", we mean that an instrument can only belong to one of the type or the scope that we defined.

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

Why?

The "Why" question defines why people are visualizing that dataset. Usually, analysts are trying to answer **questions**, by undertaking **tasks**, in order to generate new **insights** from the data. "Whys" are composed of **actions**, i.e. what the analyst is trying to achieve, and **targets**, i.e. what the analysts is looking at or for.

This question was answered through discussions with the analysts and required the development of various draft visualizations (see "How and evolution"). Below is a list of questions, tasks and insights that the Interactive Maps should support, classified according to Munzner's taxonomy.

Actions

- Analyse (high-level)
  - **Discover**. Typical question: "are there regional trends in the types of instruments used by governments to address the issue of climate-induced migration?"
  - **Present**. Typical task: "present the worldwide increase of law instruments related to climate-induced migration".
  - **Enjoy**. Impressing casual analysts was part of the Interactive Maps' agenda, as an incentive to dig deeper into the data.
- Locate (intermediary)
  - **Lookup**. Typical question: "how many new instruments related to climate-induced migration did Brazil ratify in 2015?"
  - **Locate**. Typical question: "where is the country that produced the most instruments related to climate-induced migration?"
  - **Browse.** Typical question: "are there particular trends in the adoption of new law instruments in South America?"
  - **Explore**. Any unfocused questions that are not related to a particular task.
- Query (low-level)
  - **Identify**. Typical task: "Find a country that is not following the global trend of its region".
  - **Compare**. Fictive insight: "Find out which type of instruments was used the most between migration instruments and humanitarian protection instruments".
  - **Summarize**. Fictive insight: "There has been a global increase of law instruments related to climate-induced migration since the beginning of the 2000s".

Targets

- All data
  - **Trends**. For a fictive insight, see "Summarize" above.
  - **Outliers**. For a typical task, see "Identify" above.
  - **Features**. Any general observations on the data.
- Attributes
  - **One** attribute. Fictive insight: "The most prolific year for new law instruments in Brazil was 2015".
  - **Many** attributes. Fictive insight: "In France, for every increase of new humanitarian protection instruments, there is a similar increase of migration instruments".
- Spatial Data – since the Interactive Maps feature a geospatial dimension
  - **Shape**. Fictive insight: "There is a common trend in the adoption of new law instruments in South America".

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

How and evolution

Having defined the "what" and the "why", the question of "how" to represent our data becomes easier to tackle. We started our series of prototypes by making an adaptation of Boyandin's Flowstrates [2], as seen in "Fig. 6 - Flowstrates adaptation prototype". The idea was to see the evolution of migration flows across the world, along with the adoption of new law instruments and the occurrence of disasters. As mentioned in the "What" section, this idea was dropped when it became clear that we could not obtain enough relevant data regarding migration flows and disasters.

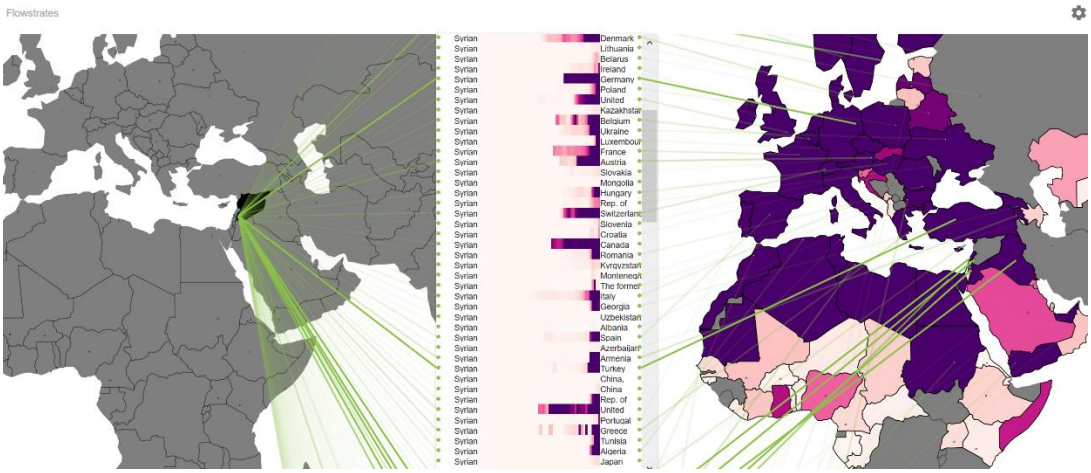


Fig. 6 - Flowstrates adaptation prototype

Further prototypes explored the relationships between instruments, the countries involved and the organizations and initiatives to which they belong. Fig. 7 - Circle packing prototype shows one of the prototypes using the "circle packing" algorithm to display the law instruments.

- The upper left panel featured a graph whose nodes were countries, organization or initiatives. The connections between these nodes represented the number of common instruments. A connection between two countries thus implied bilateral instruments, while regional and international instruments were represented by connections between countries and organizations or initiatives. These two particular types of nodes were depicted using a different filling colour so that they could be easily distinguished from regular nodes.
- The upper right panel displayed a map that analysts could use to locate countries more easily. However, filling colours for the countries were not used at that time, as the idea of "dominant trend" (see below) had not yet been developed.
- The bottom left panel presented the structure of the selected node. It was intended as a more detailed view than the graph provided.
- The bottom right panel would have contained text and description of the selected node.

While the circle packing intrigued analysts, its graphical aesthetics failed to impress them and, more importantly, its informative value was not deemed sufficient. Notably, analysts found it difficult to grasp the meaning of what they were seeing and preferred more relatable data visualizations.

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

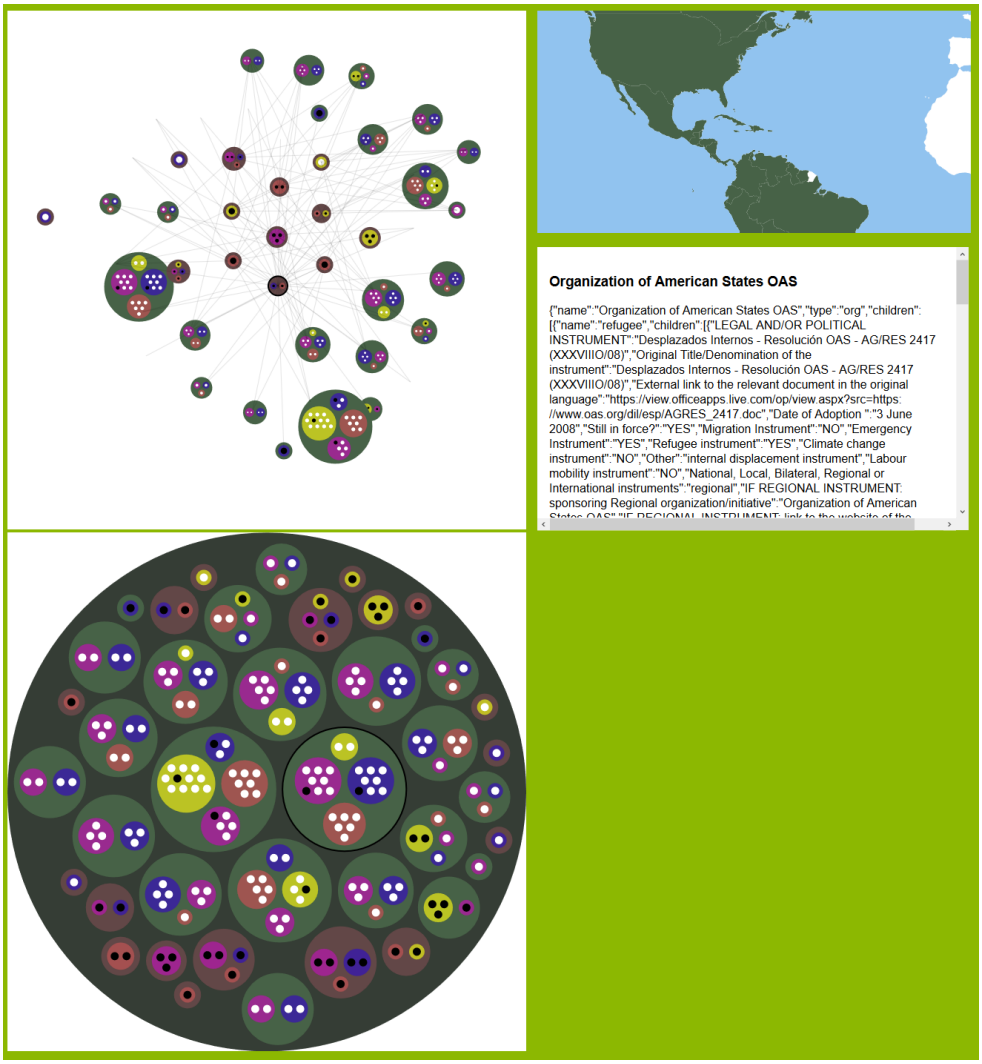


Fig. 7 - Circle packing prototype

Based on the feedback received, we thus decided to rely mostly on common data visualization techniques. As mentioned in the "What" section above, the links between countries and organizations/initiatives were dropped because of their lack of perceived value to the analysts. We also simplified the display of the data. Not only was it impossible to show both type and scope of instruments within a country without resorting to complex visualizations, but it was also cumbersome to display the structure of one of these two dimensions directly on the map. We thus derived two concepts:

- The "dominance": for a given country, the highest number of instruments of a scope would determine the "dominant scope", and the highest number of instruments of a type would determine the "dominant type". For instance, we would consider "humanitarian protection instruments" as dominant for a given country if the number of instruments of that type is the highest.
- The "highlight": the highlight is a parameter of the visualization that represents the dimension of the data selected to display. The highlight can be either the type or the scope of the instruments. Switching from one to the other adapts the visualization accordingly.

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

For the next prototypes, we settled on a combination of simple, yet linked visualizations, split into two parts, as shown in “Fig. 8 - Choropleth prototype”:

- The first part, “general view”, displayed all countries. It contained two visualizations and an option:
  - A set of proportional bar charts displaying the composition of instruments within a country.
  - A large choropleth map whose filling colours encoded the “dominance” of a country. Hovering over a country with the mouse generated circles around all countries that share similar law instruments. The radius of the circles encoded the number of instruments shared between both countries.
  - The option allowed analysts to switch highlighting between scope and type. Clicking on a country “selected” it for the detailed view.
- The second part, “detailed view”, showed the selected country (if any). It contained one visualization:
  - A matrix displaying all instruments for that country on the two dimensions (scope and type). Two redundant channels, icons and colours, were used to encode whether the instrument was binding or not.

This prototype, presented during the Ascona conference in March 2018, received mixed reviews. While the visualizations were easy to understand, some analysts considered the overall aesthetics of the visualizations to be unappealing. The prototype was also lacking in features, as it did not provide ways to analyse the evolution of law instruments over time. The next, and final prototype was built to respond to the feedback received.

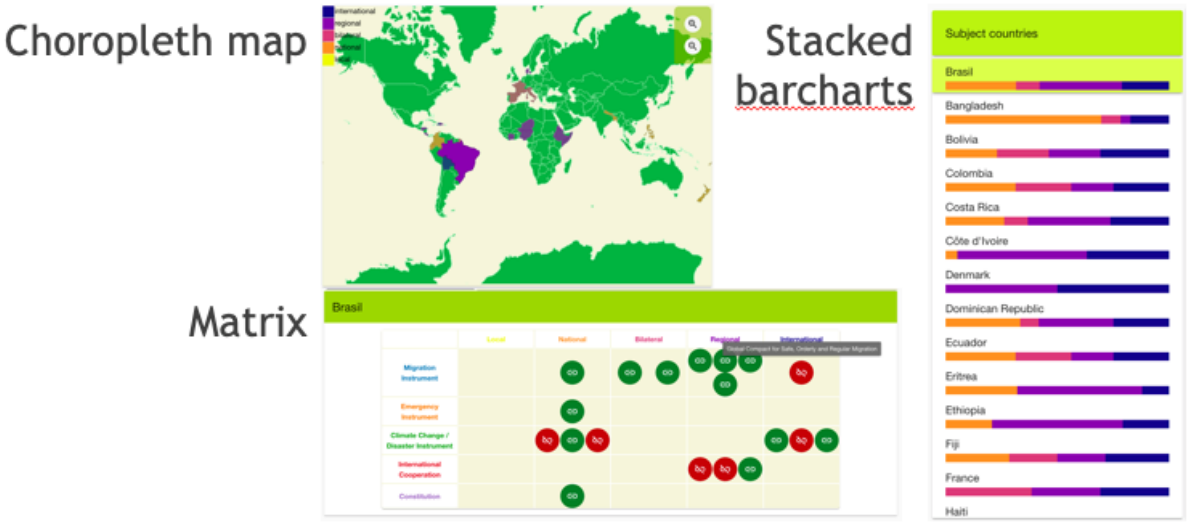


Fig. 8 - Choropleth prototype

Final version

The final version of the Interactive Maps is based on the last prototype and features two similar views. Both views rely on identical colour schemes for the two highlights: one sequential colour scheme that emphasizes the ordered nature of the “scope” property of the data, and another scheme that uses categorical colours to indicate the lack of sorting order within the “type” property of the data.

This Project has received funding from the European Union’s Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors’ view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

General view

The “general view” now contains three visualizations.

Figure 9 - Bar charts (left: proportional, right: non-proportional)

The first visualization is a set of bar charts, seen in Figure 9, that displays the composition of the instruments for all countries. The option of using proportional or non-proportional bars is now open to the analysts. Proportional bars provide a means to compare the compositions of different countries, while non-proportional bars make comparison of the total number of instruments easier. Coming back to our “What-Why” definitions from the previous sections, we can assert that these bar charts support tasks of comparison and summarization of both number and structure of the instruments, between countries or highlights. Alphabetical listing of the countries means that they also allow easy localization of a specific target, should analysts so wish.

This Project has received funding from the European Union’s Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors’ view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

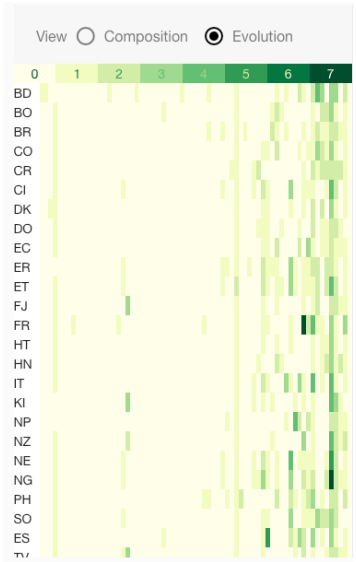


Figure 10 - The Heatmap

As an alternative to the bar charts, a heatmap, seen in Figure 10, can be displayed instead. It displays the number of new instruments adopted by all countries across the years. This visualization offers an instantaneous overview of the evolution of the law instruments worldwide, making use of a property of the data that was ignored in the previous prototype. There again, browsing and locating countries is simplified by the alphabetical sorting.

The choropleth map, visible on Figure 11, was redesigned entirely, while still encoding the “dominance” of countries. Unlike the previous prototype, this map uses 3-dimensional hexagonal bars on top of the coloured areas to display the total number of instruments, or the number of instruments of the dominant trend of the countries. While 3-dimensional data visualizations are widely criticized for being less effective than their 2-dimensional counterparts, their presence, along with the new rendering and improved controls, were more engaging for the analysts. We believe that the loss of efficiency is an acceptable trade-off in the context of the CLISEL Project: the Interactive Maps are an informative tool aimed at analysts. If these maps are not engaging enough, they might simply fail to attract the interest of analysts in the project’s data and contributions.

This Project has received funding from the European Union’s Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors’ view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

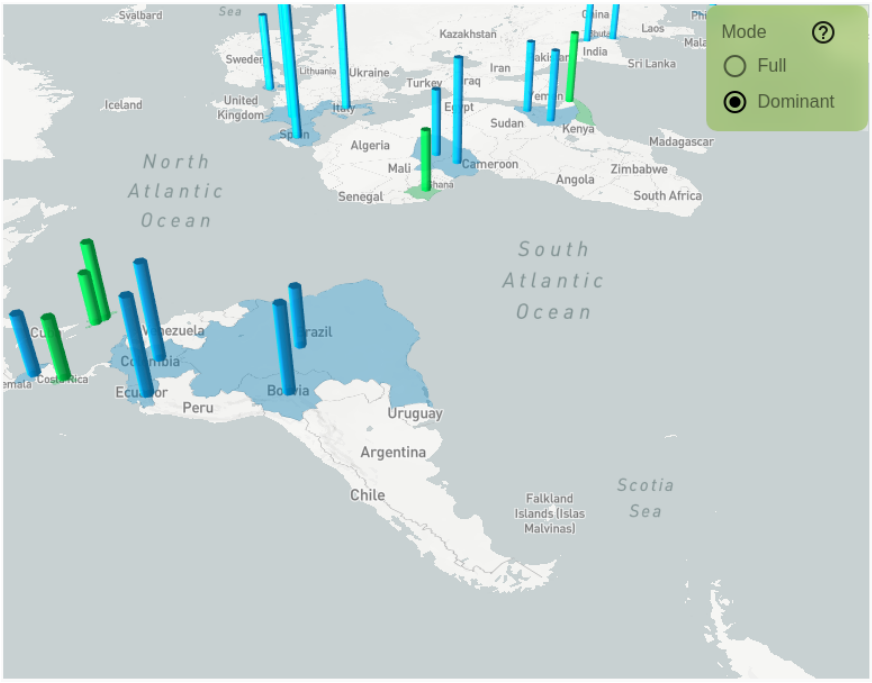


Figure 11 - Choropleth map

Detailed view

The "detailed view" now contains four visualizations.

The first row is composed of two similar stepped line charts, seen in Figure 12. They display the evolution of law instruments in the selected country over time, for both highlights. Steps were an obvious choice to represent the adoption of new law instruments, instead of continuous lines: the latter are more suited to display transitions between two States, while the adoption of law instruments is a discrete event occurring in a specific year. Complementary to the heatmap, these charts show the cumulative number of instruments for the selected country (while the heatmap only shows the new adoptions for each year).

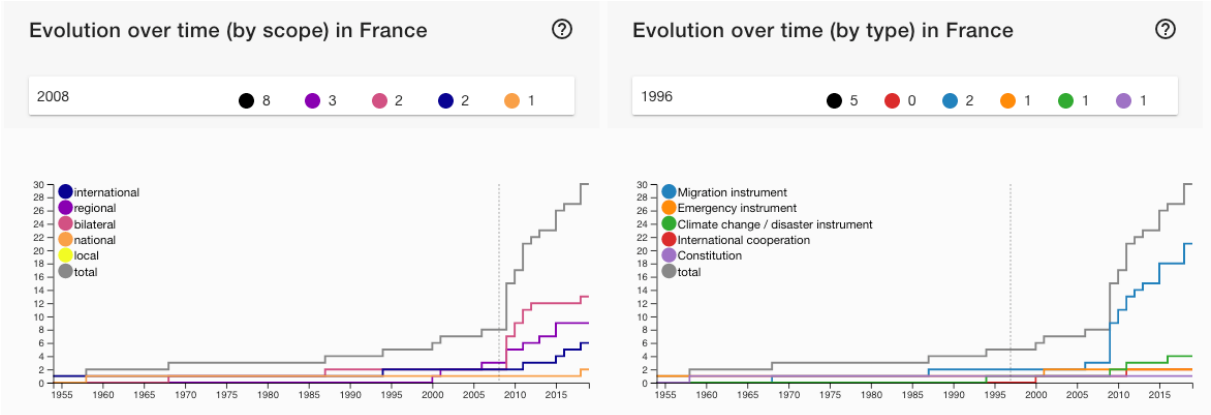


Figure 12- Line charts

The second row features a small Sankey diagram representing the connections of bilateral and regional instruments to other countries. Hovering over a node or a link highlights the corresponding instruments in the matrix, as seen in Figure 13.

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

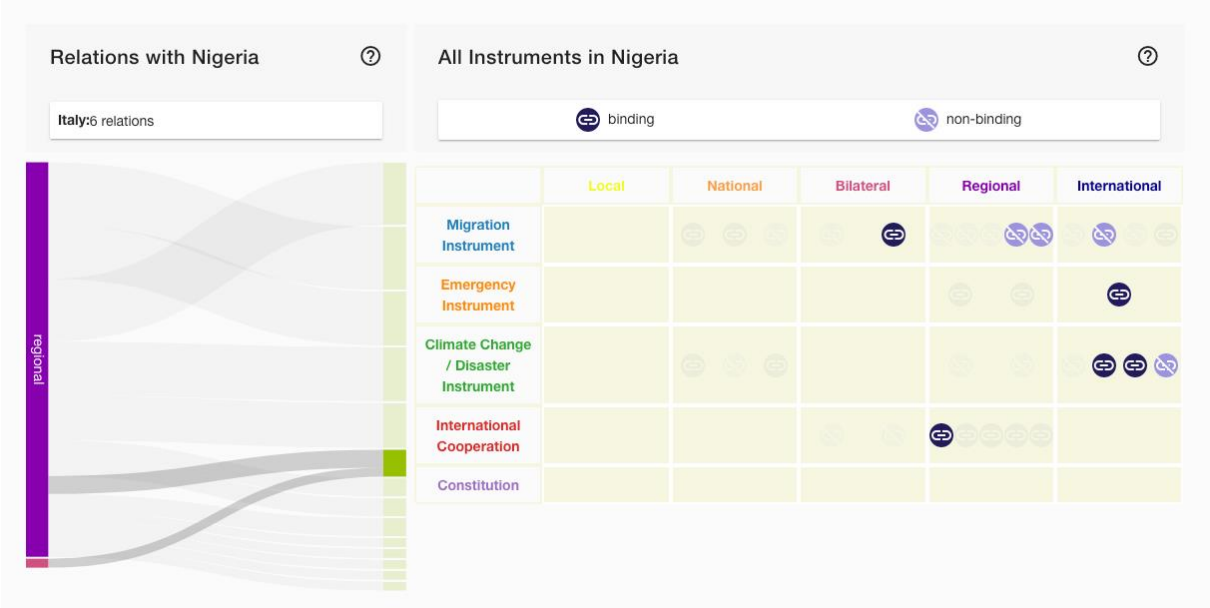


Figure 13 - Sankey diagram and matrix

Finally, the matrix is almost entirely similar to the previous prototype, with the exception of the colours used to encode the binding or non-binding status of the instruments. Clicking on an instrument in the matrix opens up a window with all its details, as seen in Figure 14.

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

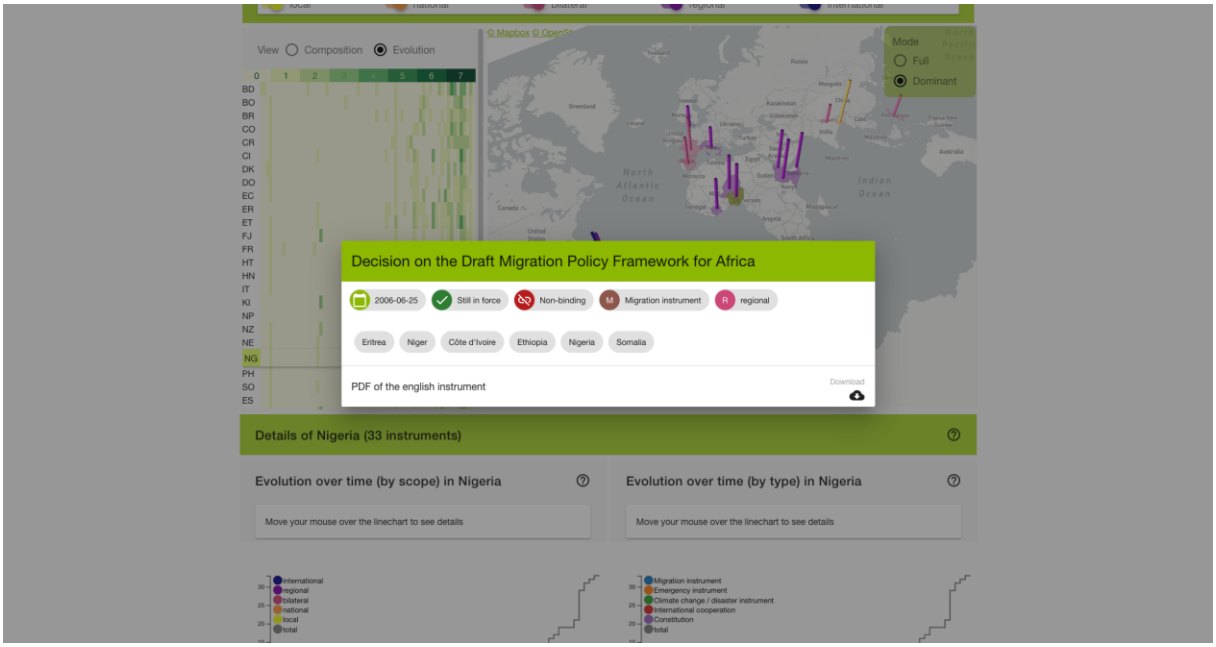


Figure 14 Section of an instrument

Technology

The Interactive Maps are a dedicated Node.js application that relies on the following technologies:

- **Vue.js, Vuetify, Nuxt.js**: see the CLISEL Data "Front-end technologies" section for more about those technologies.
- **D3.js**: *JavaScript* library bundled with various data visualization algorithms. D3 is used to compute
  - both colour schemes
  - the data used for both line charts
  - the data used for the Sankey diagram.
- **Deck.gl**: *JavaScript* library used to build various data layers on top of maps. From a technological perspective, it relies on *WebGL*, an API used to display advanced graphics on the web.
- **Mapbox**: *Mapbox* is an online service that provides maps to use in web applications. The base layer of the choropleth map relies on its data.

The data used by the Interactive Maps are provided by CLISEL Data (see the "CLISEL Data" section), eliminating the need for a complex back-end.

4. The end-user-centred phase of the Interactive Maps

As explained in the methodological sections, the CLISEL Interactive Maps have been built up taking into account the feedback of interested stakeholders, as well as of potential end-users of the Maps (primarily, policy-makers and academic experts in the relevant fields of research). During the first phase of the project, the UBERN team devoted substantial effort to the collection and mapping of instruments as part

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

of the preparations for CLISEL's Workshop 3 "Migration as adaptation?" (held on 21 April 2017 – see WP4) at the University of Cagliari, Italy. A preliminary mapping exercise was undertaken and information was disseminated to all stakeholders involved in this activity.

During the second phase, UBERN's *ad hoc* activities involved potential end-users during the drafting process of the mapping exercise by displaying the **CLISEL poster** during each meeting and donating a copy to each of the municipalities that welcomed us (Annex 2).

In particular, UBERN presented the mapping exercise as part of the description of the CLISEL Tool Box during the series of workshops organized in Italy on ' Migration and climate change: the role of local authorities at the national, European and international level' held on:

- 26 June 2018 at Cinquefrondi Municipality (Calabria Region);
- 28 June at Isca sullo Ionio Fraz. Marina (Calabria Region);
- 31 July 2018 at Calceranica al Lago (in the province of Trento, Trentino Alto Adige Region);
- 20 September 2018 at Oristano (Sardinia Region);
- 28 September 2018 at Turin (Piedmont).

After a preliminary illustration of our CLISEL Tool Box a short questionnaire was circulated among all the participants at each workshop. The positive opinions on the relevance of this mapping exercise led us to include them in the CLISEL Travel App.

More recently, an *ad hoc* activity for gathering feedback from high-level experts was held during the training activity organized by UBERN in Naples on "Migration governance issues: Local authorities at the frontline in times of climate change and security", which took place in Naples, Italy, from 13–14 December 2018. The organization of this training module involved representatives of local authorities in Naples and the Campania region, as well as high-level experts in the field who joined the training session. Part of the training was dedicated to the presentation of the CLISEL Tool Box with all its instruments. Participants were also asked to fill in the CLISEL Tool Box questionnaire (see Annex 3), in order to gather the relevant feedback for its implementation.

THE CLISEL TOOL BOX

The CLISEL Tool Box includes all the operational instruments that have been developed by the project

1- Based on the introduction to the project, do you think the CLISEL Tool Box would be a useful instrument for keeping up to date on the topics related to migration, security and climate change?
O Very useful
O Somewhat useful
O Not very useful
O Not useful at all
O I don't know

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

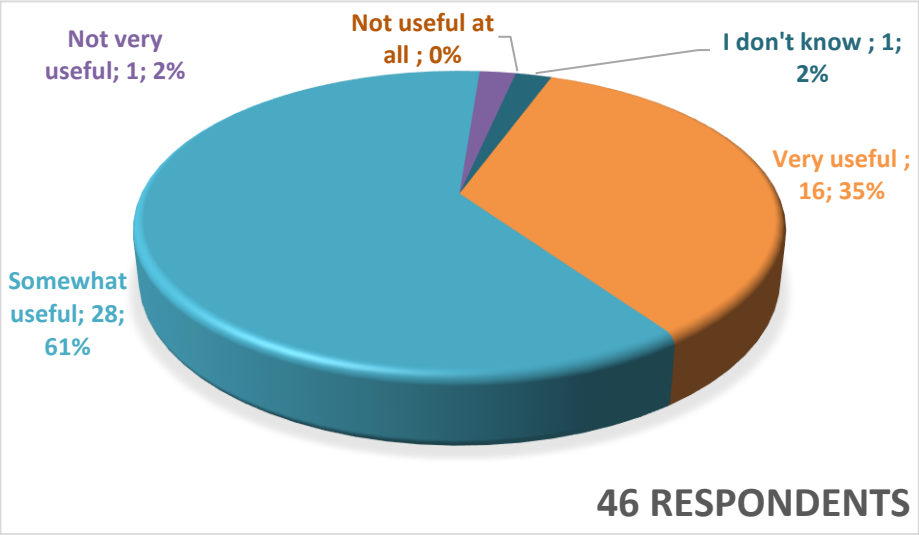


Fig. 15. Results of the Tool Box questionnaire - question 1

2- When you draft a political and/or normative document on migration and/or climate change issues, you prefer to consult [select all the options that are true for you]

O Web search engines
O Paper databases/archives
O Electronic databases/archives
O Other (please specify)_____

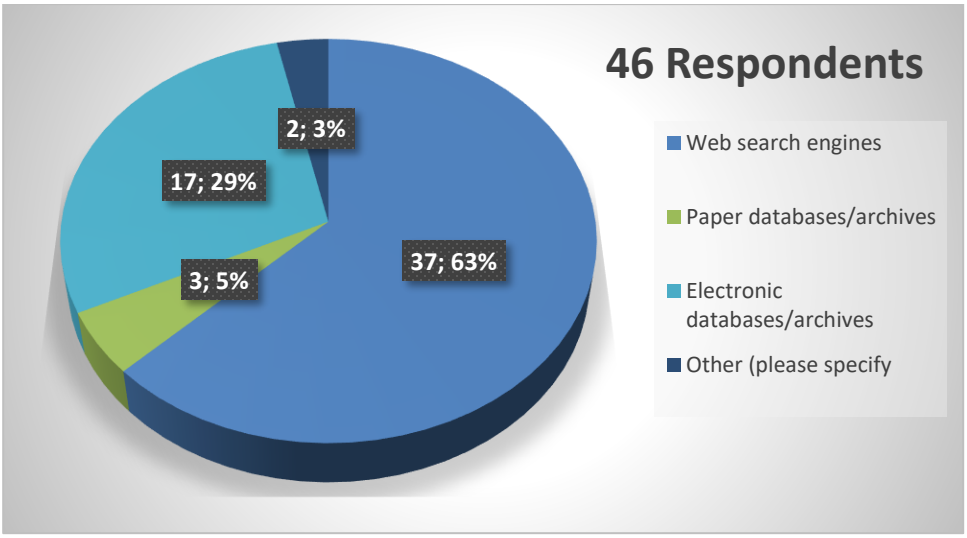


Fig.16. Results of the Tool Box questionnaire – question 2

3- The documents that you normally consult and/or you need when you deal with migration and/or climate change issues are [select all the options that are true for you]

O Municipal
O National

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

O European
O From different European legislations
O From different extra-European legislations
o International

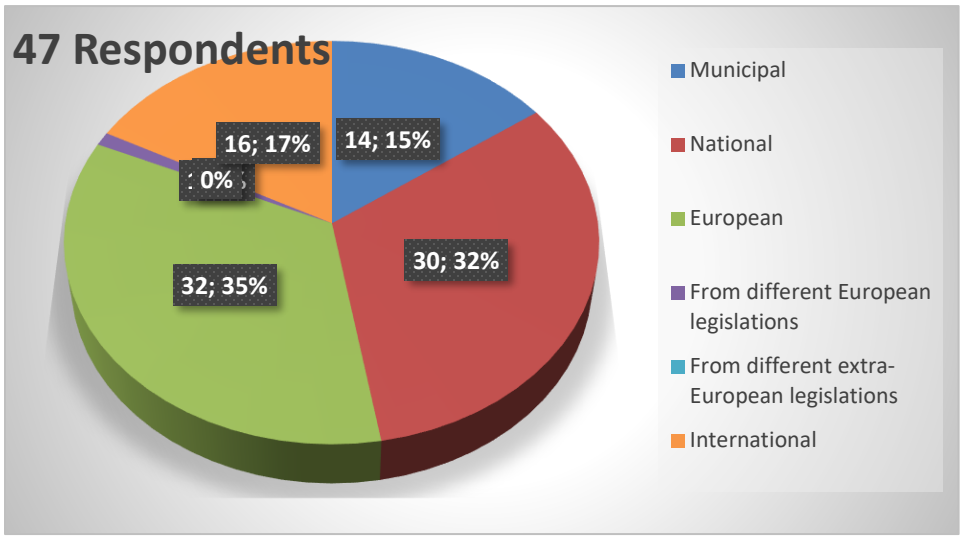


Fig.17. Results of the Tool Box questionnaire – question 3

4- As an alternative and/or in addition to the instruments mentioned in the previous questions, do you think that the CLISEL Tool Box would be useful to you?

O Very useful
O Somewhat useful
O Not very useful
O Not useful at all
O I don't know

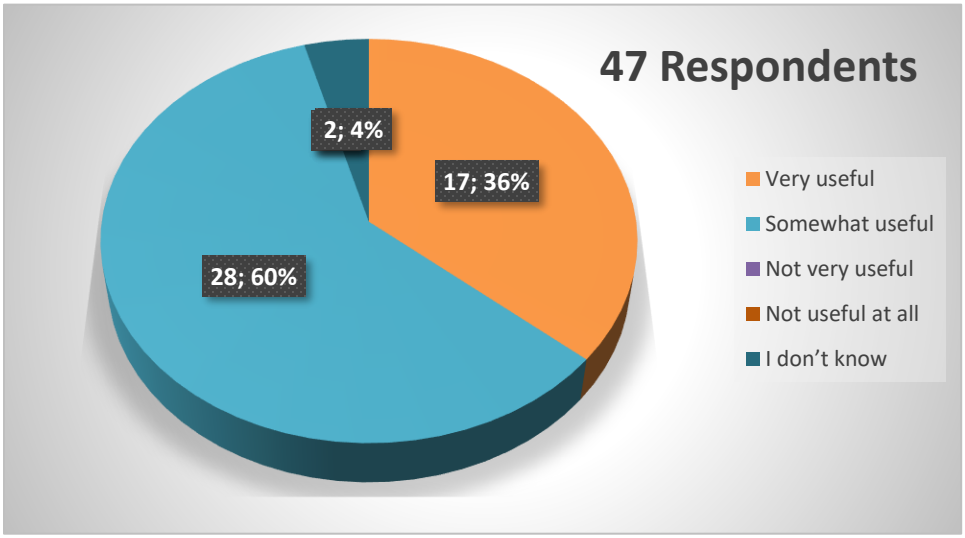


Fig. 18. Results of the Tool Box questionnaire – question 4

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

Interactive Maps The CLISEL Interactive Maps offer a geographical overview of the current normative and political instruments that have been adopted on issues linked to climate change, migration and security.

8- Taking into account that the CLISEL Interactive Maps will offer the possibility to consult political and normative instruments from European and extra-European legislation, do you think that they could be useful for consultation on topics linked to migration and/or climate change?

O Yes
O No
O Maybe
O Other

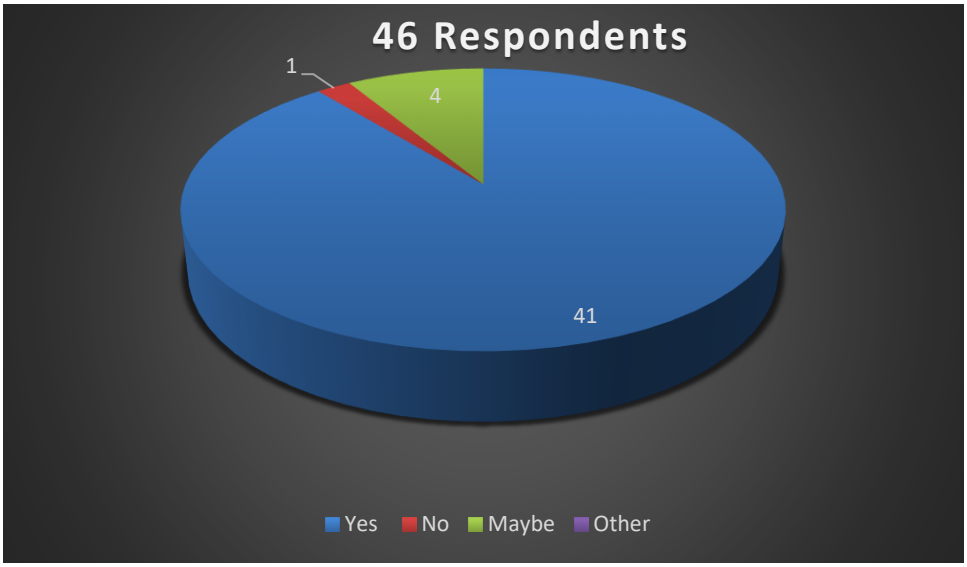


Fig.19. Results of the Tool Box questionnaire – question 8

The results to this question were overwhelmingly positive (with 41 out of 46 respondents answering 'yes'), and reflected the great interest in the CLISEL Interactive Maps that was also expressed during the presentations at each and every workshop. During the training activities in Naples, we raised some specific questions on the finalization of our prototype and in particular we tried to explore the relevance of a regional focus.

The mapping exercise was shared and discussed with key stakeholders at the international level. In particular, UBERN was invited to provide insights into the elaboration of the recommendations of the UNFCCC Task Force on Disaster Displacement, and to submit an input statement to the Human Rights Council and during the drafting process of the Global Compact for Migration.

The following input statements have been submitted by the UBERN team:

- ✓ **Elisa Fornalé, C. Doebbler, N. Rehouma, A. Yildiz and Federica Cristani** "Contribution to the OHCHR Questionnaire in relation to Human Rights Council Resolution A/HRC/35/20 on human rights and climate change (published online in April 2018), available at

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

http://www.ohchr.org/Documents/Issues/ClimateChange/Protection/WorldTradeInstituteUniversityBerne.pdf;

- ✓ **Elisa Fornalé and Federica Cristani** "Recommendations addressing displacement in the context of disasters and the adverse impacts of climate change (May 2018), Submission to the Task Force on Displacement Stakeholder Meeting, 14–15 May 2018, Bogis-Bossey (CH)", available online at http://www.environmentalmigration.iom.int/sites/default/files/Final_Task%20Force_Contribution_31_05_2018.pdf.

An ad hoc feedback and testing session was organized during the international conference on "Connecting Environmental Changes and Human Mobility as a Way to Draw New Maps of Knowledge", which took place from 3–6 March 2019 at the Congress Centre Monte Verità, Ascona (Annex 1).

In particular, on 4 March 2019, Pierre Vanhulst (UBERN) held a dedicated session on the illustration of the first prototype of the CLISEL Interactive Maps "Collaborative analysis of data visualisations: Structuring exchanges between participants for better insights". The aim was to interact with all our participants by giving them the opportunity to use the innovative tool of "end-users annotations", after explaining the background idea and methodology, as well as the specific software and code development.

The audience – which comprised high-level experts and academics in the field, as well as Italian policy-makers – was invited to use the prototype (accessible at the address https://clisel-wp3.vanhulst.one/) on their own laptops. The CLISEL Interactive Maps include an 'annotation' section, where each user is encouraged to leave comments on the prototype. All the comments received were very useful for the testing and finalization of the tool.

Fig. 20. Pierre Vanhulst presents at the conference in Ascona

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

At the same conference, Dr Loddo shared the salient results of her mapping exercise on South Asia, in her presentation “Planning the future – facing the emergencies: The legislation on climate change and migration in the Philippines, Bangladesh and Nepal”.

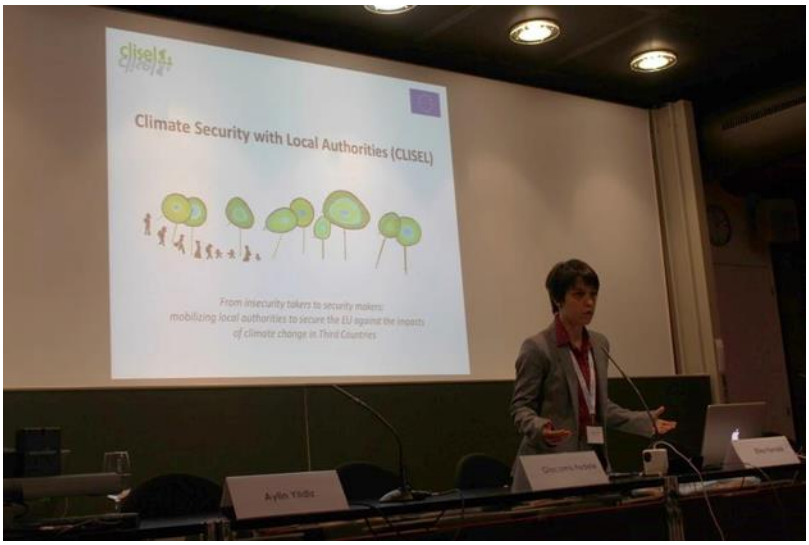


Fig. 21. Dr Loddo presents at the conference in Ascona

All the above-mentioned activities and events enabled not only the presentation of the mapping exercise to the relevant national, European and international stakeholders, but were also opportunities for a dialogue on the best practices collected and the identification of further instruments for inclusion in the Interactive Maps.

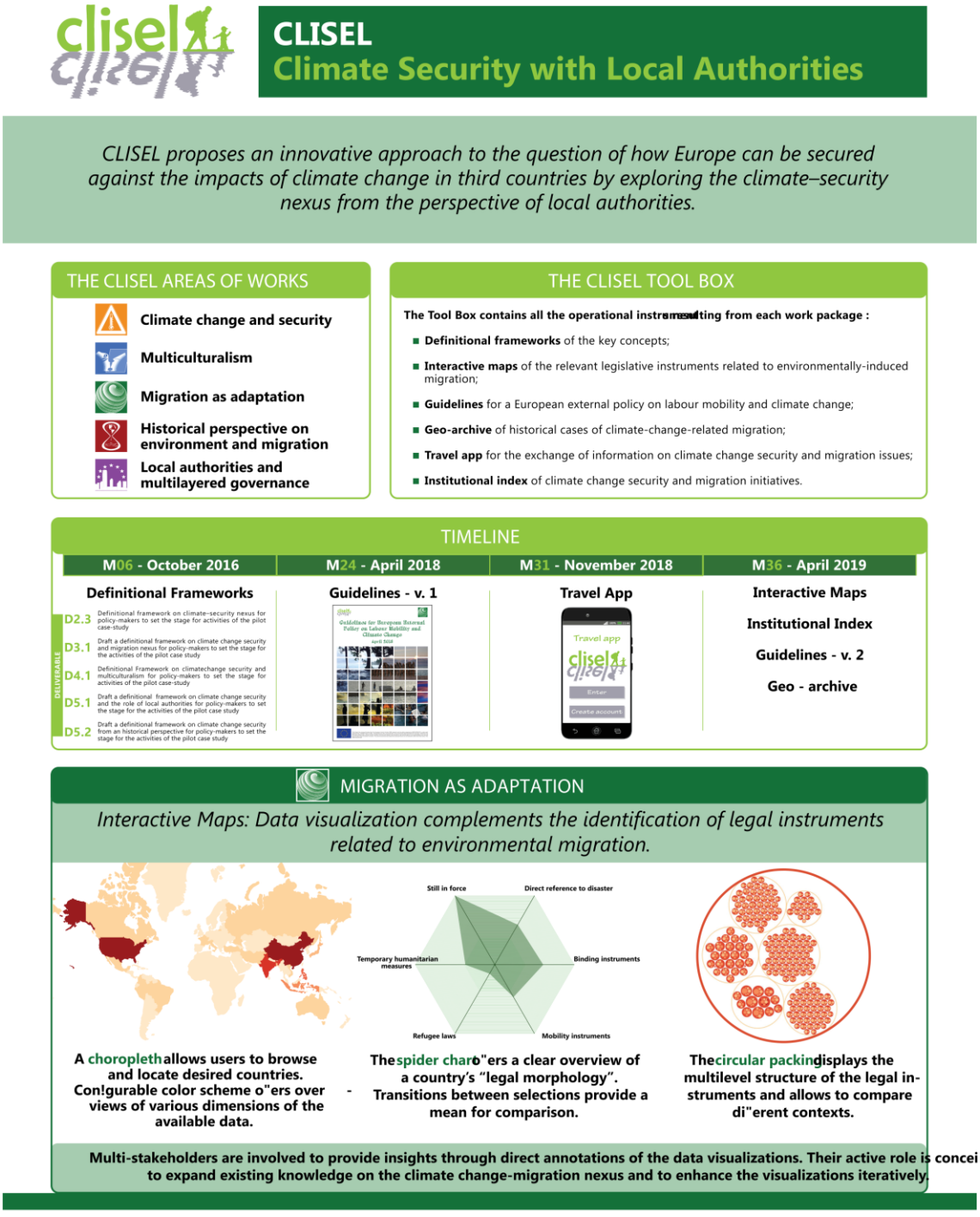
Linking the CLISEL Interactive Maps to other instruments of the CLISEL Tool Box: the Travel App

As already mentioned, workshops with potential end-users of the CLISEL Interactive Maps were held at the same time as the user-testing phase of the CLISEL Travel App. This was very useful, given that the CLISEL Interactive Maps can be consulted through the CLISEL Travel App (for the detailed description of the section of the CLISEL Travel App dedicated to the Interactive Maps, see Deliverable D5.6). Every time the CLISEL Interactive Maps are updated, the corresponding section of the Interactive Maps of the CLISEL Travel App reproduces the update, thanks to a synchronization system. Moreover, thanks to the ‘Connect’ section of the CLISEL Travel App, the users of the mobile app can contact other users – including experts and academics that are using the same application – in order to get more information on the instruments included in the Travel App/Interactive Maps or to give updates and feedback on the instruments already included to the CLISEL team.

This Project has received funding from the European Union’s Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors’ view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

Annex 1.

CLISEL poster



This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

Annex 2.

Questionnaire on the CLISEL Tool Box

QUESTIONNAIRE ON THE CLIMATE-SECURITY TOOL BOX

We ask you to kindly take a few minutes to fill in this questionnaire. The questionnaire is totally anonymous.
You are Male Female Age
Occupation_____
You normally use a smartphone YES or NO

How often do you use Mobile Applications on your smartphone?
o Often
o Sometimes
o Rarely
o Never

THE CLISEL TOOL BOX

The CLISEL Tool Box includes all the operational instruments that have been developed by the project.
1- Based on the introduction to the project, do you think the CLISEL Tool Box would be a useful instrument for keeping up to date on the topics related to migration, security and climate change?
o Very useful
o Somewhat useful
o Not very useful
o Not useful at all
o I don't know

2- When you draft a political and/or normative document on migration and/or climate change issues, you prefer to consult [select all the options that are true for you]
o Web search engines
o Paper databases/archives
o Electronic databases/archives
o Other (please specify)_____

3- The documents that you normally consult and/or you need when you deal with migration and/or climate change issues are [select all the options that are true for you]
o Municipal
o National
o European
o From different European legislations
o From different extra-European legislations
o International

4- As an alternative and/or in addition to the instruments mentioned in the previous questions, do you think that the CLISEL Tool Box would be useful to you?
o Very useful
o Somewhat useful
o Not very useful
o Not useful at all
o I don't know

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

CLISEL TRAVEL APP

The CLISEL Travel App has been conceived as an interactive instrument that enables exchange of information and communication on topics linked to climate change, migration and security.

5- Based on the info provided in the introduction, do you think that it could be useful to use the CLISEL Tool Box off-line with the Travel App?
- o Very useful
- o Somewhat useful
- o Not very useful
- o Not useful at all
- o I don't know

6- If the Travel App could connect you with other users would you use this possibility?
- o Yes
- o No
- o Maybe
- o Other

7- Do you think it is useful to share with other end-users info on the territory where they live?
- o Yes
- o No
- o Maybe
- o Other

INTERACTIVE MAPS

The CLISEL Interactive Maps offer a geographical overview of the current normative and political instruments that have been adopted on issues linked to climate change, migration and security.

8- Taking into account that the CLISEL Interactive Maps will offer the possibility to consult political and normative instruments from European and extra-European legislation, do you think that they could be useful for consultation on topics linked to migration and/or climate change?
- o Yes
- o No
- o Maybe
- o Other

INSTITUTIONAL INDEX

The CLISEL Institutional Index will progressively map all institutional initiatives and programmes at the local, national, regional and international levels that deal with climate change, migration and security.

9 - Do you think consultation would be easier, if the Institutional Index was:
a- thematic
b- extensive
c- less extensive

10- Select the initiatives that you know, or would like to know more about:
- o Euro-Mediterranean Regional and Local Assembly (ARLEM)
- o Italian Association for the Council of the European local and regional authorities [*Associazoine italiana per il consiglio dei comuni e delle regioni d'Europa – AICCRE*]
- o C40 Climate Leadership Group
- o Council of European Municipalities and Regions (CEMR)
- o EU Capital Mayors meetings
- o Europe2020 Monitoring Platform
- o European Migration Network

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.

o European Regional and Local Authorities on Asylum and Immigration – ERLAI
o Global Parliament of Mayors
o International Council for Local Environmental Initiatives – Local Governments for Sustainability – ICLEI
o International Urban Cooperation
o Mayoral Forum on Mobility, Migration and Development
o Mayors for Peace
o Covenant of Mayors
o Solidarity Network of Municipalities RECOSOL [*Rete dei Comuni solidali: Comuni della Terra per il Mondo*]
o World Organization of United Cities and Local Governments – UCLG

11- Do you know of any additional initiatives around the themes of climate change and migration? (Please list)

_____
_____

12- Would you like to learn more about participating in any of the above-mentioned organizations?
o If Yes, which?_____
o No

This Project has received funding from the European Union's Horizon2020 research and innovation programme H2020-DRS-2015, under grant agreement No. 700385 Project CLISEL, Climate Security with Local Authorities, and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 16.0038.
This document reflects only the authors' view and the Agency is not responsible for any use that may be made of the information it contains.
The opinions expressed and arguments employed herein do not necessarily reflect the official views of the Swiss Government.