PLACARD first version of digital CCA & DRR landscape visualisation

Sukaina Bharwani, Richard Taylor, Rob Lokers, Joske Houtkamp, Julia Barrott, Eleni Karali & Dragana Bojovic

SEI-Oxford, Alterra and CMCC

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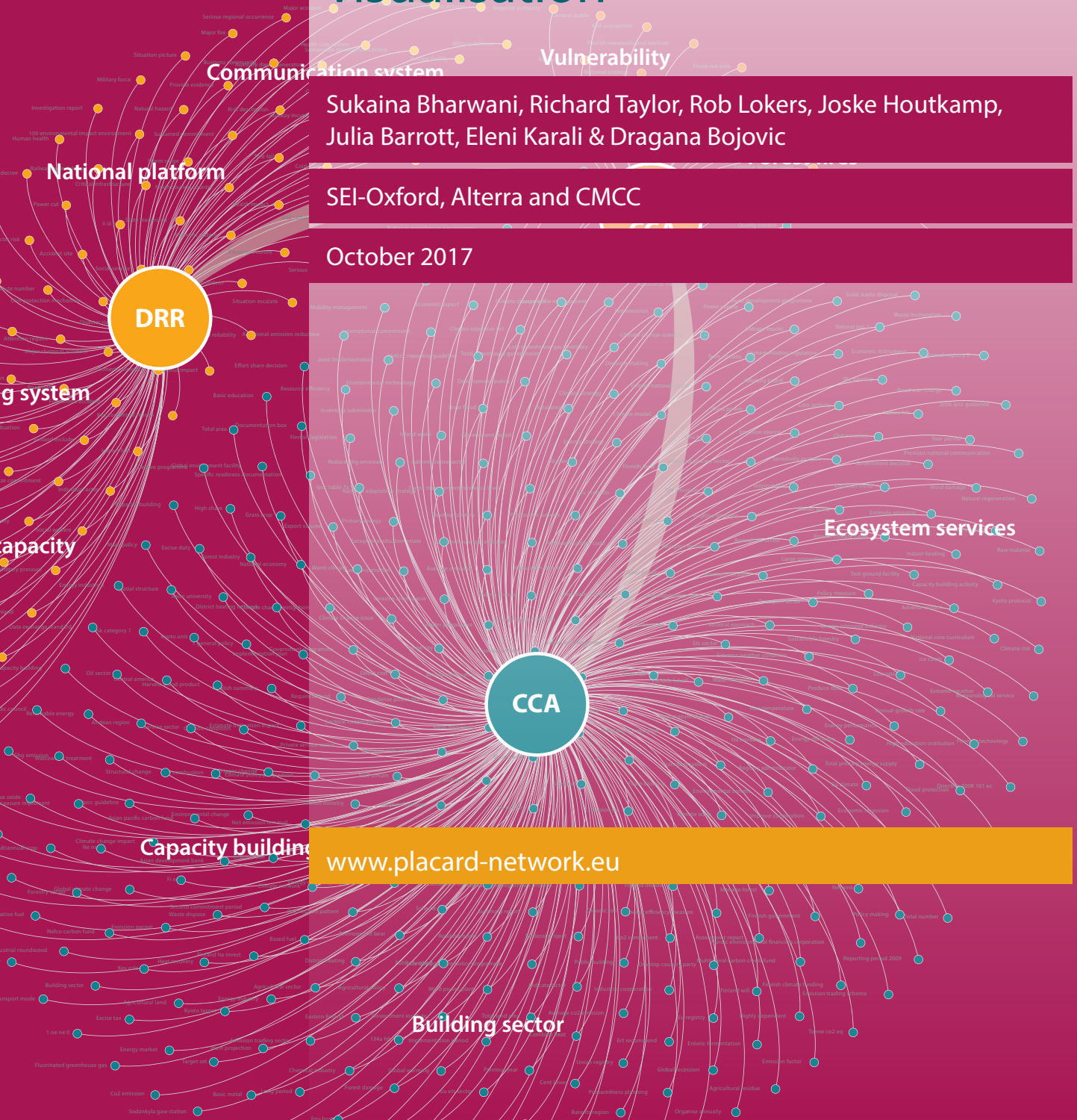

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Contents

Introduction

This milestone report describes a methodology developed to better understand the needs of potential users of a "visual landscape" (Task 6.2) for climate change adaptation (CCA) and disaster risk reduction (DRR). The first version of this landscape (MS23) builds on the first iteration of two analyses: the "Stakeholder and boundary organisations, knowledge Platforms, policy and research Initiatives, existing Networks/ partnerships and End user needs" (SPINE) analysis, led by Helmholtz-Zentrum Fuer Umwelforschung (UFZ); and the social network analysis (SNA) led by the Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC), both in Work Package 2. This version of the visual landscape translates the social network analysis into a live and interactive online webpage. Ongoing discussions within the PLACARD consortium and with stakeholders have provided ideas on how this visualisation could be further extended to increase its utility for CCA and DRR decision-makers.

An extension of the approach is to collate project summaries from key CCA and DRR online platforms to better understand who is doing what in both domains, and where the synergies and gaps lie. In so doing, opportunities for better collaboration and communication will be identified. This approach will also enable the crowdsourcing of language and terminology used in the project descriptions (e.g. keywords applied to all content on these platforms), thereby also contributing to the development of information and knowledge exchange standards necessary in PLACARD (D4.1). The visual landscape will drive traffic back to each online platform providing this source data, to encourage collaboration, coordination and communication between both CCA and DRR actors and activities.

The report begins with an explanation of: challenges to collaboration, coordination and communication in the fields of CCA and DRR; results from the social network analysis thus far; the translation to an online, interactive version; methods to elicit user needs; the roles terminology and language standardisation can play; wireframe diagrams illustrating potential versions of the tool, and explaining how these may address challenges identified both in the literature and by users; and, a discussion of next steps and action points. This milestone presents a first version of the landscape, which will be further refined based on feedback from interviews, an online survey and stakeholder meetings in October 2017.

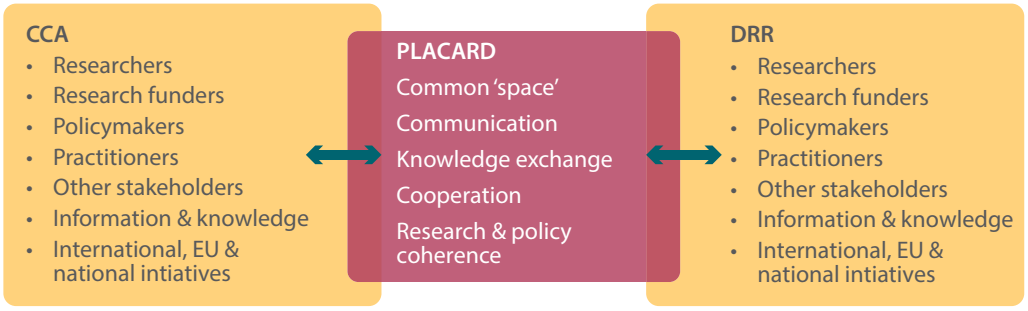
The CCA-DRR challenge

Activities between the CCA and DRR communities overlap, but fragmentation persists when it comes to research, policy-making and practice. Both communities attempt to reduce the negative impacts of climate change and disasters, but do so through different actors and institutions, and with different time horizons, research methodologies and policy frameworks. These differences are compounded by information overload through the multiple channels of dissemination and communication within each community. This can ultimately lead to: inefficient use of resources; duplication of initiatives; incoherence in mainstream policy and practice; missed opportunities for learning and cooperation; conflicts and barriers between CCA and DRR (prevention); and, general miscommunication between the domains and a complex landscape of actors – in summary, a lack of collaboration, coordination and effective communication. All of these factors impede the ability of research to make the transition into action.

It is interesting to note that in a post-conference survey conducted after the Adaptation Future conference in 2016, some respondents reported that a major impediment to successful and effective CCA actions stemmed from "confusion of concepts within adaptation science and/or lack of clarity and overlap with development, disaster risk and mitigation agendas." This and other similar feedback led us to carefully consider how PLACARD might also address the issue of the potential confusion surrounding key concepts.

PLACARD seeks to address these challenges by creating a way for these two communities to communicate more effectively. PLACARD will create a comprehensive knowledge-exchange platform – the PLACARD online connectivity hub – to enhance dialogue between CCA and DRR stakeholders. The platform seeks to address gaps in, and support for, the development and implementation of an evidence base for "actionable learning". Thus, the platform ultimately seeks to increase effectiveness of CCA and DRR research and practice in a range of ways (see Figure 1).

Figure 1: How PLACARD seeks to enhance the cooperation between CCA & DRR



Interactive visualisation of Social Network Analysis (SNA)

The task builds on insights from the first iteration of the two analyses (SPINE and SNA), both of which map actors as opposed to activities of the actors per se. The above-mentioned analyses have been described in detailed in MS9 and MS10. Thus far, the results of these tasks have identified the actors in the European CCA and DRR communities that serve as key bridges, influencers, and conduits for communication and collaboration. Results from this first draft of the visual landscape will also provide input for a second round of both analyses in terms of the additional data required to create visualisations of "who is doing what, where" as well as "who is linked to whom".

Milestone MS23 launches a first digital version of the CCA and DRR landscape visualisation. This has involved providing an online version of the social network analysis. Over the coming months, feedback from PLACARD partners and potential users of the tool will inform the expansion of the visualisation, which will incorporate new data into the network database.

Key results of the first round of the Social Network Analysis (Milestone 10)

Social network metrics were calculated to quantitatively assess the roles of different actors in the network and their interrelationships. In particular, CMCC focused on centrality measures (degree, in-degree, betweenness and eigenvector) that are considered good indicators of actors' power position. "Power", here is defined in a very broad sense to mean the strength of the role played by an actor in influencing interactions in the social network.

Box 1: Explanations of social network metrics

Degree centrality – the measure of the total number of edges (links) connected to a particular node – a good indicator of ability of an actor to communicate directly with others in the network and transfer information.

In-degree centrality – does not consider an actor's own assessment, but only interactions that other actors specified having with this actor.

Betweenness centrality – a measure showing how often a given node lies on the shortest path between two other nodes – can represent the control of an actor over connections or the ability of an actor to restrict connections in the network. A node with high betweenness centrality has the power to connect disconnected groups, to broker opinions and to control information flow.

Eigenvector centrality – assigns relative scores to all nodes in a network based on the principle that connections to high-scoring nodes contribute more to the score of the node in question than an equal number of connections to low-scoring nodes. It accounts not only for the node's own degree, but also the degrees of the nodes to which it connects.

Source: PLACARD Milestone MS10

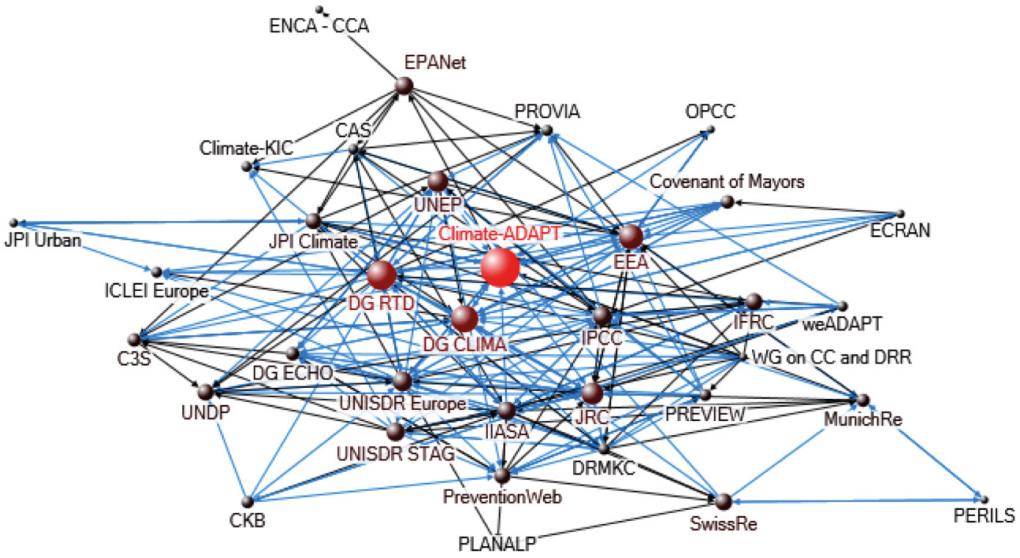


Figure 2: Social Network Analysis based on intensive communication and collaboration, presenting betweenness centrality – in effect visually showing which actors have the most relative power to connect disconnected groups, broker opinions and control information flows. Node size and colour are determined by the node's betweenness centrality value, indicating the influence that an actor might have on the way that actors connect in each network. Strong communication is represented with black and strong collaboration with blue edges (PLACARD Milestone MS10).

Thus, the analysis includes data about the existence of relationships, the frequency, intensity, and type of interaction, and whether these relationships are mainly related to the fields of DRR or CCA, or both ("types of relationships").

An interactive version of the analysis (see Figure 3 and 4) was made with the "igraph" and "visNetwork" packages for "R Statistical Software". This provides an overview of the central nodes of most importance or influence over collaboration and communication flows and what type of interactions they have – "DRR" or "CCA" as mentioned in MS10. Detailed steps for creating this online visualisation are included in Annex 1, and further details about the SNA itself are available in PLACARD Milestone "MS10 First version of the network database and related documentation".

The Climate-ADAPT platform, shown with the large red node, emerged as the actor with the highest degree, betweenness and eigenvector centrality, thus showing a relevant role in communicating with the actors involved in the survey and setting up communication with those that do not have reciprocal interactions. Figure 2 illustrates this, pointing out those actors who have the power to connect disconnected groups, broker opinions and control information flow. Other key actors identified were: the Directorate-General for Research and Innovation (DG RTD), the European Environment Agency (EEA), and the Directorate-General for Climate Action (DG CLIMA). The actor with the highest in-degree – that is, the number of ties that others specified they had with them – was DG CLIMA, followed by EEA and IPCC.

The web page provides an alternative way of looking at the same data used in Figure 2 and in the analysis of MS10. Figure 3 shows the whole network, with UNISDR.Europe having the highest degree centrality and betweenness centrality. Figure 4 shows the selection of the CCA nodes (coloured yellow) and their out-links. Note there are differences in some aspects of this visualisation (e.g. degree centrality and betweenness centrality measures) relative to MS10. In the interactive online version, interactions that respondents reported to said happened only infrequently (i.e. from time-to-time), relationships, (i.e. links) were not included,[1] due the resulting density of the network which is difficult to visualise. The sensitivity to this slight change of the different CCA and DRR actors that emerge as the biggest connectors (Climate-ADAPT or UNISDR) is in itself interesting.

Figure 3: Interactive online visualisation of the SNA shown in Figure 2.

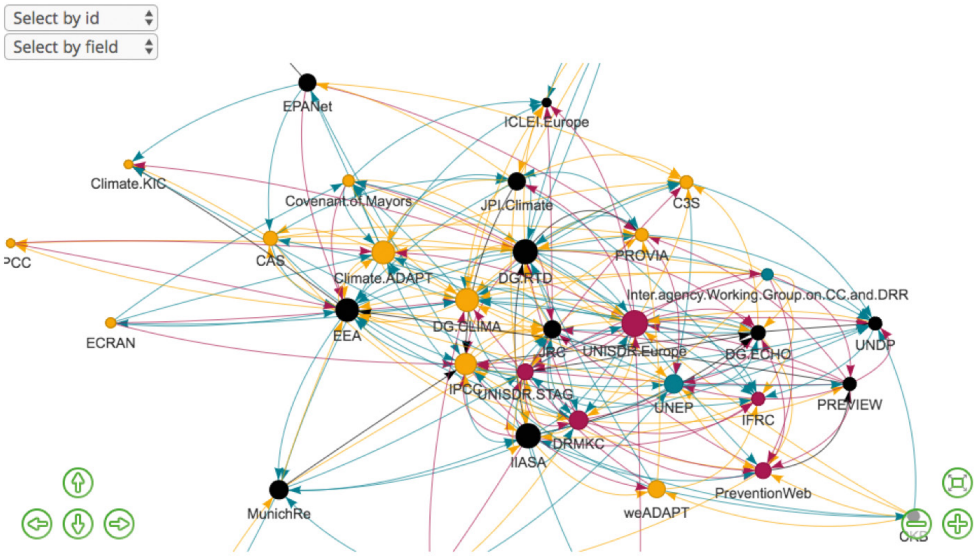
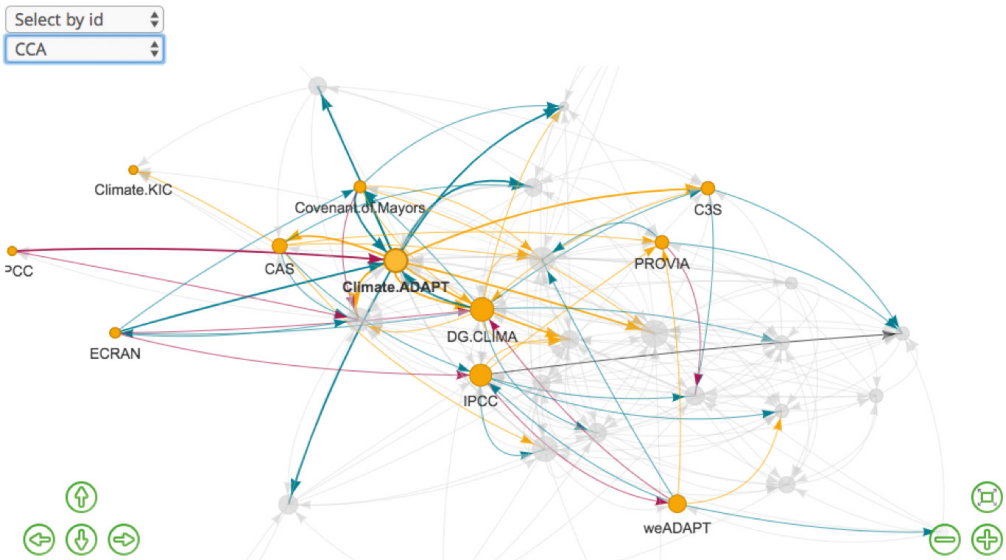


Figure 4: Interactive online visualisation of the SNA shown in Figure 2.



1 Possible responses were:

I am aware that this actor exists, but to my knowledge, we do not have any contact with them

Myself and/or my colleagues communicate with this actor from time to time

Myself and/or my colleagues have frequent communication exchange with this actor

Myself and/or my colleagues collaborate with this actor from time to time

Myself and/or my colleagues have regular and/or institutional collaborations with this actor

PLACARD landscape visualisation

The aim of the final deliverable (D6.4), due in May 2018, is to reduce this fragmentation by visualising the landscape of CCA-DRR activity in Europe, in a structured and standardized way to support better communication, collaboration, and coordination. This is timely and should also have a legacy beyond the lifetime of PLACARD. The final visualisation will build on this milestone (MS23), as well as feedback from: PLACARD partners and stakeholders; results from the second iteration of the SPINE and the SNA; user interviews; an online survey; development of a CCA-DRR taxonomy; and, collaborations with online platforms such as Climate-ADAPT, PreventionWeb and weADAPT. The second iteration of the SNA will focus on four European countries and will explore i) the interactions among actors within each country and, ii) the one-way interactions of these actors with the most important actors at the 'European level' as identified from the the first round of the SNA.

As an important first step, we consulted partners working in the two fields in an attempt to better understand what the focus of further visualisation tasks should be. Several key engagements, interviews and an online survey provided insights into the needs of users that could potentially benefit from a PLACARD visual landscape. This allowed us to narrow the focus and to concentrate on key areas to visualise.

Identifying users and exploring their needs

The second General Assembly (held in Leipzig in June 2016 – Deliverable D7.2) agreed that the national level would be a useful scale as a focus for PLACARD when addressing concrete recommendations about the integration of the CCA and DRR domains (e.g. the green intersection of the triangles in Figure 5).

Next, the project conducted interviews to provide feedback about the "visualised landscape", specifically how it could look, and how it could be useful to national-level decision-makers.

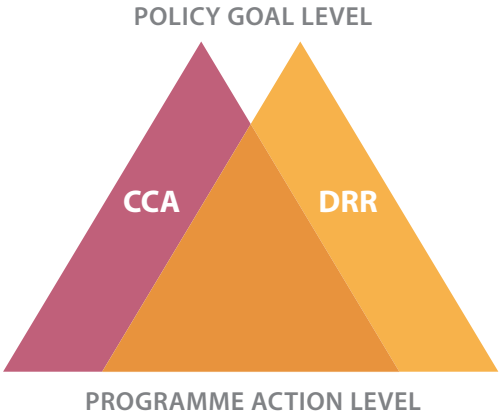


Figure 5: Relationship between climate change adaptation and disaster risk reduction, UNISDR (2009).

A survey of potential users was also carried out to explore current barriers to effective collaboration between the fields of CCA-DRR to guide what would be important to include in the visualisation.

This was followed by analysis of national level CCA-DRR reports (see Section xx).

Interview methodology and planned survey

In June and August 2017, Skype interviews were held with four potential users who had been selected based on stakeholder analysis and expert judgement (input of project members). To achieve a balanced representation of expected users in different domains, and their information needs, four additional interviews have been scheduled in September and October.

The interviewees who participated in July and August represent planners and policy advisors in different areas of the CCA and DRR domains: flood risk prevention, fire risk prevention, regional water management, and humanitarian protection. They are employed by NGOs, network organisations or research initiatives in France, Germany, The Netherlands and Spain. They already search for and apply knowledge from both CCA and DRR for their specific sectors.

The purpose of the interviews is twofold: to identify users' information needs regarding the content the visualisation should offer, and to understand how the information representation could best support them in their search or exploration of this content. The questions refer to the type of information users require in their work, which information sources they currently use, how information is represented, the usefulness of the representation, and which information is now missing from available sources.

The results in the first place confirm that the interviewees currently struggle with finding the information they need for their activities in planning and policy making, that they regard it as a wearisome task, and that they are concerned that they miss important information in the multitude of available websites and databases. Moreover, the outcomes show that these future users require information on **activities of organisations** in the CCA and DRR domains, on **roles and responsibilities** of actors in existing networks, and on **case studies and lessons learned** from them. The presentation or visualisation should make the large amount of information on CCA and DRR actors easily accessible and understandable. It should present a simple, uncomplicated overview, and offer more details and information on drilling down. Finally, the presentation or visualisation should take **language barriers** into account because many users may not read English fluently.

At several opportunities such as conferences and workshops, informal interviews were held to further understand how the visualisation could support communication and collaboration among CCA and DRR stakeholders.

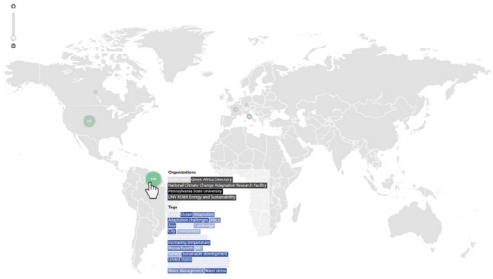
From the interview results we determine not only major requirements for the visualisation, but also create a small number of typical users (= personas) with descriptions of how they would use the visualisation (user scenarios). These are used in the initial design phase to communicate the envisioned use of the application to stakeholders, and then again in the design and testing phases. The persona-scenario technique is effectively applied in user centered application design to ensure the application meets user requirements and to avoid a purely data-driven approach in the design process.

The design options resulting from the requirements analysis will be evaluated in an online survey with roughly 30 participants. Feedback from the survey will be used to improve the design before implementation begins in January 2018.

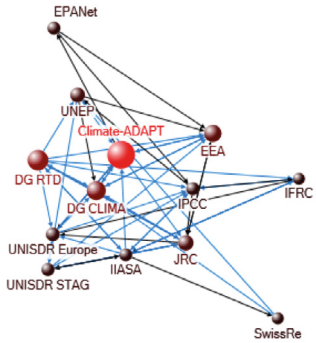
Example of stakeholder feedback

At a meeting of the ESPREssO project (held, in Bonn in May 2017), we posited some examples of ways to approach the CCA-DRR landscape visualisation task (Figure 6). We received valuable feedback on the potential utility overall and the specific types of visualisation that might be useful. A resounding 93% of participants agreed that some sort of CCA-DRR landscape visualisation would be useful for decision-makers. We explored the reservations of the remaining participants and integrated further questions, addressing potential concerns into our scoping process.

Figure 6: Example visualisations shared with stakeholders at the ESPREssO project meeting.



a) Visualising case studies on a map



b) Mapping actors and their relationships

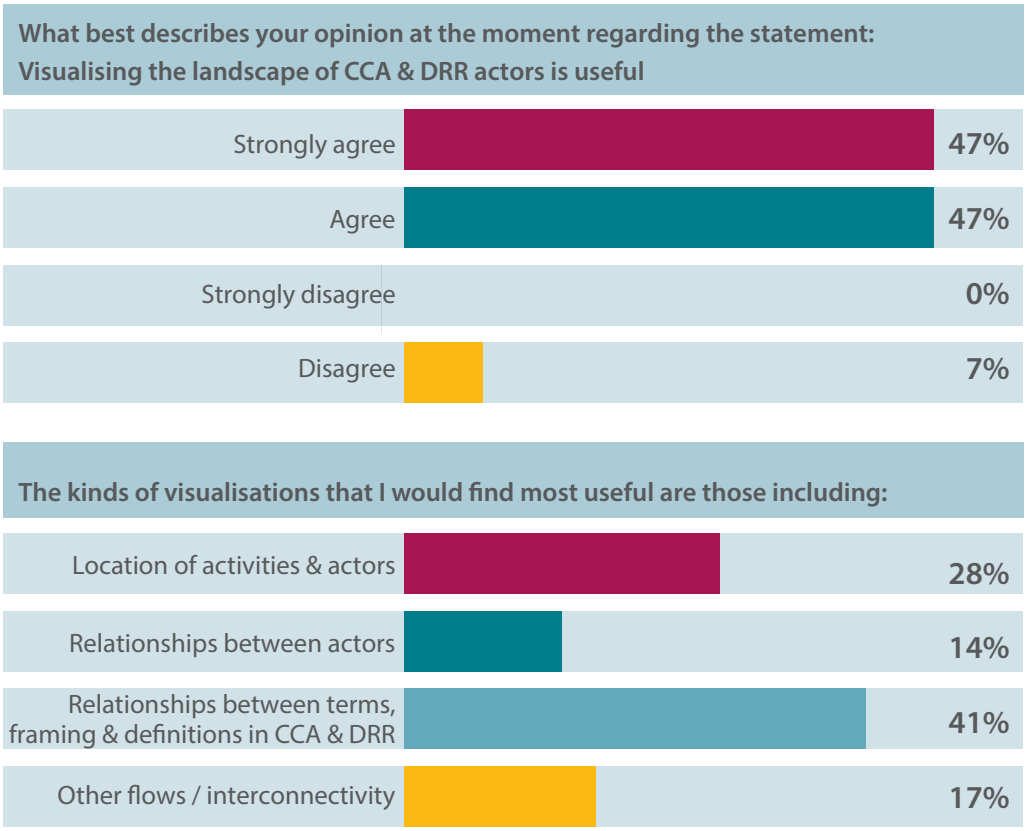
c) Visualising language and taxonomy

d) Visualising other kinds of flows

After viewing a wide array of possible visualisations, participants were asked to vote on "what" would be useful to visualise (Figure 7). Language, terminology and framing between the CCA and DRR communities emerged as key areas for which visualisation could prove helpful. In all, 41% of respondents chose these priority issues, a result that confirmed previous feedback. The location of actors was also deemed valuable to visualise. Other flows, and the relationships between actors, were considered less important.

Whilst this was a small sample of respondents, similar views on visualisations are being collected using interviews and a survey, as described above. Results from these two data collection tasks will feed into the design of the visual landscape. A first draft of the possible landscape (using wireframe diagrams), based on feedback so far, is shown in Section xx.

Figure 7: Feedback on the types of visualisations that would be useful (from the ESPREssO stakeholder meeting).



Language and terminology

In April 2015, PLACARD hosted a meeting in Brussels where some work on the use of terminology and language within the climate change adaptation and disaster risk reduction communities was presented. Three organisations – the Stockholm Environment Institute (SEI), the United Nations Office for Disaster Risk Reduction (UNISDR) and the Renewable Energy and Energy Efficiency Project (REEEP)[2] – shared the results of an experiment conducted on the use of terms across a set of documents from the PreventionWeb platform. They found that there was a large agreement between the terms used within the CCA and DRR documents. However, it became clear that although the same terms were sometimes being used, more research was required to understand whether the same terms were applied in different ways or were intended to mean different things.

SEI has some experience of mapping the CCA landscape, where network graph analysis allowed the visualisation of **actors/organisation**s working on particular "topics", which are represented by **keywords** in online articles from the climate change adaptation platform, weADAPT (Bharwani et al., 2015). This task takes the same approach, collating topics, organisations and case studies from across both CCA and DRR domains collaborating with online platforms, PreventionWeb, Climate-ADAPT, as well as weADAPT (PLACARD boundary panel members). The advantage of this approach is that it will allow us to explore the "confusion of concepts within adaptation science and/or lack of clarity and overlap with development, disaster risk and mitigation agendas" mentioned earlier. It will do this by analysing the keywords applied to each piece of content, and work towards raising awareness amongst the two communities about how terms are being used differently. Knowledge sharing and knowledge exchange standards emerging from this analysis will contribute towards "Guidelines for improved IKM" – D 4.1).

Finland – term extraction and visualisation

To focus on the national level, and using Finland as a prototype for this work, we applied data-mining algorithms (which rely on the Natural Language Toolkit – NLTK) and the Climate Tagger tool to extract key terms from several national CCA and DRR reports. Reports included CCA documents such as the Sixth National Communication to the United Nations Framework Convention on Climate Change (UNFCCC), and DRR documents such as the Post-2015 Framework for Disaster Risk Reduction report (HFA2) and the National Risk Assessment for Finland. Some visualisations of these term extractions are shown below.

2 Developers of the Climate Tagger tool: www.climatetagger.net

Preliminary analysis shows a clear division of terms between "context-led" and "outcome-led" framings of vulnerability between the two domains. Figure 8 clearly shows that many terms apply in only one domain. However, even in the overlapping region showing terms that are used in both domains, the same term may be used in different ways. Raising awareness about the ways in which language is used can be key to more effective planning, intervention, collaboration, coordination and communication. Some examples where this might be the case, emerged from the analysis of the Finnish reports:

- The term "vulnerability" is commonly used in both spheres, but the CCA report refers to "vulnerability assessment" whereas DRR documents emphasise "vulnerability reduction". This reflects the different "framings" of the two communities – outcome vulnerability (from hazards and risk management) versus contextual vulnerability, which is more about systemic and long-term risk/vulnerability reduction, e.g. through capacity building in the CCA domain. Ultimately differences in framing could affect both the planning and efficacy of responses.
- The word "protection" also occurs in both Finnish documents. The DRR report refers mainly to civil protection measures and mechanisms, such as the emergency services. The CCA report – the Sixth National Communication on Climate Change (6NC) – uses the term more frequently, and in the context of species and ecosystem protection – sometimes with reference to laws and policies, and other times with reference to water resources, such as flood and coastal protection. Thus, the view of "protection" in the CCA sphere again involves a longer-term, vulnerability-reduction view.
- In CCA documents, "floods" are considered in the context of vulnerability assessments, using flood maps. In the DRR documents, floods are mentioned with reference to flood forecasts, early warning systems, damage and insurance mechanisms. This stands in contrast to the CCA-oriented, long-term protection measures. That is, reduction of potential impact of the risk/hazard as opposed to overall more systemic risk reduction.

At the same time, the CCA document does address the ways in which floods will exacerbate other risks in the short term – such as, for example, affecting communication, power supplies, waste water treatment, road maintenance, transport infrastructure, and services for vulnerable populations, including the elderly, a focus of concern in Finland because of its ageing population. This balanced discussion of both short- and long-term risks perhaps reflects a high degree of integration between the CCA and DRR domains in Finland. However, further research would be required to determine if this is the case compared to other European countries.

Why does this difference matter? If a DRR practitioner focuses on preparedness and early warning for a flood, the data s/he requires are different from those needed by a CCA-focused practitioner working to address long-term flood prevention. Awareness of these differences can provide more nuanced entry points for organisations trying to collaborate on how to design more integrated national development plans or a service to better support user needs.

- "Forest fires" is an overlapping term. DRR documents refer to a satellite fire observation system that has been designed to work continuously and is part of the forest-fire-fighting system. This system addresses prevention, early warning and effective suppression of fires. The focus is on indices, likelihoods, probabilities and impacts. However, in Finland's CCA report forest fires are discussed in the context of emissions impacts due to the burning of biomass (from fires which include controlled burning), loss of carbon sinks and related health impacts from burning. "Fires" receive much less attention in the CCA documents. When mentioned, the context concerns possible increased drought episodes in the future in southern Finland, where the risk is low.

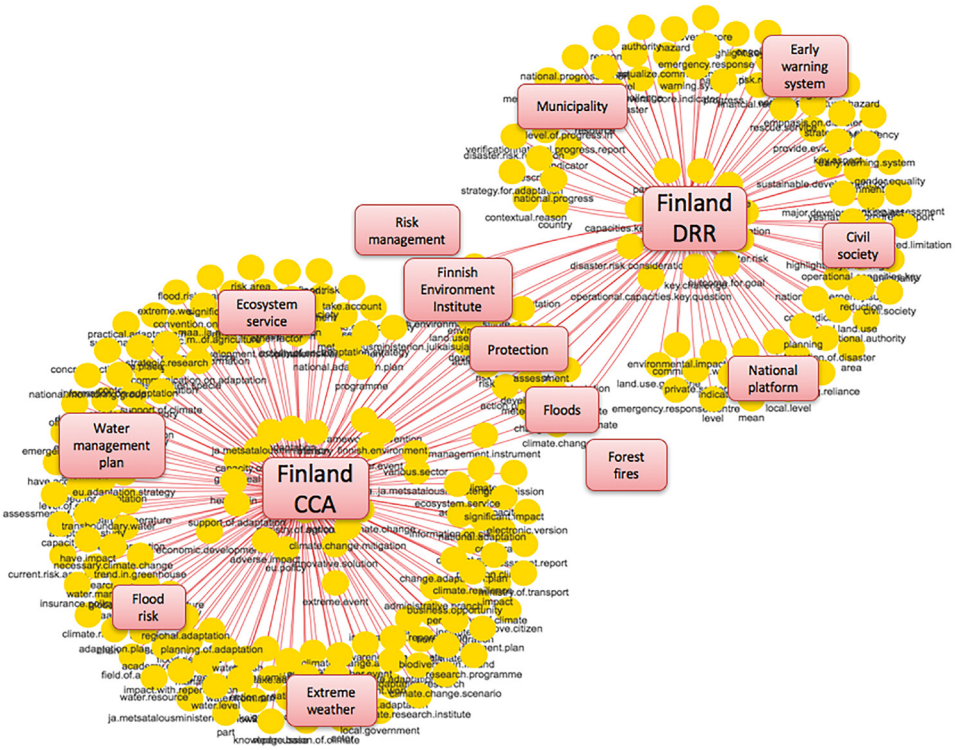


Figure 8: Context- vs outcome-led framings of the term "vulnerability" – results from data mining national planning documents for Finland.

Moving a step beyond this, we also explored the degree of collaboration evident at other scales, such as local, subnational, national, regional or European levels (vertical), and across borders, such as e.g. transboundary issues (horizontal). To achieve this, we began to code potential "knowledge mismatches" (Birkmann and Teichman, 2010) such as scale, knowledge, norms and goals within this data (Figure 9). This also helped standardise the data that emerged from the CCA and DRR reports into simplified language from which patterns could more easily be deduced.

This work provided further nuanced results about the similarities and differences between the two domains in the use of language and in the language itself. However, the drawback of this data mining method and the supplementary coding approach, is that it is both resource- and time-intensive.

Norms	Sectors	Actors	Scale	Hazard	Goal
Economic	Transport sector	Donor	National	Storm	National security
Legal	Service sector	Educational institution	Regional	Flood	Economic development
Policy	Energy sector	Government institution	Local	Landslide	Sustainable development
Educational	Forestry sector	Multilateral institution	International	Hurricane	Capacity development
Research	Environmental health sector	Hydromet	Municipal	Solar storm	Disaster resilience
	Human health sector	Met office	European	Drought	Humanitarian assistance
	Defence	Research institute	All	Wildfire	Climate change adaptation
	Communications & IT	EU actor		Thunder	Long-term risk reduction
	Rail	Intergovernmental panel		Storm surge	Cross-cutting
	Agriculture sector	Parliament		Technical disaster	Energy security
	Rural development	Institute		Aerosol emissions	Climate-compatible development
	Education	Aid agency		All	
	Building sector	Disaster response agency		Cyber security	
	Research & development	Development corporation		Terrorism	
	Cross cutting	Authority		Fire (e.g. infrastructure)	
	Waste & sanitation	Web-based application			
	Industrial process sector	Insurance company			

Figure 9: Coding potential "knowledge mismatches" (Birkmann and Teichman, 2010).

Preliminary application and analysis of these codes when visualised provided the following results. Figures 10–12 show the hazards, sectors and types of actors covered by each domain and where there are overlaps.

Reflecting previous discussion on the Finnish data, short-term hazards were mostly connected to the DRR documents with emissions-related risks featuring in the CCA report only. Risks which overlapped were storms, floods and fires.

This figure also confirms that those sectors which require emergency planning fall under DRR and those requiring more long-term planning appear in the CCA document, e.g. the building sector, education, forestry etc.

Reflecting sectors primarily associated in each report, the relevant actors are also represented here, e.g. the DRR management response agency and educational institutions under CCA. Insurance companies overlap between the two domains as they address both short- and long-term risks.

Figures 10-12: Visualisations of terms and categories extracted from the Sixth National Communication to the UNFCCC (CCA) and the combined HFA2 and National Risk Assessment (DRR) for Finland.

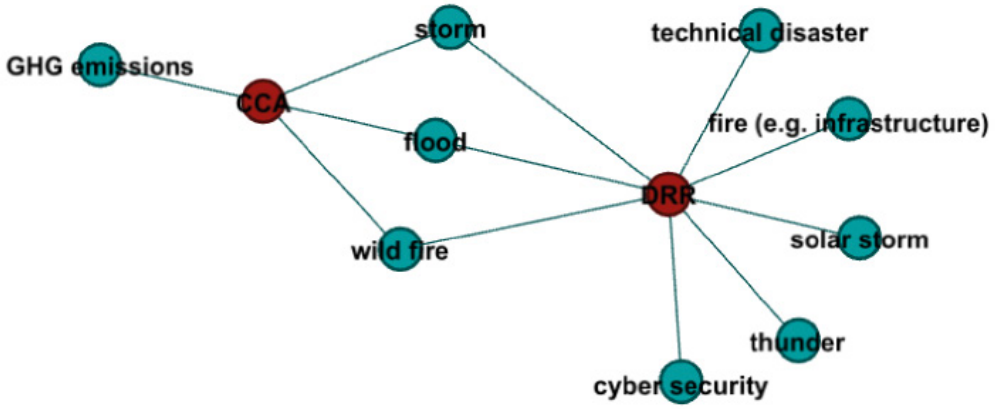


Figure 10: Risks extracted from CCA report (left cluster) and DRR report (right cluster).

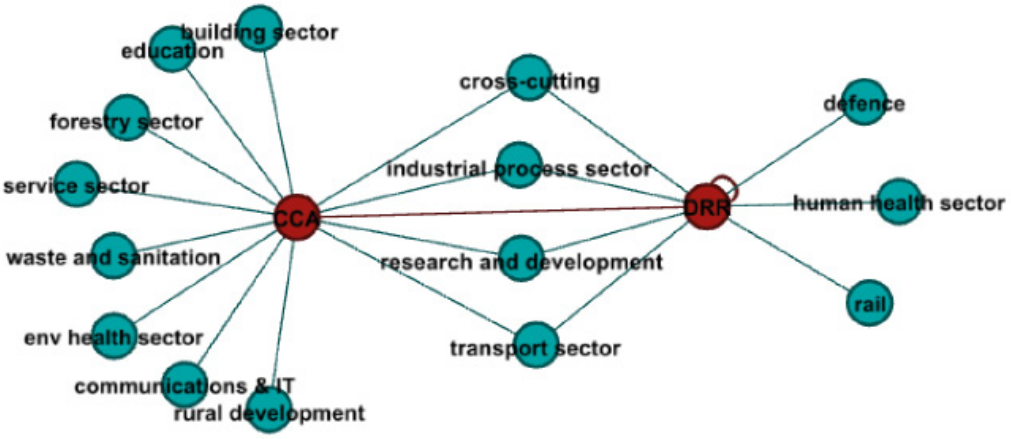


Figure 11: Sectors extracted from CCA report (left cluster) and DRR report (right cluster).

Figure 12: Actors extracted from CCA report (left cluster) and DRR report (right cluster).

Looking forward

Our future approach is underpinned by our long-term engagement with PLACARD stakeholders and partners, and reflections on the experience of data mining national-level reports. Our previous work shows that stakeholders are interested in how language and terminology are used to describe CCA and DRR activities. They want to know what, where and how activities are implemented – and to know who is undertaking a given activity and what lessons have been shared.

With this in mind, we take a two-pronged approach to provide ways to visualise the answers to the "what, where, how and who" questions. These two prongs are:

1. Harvesting projects from a range of CCA and DRR platforms (part of the PLACARD boundary panel), and then visualising them in one online space, the PLACARD online connectivity hub, which is dedicated to the intersection of these two domains.
2. Visualising how terminology is applied in the CCA and DRR[3] communities, and then working towards increasing awareness about the differing use of language in these two domains.

1. PLACARD landscape visualisation

The idea underpinning the PLACARD online connectivity hub is not to create a new platform, but to create a space that links the actors and organisations from many different CCA and DRR online sources (e.g. PreventionWeb, Climate-ADAPT, weADAPT, etc.). The platform will drive additional traffic back to these websites, which ought to include visitors who would not ordinarily visit them i.e. from a different specialist audience.

Visualisation of terminology used (via national-level reports, online platforms, or other sources) also supports the identification of new terms in need of standardisation. Therefore, good terminology is key to good visualisation and vice-versa. A key benefit of this approach is that it can enable crowdsourcing of new language and terminology as they emerge in the CCA and DRR domains.

3 Initially, the work will rely on European, national-level reports, and, later, on platform data.

2. Visualisation and language harmonisation – a reciprocal approach

As such, this work will contribute to the iterative development of common CCA and DRR IKM standards. The development of terminologies and taxonomies often takes place in a top-down manner, using expert feedback alone.

By contrast, we will employ a hybrid approach, which incorporates the bottom-up method of extracting terms from documents. This method, which provides more rigorous results, will be explained in further detail in a forthcoming project report ("M4.3:First version of IKM guidelines and standards for CCA and DRR knowledge brokering", due December, 2017).

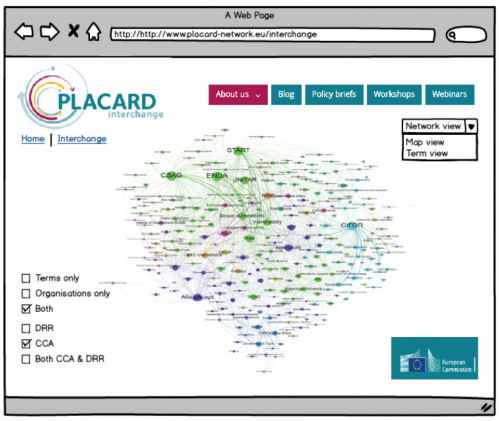
Standardisation of language contributes both to institutional strengthening (WP4) and to mapping the CCA-DRR landscape (WP6). The project connects European stakeholders to relevant existing and ongoing CCA and DRR actors and communities, and it has the potential to identify previously unrecognised gaps and areas of common ground between the two themes.

Examples of visualised landscape and language

This series of wireframe diagrams (Figure 13) demonstrates how the visualisation landscape/tool could look. At workshops in October 2017, stakeholders will evaluate refined versions of these wireframes, and offer their feedback and suggestions to make the tool more useful for decision-makers.

Figure 13: Example wireframes of the visualised landscape.

Wireframe 1: A network diagram (such as Diagram 1, shown here) would collate data from case studies submitted to the Climate-ADAPT platform, which was shown to be the CCA network's most influential connector. The diagram would also map weADAPT keywords and organisations. To visualise overlapping issues and synergies with the DRR domain, further data will be included from the PreventionWeb platform.



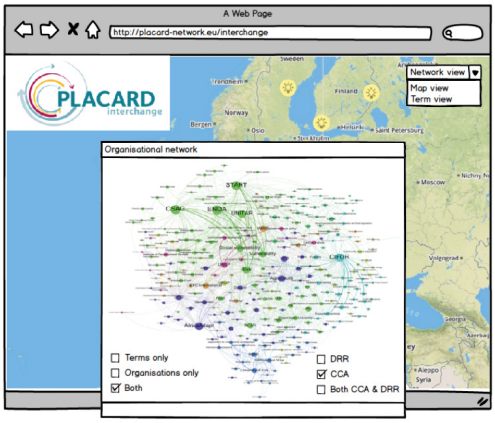
Wireframe 2: User feedback indicates that a network diagram of the type shown in Diagram 1 is too complex to be useful for decision-making. Therefore, a simplified version can be toggled by clicking on the "Map view", which will enable all projects to be seen on a map, instead (see clusters and lightbulbs, which represent projects).

Wireframe 3: This "view" would enable decision-makers to use the search bar to bring up case studies of specific interest. The tool would also provide some information about the nature of the content that exists by using a weighted tag cloud, based on keywords in the projects.

Wireframe 4: Searching for one term causes related terms to appear as well. For example, as shown in Wireframe 4, a user searching for "drought" also sees terms such as "adaptation", "agriculture", and "precipitation".

A user interested in "agriculture", for example, can click on a particular lightbulb that brings up all case studies relevant to that term. Related terms might consist of logically linked words ("rainfall" and "fertilizer"), but rather unexpected terms ("gender", "food security" or "early warning system") might surface too, enabling more "actionable learning" by users new to either the CCA or DDR domain.

Wireframe 5: For a user who wants to be reminded of the network of organisations working on agriculture and related issues in a network format, s/he can pick this option from the menu (top-right) to make the underlying network database visible again.



Wireframe 6: As network maps are too complex to understand quickly, the same information can be displayed as shown in Wireframe 6, where tags can be "toggled" by "organisation" or by "area of work".

A more sophisticated network mapping library such as, D3[4] can be used to create online, interactive network visualisations.[5] The final version of the wireframes of the visualised landscape will further explore this option, and will be presented to stakeholders in Autumn 2017.

4 D3.js is a JavaScript library for manipulating documents based on data. D3 helps you bring data to life using HTML, SVG, and CSS. D3's emphasis on web standards provides the full capabilities of modern browsers without being tied into a proprietary framework, combining powerful visualization components and a data-driven approach to DOM manipulation.

5 See https://github.com/d3/d3/wiki/Gallery

Conclusions

This work has incorporated input from PLACARD (and ESPREssO) activities that relate to the mapping of the CCA-DRR landscape, such as the SNA, the SPINE, and stakeholder workshops. It has led to insights on how these can be used to effectively visualise the landscape for decision-makers as well as to new suggestions on how to adapt activities to provide data and knowledge that better fits the (visualisation) demands of the community.

Our work shows that there is demand for visualisations that provide insight into the relationships between CCA and DRR in areas ranging from relationships between organisations, and gaps and overlaps in working areas, to terminology use and sharing lessons learned. From (small-scale) inquiries and interviews within the PLACARD project, we see that there is specifically interest in the terminology aspect and location of activities and actors. Thus, the development of the visual landscape also supports the WP4 task (first draft due December 2017) on the development of information knowledge management (IKM) guidelines and standards for CCA and DRR communities. Roles and responsibilities of individuals within organisations and the availability of multiple languages have also emerged as user needs from the hub. These features will be included in the updated wireframes, presented to stakeholders in October 2017.

This has resulted in some key recommendations for the second iteration of the SPINE and SNA. Namely, to include standardised keywords or focal areas describing organisations' activities and projects in any further data that is collected. This information allows the hub to visualise not only who is in the landscape and what relationships they have (SNA), but also what areas of CCA and DRR they address in their work. This information is key to visualising both gaps, synergies and more effective collaboration. As some of this new data will be based on ESPREssO country case studies, the national level focus will provide a rich set of information to visualise.

Next steps

Based on the findings from this task, the project has developed a first set of wireframes that could fulfill some of the demands regarding visualisation of the current CCA-DRR landscape. Going forward, the following steps will be carried out:

- Stakeholders will test and evaluate improved versions of the wireframes presented in this report, at workshops in October 2017.
- Their feedback will help to specify the final design of the PLACARD online connectivity hub and implementation of the tool will begin. This is scheduled to be completed by May 2018.
- Iterative feedback based on consultations with a PLACARD working group created specifically for this purpose will start in November 2017 until the final version is produced.
- Once launched in May 2018, the use of the tool will be evaluated through user testing with partners and stakeholders, during the remainder of the PLACARD project. It will be improved and refined as needed.
- Continue discussion with the knowledge managers of key platforms (Climate-ADAPT and PreventionWeb) to get their permission to use their data for this collaboration.
- Create a PLACARD working group to for regular consultation on the online connectivity hub. This group will provide feedback to the IT development team from November 2017 onwards.

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Birkmann, J. and Teichman, K. (2010). Integrating disaster risk reduction and climate change adaptation: key challenges—scales, knowledge, and norms. *Sustainability Science*, **5**(2): 171–84. DOI:10.1007/s11625-010-0108-y.

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Annex – Interactive SNA visualisation for PLACARD

The steps involved in making an interactive web page for the PLACARD site, to provide an online version of the Social Network Analysis carried out by CMCC:

1. Data cleaning for importing into R

This involved importing the original dataset from the first round of the SNA carried out in WP2 (all responses to the survey in the form of an adjacency matrix) and cleaning it to deal with missing data. We opted to ignore 'time-to-time' relations (coded 2, 4) and use only intense relations (coded 3 and 5) because including both would produce a very dense, difficult to visualise network. We also ignored diagonals in the adjacency file, where the actor/organisation stated that it interact with itself.

We also decided not to use the link attribute for type of intensity (communication or collaboration) because only a limited number of variables can be shown in the current visualisation.

We elected to include all of the actors – not just respondent actors – this differs from the treatment in MS10 titled "First version of the network database and related documentation,". Therefore the network included 35 actors and included 228 edges.

2. Including Node and Link Attributes

We then imported the second part of the survey dataset – indicating the type of interaction as a link attribute – whether "DRR" ,"CCA", or both. For some of the links it was not indicated the type of interaction so a fourth category was coded as "Not specified".

The Actor field was added as a node attribute – obtained from a further file based on information in the SPINE dataset and checked against the SNA deliverable. The Actor field was coded as "DRR" ,"CCA", "both" or "Other".

This resulted in using 4 types of nodes and 4 types of links – used in the colour coding and in the groups filter (see below).

3. Computing further Node and Link Attributes for visualisation

Computing the measures – only degree and betweenness centrality was computed, but there are many other measures available. A node size attribute was based on betweenness centrality scores, all nodes have a minimum size of 6, whereas the maximum is 18 (UNISDR. Europe had highest betweenness centrality)

Colour coding used PLACARD website theme colours – for both edges and nodes – and therefore were different to the colours ones used in the SNA deliverable:

For "DRR" the colour used was "#a81950" – dark red

For "CCA" the colour used was #F7A600 – yellow

For "Not specified" or "Other" the colour used was "#555555" – grey or black

For "both CCA and DRR" the colour used was "#037d8e" – green blue

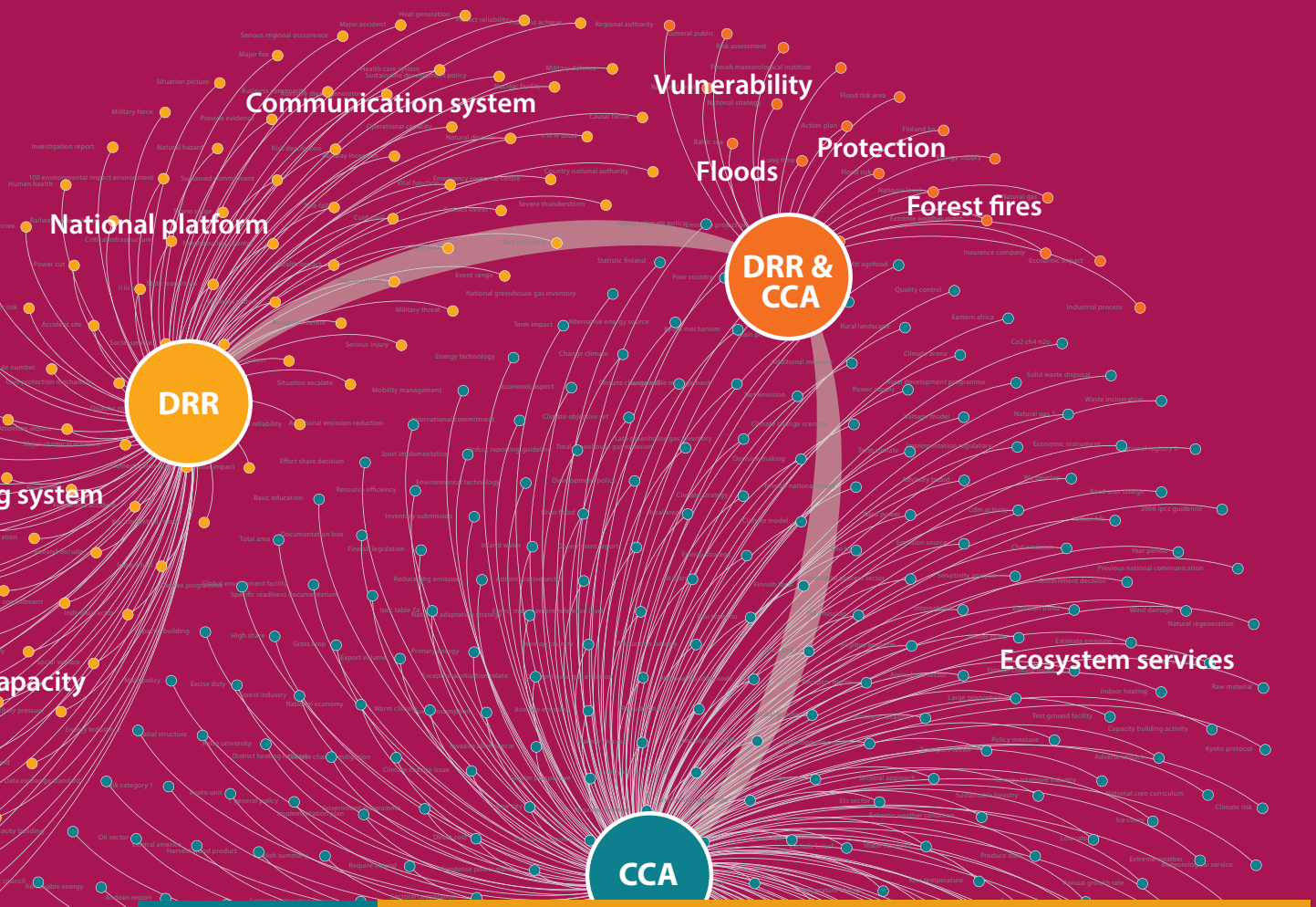
4. Visualisation and Interactive visualisation tools

The network layout used was the default one of visNetwork called "layout_nicely". This is used to display the network in the central panel of the webpage. The network is a directed network, ie. showing any connections in both directions between each pair of actors, with the connections drawn using curves.

Interactive visualisation elements available in visNetwork include tooltips, pan and zoom, navigation controls, tooltips and drop down selection menus. A tooltip was constructed both for actors (the name of the actor and the field) and for links (the type). There are two available drop-down menu controls. The upper one allows to use a drop down menu for selecting actors by their ID name – in the central panel this will highlight links of a particular actor and between partners of that actor. Users are also able to highlight in a similar way by clicking on any actor or link of interest. The lower drop down allows the user to select a Group – it filters the graph to show a sub network of actors concerned with either "DRR" "CCA" "both DRR and CCA" or "other" and their links. Other visualisation elements are the legend showing the node colouring for groups and some navigation tools for the central panel.

5. How to use and interpret the network

The page initially shows the whole network – the idea is to get an overview of which are the central nodes of most importance or influence over collaboration and communication flows and what type of interactions they have – "DRR" or "CCA" or both. There is no new network analysis and readers should refer to the MS10 "First version of the network database and related documentation" deliverable for more detail. The visualisation is a work in progress and the tool is not fully featured. The objective is only to allow interested users to visualise the data in an exploratory way.



www.placard-network.eu

PLACARD interchange – PLAtform for Climate Adaptation and Risk reDuction – is a hub for dialogue, knowledge exchange and collaboration between the climate change adaptation (CCA) and disaster risk reduction (DRR) communities.

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