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PLACARD Summary of evolving issues in CCA and DRR: 2015–2020

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Contents

Introduction

PLACARD aimed to bridge gaps between the climate change adaptation (CCA) and disaster risk reduction (DRR) communities by fostering and engaging in dialogue about specific issues. Since 2015, PLACARD has provided three short and easy-to-read Evolving Issues Briefs to inform the PLACARD community about the evolution of these issues.

This summary provides a final wrap-up of the evolving issues: what their status was at the beginning of the project, how this has evolved over time, what PLACARD's contribution was to that evolution, and why these issues are important to the CCA and DRR communities. The summary particularly highlights pending issues and research questions that can support others to work on these issues and strengthen collaboration between CCA and DRR. We hope that policymakers, practitioners and academics will continue the dialogue after the PLACARD project ends.

The summary considers the following evolving issues:

1. Coherence between the Paris Agreement and the Sendai Framework for Disaster Risk Reduction and the connection with the EU Green Deal
2. Terminology and knowledge management in CCA and DRR
3. Narratives and stories for prevention and preparedness
4. Nature-based solutions and wildfire
5. Finance and funding for CCA and DRR
6. Climate services for DRR
7. Sharing loss data for risk assessments
8. Foresight methods

The information stems from the three evolving issues briefs and from the presentations at the 4th European Climate Change Adaptation conference (ECCA 2019).

1. Coherence between the Paris Agreement, Sendai Framework for Disaster Risk Reduction and connections with the EU Green Deal

The Sendai Framework for Disaster Risk Reduction (Sendai Framework; 2015) and the Paris Agreement (2015) are important international agreements with a common goal of achieving a resilient future. Although their agendas differ with regard to scope, structure, implementation mechanisms and legal enforcement, they also overlap largely. Since national governments are committed to both international agreements, coherence in implementing them may avoid work inefficiencies and create synergies for more effective and efficient policies, an enhanced knowledge base, stronger collaboration and a better use of available resources. PLACARD highlighted the potential areas of collaboration via two straightforward flyers that interpret the agreements through the lens of the other community and fostered dialogue on these issues with policymakers at European and national levels. PLACARD also elaborated recommendations on how to foster coherence between institutions.

How this issue evolved during PLACARD

The discussion began after the international agreements were signed in 2015 and aimed mainly to explore fields for coherence. The conclusion of this dialogue was that coherence is most likely to happen in these fields:

- Safeguarding sound governance
- Enhancing knowledge management
- Ensuring effective financing
- Monitoring and reporting
- Risk assessment methods.

Coherence between the agreements is now being made operational, for instance by raising awareness of good practices and sharing experiences among national governments.

Unfortunately, actual coherence between policy processes through implementing common and aligned actions is yet to happen as the implementation of both agendas is controlled by different ministries/departments preoccupied with either environment and climate change or civil protection issues.

However, the dialogue on coherence between international agreements is entering a new stage since the EU Green Deal was launched in December 2019. The PLACARD team has analysed the EU Green Deal and found four gaps in relation to the Paris Agreement and the Sendai Framework.

Pending issues and research questions

Operationalisation of the coherence

While the fields of coherence between the Paris Agreement and the Sendai Framework for Disaster Risk Reduction are acknowledged, the operationalisation of the coherence is still to be coordinated. This pending issue results in the following research questions:

- How can coherence of the Paris Agreement and Sendai Framework be coordinated and operationalised at national and city levels?
- What would be clear targets and indicators to measure progress in the international agreements?
- How can national risk assessment and CCA reporting cycles be harmonised?

Integration of Paris Agreement and Sendai Framework for Disaster Risk Reduction in the Green Deal

The EU Green Deal aims to build a Resilient Europe. The proposed Climate Law intends to operationalise the implementation of the Paris Agreement in Europe, as part of the Green Deal. It is not clear yet how this EU Green Deal relates to the Sendai Framework. The question is therefore:

- How can the Sendai Framework be integrated into the EU Green Deal?
- How to mobilise finance for climate change and disaster risk reduction in the context of the Green Deal?

PLACARD output on this topic

- Leitner, M., Buschmann, D., Capela Lourenço, T., Coninx, I. and Schmidt, A. 2020. Bonding CCA and DRR: recommendations for strengthening institutional coordination and capacities.
- Michalek, G., Sushchenko, O. and Schwarze, R. 2020. Why CCA and DRR are crucial for achieving European Green Deal goals.
- Sushchenko, O. and Schwarze, R. 2020. Economics and finance of disaster risk reduction and climate change adaptation: main gaps identified in the PLACARD project and arising alignment opportunities for the EU Green Deal. PLACARD project, FC.ID: Lisbon.
- Michalek, G. and Schwarze, R. 2019. SFDRR through a climate change adaptation lens.
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2. Terminology and knowledge management in CCA and DRR

Shared terminology is critical to improving communication, coordination and collaboration. However, the huge amount of often fragmented and unstructured information available to us, leads to limited learning, and partially explains the large gap between research and action. PLACARD's focus has been on building a shared understanding in the terms and language used in climate adaptation (CCA) and disaster risk reduction (DRR). Many terms overlap but may differ in meaning. Even within organisations, significant disparities in the use and interpretation of language may occur. This hampers knowledge exchange and can result in misunderstanding. PLACARD has developed some principles for better Information and Knowledge Management and has published a roadmap for transforming online knowledge management through improved and standardised use of language and terminology. PLACARD has developed the Connectivity Hub, a 'search and discovery' tool, to access knowledge from across five existing CCA and DRR knowledge portals, Climate-ADAPT, PreventionWeb, Eldis, BRIDGE and weADAPT. This is made possible through the terms (tagging systems) used to describe content in each platform. Analysis of these terms has contributed to the development of a high level taxonomy for CCA and DRR. This taxonomy could in turn be applied to different platforms to ensure they are sharing knowledge using a common set of standards. The Climate Tagger is a tagging system developed by PLACARD boundary partner, REEEP, and there is potential for the PLACARD taxonomy to be integrated in the Climate Tagger for widespread use. Working with the Semantic Web Company, PLACARD has also explored the potential to take taxonomies further, expanding them to more agile ontologies and knowledge graphs to further enhance the 'search and discovery' of information.

How this issue evolved during PLACARD

Before and during the PLACARD project, attempts were made to increase mutual understanding of CCA and DRR. However, these efforts were very time-consuming and challenging, because terms needed to be translated into other languages and because definitions evolve over time. Other initiatives included increasing the role of knowledge brokering to "translate" knowledge into the language of another community. However, obstacles were still present, such as resources being in unconnected databases, data that were not open access, use of different key words and the different interpretation of those terms. Furthermore, there were still knowledge gaps, despite the increasing amount of knowledge available via webportals. These knowledge gaps were mainly due to difficulties finding and accessing relevant knowledge.

Therefore, PLACARD used tagging and visualisation to make access to knowledge easier. The Connectivity Hub "search and discovery" tool links resources from both communities to connect different types of knowledge to planners, decision-makers, researchers, policymakers, students, interested citizens, organisations and anyone working in CCA and DRR fields. It also utilises taxonomy metadata to harmonise keyword tagging across these multiple platforms, and supports increased understanding of how terminology is used through a glossary. The prototype has been tested and is now ready for scaling.

However, the challenge remains that to be able to find the knowledge from the other platforms via the Hub a common tagging system is required, e.g. where resources are tagged via the Climate Tagger using an overarching taxonomy that reflects and connects the distinct language and disciplinary environments. This shared tagging system would use a controlled vocabulary, which is test with experts. To make such a coordinated knowledge ecosystem work, all knowledge platforms should follow international standards to ensure consistent content tagging. Such standards are a step towards Linked Open Data and the Semantic Web, which promote common protocols to allow the interconnection and structuring of relevant data across the World Wide Web.

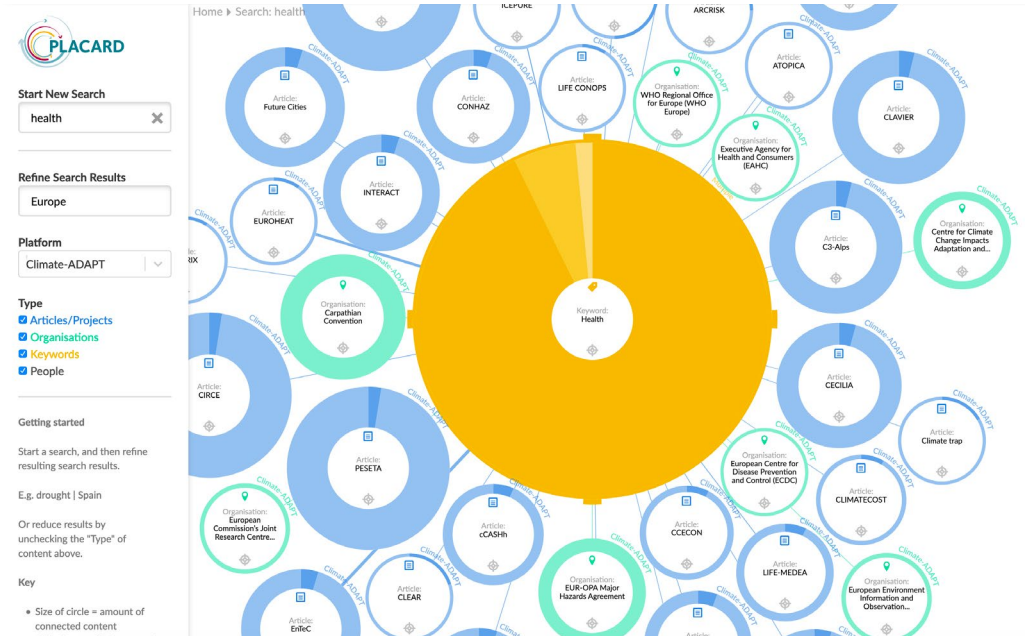

Figure 1: Screen shot of the PLACARD Connectivity Hub.

Pending issues and research questions

Scaling of the Connectivity Hub

To ease access to knowledge, standards for information and knowledge management are still needed. PLACARD has been able to share some relevant guidelines and principles, based on the decade-long experiences of weADAPT.

The main pending issue is that the Connectivity Hub is now ready for scaling so that more knowledge platforms can join. This process could be eased if a shared tagging system became standard practice, fostered for instance via international standards. In the meantime, the Connectivity Hub should reach out to potential users to further support peer-to-peer learning and dialogue. The following research questions will establish how it can best meet users' needs:

- How does the Hub enhance search and discoverability of content?
- How does the Hub improve usability of CCA and DRR information?
- How does the Hub promote shared understanding and increased awareness of how language is used in each domain?

PLACARD output on this topic

- Barrott, J. and Bharwani, S. 2019. Enhancing learning, communication & knowledge – sharing by design.
- Bharwani, S. 2018. PLACARD video on connectivity hub.
- Connectivity Hub
- Barrott, J. and Bharwani, S. 2018. Good practice for online knowledge sharing.
- Barrott, J. and Bharwani, S. 2018. Words matter – using language & technology to better inform the CCA & DRR communities.
- Barrott, J. and Bharwani, S. 2017. Visualising a harmonised language for CCA and DRR.
- Barrott, J., Bharwani, S. and Brandon, K. 2020. Transforming knowledge management for climate action: a road map for accelerated discovery and learning. PLACARD project, FC.ID: Lisbon.

3. Narratives and stories for prevention and preparedness

Narratives are stories that are told with a specific purpose. We can use them to create joint understanding and encourage action. In this sense, stories are "soft" tools for action and collaboration that can help to bring the CCA and DRR communities together. PLACARD's role has been to bring together existing knowledge and experiences on stories/narratives for prevention and preparedness by reviewing scientific literature, holding workshops and through capacity-building sessions with policymakers, practitioners and scientists at conferences. The generated knowledge and understanding can be found in the narratives recipe book, which describes the key ingredients of successful stories and how to use them strategically. PLACARD also prepared a video on the power of words to promote the strategic use of stories in the CCA and DRR domains. During the PLACARD project , art was extensively and successfully used as a medium to tell stories.

Stories engage human values and emotions in dialogue – in contrast to what scientific findings aim to do – which are important drivers of human behaviour. The transformational power of stories and narratives was already known at the beginning of the PLACARD project; our role was mainly to encourage the PLACARD community to make more and better use of this power by bringing attention to the topic and providing practical guidance on strategic story development

There is a lot of literature on stories and narratives, especially in disciplines other than climate and disaster science. PLACARD has helped translate this theoretical understanding to the CCA and DRR practice.

How this issue evolved during PLACARD

During the PLACARD project awareness and willingness to use stories strategically has grown, and the community is now looking for tools and principles to make the most effective stories. People are sharing experiences and trying to better understand the ingredients of successful stories. We are seeing more academics use visuals or art stories to present their scientific findings as well as boundary organisations like ICLEI, Climate-ADAPT, weADAPT and PreventionWeb promoting the use of stories.

While both the CCA and DRR communities acknowledge the power of stories and narratives, there can be disagreement on the content of the narratives. For example, the climate change narrative can be misused as a prism through which to explain disasters. However, from the perspective of the DRR community, disasters have always taken place (although some may be increasing in frequency and severity) and the increasing impacts may be explained by increasing vulnerability due to human decisions, rather than by climate change alone. Consequently, this climate change narrative is considered inadequate and biased by DRR community and may even cause inaction and frustration. We observe that a debate between narratives from CCA and DRR fields is currently taking place, and the expectation is that joint narratives will emerge as the result of this debate.

Figure 2: Bridging the gaps between climate change adaptation and disaster risk reduction, drawn by Betram de Rooij.

The debate is leading to evolution in two additional areas. Firstly, there is an increasing awareness that successful stories and narratives are context dependent; that is, the contextual culture determines the success of a story, and the degree of trust in the organisation or person telling the story affects its power. Secondly, the preferred genre of the story is changing. Over the past year, more people recognise that fearful stories have limited impact over time. They leave people feeling overwhelmed and disempowered. There is now more need for positive narratives and stories of hope that can help people to reframe problems and empower them to find solutions.

Pending issues and research needs

The rise in use of strategic narratives as a tool affects all stakeholders in the CCA and DDR communities, each with specific issues that still need to be addressed through research.

Use of stories in mainstream policymaking:

In the coming years, more tools will be needed across different governance levels to foster climate action and preparedness for disasters. More information is needed to establish:

- How can strategic narratives be used as a tool across different governance levels to foster climate action and preparedness for disasters?

Cultural aspects of stories' success:

It is not yet understood what strategic narratives are culturally appropriate in which specific contexts. A taxonomy of successful narratives according to context could be created by asking questions such as:

- Do narratives aiming to evoke prevention and preparedness with regard to the same risk, but at different geographical places (e.g. heatwaves occurring in the North and South of Europe) share some similarities/common features? If so which ones?
- Can some general conclusions and recommendations be drawn from the most successful stories? Or are these success stories 100% context-dependent?

Scientific validity of stories:

The power of stories can be misused to spread misinformation, so users need ways to test if what they are told is scientifically correct. Discussions during ECCA 2019 covered this topic and raised these questions:

- How can stories be checked if they are in line with scientific evidence?

Diverse values and worldviews:

For stories to be successful, they have to align with the worldview and values of their audience. But different people have different values and worldviews, which raises questions such as:

- How can diverse voices be addressed when building a narrative?
- How can contradicting worldviews be considered and people with very diverse values be engaged through narratives?

Trust in storytelling:

If stories are to successfully mobilise people, they need to be trusted. Answers to these questions are needed:

- What are the most trusted communication channels and organisations/institutions?
- How can trust be built with communities that are not aware of climate change consequences and climate-related disasters?

PLACARD output on this topic

- Stories for action web page. 2020.
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- Coninx, I., Bentz, J., Michalek, G. and de Rooij, B. 2018. How to become a climate chef and avoid disasters. PLACARD project, FC.ID, Lisbon.
- Bentz, J. 2017. Learning about narratives through creativity and imagination.
- Museum of Transformation stories. 2017.
- Bentz, J. 2017. Do narratives improve CCA & DRR?
- Swart, R. 2017. Telling stories to help increase resilience.

4. Nature-based solutions and wildfire

International agreements such as the Paris Agreement, Sendai Framework and Agenda 2030 emphasise the importance of nature-based solutions (NBS) to prevent extreme events induced by climate change. The approach is labelled differently by the two communities: "ecosystem-based adaptation – EbA" by CCA and "Eco-DRR" by DRR. Collaboration between the two communities can avoid suboptimal, independent response to these climate-induced extreme events, such as wildfire and flooding. With NBS being promoted by international agreements, we observed that many European organisations initiated dialogues. PLACARD took up an expert role while contributing to these dialogues, with the aim of exchanging knowledge and strengthening synergy between the approaches of the CCA and DRR communities.

How this issue has evolved during PLACARD

This topic has increasingly gained attention over the past years. At the start of the PLACARD project, the discussions focused on providing evidence for the benefit of NBS compared to other solutions. The principles of ecosystem services have been used to illustrate the tangible and intangible benefits of NBS. The logic that ecosystems, when properly managed, provide various services to people and to the economy is now widely understood. Discussions have moved towards the operational aspects of NBS such as exchanging knowledge about innovative and effective NBS concepts, how to integrate NBS in policy and practice via inclusive governance and innovative financial instruments, and how to monitor the effects of NBS. We have also seen that NBS is explicitly used by other organisations and networks to bring together the CCA and DRR communities. International cooperation has a clear role to play, as countries are looking for effective guidance to improve their policy frameworks. Countries acknowledged that unprecedented extreme events may become more common.

The first observed evolution has been in testing and understanding NBS. Many projects are being funded to test NBS concepts in practice, mainly financed by European funding agencies such as the European Commission, European Investment Bank or JPI Climate/ Urban Europe. Most of them follow the same logic:

- Develop a proof of concept
- Demonstrate and test the solution
- Proceed with the implementation of the innovative NBS
- Engage with the public and private sectors to mainstream the NBS.

These projects are also used to improve understanding of innovative and effective NBS. For CCA and DRR, the dialogue is about what NBS are effective under which conditions. The debate about effective NBS also includes issues such as trade-offs, negative impacts of NBS (e.g. increased risk of drought and wildfire) and impact on health (e.g. due to increased risks of pests and allergies).

This understanding is being collected in various ways. For example, the European Topic Centre on Climate Change impacts, vulnerability and Adaptation (ETC/CCA) is working on a report to gather existing knowledge on effective NBS and the PLACARD consortium members are contributing to it.

The knowledge on NBS is brought together and shared in portals like ThinkNature, Oppla and Urban Nature Atlas. ThinkNature has emphasised the lack of knowledge among policymakers and practitioners on how to design, implement and maintain NBS. The ThinkNature platform therefore brings together experiences, fosters dialogue on NBS implementation and aims to close knowledge gaps.

The BiodivERsA ERA-NET has developed a typology of three main types of NBS interventions: those involving better use of existing natural and protected ecosystems; those based on developing sustainable management procedures; and those involving the creation of new ecosystems (ThinkNature has slightly adapted this typology). IUCN has developed a categorisation of NBS approaches based on restoration, specific issues, infrastructure and ecosystem management and protection (see Figure 3).

Figure 3: Source: Nature-based Solutions to address global societal challenges, IUCN.

The second evolution, and the current NBS "hot topic", is in exploring the best NBS implementation methods. Complexity arises through context-dependency: whether NBS is implemented at local or ecosystem level. There are also many challenges: dealing with uncertainty of climate change projections, gaining political commitment and mutual understanding, collaborating among relevant policy departments, integrating NBS in policies, involving the private sector and citizens and financing and scaling NBS.

The integration of NBS in policymaking is encouraged in different ways. For instance, the Convention on Biological Diversity has developed voluntary guidelines to help national governments integrate NBS in planning. In Europe, we observe that many European member states and some leading cities have developed an NBS strategy or have declared NBS ambitions, mainly fostered by European initiatives. At these levels, discussions cover how to operationalise the strategies and ambitions, what cost–benefit methods include the non-economic values of NBS and what financing models are available (see also the next topic: Finance and funding). Business models for nature-based solutions and return-on-investment from investing in ecosystem services have received some attention but most of the models envisage public funding. The Naturvation Urban Nature Atlas developed eight sustainable business models – risk reduction, green densification, local stewardship, green health, urban offsetting, vacant space, education, and green heritage – with detailed descriptions of value proposition, delivery and capture as well as enabling conditions and risks.

At the operational level, we observe that scientists are developing tools and guidelines to help policymakers plan and design suitable NBS. Use of these tools in policy will remain a prominent issue in the coming years and is a current challenge.

The third evolution is in monitoring the effectiveness of implemented NBS. There is currently a lack of quantitative and measurable evidence on the specific effects of NBS is different contexts. This information is needed to further integrate NBS in policy and to mobilise finance. Monitoring approaches are being developed, such as citizen science, sensory networks, remote sensing and performance indicators.

The focus of PLACARD has been to follow and contribute to the debate on wildfire management. We have highlighted the importance of integrated land-use management and forest management that uses NBS principles, as a pathway to deal with extreme events such as wildfires and floods. We have also contributed to making a link between wildfires and their impact on water resources. The three key principles are approaching the extreme event via the concept of multilayer safety, applying a landscape approach and taking a long-term perspective when planning for short-term action. The discussions on wildfire risks are now clearly shifting from responsive approaches towards adaptive and anticipatory measures to prevent risks. The evolution in the dialogue is that more knowledge and experience should be shared among countries and people involved. More awareness is needed of the exposure and measures that can be taken. Multi-risk approaches need to be developed that can deal with the complex interlinkages between different natural hazards and the impact on forests as well as society. Lastly, we need to understand better how awareness and action can be encouraged at different levels, from politicians to the public.

Pending issues and research questions

Exchanging knowledge:

The focus of NBS is currently on testing and evaluating in order to share knowledge. Sharing knowledge will help to develop the best ways to operationalise NBS. The related research questions are:

- How can the transfer of knowledge from science to practice and vice versa be supported?
- How can knowledge be transferred between regions that differ in terms of type of ecosystems?

COVID 19

The lockdown and COVID 19 create a great opportunity to build back better. It would be a good opportunity to further implement NBS:

- What narrative would be successful to foster implementation of NBS after Covid 19?

Effective NBS:

At the moment, there is a search for the most effective NBS for specific issues that are taking place. To better understand the conditions that determine the effectiveness, the following research questions needs to be answered:

- Which ecosystems might collapse due to climate change or disasters? What impact do climate change and disasters have on environmental quality? And how should this understanding be included in the development of NBS?
- What NBS are suitable and effective for dealing with climate change and disaster risks?
- What NBS are suitable for dealing with multiple risks?

Governance models for NBS policymaking and management:

Decision making on NBS is requiring new decision methods and the management of NBS is looking for new types of partnership. Research questions are:

- What methods are useful to assess the costs and benefits of NBS, compared to grey solutions?
- How can trade-offs and negative impacts of NBS be dealt with?
- How can private sector/citizens be involved to implement NBS?
- How can NBS be mainstreamed in policymaking at national and local level?

Monitoring approaches:

By focusing on effective NBS, the role of monitoring is important. Monitoring methods are still in development. Research questions are:

- How can the impact of NBS be monitored?
- What is the best scale for monitoring the impacts of NBS?

With regard to wildfire, the following questions emerged:

- What methods are suitable for mapping wildfire hazard zones?
- What management should take place to decrease wildfire risks?
- How can governments involve communities and businesses to increase awareness and knowledge about wildfire risk as well as encourage investment in individual fire protection measures?
- How can insurance and other risk transfer mechanisms encourage preventive action?
- What international cooperation and guidance would support countries to take action?
- Which water quality parameters should be assessed after a fire? Are there easily measured proxy parameters to account for them?
- Which rainfall and associated run-off events will trigger fire-induced water contamination?
- What is the probability of a contamination event with a given magnitude and duration occurring?
- How long do contaminants take to reach a given water body? How much time do managers have to take appropriate measures? How long does contamination last?
- How does the management of contamination impacts differ between different water supply sources, such as streams, reservoirs and groundwater?
- What post-fire solutions can mitigate water quality problems?

PLACARD output on this topic

- Mysiak, J., Castellari, S., Kurnik, B., Swart, R., Pringle, P., Schwarze, R., Wolters, H., Jeuken, A. and van der Linden, P. 2018. Brief communication: Strengthening coherence between climate change adaptation and disaster risk reduction. *Natural Hazards Earth System Sciences*, **18**(11): 3137–3143. doi: 10.5194/nhess-18-3137-2018
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- Pulquério, M. 2018. City-level implementation of nature-based solutions for adaptation.
- de Rooij, B. 2018. Towards resilient forest landscapes.
- de Rooij, B. 2017. Floods and forest. Opening opportunities.
- Salvaterra, T., Allenbach, K., Hobson, P., Ibisch, P.L., Korn, H., Mysiak, J., Renaud, F. and Pulquério, M. 2016. Exploring the potential of ecosystem-based approaches. Policy brief with proceedings from a PLACARD session at the 4th Adaptation Futures Conference, 10–13 May, Rotterdam.
- Salvaterra, T. 2016. Discussing ecosystem-based solutions for CCA & DRR at Adaptation Futures 2016.

5. Finance and funding for CCA and DRR

There are still gaps in the finance and funding available for CCA and DRR. These gaps are related to lack of coherence of public funding and access to private funding and the unsustainable impact of investment decisions that increase climate change and disaster risks. This topic of finance is complex and ongoing in various arenas. The role of PLACARD was mainly to wrap up the ongoing work in scoping and contributing to dialogues about the risk transfer mechanism at EU level, urban finance, cost–benefit assessment of green infrastructure and boosting public–private sector cooperation.

How this issue has evolved during PLACARD

At the start of the PLACARD project, the main finance issues were that the CCA community could access much more public funding than the DRR community and that the DRR community had difficulty accessing public climate adaptation funds. There has, however, been a long tradition of corporate social responsibility and sustainable finance in terms of private funding. The issue of finance and funding has evolved tremendously over the past years and will continue in the near future, both with regard to public funding and private finance.

One evolution is in the improvement of tools to monitor CCA and DRR funding, which is mainly public funding. This evolution is promoted via international agreements (Sendai Framework and Paris Agreement). Monitoring is complex due to funds coming from different sources: DRR finance is mainly national and demand-driven, while CCA funds mainly come from global sources. We observe that organisations like the OECD are developing markers/indicators as a way to monitor funding amounts, and countries are making data available via the OECD creditor reporting system. From the CCA perspective, we have observed the development and evolution of the Enhanced Transparency Framework, and several other frameworks to monitor adaptation and adaptation finance are also being developed.

A second evolution is the increasing role of private investment in CCA and DRR, with public organisations seeking mechanisms to mobilise private funds. One way is to push forward sustainable finance for corporate investments. The European Commission has developed new guidelines on corporate climate-related information reporting as part of its Sustainable Finance Action Plan. These guidelines cover aspects like EU Taxonomy, EU Green Bond Standard, benchmarks methodologies and guidance to improve corporate disclosure of climate-related information.

The OECD has also published a report on corporate systems currently used to report climate information. Sustainable finance will require internal capacity-building and tools to help portfolio managers incorporate climate-related data on risks.

A third evolution is taking place in the decisions about how to invest in infrastructure after a disaster. These are now in the mindset of "building back better", since climate change is expected to increase disaster risks. The ambition is to develop guidelines for this type of investment decision. New infrastructure standards are also emerging to climate-proof infrastructure and improve the risk profiles, such as ISO 14090, ISO 14091 and ISO 14097. However, these standards are not yet common practice and there is a need to share best practices on climate resilience and reduce the transaction costs of integrating climate resilience in investment decisions. Furthermore, with regard to green infrastructure, there are discussions taking place on the best methods to assess the direct and indirect costs and benefits of infrastructure investment, both for public and private sector. Public organisations are looking for ways to estimate and express the economic benefits of CCA and DRR measures. Discussions are also taking place on how to assess the costs and benefits of NBS, in order to guide public and private investment decisions. This remains challenging, and public authorities are exchanging experiences and practices so they can integrate new methods into their spatial planning policies. Current methods have to be improved, non-economic values of intangibles have to be assessed and future changes should be included in their assessments.

A fourth evolution relates to NBS, where new hybrid financial instruments are being developed to enable public and private funding. The concept of the insurance value of ecosystems is gaining popularity, since healthy ecosystems reduce disaster risks, damages and losses. Other options are voluntary payment, land property rights, green bonds or crowdfunding. These discussions on financing mechanisms for NBS are supported by initiatives from institutions such as the European Investment Bank, which has set up the Natural Capital Financing Facility as a way to finance NBS, and the ThinkNature platform, established by the European commission to collect case studies on business models. The platform is also sharing information on financial mechanisms like supply-chain finance, forms of governance financing and the establishment of special ecological industrial and city development funds.

A fifth evolution is in the development of financial instruments to support CCA and DRR in developing countries where public governments lack sufficient funding. These risks can be shared among more economic agents via catastrophe bonds and swaps for instance. Also, insurance companies and banks are collaborating to integrate resilience into their products. Insurance mechanisms for dealing with climate and disaster risks include microinsurance, index-based insurance and regional pools. Loss and damage data are very important in these methods, but market-based insurance has to be re-designed to be feasible and guarantee equitable compensation. Vulnerable nations in particular will have to use financial tools that go beyond insurance. One promising instrument is bonds. There are currently four types of bonds that are suitable for resilience financing: green bonds, catastrophe bonds, resilience bonds and impact bonds. Financial organisations are assessing their exposure to transition and physical risks and opportunities and how changing risk profiles might affect their financial stability. There is a need to create more consistency in methods to assess exposure to physical and transition risks.

The banking sector is also getting involved in the dialogue about future investments and lending opportunities. In September 2019, 33 banks issued a Collective Commitment to Climate Action in which they promised to align their lending policies with international climate goals. Larger banks such as the European Investment Bank and the African Development Bank are using climate screening systems to assess the climate risks of projects. Their challenges are making sure that data requirements and assessment methods fit with the client, that the new systems fit with existing assessment processes, that internal champions promote the climate screening systems, that staff are extensively engaged in the design of the system and are supported to appraise and manage risks. It's clear that the use of standards, risk assessment methods and climate screening systems is increasing the willingness to invest in projects that support climate resilience. CCA and DRR managers are also looking for private investment but are hampered due to their limited capacity to build bankable projects. Another bottleneck is the lack of common language between climate and disaster scientists on the one hand and bankers on the other hand.

A sixth evolution is occurring in the use of modern technologies to mobilise finance to support CCA and DRR measures. While they can be affected by high transaction costs, lack of reliable and frequently updated data and time lags in financial transactions, modern IT solutions such as distributed ledger technology, the internet of things and artificial intelligence are opportunities to develop innovative financial solutions to climate change and reduce related consequences. Examples are self-financing, crisis financing, climate insurance and risk transfer tools. We observe that innovation is occurring and prototypes are being tested.

Pending issues and research questions

A number of pending issues remain in various aspects of funding and finance. One example is that internal capacity-building and tools are needed to help portfolio managers incorporate climate-related data on risks. Another pending issue is the reliability of and trust in non-financial information and data and how this can be audited.

There is still a discussion on the best methods to use to make investment decisions, and an upcoming issue is how to mainstream them in planning practices. There is also the issue of what business models to use to finance natural asset management.

Coordination of funding and finance:

The pending issue is that CCA and DRR are still coordinated by different funding programmes, while they would benefit from coordination of funding activities. Related research questions are:

- How can financial instruments be coordinated for investment in CCA and DRR?
- How can the key technical or regulatory impediments to connecting the CCA and DRR agendas be overcome?
- How can national budgets be leveraged to achieve higher levels of complementarity in funding CCA and DRR measures?
- How can long-term funding be secured?

Monitoring of CCA and DRR funding:

International agreements require finance streams between countries. The pending issue is on monitoring methods that are still in development to assess the funding streams: Related research questions are:

- How can the amounts of CCA and DRR finance be estimated and tracked properly?
- What is the most appropriate methodology to estimate and monitor mitigation and adaptation finance?

Private investment and sustainable finance:

Private sector is taking up a role to invest in CCA and DRR. The pending issues are on how to mobilise more private funding. Research questions are:

- What is the common taxonomy for CCA and DRR financing?
- How can the incentives in the existing capital markets be changed?
- How can financial resources be gathered to leverage community solutions?
- What financial instruments enable public and private sector participation?
- What are the best business models for CCA and DRR?

Green infrastructure:

NBS or green infrastructure are a preferred solution for CCA and DRR in several situations. However, the financial aspects of implementation are still not clear and therefore an important pending issue. Research questions are:

- How can NBS be mainstreamed at the private and the public level? Who pays for what?
- How can the long-term (co-)benefits and costs of NBS be estimated and quantified?
- How can assessment methods be integrated into spatial planning?

Insurance and investment:

- How can transaction costs be decreased of standards that foster climate resilience?
- How can banks use consistent methods to assess their exposure to transition and physical risks?
- How does the concept of index-based insurance work in practice, and who benefits from it? Is index-based insurance going to be used by the most vulnerable people?
- What is the role of assurance providers, including professional accountants, in the context of climate-related information with regard to voluntary and mandatory reports of public and private sector entities?

PLACARD output on this topic

- Sushchenko, O. and Schwarze, R. 2020. Economics and finance of disaster risk reduction and climate change adaptation: main gaps identified in the PLACARD project and arising alignment opportunities for the EU Green Deal. PLACARD project, FC.ID: Lisbon.

6. Climate services for DRR sector

Climate services are a way to climate-proof the DRR sector by improving access to climate data. Climate service development can therefore be a tool for more collaboration between the two communities.

PLACARD's dialogues focused on exploring climate services requirements for the European DRR sector. The results were summarised in the article How could climate services support disaster risk reduction in the 21st century? PLACARD's main contribution to the evolution of this issue has been to connect different types of climate services with the different information requirements in each of the different phases of the disaster risk management cycle (see Figure 4). We have brought the specific information requirements to the agenda of research funding agencies, to encourage research on DRR-related climate services.

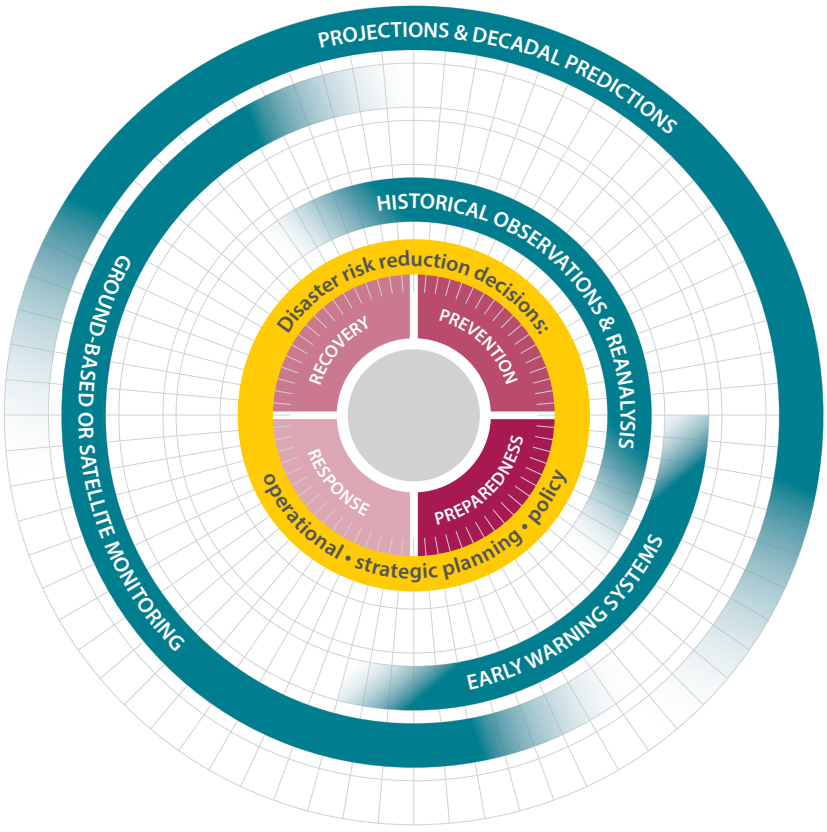

Figure 4: Connecting climate services to the disaster risk management cycle.

How this issue has evolved during PLACARD

At the start of the PLACARD project in 2015, the concept of climate services was quite new and the first services were in development. Since then, attention has increased on developing climate services to improve the access to and ability to act on complex climate data. Two ideas have evolved particularly: that the information needs of users are the starting point for development of climate services, and that the development must be a process of co-production and interaction between service providers, purveyors and users. We have also observed a growing awareness that climate services for the DRR sector already exist, but potential users need to be linked with these services. Therefore, these services need to be tested in the DRR sector and improved when needed. We expect this issue to further evolve in the coming years so that these developed climate services are mainstreamed in DRR practices and scaled throughout the DRR sector.

While development of climate services for the DRR sector is in the development phase, we observe that discussions mainly concern how issues such as availability of data about exposure and damage from historical disasters and the required high resolution of climate change projections have to be solved. These aspects are part of current discussions with regard to sharing private data as well as how to deal with the uncertainty that is inherent in climate change projects.

While climate services are currently developed and tested in the contexts of projects, we expect in the coming years that climate services will be increasingly used in DRR practice. However, further development and actual application face some challenges, which give rise to a number of research questions:

Vulnerability

The real cause of disaster impact is often vulnerability, rather than hazard. Taking into account changes in vulnerability over time is complex:

- What methods can be used to assess changes in vulnerability over longer time periods?
- How can we ensure that climate services do take into account the changes in vulnerability over time?

Available data:

It is difficult to match user requirements, particularly scale and time requirements, with the existing data. Research questions are:

- How can the transdisciplinary development of climate services among different scientific disciplines, including social scientists and disaster science, be improved to tailor climate services to the histories, contexts and risk profiles of users, as well as their decision-making contexts?
- How can the co-production of climate services that follow certain protocols and should be grounded in participatory research literature be improved?

- How can the lack of observational data on hazard and vulnerability characteristics of past disasters be addressed so that these data can be used in the climate services for future projections?
- How can the short time horizon and high resolution that is needed for DRR decision-making be dealt with?

Co-development

It is emphasised to co-develop climate services together with users and data providers. The upcoming group of users to involve are citizens. There are not yet many experiences on how to involve them in the development and use of climate services:

- What methods for co-development are successful when developing climate services for the DRR sector? .

Use and business models of climate services:

Once the climate service is developed, it is leaving the 'testing-zone'. This happens most of the time at the end of public funded projects. However, many climate services are at that moment not yet ready for the market and are not financially sustainable yet. Related questions are:

- How can the use of climate services be supported, in particular when specific skills are required to apply these services?
- What are suitable uptake mechanisms for climate services in the DRR sector?
- What are suitable business models for climate services for the DRR sector?

Transparency:

There is a lack of transparency about the quality of climate services and the data that is used in the climate services. Research question is:

- What certifications or standards would be helpful to assure users of the quality of climate services?

PLACARD output on this topic

- Street, R.B., Bontemps, C., Mysiak, J., Karali, E., Pulquério, M., Murray, V. and Swart, R. 2019. How could climate services support disaster risk reduction in the 21st century. *International Journal of Disaster Risk Reduction*, **34**: 28–33. doi: 10.1016/j.ijdrr.2018.12.001
- Pulquério, M., Street, R.B., Swart, R., Mysiak, J. and Karali, E. 2018. Development of climate services for disaster risk reduction.

7. Sharing loss data for risk assessments

The CCA and DRR communities have a long tradition of collaborating on assessment methods with regard to climate change related extreme events. While disaster risk assessment methods mainly aim to assess present risks, including climate change supports the assessment of future risks as well. The complexity of integrating climate change in disaster risk assessment methods is related to the uncertainty of biophysical dynamics and its impact on exposure in the longer term, the complexity of socioeconomic dynamics and how this affects long-term vulnerability, and the lack of data availability to validate the assessment methods. Sharing data and coming to an agreed set of shared assessment methods would strengthen the collaboration between the two communities. PLACARD has mainly contributed to ongoing dialogues via its experts. We have supported by our experts the ETC/CCA report that reviewed national climate change vulnerability and risk assessments in Europe (2018), and we have contributed to the dialogue on loss data collection and recording, mainly by contributing to the EEA report on CCA and DRR in Europe.

How this issue has evolved during PLACARD

At the start of PLACARD, the dialogue on assessment methods acknowledged the variety of methods used as well as the varying definitions of the same terms. Other gaps already identified included:

- lack of overview on assessments used by European countries
- mismatch of information produced by scientists and the needs of practitioners and policymakers
- lack of data on physical infrastructure assets and economic commodities
- inefficiency in overall data sharing
- lack of enhanced involvement of the business and private sectors.

With regard to risk assessment methods, the ETC/CCA has reviewed impact, vulnerability and risk assessments methods –the first time they have been reviewed systematically – that are used in member states. The report confirms the wide variety of approaches and methods in place as well as the existing challenges, for instance data gaps, difficulties comparing across sectors and the integration of quantitative and qualitative information. The dialogues on assessment methods are now about sharing knowledge on assessment methods;

common metrics for impacts and vulnerability using both multisectoral and thematic assessments; how to involve stakeholders; and how to improve data availability, for instance with regard to non-climatic factors and cross-border collaboration.

The gaps on loss data have been specifically looked at by PLACARD team. Loss data includes details on human indicators, economic losses, socioeconomic data on population, income, land use in affected regions, as well as information on indirect losses such as business and transport interruption. Acquiring this type of data is crucial to increasing understanding of disasters and climate change, but access to this data is often limited or incomplete. PLACARD has contributed to the dialogue by raising awareness on the benefits of sharing, collecting and recording loss data. The discussion has evolved into initiatives to improve data availability. The European Joint Research Centre (JRC) is playing a leading role. In 2014, JRC had already deployed sound principles for data collection: data should be precise, comprehensive, comparable and transparent. Guidelines for data recording and sharing have been developed by the EU expert working group on disaster damage and loss data. The discussion on this issue is now at the stage of operationalising the guidelines. For instance, the Loss Data Enhancement for DRR and CCA (LODE) project aims to build a loss data system in Europe by bringing together the fragmented data, based on user needs. LODE works in close collaboration with the Disaster Risk Management Knowledge Centre data hub.

Pending issues and research questions

Collection and recording of loss damage data:

The loss damage data has to be improved in order to play a role in CCA and DRR. Related research questions are:

- How can data from private sector be used in CCA and DRR? How can the commercialisation issue of data be overcome? How can data be shared in an open way, with respect for privacy regulation?
- How can loss data be monitored and collected among different policy departments?
- How can the quality of the data be controlled?
- How can data and methods be tailored to the needs of new users?
- How can users be supported to analyse the collected data?

8. Foresight methods

Foresight methods are forward-looking and forward-thinking methods that foster policy coherence between CCA and DRR. Foresight methods can be used to debate and shape the future in a participatory, open and action-oriented way. Joint development and application of foresight methods is expected to support collaborative activities and mainstreaming of CCA in DRR and vice versa. It promotes the development of trust and shared values, production of salient knowledge and the capacity to make future-oriented decisions.

Foresight tools can help to encourage strategic thinking and prioritisation of CCA and DRR into a common strategy and approach. The tools build also flexibility into policy measures and across policy areas. PLACARD has elucidated the added value and different methods of foresight in a foresight report as well as reviewing the current use in CCA and DRR communities and experimenting with foresight methods during dialogues. In this way, PLACARD has promoted the further use of foresight methods in CCA and DRR contexts.

How this issue has evolved during PLACARD

PLACARD has concluded that foresight methods are commonly used in CCA, but less so in the DRR community (and they are not always called "foresight": see Table 3, PLACARD Foresight report). These methods were known by the communities even before the PLACARD project started. However, its potential can be further deployed. Many methods are limited to quantifying risks and do not explore response options. While foresight methods were traditionally mainly quantitative scenarios and involved modelling, we have observed that recent foresight methods include participatory involvement and engagement of stakeholders to make sense of the future. At ECCA 2019, several presenters demonstrated tools for considering future developments. Interest in and awareness of foresight is growing, with more methods being applied and being continuously improved based on experiences. Future opportunities for application in CCA and DRR are:

- To support joint political agenda setting for CCA and DRR in the context of the White Paper on the Future of Europe, drafted by the European Commission in 2017.
- To support joint policy development in the context of the Commission Staff working document: Overview of Natural and Man-made Disaster Risks the European Union and the revision of the EU adaptation strategy based on scenario analysis (by JRC PESETA). At national and subnational level, climate adaptation strategies and action plans can be enriched via foresight methods. There is also the opportunity to use foresight to develop

and implement the EU Civil Protection Mechanisms to achieve targets in the Sendai Framework while including the long-term impact of climate change, as requested by the Paris Agreement.

- To support research programming: In 2015, a foresight exercise from the European Commission developed two scenarios for Europe and derived three principles for future research programming from its analysis: openness (open innovation, open science, open to the world), experimentation and flexibility; and European-level cooperation. Foresight is also used in strategic programming activities for transnational research of the joint programming initiatives (JPIs). In the coming period, it can be used to shape the EU research and innovation agenda, including the development of the 9th Framework Programme Horizon Europe.

Figure 5: Image created as a result of a visualisation exercise at the PLACARD foresight workshop, October 2016.

Pending issues and research questions

CCA and DRR efforts can be better integrated through use of a broader set of foresight methods, which will help strengthen the link between international mechanisms such as the Paris Agreement, the Sendai Framework and the Sustainable Development Goals by exploring their implications for European, national and local action. Research questions are:

- How can the exchange of successful foresight experiences take place to build foresight skills to discuss futures?
- Foresight is about determining alternative future developments via modelling outcomes and about human input in the form of creativity, expertise and sense-making. The question is how can we manage evidence and facts on the one hand and perceptions and worldviews on the other hand?
- Foresight is a learning process; it is demanding for participating actors and rarely leads to quick, direct and easy results. It takes time to use foresight tools. Outcomes are merely eye-openers that change priorities, strategies or preferred measures. How can foresight be made less demanding and better integrated with actual policymaking?
- Future research should improve capacity-building so that foresight can be integrated into CCA and DRR, by exploring how CCA actors can benefit from a clearer understanding of the importance of DRR, focusing on extreme climate events, while DRR communities may benefit from incorporation of adaptive and long-term perspectives when focusing on disaster prevention.

PLACARD output on this topic

- Leitner, M., Bentz, J., Capela Lourenço, T., Swart, R., Coninx, I., Allenbach, K. and Rohat, G.T. 2019. Foresight promotion report for policy- and decision-makers. PLACARD project, FC.ID: Lisbon.
- Leitner, M., Swart, R., Gaventa, J. and Holman, I. 2018. Exploring the use of foresight methods in climate resilience.
- PLACARD project. 2017. What might the future look like?
- Leitner, M. and Bentz, J. 2017. Using foresight in public to public partnerships – reflections from ERA-LEARN training.
- Leitner, M. 2017. How can foresight help to reduce vulnerability to climate-related hazards?
- Rohat, G. 2017. Exploring a foresight approach for CCA and DRR.

Conclusion and way forward

Placard is coming to an end and others will take the evolving issues further. Inspiration and recommendations on how to proceed with the evolving issues are compiled in the work of Bonding CCA and DRR: recommendations for strengthening institutional coordination and capacities.

There PLACARD provides insights and inspiration through showcasing innovative activities that target cooperation, collaboration, improved communication, increased coherence, and capacity-sharing between the CCA and DRR communities.

Core results focus on a set of recommendations on how institutions in the fields of CCA and DRR can cooperate more effectively and/or effectively integrate relevant policies and measures across the CCA and DRR space.

The recommendations area structured along five core areas for action, that reflect actions:

- Safeguarding sound governance
- Ensuring effective financing
- Seizing opportunities for cooperation
- Sharing new forms of communication
- Enhancing knowledge management

Actions to put recommendations into practice are:

- More concerted funding and greater investments in DRR and CCA activities are needed to reduce vulnerability to climate risks.
- Prioritise and invest in initiatives that have the potential to decrease people's vulnerability to climate risks, for example, through prevention, risk mitigation strategies and disaster risk reduction in the light of climate variability, and a changing climate on different levels.
- Convene the CCA and DRR community in Europe, including hosting topical workshops for decision-makers and experts, empowering communities and individuals at all levels, and continuing to support the ECCA conference series.
- Innovate by developing new tools and approaches to support decision-makers in climate risk management across the public and private sector, and supporting new, relevant initiatives with seed funding.
- Learn, with a focus on knowledge management, developing common standards and sharing best practices, as well as providing training to professionals on a variety of relevant topics and skills.

PLACARD Summary of evolving issues in CCA and DRR: 2015–2020

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