LODE PROJECT

Good practices and challenges of current loss and damage data management

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Loss Data Enhancement for DRR & CCA management

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1. Purpose and objectives of the first international workshop with stakeholders

The LODE Project is organized around showcases across Europe were local stakeholders are involved. These local stakeholders share a common interest and knowledge on a specific hazard and specific disaster. The international workshops aimed at creating a community of stakeholders across countries, involving also EU level and international stakeholders in charge of policies and initiatives on disaster loss data.
The 15 October 2019 Nice workshop has offered the opportunity to both share with the stakeholders the different showcases across Europe and benefit from their feedback and main expectations. The workshop was organized to achieve an initial integration among all participants (project partners and stakeholders) and give them all the possibility to express their thoughts and their understanding of the problems that were proposed to them that are from two categories: specifically linked to the showcase they are involved in and across showcases.

More than 35 participants and stakeholders (see Annex 1) were present during the workshop and their different backgrounds around Europe included:

- Public administrators
- State engineers
- Insurers
- Lifeline service providers
- Trade association
- Chamber of commerce
- Social platform managers
- Researchers
- Mayors
- NGO
- Public (association of victims)

The LODE project has fixed as an objective for the stakeholders' participation: "*experience the added value of damage and loss data through a variety of applications aimed at using the data for different purposes, including improvement of risk models, forensic investigation to support both a more resilient recovery and learn from the disaster, identification of needs and priorities, and accounting for national, European and international policies.*" (page 22). With that respect, the consortium identified four categories of involvement mechanisms: "information", "consultation", "association" and "deliberation/concertation" (see Figure 1).

Figure 1. four categories of involvement mechanisms in the LODE Project

The 1st LODE workshop was based on the "deliberation/concertation" involvement mechanism.

2. Structure of the Nice Workshop

As can be seen from the final program, the workshop started with a brief introduction of the LODE project and the results it has achieved insofar; then all stakeholders presented themselves.

Figure 2. Stakeholders presentations

They had the choice to simply say who they are, where they work, what is their task or instead provide a brief presentation regarding their activities and interest in the LODE project. Some, such as the representatives of the forest sector in Finland, described the challenges they had to face in the case of the storms that provoked significant damage to the ecological assets of the forests that were hit. Others decided to present short videos summarizing the activity of their office.
Then a sort of simulation game has been attempted. Participants, including both partners and stakeholders, were divided in groups, with the idea of maintaining a certain diversity in terms of countries and institutions involved. Each group had at its disposal a map with some information regarding a flood event that actually occurred in a small town in Italy and on which many data were collected by the Polimi team. The maps represented the area that was inundated and the features of the exposed/affected elements. Each group was assigned a specific task; each group was assigned a moderator from the Polimi team that organized the simulation and a rapporteur that had to take notes and to present the results of discussions in the first session after lunch. The three groups tackled three different relevant aspects of post-disaster data collection and management (see Figure 2).

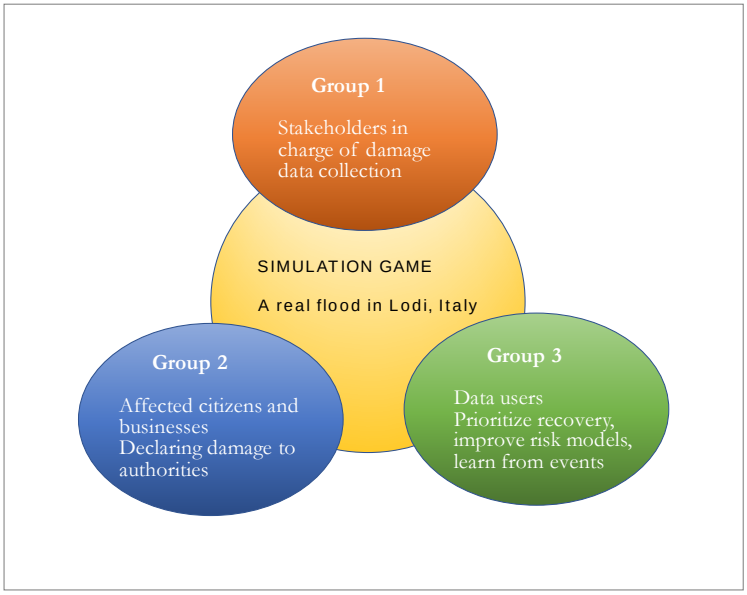

Figure 3. Inclusive stakeholders participation mechanism: Simulation game around flooding

Simulation is an inclusive process that aims at creating a realistic situation where the stakeholders can imagine and project themselves in different categories of roles and scenarios.
With that respect, simulations are used for two categories of purposes: Scientific and technical predictions or emergency management.
A disaster such as one induced by flooding is a disruptive situation where known and unknown outcomes can impact citizens, stakeholders and organizations in a given territory. The way actors in the different groups react to the simulation is based on knowledge and past experiences that gives an image of their need and daily uses of data. Simulations appear to be a pedagogical process for loss data processing and life cycle.

The first group addressed the issue of collecting data. Participants of this group were selected considering stakeholders that are actually carrying out such work in their real working activity. Among such stakeholders we can recall the responsible of the Ministry of Infrastructures in Greece, Maria Kleanthi (Directorate General of Natural Disaster Rehabilitation).
The second group was simulating affected citizens and businesses that had to declare damage to authorities. In this group, representatives of the insurance sector were for example located, as they have the largest experience with people trying to get compensated for damage.
The third group represented the data users, that are all public administrations, scientists, who need the post disaster damage data to prioritize recovery, to improve risk models, to learn from real events. In this case we grouped stakeholders that pertain to public administrations who are not data collectors but certainly users of such data, for example the municipal officer of the City of Madeira in Portugal, Sérgio Lopes.
After the summary of the results obtained from the three discussion groups on the simulation of the flood, a couple of presentations regarding the advancement of the LODE project on the development of the information system to facilitate the collection, storage and query of data were provided.

In particular, Mihailo Ratknic from Serbia presented the database that is available in Serbia and showed how the two case studies in Serbia (the Tara mountain forest fires in 2012 and the showcase of the historic centre of the city of Tekjia that occurred on the 15th of September 2015) could fit in the database. Xavier Romão from the University of Porto in Portugal presented the advancement of the work carried out on the showcase of the Madeira mudflow in 2010 and the preliminary advancement on the development of a method to determine damage to cultural heritage. Then Anna Faiella presented the practical work carried out insofar in developing a data relational model and initial interface for the agricultural sector. It was highlighted that the methodological steps carried out for the agricultural sector will be used as a paradigm for all other sectors. Stefano Luoni from JRC explained how the information system developed by the LODE project will be integrated in the Risk Data Hub currently under development within the DRMKC.
Following those presentations, a final round table took place, in which stakeholders were asked to provide their opinion and their suggestions regarding the future developments of the project, and also a comprehensive comment on what they had got from the workshop.

3. Aspects that have been raised in the three working groups

In each working group, a post-it session was organized and a facilitator was named to summarize the discussions within the group.

3.1. Group 1: Data collection

Figure 4. Participants to the Group 1 "Data collection"

Figure 5. Pos-it session in the Group 1 "Data collection"

Figure 6. Representative of the Group 1 "Data collection"

The group discussed how to carry out damage data collection based on their own experience in different countries. Results of course do not reflect on the entire system of data or procedure used, but some points they consider useful to be presented in the group.

The following sectors were considered:

- Private buildings.
- Businesses.

- Agricultural activities.
- Strategic building and Infrastructures.

It was possible to distinguish the contributions of the discussion in four categories: indicators, procedures, tools, main expectations.

About the indicators, they depend mainly on the considered "object/system", but also on other factors, like the time from the event or the presence of an insurance system.

- For buildings and flood-related events, height of the water and floor affected were considered as important information to be able later to use such data for risk modelling purposes.
- For agricultural activities, a measure of the production and animals after the events compared to the average values of production were suggested as used in Serbia.
- Damage to crops is generally treated in a different way, according to a different compensation framework. In Serbia, damage is classified in 3 groups:
    - ✓ Damages to the crops only- recoverable
    - ✓ Damages to crops and soil, which is recoverable after a certain time.
    - ✓ Damages due to toxicological events.
- The accessibility and usability of the different elements/structures necessary for all the production phases is also important (example: the accessibility/usability of silos to store the cereals after the harvest, to guarantee the production chain)
- For insured assets, the data of the claim for the payments are considered as a standard in the insurance sector in some countries.
- For the road system, the collection of the interruptions, considering also the landslides are important to measure the intrinsic damage, but also to know the accessibility of the affected territory

As for the procedure to follow for damage data collection, different alternatives were presented by the stakeholders.

- In some cases, self-declarations and claims are considered, in some other cases like Greece, surveys are triggered by the event without specific requests by victims
- The representative of the Ministry of Infrastructures in Greece, that is responsible for post-disaster damage data collection explained how the task for collecting data would be handled in her country, should such a flood occur there. First it has to be pointed out that they would send surveyors to the field without waiting for a communication of the private owner. Priority would be given to critical facilities. Her office would collect the data by floor and buildings and then depending on the value of the event/ disruption they would determine a certain amount to be granted for private owners. The compensation is generally payed 60% from the state 40% from the private insurance. Compensation to businesses is payed to those who run the activity not to the owner of the building. In order to make sure compensation is payed to the entrepreneurs, a check on the electric code is carried out so to be as precise as possible. In case of compensation to residents, the issue of displaced people has to be considered.
- The representative from the Catalunya Civil protection Authority suggested that a public officer would go survey damage to buildings and to the public sector, whiles damage to

businesses would be communicated to emergency services by the owners. Civil protection services are equipped with two dedicated phones for each municipality as in the case of the police.

- In countries were insurance penetration is high, for those assets that are insured the procedure of post disaster data collection is carried out by insurance companies. Uninsured public facilities and other goods that are not insured are surveyed by teams of the public administrations. There are differences in this regard among countries with respect to the sectors (depending on which are insured, and which are not).
- An important point that was mentioned regarded to possibility to access to sites where damage occurred in order to be able to assess it; this is particularly relevant for some components of lifelines.
- The timing of the data collection has been raised as an important topic. In fact, right after the event only direct physical damage can be certified; indirect, second order damage may be detected only after a certain time. But the procedure does not always contemplate more rounds of damage data collection. In Finland, they are mainly concentrated onto the insurance point of view so on the one hand they trust the owner in the delivery of the report and as for France it is crucial the timing of the release of data and so is the process of collection-elaboration and delivery. Moreover, in Finland the total refund at the end of each year must be assessed, implying that damage declarations must arrive soon so as to be dealt with in time.
- In France an important problem would be represented by indirect damages, especially related to businesses for the loss of incomes. They will propose a law where insurances must provide a certain refund to private and businesses. The case of indirect losses on the occasion of the Thailand flood was provided as a relevant internationally well-known example. The problem would be then until what threshold insurance can actually compensate and about the timing for refunding.

About the tools used to collect damage data, there are many differences among the countries and the considered assets.

- The tools range from papery form (like in Serbia), to excel files to information systems (more rarely).
- In any case, one point of outmost importance relates to the specific identification of each assessed asset so as to be able to locate it in a specific place and avoid duplication of surveys and gaps in others that are never assessed. The method for the identification of the surveyed asset is essential as it permits also to add data later on being sure that the item implied is the same specific one for which multiple surveys have been conducted to collect different types of data. Further, a common identification of the asset in different databases permit the link of different information. Last but not least, the identification method must be flexible to be adapted to the requirements of each country.
- An added value is provided by linking textual data with images and maps, something that is possible thanks to drones, maps, satellite images, georeferenced pictures.

Thinking to possible improvement in the present states, the main expectations were discussed

- A collection system with phone application, an open data system and database system which can be shared with other stakeholders.
- Use of GIS to collect and store data
- The collection system should consider all possible hazards. For the different states.
- Having an application on the smartphone to collect data (for some specific aspects, available for the citizen too).
- Importance of a common understanding of the different concepts/definition (it's not only a question of language)
- To fill the data management system, with the data known before the event for the different assets (e.g.: the buildings and infrastructures identification and characteristics)
- Ecotoxicology

3.2 Group 2. Affected people and assets reporting damage

Figure 7. Participants of Group 2 "Affected people and assets reporting damage"

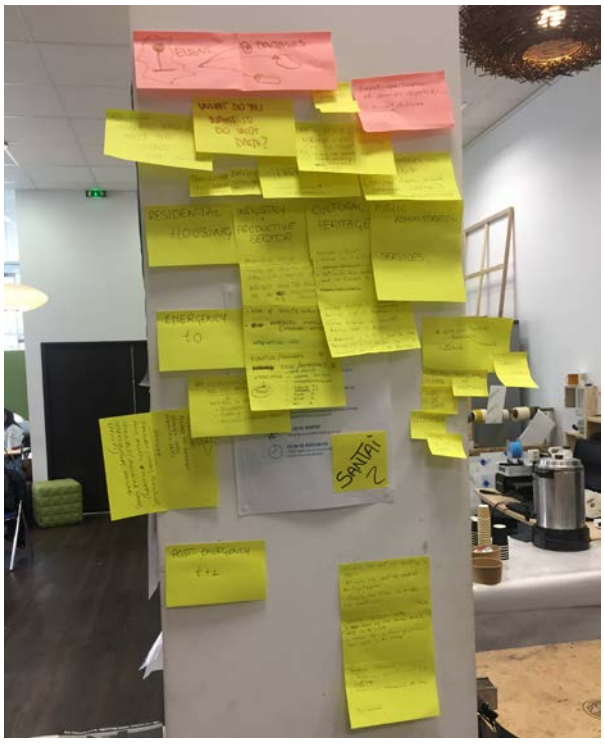

Figure 8. Post-it session for Group 2 "Affected people and assets reporting damage"

Figure 9. Representative of Group 2 "Affected people and assets reporting damage"

The group discussed the point of view of those who are claiming the damage, asking for compensation.

The group discussed flood-related negative impacts to the following sectors:

- residential/housing;
- industry/productive sectors;
- cultural heritage
- services
- agriculture + forestry

Detailed considerations pertaining the sectors that were considered are:

i. ***Residential sector****:* when dealing with floods, the main damage relates to contents rather than structure. During the discussion a point was also made about considering the vulnerability of the affected population (people in need, children, with health problems). This was deemed to be useful if we want to carry out a forensic investigation of disasters.

ii. ***Cultural heritage and tourism***: immediate damages and losses to cultural heritage include damages to immovable and movable assets; closure of a buildings to protect vulnerable heritage. Immediate damages and losses to tourism include closure of hotels and losses to cultural facilities that must be closed because of the event. In the long run, losses depend on the time needed to re-open the buildings, and to satellite commercial activities.

iii. ***Business****:* Participants highlighted the importance of understanding with more detail the specific activities that are carried out in the firm to have a complete picture about incurred losses and damages. They also stressed the need to consider cascading-effects: what happens if the disaster involves headquarters? What if it involves operational sites? An interesting point was made with respect to the non-material damage and/or loss a business can suffer. If servers are damaged, data and knowledge could be lost. These include data of customers (email addresses, billing), information, investment plans, do business have backups?

iv. ***Agriculture****:* there are many factors that determine the degree of damage and losses (crop, type of soil, growth stage…). Types of damages and losses discussed for this sector includes damage to or loss of livestock and damage to ecosystem services.

v. ***Forestry****:* disasters can affect those sectors relying on the forest, like tourism, hunting, and honey production. Ecosystems and their functionalities can also be affected.

An issue that has been mentioned relates to the loss of data and information, requiring repetition of surveys that had been already carried out.

Main challenges that have been identified

- With respect to the time scale: loss and damage assessment need to take place at different times to get a comprehensive picture (some damages can show up at a later stage!)
- As for the time scale, it must be taken into consideration the fact that even when considering the spatial scale, not always damages necessarily materialize where a disaster strikes (e.g. impacts of the 2011 Thai flood on computer industry). Also transboundary events must be considered as relevant in the collection of data, as across the border data are not necessarily

shared and so the overall magnitude of the event is not fully acknowledged even when significant interdependency exist.

- As for the combination of spatial-temporal interaction, cascading (domino) events require 'extended' consideration of what is the appropriate time frame and spatial scale to consider for loss and damage assessment.

More general challenges

An important issue has been highlighted in the partial/inexistent inter-operability of different datasets. There is certainly the need to connect different data sources (cadastral, civil registry, chamber of commerce).

A more banal, but nevertheless relevant point that has been raised concerns the geo-localization of damages, also to avoid double-counting.

It has been pointed out that damages are not only tangible but also intangible consequences that nevertheless are very important from a social perspective, such as the impact on the well-being of the population, the mental stress.

3.3. Group 3. Data users

Data users often need data that are expensive and difficult to collect.
Damage data are useful to improve modelling in many regards. For example, they can be used to integrate dynamic hydrological modelling with data from real events. But of course, there is the need to be ready to collect the data at the time when the event is occurring in the form that will be necessary for further elaboration. In the case of the island of Madeira, there was not such a system at the time of the event that affected the city of Funchal.
Fundamental data to develop modelling capacity of future potential scenarios are for example: address, name owner, structural typology (masonry, concrete), information of the area, presence of older damages from previous events, construction quality, classification usable/not usable.
Data on how many people are homeless after the events, so how many people need sheltering are useful but only to produce a rather rough model.
Damage data to improve regulations. When a damage occurs, we have to justify the necessity of reconstruction.
Study previous events (history of events in a certain geographical area) and improve the political regulations.
Compensation estimation of cost can be used to compare with the cost of structural prevention measures, improving the empirical evidence of cost-benefit analyses that currently are based only on projections rarely on data related to real events.
In unveiling damage data, the issue of responsibility on the risk gets prominence: is damage due to failures that can be attributed to the owner of a building, to the municipality? Sometimes liabilities are really difficult to determine (e.g. wildfires), but the increased recourse to courts after disasters is perhaps a major obstacle in sharing and even in collecting and storing damage data.

As for private stakeholders, they may be more willing to share data if such sharing is limited to public authorities or if there were assurances that such data would be used in anonymous form without saying the source.

Figure 10. Participants of Group 3 "Data users"

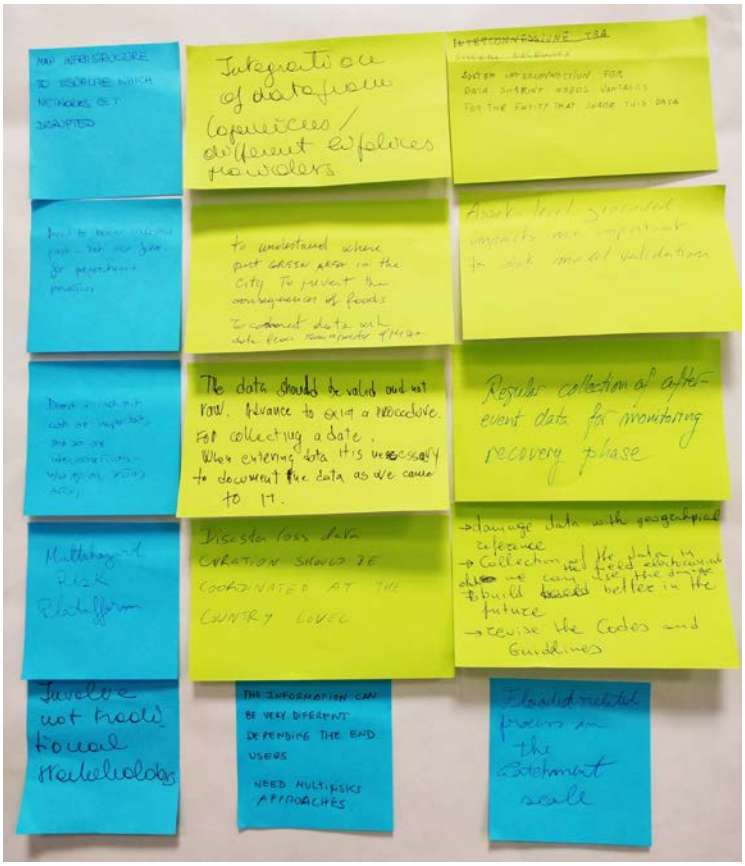

Figure 11. Post-it session for Group 3 "Data users"

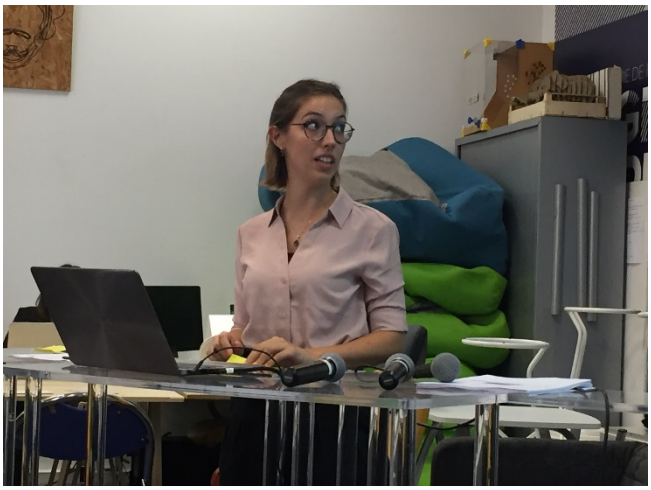

Figure 12. Representative of Group 3 "Data users"

In general term, there is a lack of indicators to describe indirect damages. A better understanding of the connection between direct, second order and long-term damage is important to better understand underlying interconnections so as to better manage future crises.
Knowing the overall costs of service disruptions not only for the service providers themselves but for all sectors depending on them can increase the willingness to better prepare and plan to reduce risks and be ready to absorb impacts and recover in a shorter time.

Post disaster damage data are useful for public administrations in charge of recovery to prioritize the interventions.
It is important to monitor the evolution of the recovery and the reconstruction. A disaster can produce long-term consequences to commercial activities in the affected area. Delays in recovery may translate in significant indirect impacts on the capacity to restart economic activities and, in this regard, there is a strong relationship between the time needed and the effectiveness in providing recovery funds and permits by public administrations in charge at the national and regional levels.
Collected and elaborated damage data can be used for a variety of purposes beyond improving risk modelling: for example to support lobbying and to get the attention from decision makers and the larger public. Another important usage that has been assigned to some authorities in different countries is the compliance with the Sendai Framework for Disaster _Risk Reduction, i.e. to be able to measure the target indicators, something that is far from banal if you do not have a good system of data collection in place and you are not able to maintain it over time.

Tools and instruments

Representing some of the data or results of queries with maps may help communicating priorities in recovery or potential risk to people. Maps are useful for a large variety of stakeholders, for example farmers.
Different types of maps with different level of detail can be produced, for example using satellite images, direct surveys on the ground, carrying out second level inspection: classify in different level of damages the usability of the buildings. It may be useful not only to represent damage to residential buildings but also to commercial activities. In fact, we may need a variety of maps for different users who need different information to be represented.
For producing good quality maps, we need georeferenced data and develop databases providing the possibility to map the result of our queries. As this may be difficult to achieve, perhaps it may be wise to pre-identify some of those queries, to predetermine the types of outputs we may need from the information system.
We may need not only to develop a database with the damage data that are collected in the field, but also access other databases with different types of information (cadastral, damage collected by other agencies, etc.). This implies the underlying willingness of different stakeholders to share data; this may be easier if they find interest, and advantage in sharing data.
Simple tools in order to help the collectors of data (engineers).
The final provider of the damage data collection and management framework should be the National Authorities.

Main expectations

There is the need to keep trace of considering cascading effects and multi-hazard events and impacts while collecting damage data; in currently available systems this is very difficult to do.

An interesting comment that was made by one of the researchers of the consortium is that after an event, analyses are concentrated in what went wrong (e.g. what was damaged), never on what went right (e.g. what was not damaged), but in order to make risk analysis we need both.

4. Main results of the Workshop

We may group the results of the workshop under four main topics:

i. Criticalities in collecting and sharing data, especially certain types of data, related to specific sectors or stakeholders.

ii. Aspects that are not currently considered or only very partially in databases and still need some conceptualization.

iii. Issues in procedures and conducts by different authorities and organizations that hamper improvement in the current way data are collected and managed.

iv. Aspects that need to be carefully considered in the design of the information system.

In the following we will address each, proposing a reasoned summary of what has been discussed not only in the working groups but also in the introductory part and in the final part of the workshop.

4.1. Criticalities in collecting and sharing data

It has been widely recognized that any attempt to develop a more coordinated, comprehensive database of post-disaster damage data is going to encounter some obstacles consisting of the reluctance of some stakeholders to share and communicate certain types of data regarding damage and losses. There are several reasons for this that have to be disentangled and for which LODE should attempt to find or propose a solution.

The most debated issue relates to liability and responsibility for the damage. Across Europe, these responsibilities are carried out by different actors depending on the legislative, the administrative and technical perimeters of concerns. Data analysts should first consider these contextual issues that could give different meaning to the abundance or to the scarcity of data.

Of course, if data can be used later to take them to court, regulators of data will not create incentives for collecting and sharing that data. There needs to be clarity about who is responsible for certain damages and to what extent a work that is conducted for compensation and learning purposes can produce data that can be used also in a court considering the contextual issues of data production.

On the other hand, legislation is unclear about who has the duty to collect such data and we all agreed that a figure, a role, an office, working as data coordinator is necessary but at the moment not mandatory. Having such a coordinator both at the local, national and European levels would therefore constitute a good practice, that nevertheless would entail some important benefits, such as easing the task of measuring the Sendai indicators.

One way to promote data sharing can be achieved by showing the different stakeholders the utility of a coordinated and comprehensive way of data collection that can provide added information and knowledge for future planning against risks, as well as for immediate response in

the time of crisis. In fact, also being able to show the stakeholders how data will be used, also with what care about personal and sensitive data, can facilitate sharing.

4.2. Issues that are not currently considered but need to be debated and further investigated

One important aspect is the credibility/legitimacy/accountability of the information that is shared. This relates in particular to the data providers: some official stakeholders are certainly legitimate but not necessarily credible at least in the eyes of some social groups, such as the citizens, that also are not always considered as legitimate source of information regarding damage they suffered. This short circuit needs to be overcome, establishing different relationships among stakeholders and creating perhaps a coordinator of data that is also acting as an interface among different stakeholders, helping them to communicate with each other.

Many interveners focused their attention on the increase of cascading effects, events that are cross border among administrations and/or countries. How to handle this type of more frequent occurrences in an information system that wishes to create a baseline for future improved risk assessments is important. Here the issue of scale and socio-cultural drivers are also relevant. In a cross-border event, both local, regional and national levels are implied, but not necessarily coordinated. And in more general terms the interaction and the scaling up and down is a sensitive issue and not trivial even from a technical point of view.

An interesting comment that was already highlighted in the groups' discussions, regards learning in a wide sense from events, so not only damage and losses, but also from what went well. In a forensic investigation we could also investigate why certain areas were not or less damaged given the same level of hazard and stress and identify resilience, protective factors. This is a hint the project may take in the application to the showcases.

Another aspect that is rarely, poorly addressed regards damage to the natural environment; however recent storms in Northern Europe as well as in Southern countries have shown dramatically the loss of trees for example. How to evaluate the value of fallen trees? How to evaluate the longer-term ecological damage to agricultural activities, to forests, or to water bodies?

Finally, it was stressed again that in many cases information that is available after a disaster is very hazard-focused, while information regarding the vulnerability of exposed assets is missing. There is the need to develop tools, such as forms, interfaces, to collect data on damage to multiple sectors, but certainly at an earlier stage one needs to know what indicators, what data are more relevant and who can provide them as a legitimate source.

4.3. Procedures and conducts

In order to improve the current way different organizations work and produce disaster damage data, there is the need to change the way in which they collaborate, they interact. It can be proposed that a common portal, a common service for collecting and querying a system for

managing damage data according to different needs and purposes may play as such an interface among different authorities and organizations, including citizens.

It was suggested that statistical offices, such as Eurostat or national statistical institutions may join the effort, so it has been proposed to involve one or two of them in the LODE project. Certainly, some statistical offices are nowadays committed to a dramatic change in their business, in the attempt to follow much more closely and track transformations that are occurring in society and in the economy. Some are committed also to produce relevant data for disaster risk reduction and post-disaster assistance in the form of data that can be used to better analyze the stricken area and propose priority lines of intervention.

It was also suggested by multiple stakeholders that procedures for damage data collection must contemplate different times of collection and surveys, based on the specific purposes for which this is done (declaration of state of emergency, first reconnaissance of the situation, longer term usability checks, more in depth damage assessment to establish funding) and also considering the time when a certain damage becomes "visible" (for example loss of business operationality, recovery of services, or ecological damage, etc.).

Finally, in terms of data use, it has been highlighted that a more comparable format of data collection and sharing and the availability of an information system for queries may help significantly in developing "parametric" models for forecasting future damage based on given inputs and on better empirical evidence of damage. For example, in Finland they are able now to estimate the percentage and distribution of power outages given what has happened in previous storms and on the meteorological expected conditions. This could be extended also to other type of damages, not limited to outages, should we obtain enough data on multiple sectors and a parallel description of the triggering event(s).

4.4. Hints and suggestions for the development of the information system

Given that we expect such a system to store sensitive and important data, both hardware and software solutions must be robust enough to avoid loss of data. We need to think of a system that provides multiple entering points for both input data and queries, but with different levels of access and possibility to change the data. There are important challenges in moving from a logical data model that we will try to develop for the sectors that are at the core of the LODE project and the need to obtain a practical model, that can be operational already at the time of the project.

With respect to the connection with the Risk Data Hub, a number of points must be highlighted. First, the fact that the Risk Data Hub has data of exposure but not of vulnerability, whereas we would like to collect and store some data on vulnerability as stressed by many stakeholders, especially those with responsibility in DRR policies and their implementation, including the Sendai Framework.

An important point that needs further thought relates to the multi-hazard, cascading effects. In the Risk Data Hub events are characterized by date, country and hazard, but to one event many phenomena are associated. So, the link between an initial event and sub-events must be

considered and the solution should be coherent with what has been already decided for the Risk Data Hub.

As for the timing, we need a system that is able to maintain memory of the history of data because, as mentioned previously, we will need more surveys, more data collection for the same event, because also some data become available/is remembered after a certain time. The timestamp of data is important also to better define the quality and the comparability of data across events and geographic areas.

5. The Special Session at the IDRIM conference

The Integrated Disaster Risk Management (IDRiM) 2019 Conference was organized by the LODE consortium member CNRS in Nice. The conference topics were around the issue of “Knowledge-based Disaster Risk Management: broadening the scope by "Smart Territories" for Sustainable and Resilient Cities and Organizations”. The LODE project topic was one of the main issues of the conference and a special session of the LODE consortium was organized (see Annex 3) in the following way.

First, a brief presentation illustrating the ideas and preliminary results of the LODE project, that took overall 15 minutes.

Then, three presentations of case studies were proposed to the audience. First, the case of Kefalonia in Greece was presented by Maria Kleanthi of the Greek Ministry of Infrastructure and Transport General Division of Rehabilitation from Natural Disasters (DAEFK). She explained that in Greece the Ministry of Infrastructure is responsible for post-disaster damage data collection. It is a three phases activity: first a rapid reconnaissance to identify priorities and criticalities; second, usability assessment, and third damage assessment on the basis of which repair projects can be presented.

As a second case, the Lorca case in Spain, was presented by Mariano Garcia, showing the advancement that has been made in the collection of data and the coordination with the local trade association. The last presentation addressed two cases from Serbia: the forest fire of Tara Mountain in 2012, and the floods in Tekija in 2015. An interesting situation of the latter is the fact that the flood occurred as a consequence of a propagation path that was not expected and for which there was no structural defense. As a result, the historic center was significantly impacted. In the presentation some ideas and preliminary applications to achieve a more structured data collection in the form of a database has been presented.

Figure 13. LODE project session at IDRiM 2019 Conference – 16 October 2019- Nice (France)

After the presentations, participants have been asked to provide their own experience and ideas regarding current practices of post-disaster damage data collection and use in their own country or in general any experience they wanted to bring into the discussion. Issues that were discussed were: the relationship between existing legislation requirements and methods and tools of post-disaster damage data collection and use; relevance of insurance data and their possible integration with data collected by public

authorities; relevance and role of data collected by companies managing critical infrastructures and ways to involve the latter in sharing information and, finally, wished improvements in the damage and losses collection methods and IT systems in order to share and integrate knowledge with other sectors of administration in charge of different tasks and aspects of risk prevention and adaptation policies.

6. The visit to the IMREDD SMART and interactive Laboratory

The Mediterranean Institute for Risk and Sustainable Development (IMREDD) is a joint Institute promoted by the PACA region and Nice local community to foster public-private partnership between research institutions and, decision-makers and end-users. The mission of IMREDD is to stimulate partnerships with the economic world that generate research, to create initial and continuous education programs and to promote expertise and innovation in companies at the service of economic development and job creation in the territory.

IMDREDD focuses its activities in the fields of sustainable development and smart cities, based on four Strategic Areas (SA):

- SA1: Environment.
- SA2: Risks.
- SA3: Energy.
- SA4: Mobility.

The main goal of the institute is to provide actors and stakeholders with information, knowledge and capabilities to contribute to SMART Cities. In that respect, philosophical and ethical aspects, as well as citizen well-being, safety and behavior are taken into account.

An interactive visit was organized by CNRS to the LODE Consortium. The visit consisted mainly in viewing the capabilities of the interactive laboratory of IMREDD.
The laboratory contains several rooms allowing an integrated view of the hazards and risks in the city, particularly in the city of Nice.
A first room is dedicated to a 3D scan of the city of Nice at 360 degrees. This room allows you to visualize in real time the space and territorial vulnerability of the city.

Figure 14. Explanation of the **i**nteractive 3D map of the city of Nice

The second chamber is dedicated to different sensors allowing to know, in real time, the air quality, the water quality, the rainfall level, and any other regulatory information in the field of risks and hazards.

The third chamber reports hazard and risk maps separately and in an integrated manner.

Figure 15. Different interactive maps in IMREDD laboratory

The fourth chamber reports on the availability and security status of networks and infrastructures. The last chamber offers an integrated vision of risks for crisis prevention and management.

The various equipment operates in compliance with the regulatory conditions for sustainable development.

The interactive laboratory is using remote-sensing and risk prevention data and knowledge information for decision aid. The formalization of a harmonized damage database across Europe should help complete the IMDREDD Smart system and connect prevention and post-disaster data. In that respect, the visit of IMREDD Laboratory had two objectives: consider what is developed and used in term of risk prevention and detect what is needed and expected by the final users.

7. Inputs for the project

The first LODE stakeholder workshop highlighted several categories of needs, data and knowledge to be taken into account in the rest of the project.

Among the inputs, we can mention:

1. The need to characterize the indicators of direct and indirect damage according to:
(i) the quantitative or qualitative nature of the data that can be collected,
(ii) the nature and frequency of the forms of damage declaration required per country and per type of hazard,
(iii) the nature of stakeholders and actors (i.e. private or public) in disaster management and/or risk prevention.

(i) Not only quantitative data are relevant for characterizing damage and risk (see also Simmons et al., 2017 and Aven, 2012). Quantitative assessments can be complemented by qualitative information that add important aspects that should not be neglected in mitigation and preparedness processes. Such qualitative data can be in the form of written text, pictures, videos. One of the reasons why such data are poorly used or neglected is the fact that we do not have appropriate rigorous and systematic means of collection and analysis. This may be a dream but still worthy to take into consideration while developing the information system.
(ii) One important issue that has been raised regards the number of different forms and tools that are used depending on the hazard, on the involved country and on the involved authority. Such diversity and multiplicity is not necessarily a good thing as it hampers attempts of comparison and the possibility to share experts and tools across countries and regions.
(iii) There is still a barrier between public and private stakeholders which hampers the sharing of data. This concern is there but without legislative intervention it is difficult to expect any improvement in the future.

2. The need to integrate damage declarations by hazard, multi-hazard, territorial level (local, regional, national, European), by purpose of declaration and taking into consideration to what degree it may be opposed/appealed by different parties. It is important to clarify that damage data have legal implications in that: they may highlight misconduct on the side of governmental agencies that should have prepared/acted and did not in an appropriate manner. Such data must be certified by a credible party in order to be granted compensation with public money; there are also issues of confidentiality that must be respected. The purpose of the declaration is therefore crucial and we may suggest in the development of our work that the use of tools such as an information system should not only be integrated in administrative procedures but also be

accompanied by an explanation of limits of validity and specific purpose of the data, limits of use exploitation etc.

3. The need to think about the security of the damage declaration database both in terms of software and hardware (e. g. cybersecurity). This issue is related to the previous point. Access to databases by third parties should occur with care and taking into consideration what are sensitive data. Who has the right to access what data must be embedded in the design of the system.

4. The need to situate the damage declaration according to the life cycle of the damage data (just after the disaster, medium and long term) and the socio-cultural context of the declaration. The iterative nature of disaster damage data collection and analysis has been already discussed in previous work (see for example the Idea project, the Guidelines by the WMO and the same PDNA), however also the territorial context where the damage declaration is made is important to delimit its validity and comparability with other cases.

5. The need to create more awareness among the stakeholders that may be impacted by disasters about the importance of collecting and sharing detailed disaster damage data in order to learn from these data and reduce the impacts of future events. Stakeholders need perhaps to have some tangible examples, demos regarding how a better damage data collection may produce improved analysis and understanding of risks that will be useful for them in order to tackle risk assessment and management. They need to become aware about the potential for easing their own work and enhance the acceptance by citizens and owners of limitations in land use so as to save future damage on crucial sectors such as housing, economic activities, services.

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Annex 1- List of participants to 1st LODE Workshop -15 October 2019 – Nice (France)- IMREDD

	Name	Organization	Country
1	Alessandra Sgobbi	DG Clima (Europe)	-
2	Caroline Lambert	DG Clima (Europe)	-
3	Antti Pulkkinen	FMI	Finland
4	Ari- Juhani Punkka	FMI	Finland
5	Heikki Tuomenvirta	FMI	Finland
6	Claire Auplat	Université Paris Dauphine	France
7	Jutine Loubry	AFPCN	France
8	Myriam Merad	CNRS	France
9	Roland Nussbaum	MNR -AFPCN	France
10	Eleonora Gennaro	CNRS	France
11	Michel Sacher	CYPRES	France
12	Eleni Mavrou	Perfecture Of Ionian Islands / Kefalonia And Ithaca Region / Civil Protection Department	GREECE
13	Maria Kleanthi	Ministry Of Infrastructure And Transport (DAEFK)	GREECE
14	Maria Panoutsopoulou	EPPO/OASP	GREECE
15	Miranda Dandoulaki	National Centre Of Public Administration And Local Government	GREECE
16	Pavlos Delladetsima	Harokopion University Of Athens	GREECE
17	Thekla Thoma	EPPO/OASP	GREECE
18	Anna Faiella	Politecnico Di Milano	ITALY
19	Carlo Capra	Assolombarda	Italy
20	Francesca Coppola	Assolombarda	Italy
21	Maria Pia Boni	Politecnico Di Milano	ITALY
22	Scira Menoni	Politecnico Di Milano	ITALY

	Name	Organization	Country
23	Stefano Luoni	JRC	-
24	Elisa Calliari	CMCC	ITALY
25	Gustav Eklund	JRC	-
26	Lucina Tessitori	Comune Di Milano	ITALY
27	Sandro Salari	Poliedra	ITALY
28	Silvia Torresan	CMCC	ITALY
29	Aparna Tandon	International Centre For The Study Of The Preservation And Restoration Of Cultural Property	Portugal
30	Bárbara Dias	National Civil Protection Authority	Portugal
31	Cláudia Paixão	Regional Civil Protection Service - Madeira	Portugal
32	Esmeralda Paupério	University Of Porto	Portugal
33	Sérgio Lopes	Regional Infrastructures And Equipment - Madeira	Portugal
34	Xavier Romão	University Of Porto	Portugal
35	Milena Pajić	Emergency Situations Headquarter Of The Municipality Of Zagubica	Serbia
36	Andreaja Mijatovic	Emergency Golubac District	Serbia
37	Goran Đorđević	Emergency Situations Headquarter Of The Branicevo District	Serbia
38	Marko Tomic	'Tara' National Park	Serbia
39	Mihailo Ratknic	INZASUM	Serbia
40	Juan Carlos Molina	CARM Cultural Heritage	Spain
41	Mariano Garcia-Fernandez	CSIC	Spain
42	Marta Garcia-Garzon	CCS	Spain
43	Miguel San Nicolas	CARM Cultural Heritage	Spain
44	Andrea Superti	Politecnico Di Milano	Italy

Annex 2- Program of the 1st LODE Workshop – 15 October 2019 – IMREDD, Nice (France)

1st INTERNATIONAL WORKSHOP	
Project Title	**Loss Data Enhancement for DRR and CCA Management (reference nr. 826567)**
Project Acronym:	**LODE**
Purpose of Meeting	**1st Workshop**
Date of Meeting:	**15 October 2019**
Location:	**CUM - Nice**

15th October 2019 International Workshop with Stakeholders

Time	Item	Speaker
9.00	Welcome to the workshop Presentation of the project and introduction to the workshop Welcome and presentation of the Nice stakeholder	Myriam Merad Scira Menoni Michel Sacher
9.40	Presentation of stakeholders: 3:5 minutes each stakeholder presenting himself/herself with 2:3 slides if wished	Invited stakeholders
11.00	Coffee break	
11.20	Breaking ice game: three groups of stakeholders and partners will be confronted with a real case scenario on which: a. Group 1: collecting data b. Group 2: affected people and assets reporting damage c. Group 3: damage data users	Facilitators: Maria Pia Boni Giulia Pesaro Scira Menoni
13.15	Light lunch	
14:30	Round-table 1: Synthesis of the game explained by a speaker for each group	Moderator: Myriam Merad

	Discussion	
15:45	Coffee break	
16:00	An example of the work that we are doing in LODE	Anna Faiella
16:20	Round-table 2: Answering key questions a. What is the added value you see in improving damage data collection procedures? b. What do you see as a critical need in terms of tools to facilitate damage data collection? c. Do you see the added value of improved damage data quality, granularity, detail?	Moderator: to be determined All
18:00	Close of meeting	

Purpose and added value of the workshop

Objectives

The first international workshop of the LODE project is organized to help the consortium getting a better overview of the processes, procedures and challenges of post disaster damage data collection, analysis and management.

Furthermore it is aimed at collecting requirements for the information system to get ideas and understanding of how the work of different agencies in charge of losses data collection can be facilitated and improved using appropriate IT tools.

Added value for stakeholders

Stakeholders will be invited to a highly dynamic and interactive workshop where they will have the opportunity to exchange ideas about improvement in their own work and practices and to co-develop requirements for enhanced instruments for post disaster damage data collection. They will be able to appreciate the developments and the orientation of the LODE project to which they have been asked to participate as external supporter and advisors.

Annex 3- IDRIM 2019 Conference in Nice 15-18 October 2019 – The LODE Session

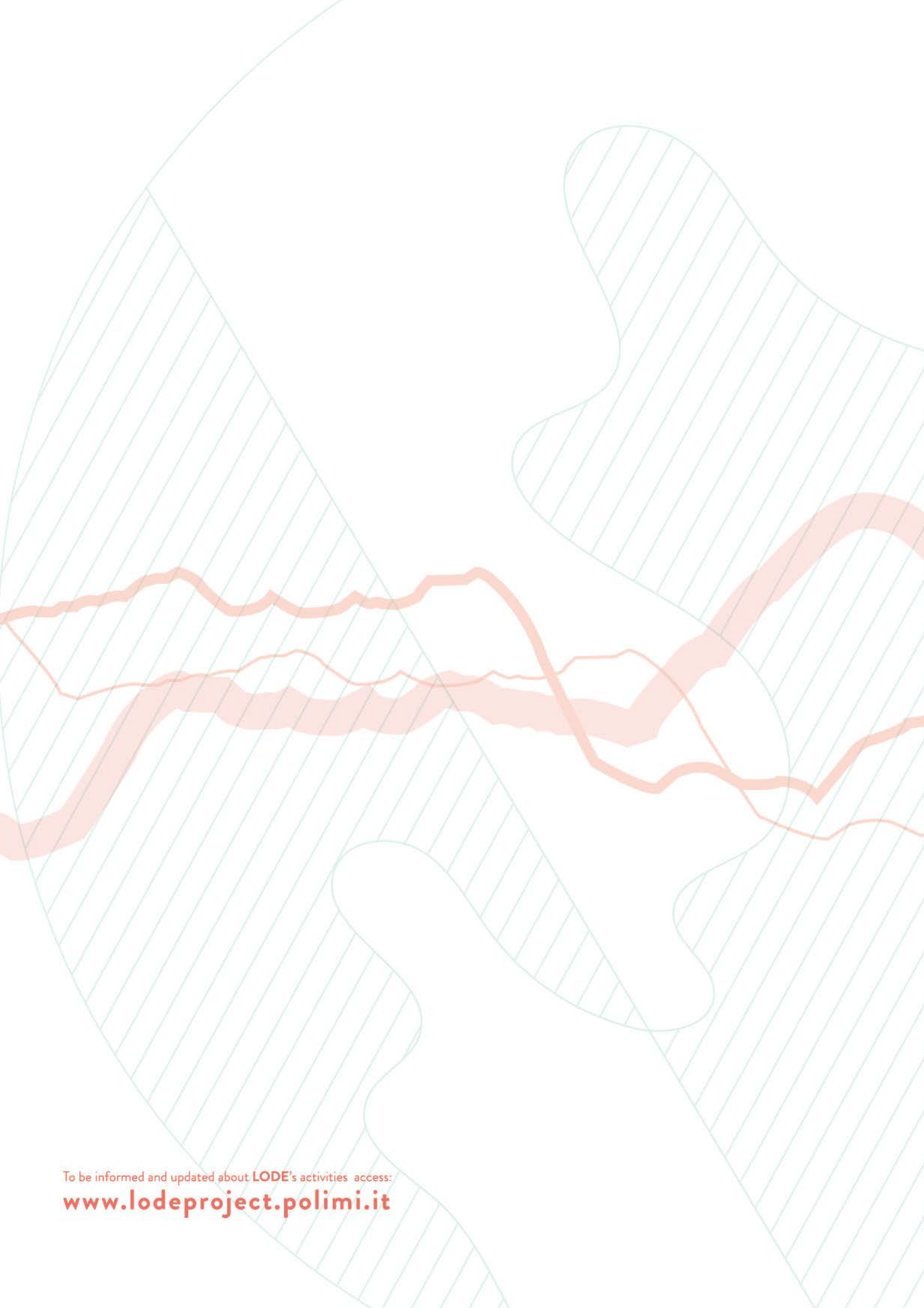
	Knowledge-based Disaster Risk Management **Smart use of post-disaster damage and loss data**	**Special session description** **LODE Project**

16/10/2019 – 13:30-15:00
Introduction to the special session:
- Scira Menoni (Politecnico di Milano)
- Myriam Merad (CNRS-AFPCN)

Better post disaster damage and loss data are needed in order to better «Understand risk» which is the first priority of the Sendai Framework for Disaster Risk Reduction. Currently available databases do not permit in depth analysis of the causes of a disaster and are not coordinated sufficiently to provide a comprehensive perspective on direct and indirect damage to multiple societal sectors across relevant spatial and temporal scales. The special session is aimed at discussing with a wide range of stakeholders from different agencies and organisations and with the public attending the IDRIM Conference how current practices of damage data collection and management can be improved so that such data can be used for multiple purposes and to support evidence based policy making and strategies for risk mitigation and adaptation to climate change.

LODE is a two years project that has been funded by the EU DG ECHO and follows a prior project named IDEA that set the path towards an in depth understanding of the opportunities in terms of use of damage data, gaps in current methods of collection, storage and analysis, and pursued initial attempts to standardize damage data collection procedures and provision of IT instruments to ease the task of surveyors and applicants for funding after disasters.

There are three main objectives to the proposed session: a. involve a larger audience in the activities that have been already carried out on the topic by different agencies and by the Lode project; b. share experience regarding smart use of damage data to shape and upgrade knowledge regarding the complexities and interdependency between hazards, vulnerabilities and exposed assets and systems in real events; c. discuss the most promising pathways to the solution of problems that have been already identified since rather long time but apparently still in search of convincing and replicable solutions. Stakeholders are often aware of problems they encounter in using data collected by other authorities and agencies or in collecting and organizing their own data to serve multiple purposes including repair requirements, feeding enhanced risk modelling and learning lessons for a more resilient recovery.



To be informed and updated about **LODE**'s activities access:

www.lodeproject.polimi.it