LODE

Loss Data Enhancement for DRR and CCA management

The context

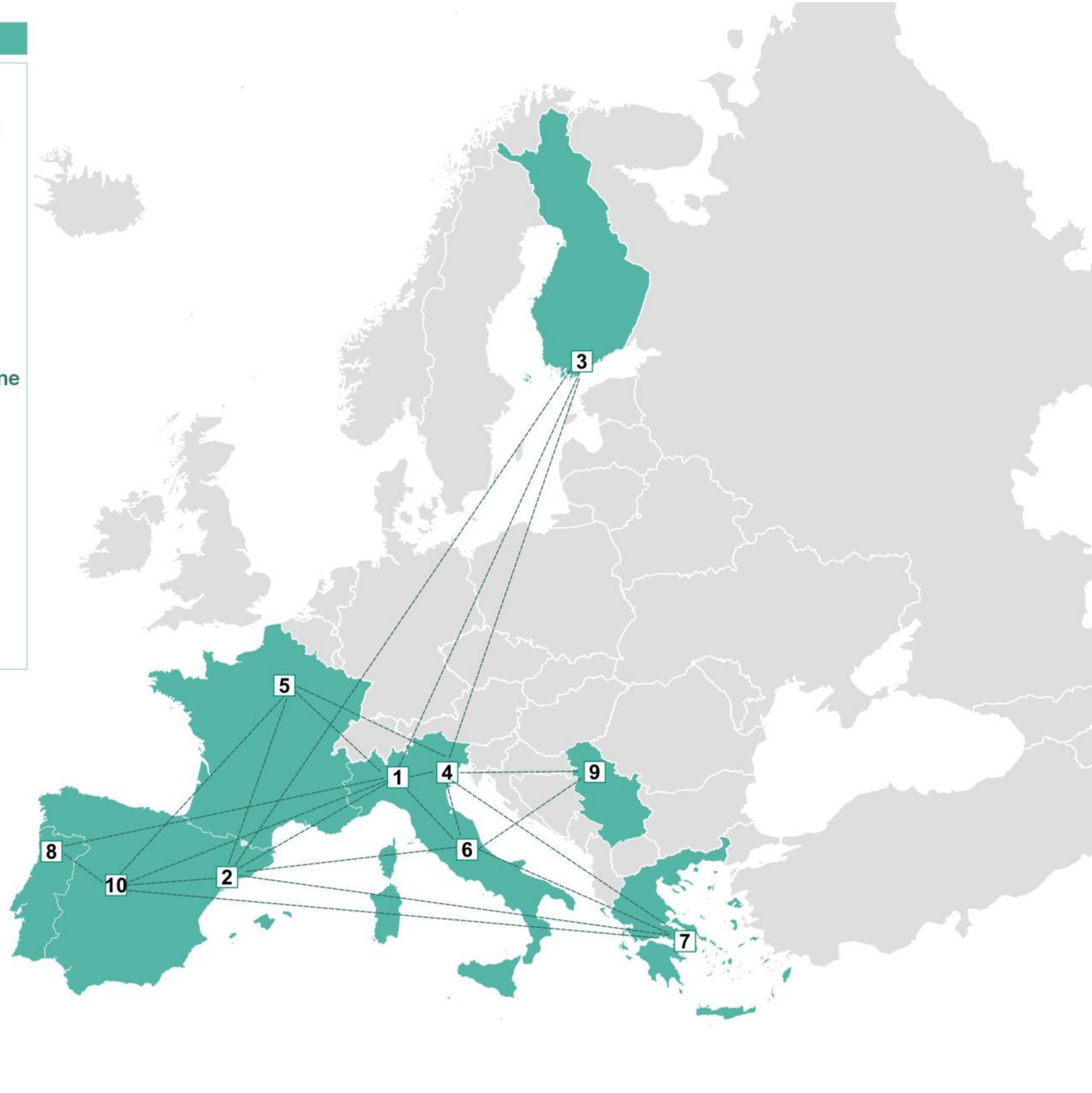
Lode is a project funded by the European Commission- **DG-ECHO – Directorate General for European Civil protection and Humanitarian Aid Operations** under the Program: **Union Civil Protection Mechanism Prevention and Preparedness Projects in Civil Protection and Marine Pollution** 2018-2020.

It is addressing one of the priority under the call, that is enhancement of Post-disaster loss and damage assessment to support risk mitigation measures and climate change adaptation. Being an UPCMP it is a practice oriented project aiming at achieving tangible results for civil protection authorities and for agencies in charge of risk mitigation

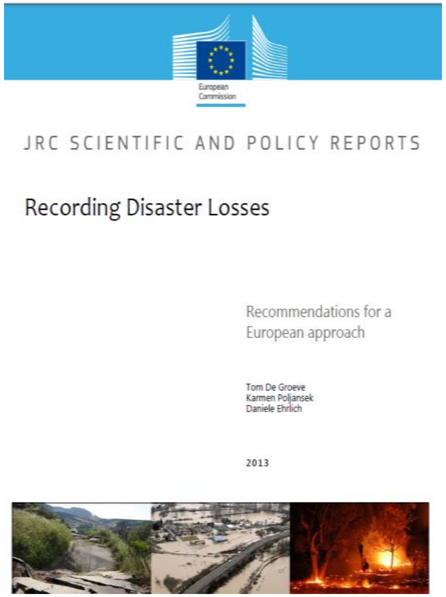
Lode’s Partners and countries

PARTNERS

1. Politecnico di Milano - POLIMI
2. Catalunya Regional Civil Protection - INT
3. Finnish Meteorological Institute - FMI
4. Centro Euro-Mediterraneo sui Cambiamenti Climatici - CMCC
5. National Scientific Research Council - CNRS
6. Umbria Regional Civil Protection - Regione Umbria
7. Earthquake Planning and Protection Organization - OASP
8. University of Porto - UPORTO
9. Forestry Institute - INZASUM
10. Agencia Estatal Consejo Superior de Investigaciones Cientificas - CSIC

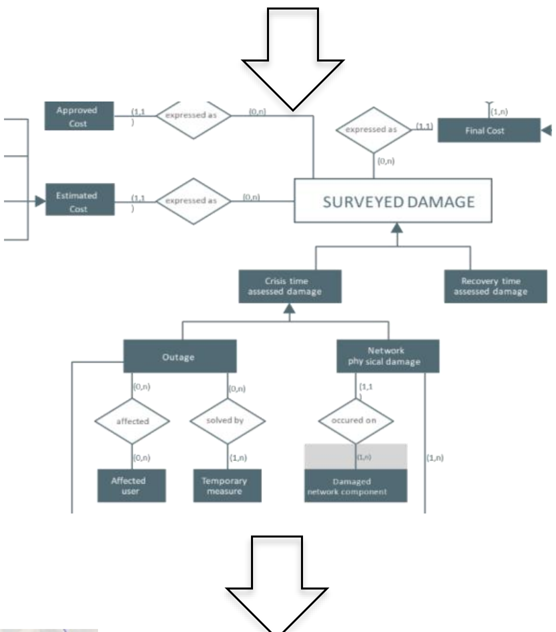


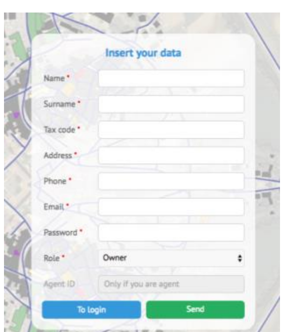
Work in progress

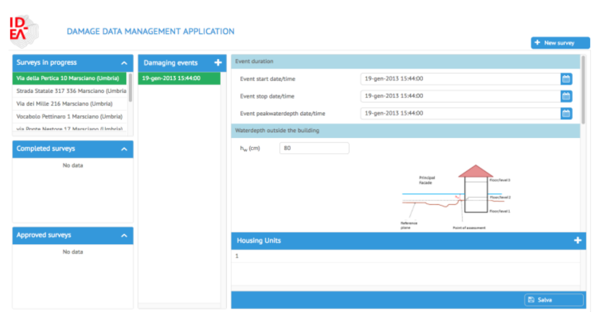


The contribution of some of us to the Technical Group on Loss Data led by the JRC is another important seed of this project. The discussions and the reports that have been produced insofar provide us with the notion of the state of art and what are the key gaps that still need to be addressed with a practical orientation towards needs and obligations of civil protection and authorities in charge of DRR and CCA

The seeds of Lode







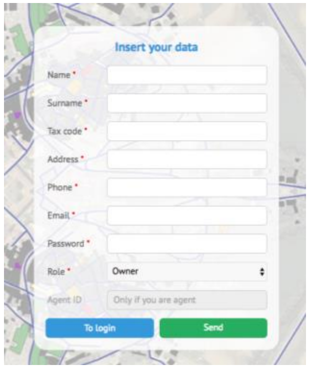
Some results:

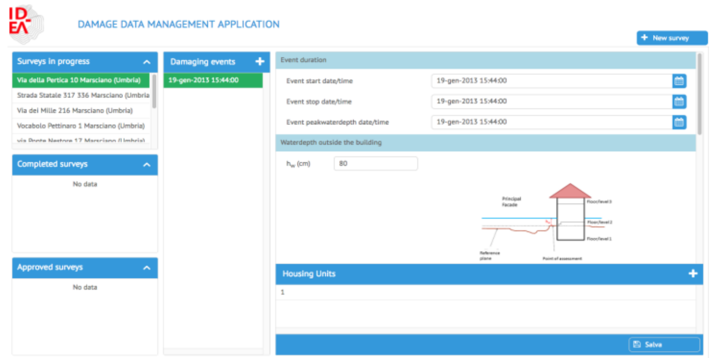
- Loss databases initiated and developed in some countries at least for some hazards

- We have developed in the context of Idea a methodological path from damage investigation → identification of key elements/factors to be collected and addressed for different uses → the development of a database (also in the context of a service carried out for the Catalunya Civil Protection)

Loss Data Enhancement for DRR & CCA management

The seeds of Lode





…

And we have started querying the database to use results for different types of applications.

SELECT Event_ID, Region, Assessment_ID, Asset_category, Location, Function, Damage_Description

FROM Event, Assessment_Survey, Damage_to_Tangible_Fixed_Asset

WHERE Event_ID=ERTQ20052012 **AND** Region= Emilia Romagna **AND** Damage_Description= Collapse of the Roof

Event_ID	Region	Assessment_ID	Asset_ID	Asset_category	Location	Function	Damage_description
ERTQ20052012	Emila Romagna	31052012XY	RE1960RW	Warehouse	Reggio Emila	Aging cheese warehouse	Collapse of the Roof
ERTQ20052012	Emila Romagna	31052012XZ	BO1973RW	Warehouse	Bologna	Aging cheese warehouse	Collapse of the Roof
ERTQ20052012	Emila Romagna	03062012XT	BO1990CS	Shed	Bologna	Cattle Breeding	Collapse of the Roof
ERTQ20052012		...	...	...	...	...	Collapse of the Roof

SELECT Event_ID, Assessment_ID, Asset_ID, Asset_category, Product_ID, Type, Damage_Description, %_Quality_Loss, VAT_Number

FROM Assessment_Survey, Damage_to_Tangible_Fixed_Asset, Damage_to_Transformed_Good, Damage_to_Transformed_Good_cused_by_Damage_to_Tangible_Fixed_Asset

WHERE Event_ID= ERTQ20052012 **AND** Cause_Asset_category= Warehouse **AND** Type= ParmigianoReggiano

Loss Data Enhancement for DRR & CCA management

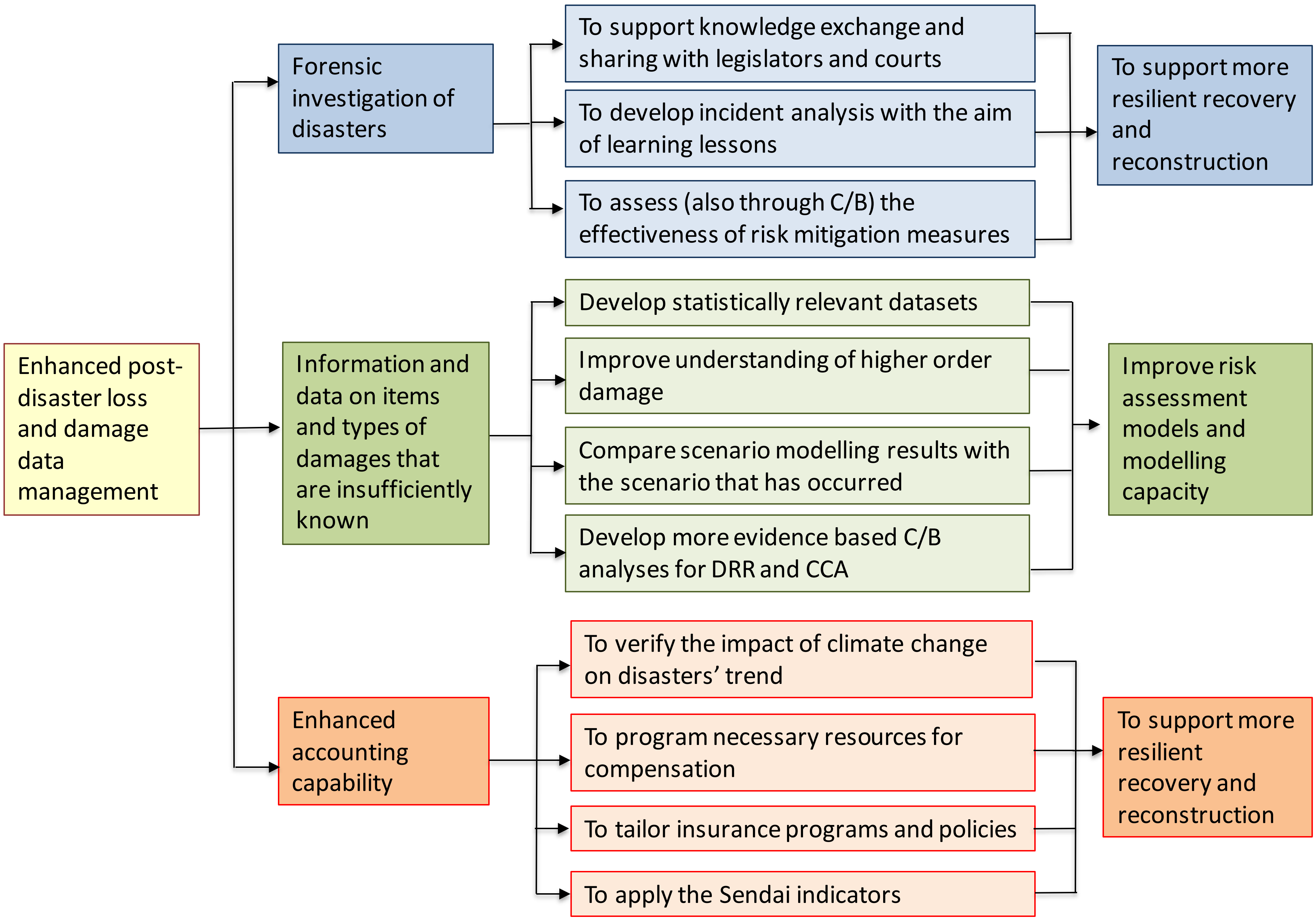
Why loss data are important?

Loss Accounting	Disaster forensic	Risk modelling	Needs assessment (compensation)
Recording the impact	Identify the cause	Modelling future losses	Recovery
Measuring trends	Learning from the past	DRR and mitigation	Fair resources allocation
Local policy (city)	Local expert teams	Local research/policy	Local officials/insurers
National policy (National Adminsitrations)	National expert teams	National research/policy (Regional, GEM)	Regional/national officers, insurance companies
International policy (UN, donors, EU Policy-DG ECHO)	International expert temas (PDNA)	International initiatives (GEM, GAR), EU policy	EU Solidarity Fund in case of activation

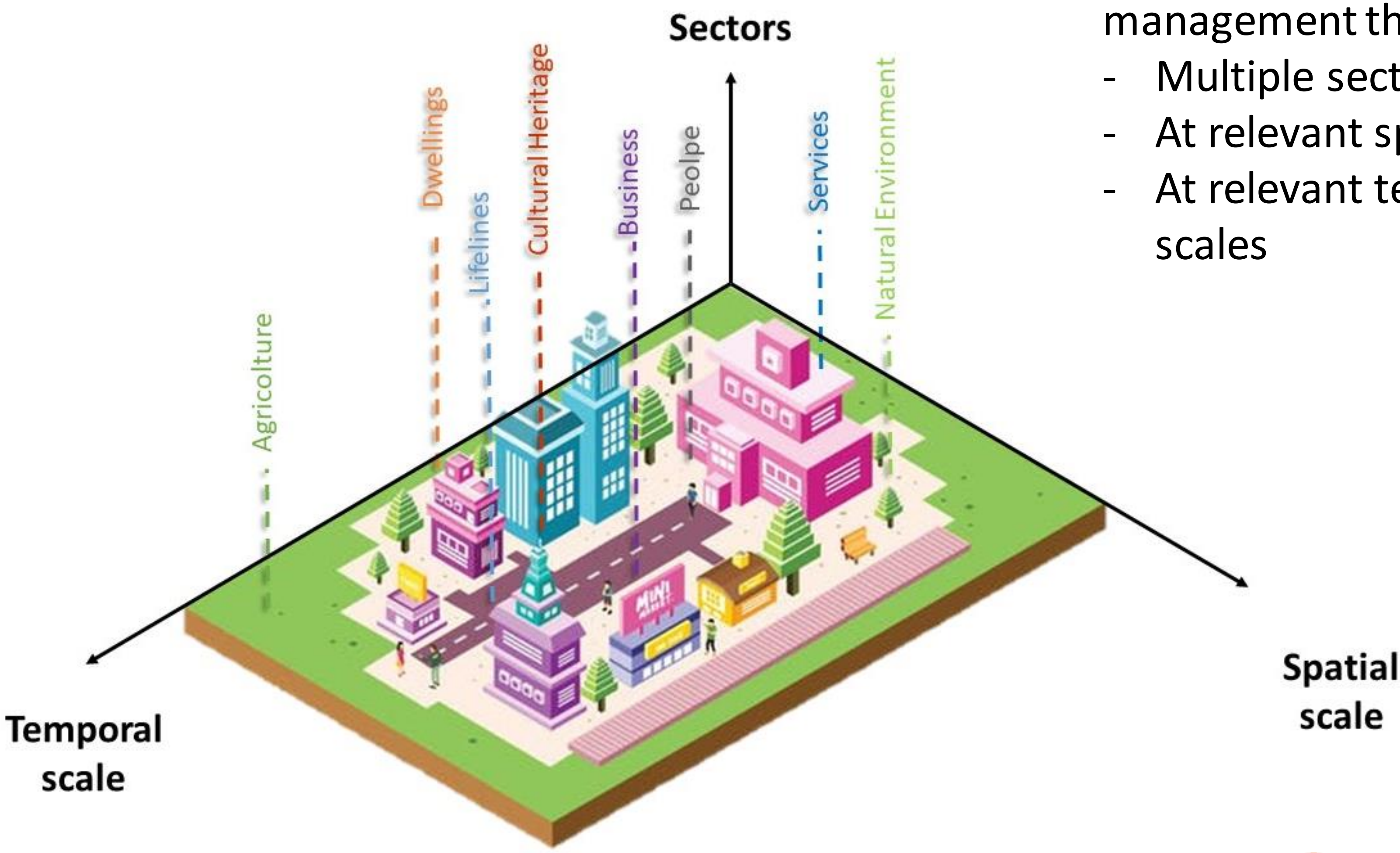
Following the First Report of the JRC Group: De Groeve et al., 2013 we understand that damage and loss data are important for a variety of purposes. We want to maximise their use to justify the effort in their collection but even more in their coordination

LODE Loss Data Enhancement for DRR & CCA management

Why loss data are important?



How different purposes and needs can be pursued

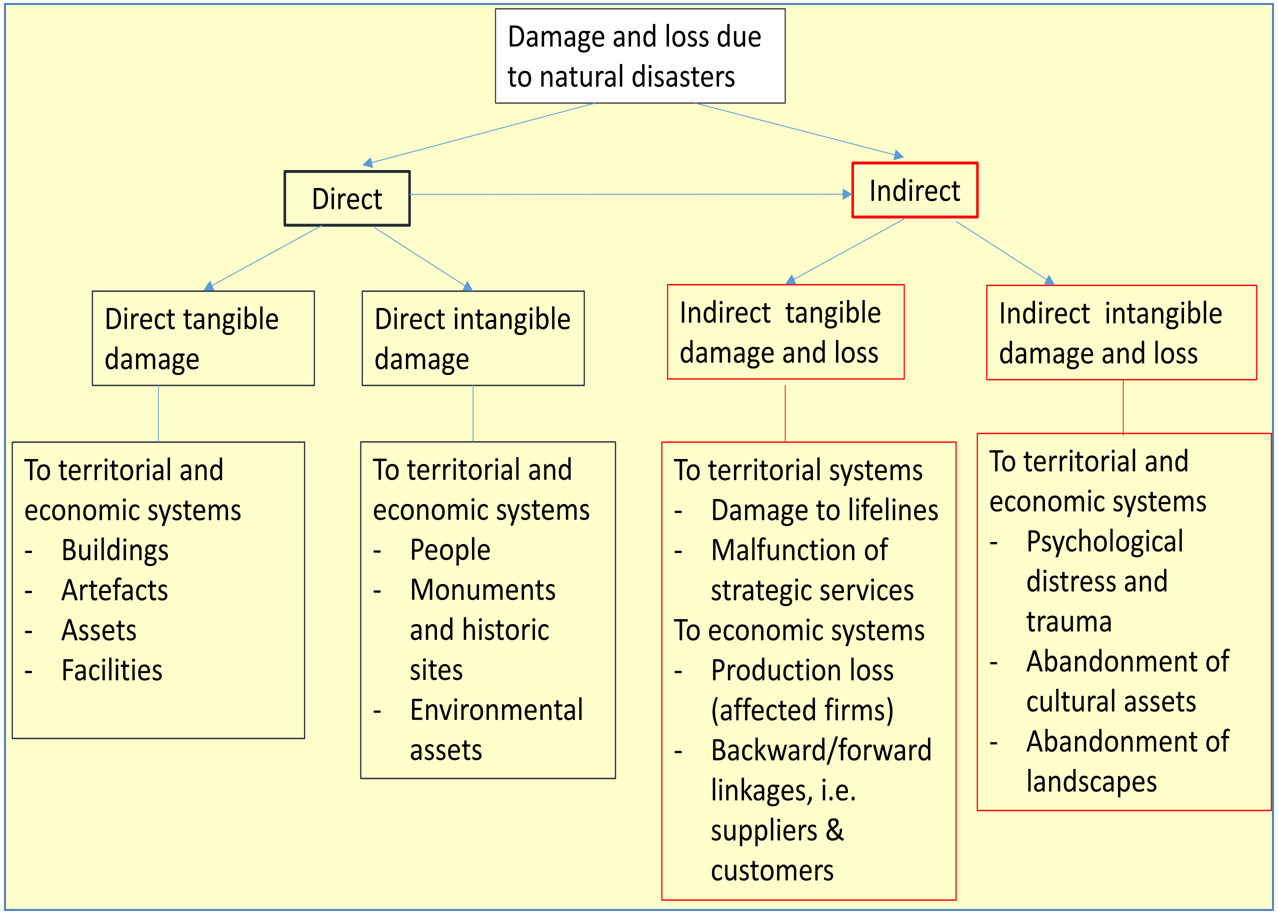


We need a damage data management that considers:

- Multiple sectors
- At relevant spatial scales
- At relevant temporal scales

Loss Data Enhancement for DRR & CCA management

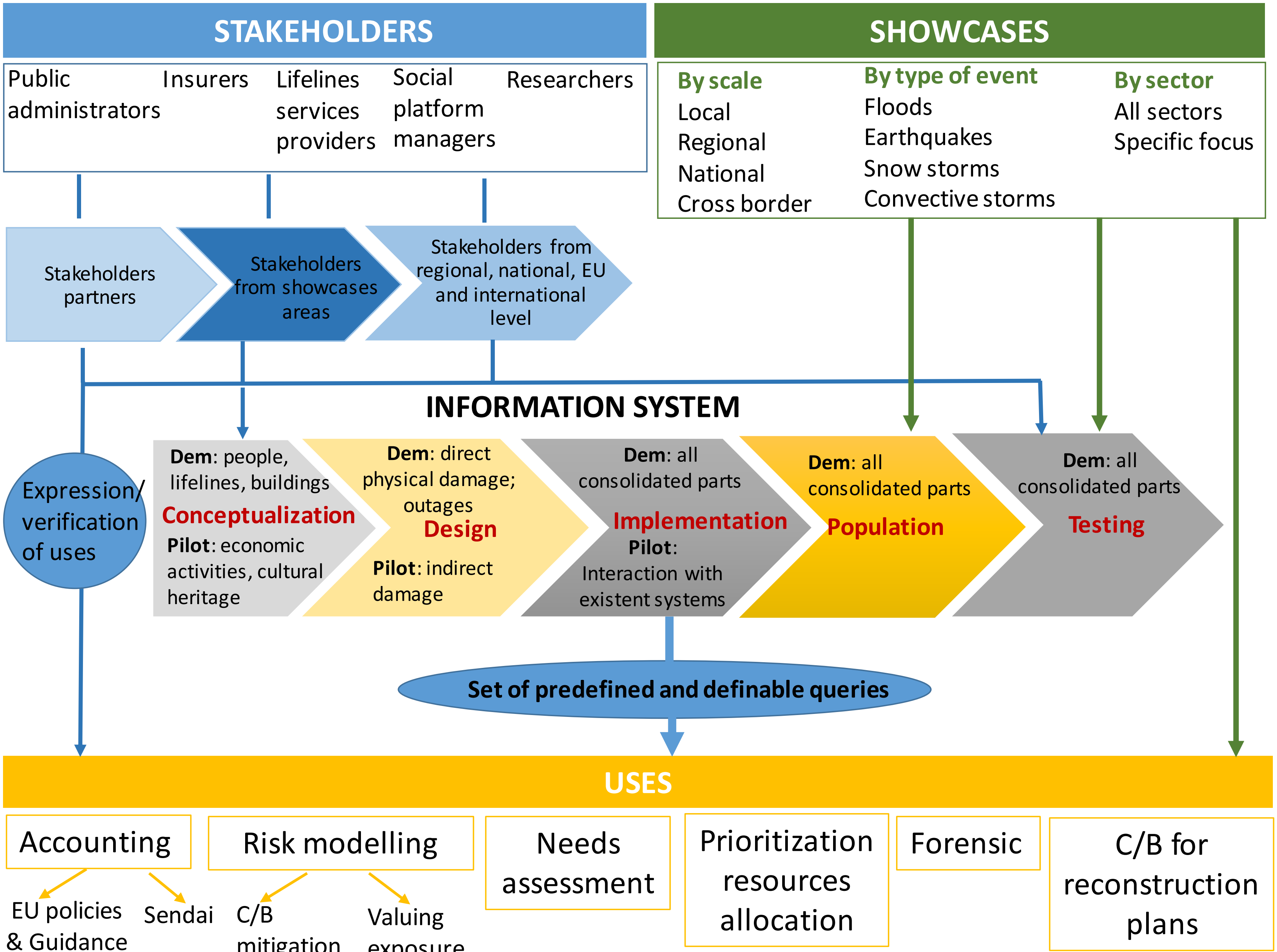
A variety of damage that are important for prevention



Gaps

- Correspondence between physical damage description and monetary values
- Need to recour to modelling for damage that cannot be fully surveyed
- Large effort of data coordination between different sectors

Loss Data Enhancement for DRR & CCA management

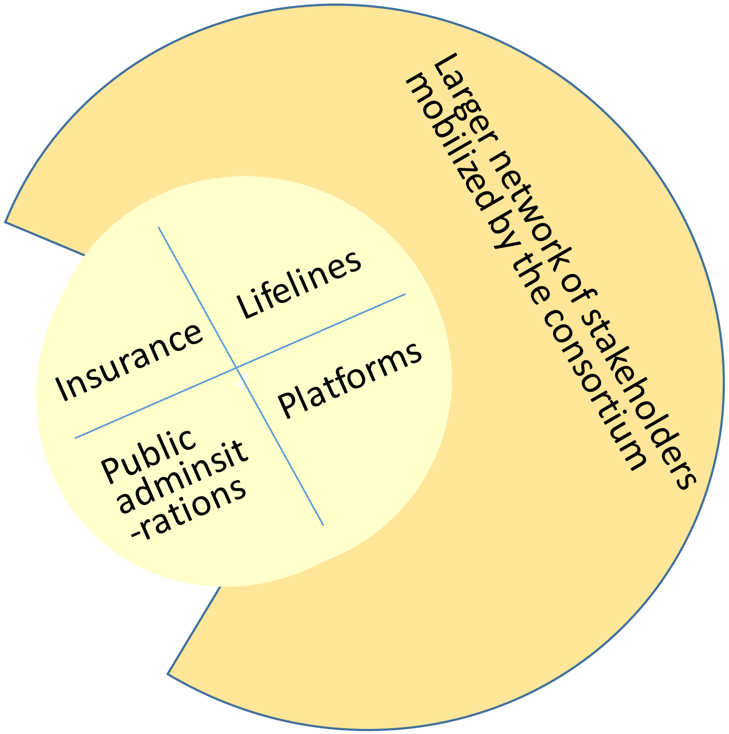


STAKEHOLDERS
Public administrators
Insurers
Lifelines services providers
Social platform managers
Researchers
SHOWCASES
By scale
Local
Regional
National
Cross border
By type of event
Floods
Earthquakes
Snow storms
Convective storms
By sector
All sectors
Specific focus
Stakeholders partners
Stakeholders from showcases areas
Stakeholders from regional, national, EU and international level
INFORMATION SYSTEM
Expression/ verification of uses
Dem: people, lifelines, buildings
Conceptualization
Pilot: economic activities, cultural heritage
Dem: direct physical damage; outages
Design
Pilot: indirect damage
Dem: all consolidated parts
Implementation
Pilot: Interaction with existent systems
Dem: all consolidated parts
Population
Dem: all consolidated parts
Testing
Set of predefined and definable queries
USES
Accounting
EU policies & Guidance
Sendai
Risk modelling
C/B mitigation
Valuing exposure
Needs assessment
Prioritization resources allocation
Forensic
C/B for reconstruction plans

Stakeholders' network

Every partner has to develop, establish and maintain a network of stakeholders that are interested in the project, pertinent to the tasks and with whom we can have meetings and invite them to the two workshops of the project.

At least 5, from different levels of government, different sectors, so that at the end we cover the map of aspects, sectors, responsibilities. This has to be done in a much more coherent and systematic way than was the case with the Idea project



Case studies and applications

Every partner is responsible for the case studies indicated in the DOA. So:

- It make sense that at least one, but perhaps more than one stakeholders of the network are persons connected to the case studies.
- In this regard we need to consider again the case studies carefully, immediately verify if the stakeholders with whom we thought to work are still available.
- Otherwise we should consider alternative case studies, carefully considering the availability of data for the population of the database and the applications

I T A L Y	Umbria, Norcia	Earthquak e	30 Oct. 2016	Local Region al	High impact for a moderate magnitude earthquake. Affected in a large region; an opportunity to collect post disaster data, investigate the damage to both single assets and systems; an opportunity to provide guidelines for reconstruction and repair according to the Sendai Indicators. The results can be applied in several medium sized cities with the same characteristics in Italy, France, and Spain.	No	Risk assessment; forensic; Lifelines and CI sector

Loss Data Enhancement for DRR & CCA management

Case studies and applications

ITALY	**Umbria, Norcia**	Earthquak e	30 Oct. 2016	Local Region al	High impact for a moderate magnitude earthquake. Affected in a large region; an opportunity to collect post disaster data, investigate the damage to both single assets and systems; an opportunity to provide guidelines for reconstruction and repair according to the Sendai Indicators. The results can be applied in several medium sized cities with the same characteristics in Italy, France, and Spain.	No	Risk assessment; forensic; Lifelines and CI sector
	Central Italy	Snow- storms	Janua ry 2017	Local Region al	The snowstorm in Italy occurred in the localities where the successive earthquakes occurred in summer and fall. Most of the areas that were affected by the snowstorm were already in the emergency state. They were dealing with another disaster while trying to recover from the previous one. Therefore, that provides a unique example for recovery and emergency at the same time.	No, but eminentl y on lifelines	Forensic; indirect damages; CI sector
	Northern Italy	Series of Floods, caused by intense precipitati on, levee break	2014-2016	Region al	Resulting floods have induced damages and difficulties such as cut off roads, mud deposits, vehicles destruction and fatalities. As a result of this event the Copernicus emergency services were initiated, and partially EU Solidarity Fund activated.	Partially	Risk modelling; forensic; use of high resolution exposure data, remote sensing ; agricultural sector

Loss Data Enhancement for DRR & CCA management

Case studies and applications

Use of the case studies:

a. Using the data to **populate the database**. Structuring and managing the data is the responsibility of each partner who need to devote effort for this task

a. The case studies will be also the field for the **different types of applications** that have been foreseen:

- Accounting (responding Sendai and use for National Risk Assessment)
- Improving risk modelling: «validation» and identification of criticalities in existing models (for this we need pre-event risk assessments available or possible)
- Forensic investigation: as Forin/Perc/Accidents but also I propose forensic as such

Loss Data Enhancement for DRR & CCA management

Case studies and applications

Accounting (responding Sendai and use for National Risk Assessment)

Sendai Indicators		Vall d'Aran case	Unit measure	Umbria case (2012)	Unit measure
Target A: Substantially reduce global disaster mortality by 2030, aiming to lower average					
A-1	Number of deaths and missing persons attributed to disasters, per 100,000 population.	0		0	
	(This indicator should be computed based on indicators A-2, A-3 and population figures)				
A-2	Number of deaths attributed to disasters, per 100,000 population.				
A-3	Number of missing persons attributed to disasters, per 100,000 population.				
Target B: Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020-2030 compared to 2005-2015					
B-1	Number of directly affected people attributed to disasters, per 100,000 population.				
	(This indicator should be computed based on indicators B-2 to B-6 and population figures.)				
B-2	Number of injured or ill people attributed to disasters, per 100,000 population.				
B-3	Number of people whose damaged dwellings were attributed to disasters.	323*	number/time	300*	number/time
B-4	Number of people whose destroyed dwellings were attributed to disasters.				
B-5	Number of people whose livelihoods were disrupted or destroyed, attributed to disasters.				
Target C: Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030					
C-1	Direct economic loss due to hazardous events in relation to global gross domestic product. (This indicator should be computed based on indicators C-2 to C-6 and GDP figures).	10.273.400	Euro	12.950.000	Euro
C-2	Direct agricultural loss attributed to disasters.	10.650.000	Euro	7420400* (28 M)	Euro
C-3	Direct economic loss to all other damaged or destroyed productive assets attributed to disasters.				
C-4	Direct economic loss in the housing sector attributed to disasters.	4.200.000	Euro	2.900.000	Euro
C-5	Direct economic loss resulting from damaged or destroyed critical infrastructure attributed to disasters.	50.939.341	Euro	50.030.341	Euro
C-6	Direct economic loss to cultural heritage damaged or destroyed attributed to disasters.	0		600.000	Euro

Case studies and applications

Accounting (responding Sendai and use for National Risk Assessment)

Sendai Indicators		Vall d'Aran case	Unit measure	Umbria case (2012)	Unit measure
Target D: Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030					
D-1	Damage to critical infrastructure attributed to disasters.				
	(This index should be computed based on indicators D-2 to D-5)				
D-2	Number of destroyed or damaged health facilities attributed to disasters.	0		0	
D-3	Number of destroyed or damaged educational facilities attributed to disasters.	10	number/time	39/2days; 7/5days	number/time
D-4	Number of other destroyed or damaged critical infrastructure units and facilities attributed to disasters.				
D-5	Number of disruptions to basic services attributed to disasters.				
	(This indicator should be computed based on indicators D-6 to D-8)				
D-6	Number of disruptions to educational services attributed to disasters.				
D-7	Number of disruptions to health services attributed to disasters.				
D-8	Number of disruptions to other basic services attributed to disasters.	4000 power	outages/time	9 public facilities; 500 Power	number outages/time

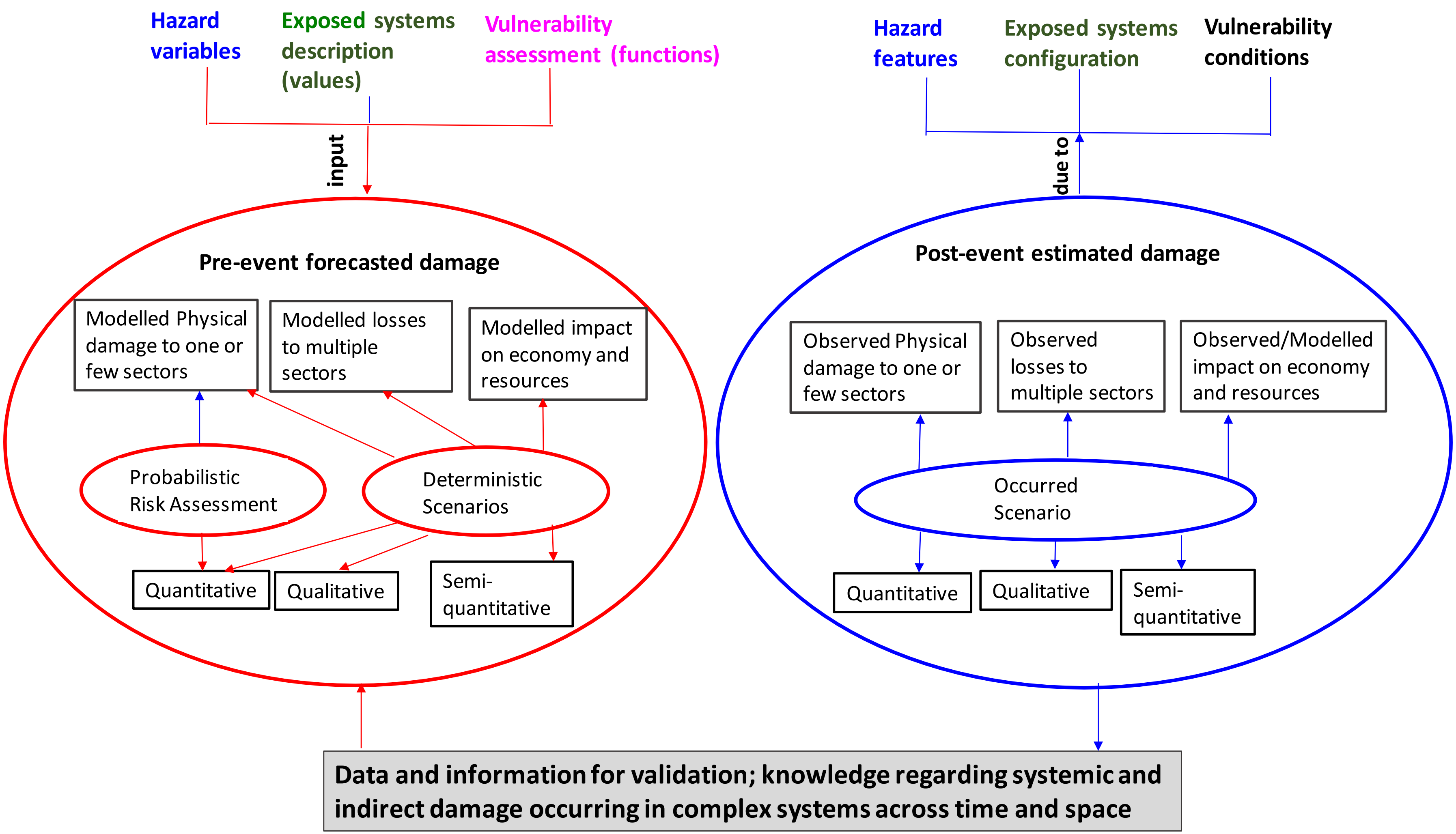
Issues encountered:

- Problem with some units of measure suggested by the Sendai indicators Group, they do not reflect the way data are actually collected and what can be achieved (also in terms of level of detail);
- There are some aspects that are not covered by the indicators and units of measure but are actually collected and then could be used for monitoring progress

Loss Data Enhancement for DRR & CCA management

Case studies and applications

Improving risk modelling



Case studies and applications

Improving risk modelling and developing C/B analysis using post-disaster damage data

Danni evitati con le dighe [€]			
Totale	Residenziale	Agricoltura	Industria/Comm.
19.402.414	2.9014.40	6.993.625	9.507.350
10.712.108	-504.137	6.487.247	4.728.998

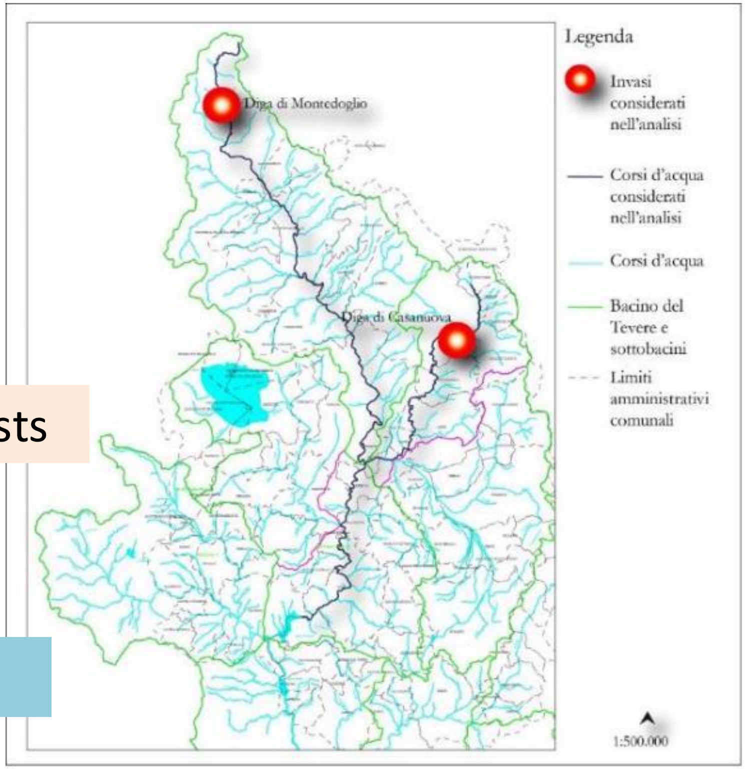
Avoided damage

Evento	Diga	Volume laminato [m3]	Mancato profitto [€]
2012	Corbara	70 M	2.000.000
	Montedoglio	25 M	714.286
	Casanuova	20 M	571.429
2013	Montedoglio	25 M	714.286
	Casanuova	21 M	600.000

Costs

Evento	Benefici [€]	Costi [€]	Benefici netti [€]
2012	19.402.414	1.285.714	18.116.700
2013	10.712.108	1.314.286	9.397.822

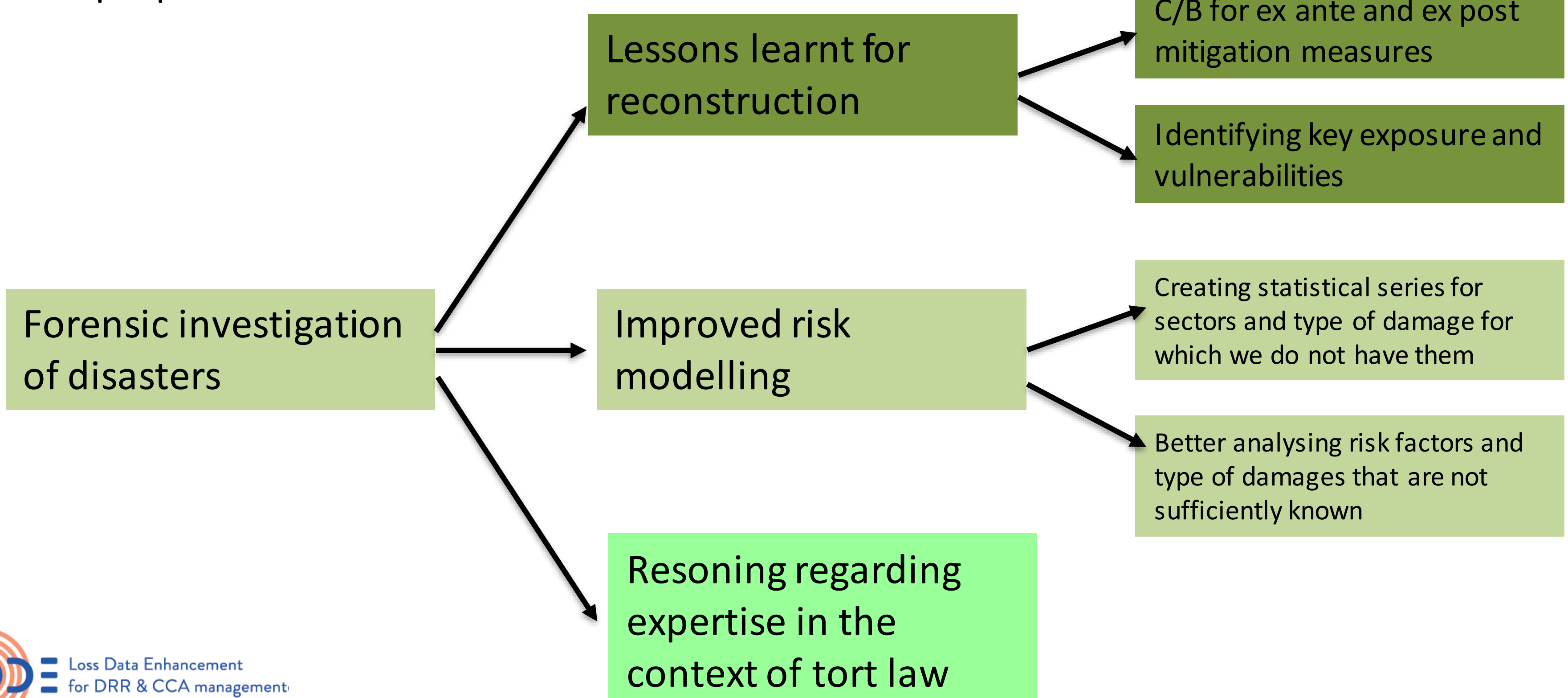
Benefits



Case studies and applications

Use of the case studies **for forensic investigation**:

- Forin/Perc/Accidents to learn lessons for: improved recovery and reconstruction; knowledge acquired to improve risk modelling
- Forensic as such, many interesting new aspects so perhaps we can think about investigating more in depth one or two cases. This however is a proposal



Information System

On the basis of the work that has been conducted for Idea and the Catalunya Service we need to:

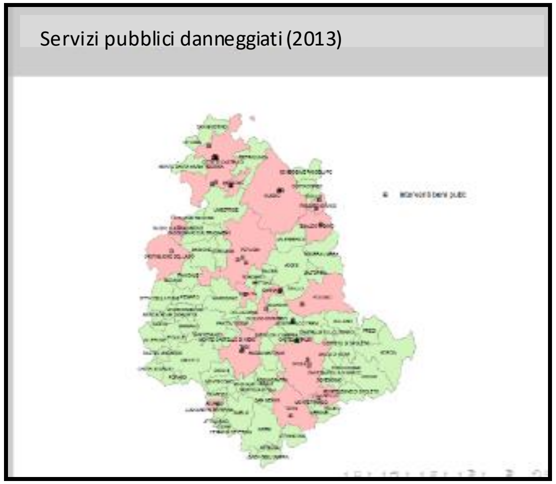
- Identify what are critical data to collect or coordinate for the sectors for which we have declared we need to do so: cultural heritage, lifelines (in particular power, water, gas), economic activities.
- Develop a full ER diagram for each sector and subsector using the collaboration with the stakeholders.
- Develop the databases and the interfaces. Design the system so that a unique access can be provided to all databases and modalities of retrieving information for different applications.
- Include in the system components for which we have already an ER: agricolture, residential and communication. Consider the possibility to include people and public facilities.

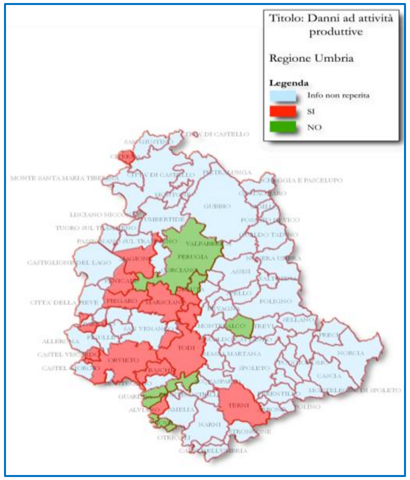
Loss Data Enhancement for DRR & CCA management

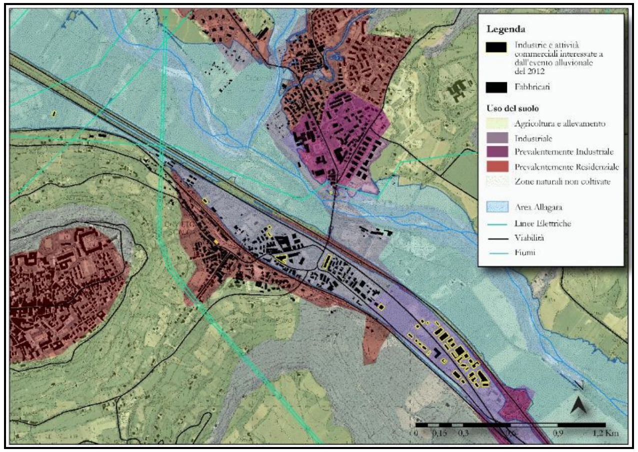
Information System

It is important to understand the interface between the databases and the geospatial representation of:

- Individual data
- Results of queries that do not require further merging and integration with other data (for various applications to be done manually)





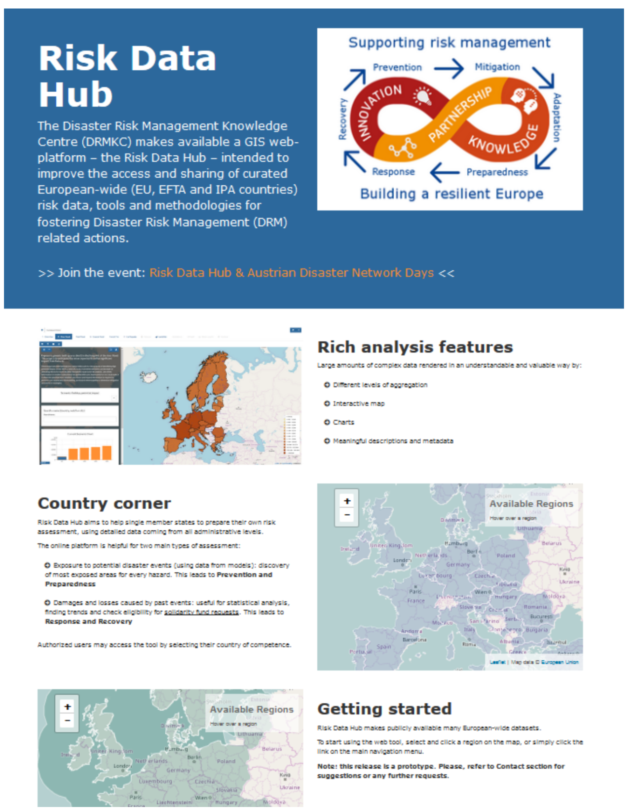


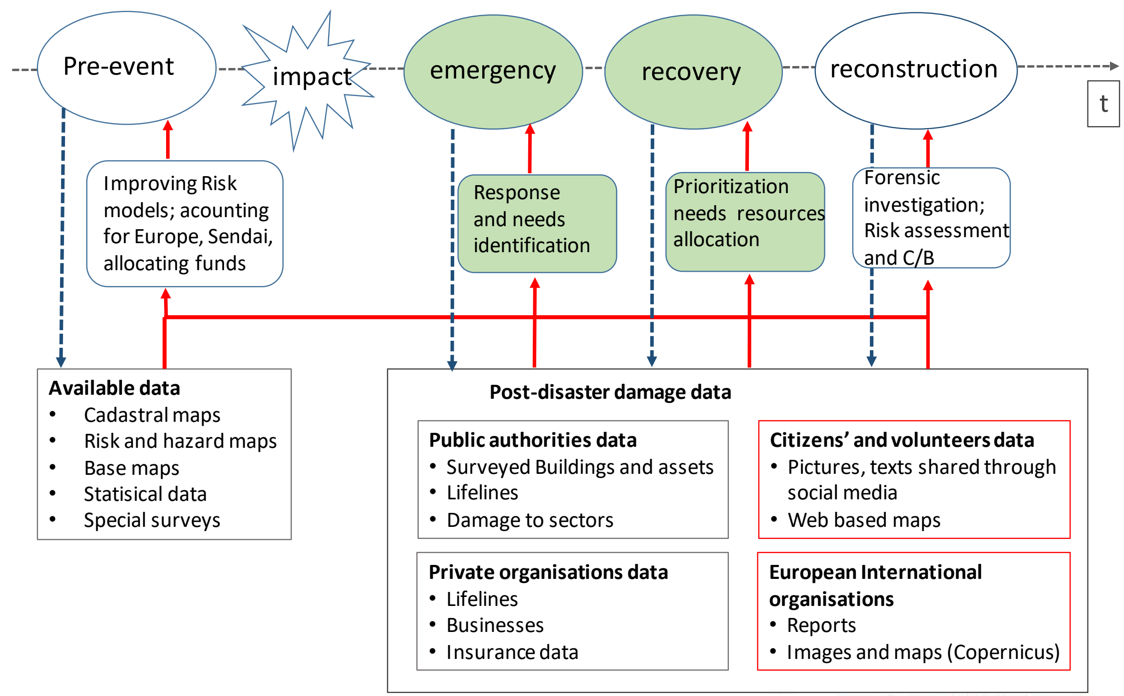
Loss Data Enhancement for DRR & CCA management

Information System

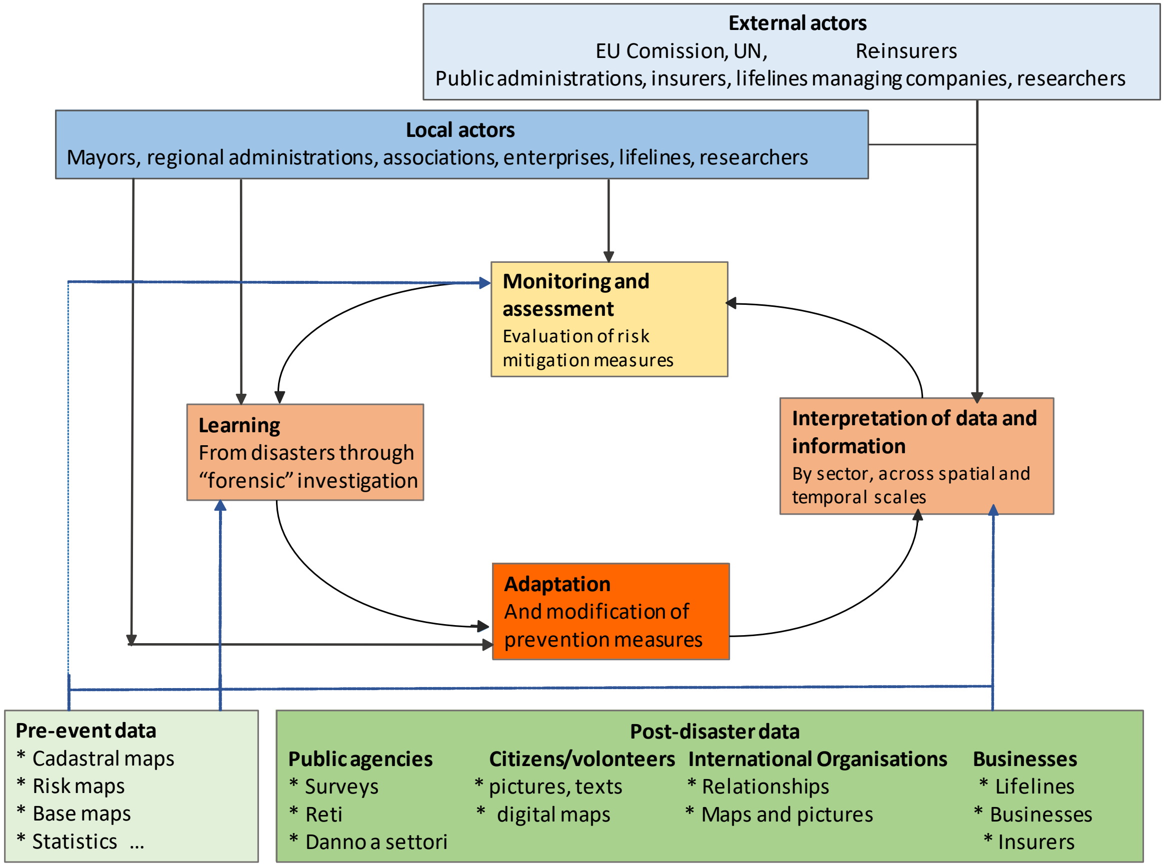
We need also to connect with the Risk Data Hub of the JRC considering that:

- It is proposed as a tool that connects between pre- and post- event damage assessment
- That it is comprised of one part devoted to historic loss data, named Risk Data Hub (RDH) Historical Event Catalogue, that is still under construction even though already advanced for some hazards.





The Lode iterative approach



The iterative approach is such that:

- We discuss with stakeholders to understand the state of the art and needs
- We develop a first proposal;
- We implement the design of the tool;
- We test it and discuss with stakeholders the usability;
- We refine the design to achieve desired result

Loss Data Enhancement for DRR & CCA management