Knowledge and knowedge management in disaster risk reduction in times of economic crisis: challenges and opportunities discussed within a European project.

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1. A project about understanding knowledge, knowledge sharing, co-producing and innovation in the field of DRR in integration to CCA

The issue of what we know in the field of DRR and CCA and whether or not available knowledge is sufficiently considered by decision and policy makers has been increasingly put on the frontline of research and practice agenda especially in the very last years. The Know-4-drr project funded under the European Commission VII FP as a support action was carried out with the aim of responding such fundamental question. Project activities were carried out in the form of participatory meetings and workshops with stakeholders, living labs, analysis conducted in a large a number of case studies to map knowledge and information flows among different actors including the wider public, and finally, through the development of professional audio and video communications about risk and prevention. Those activities produced a number of findings, the most relevant being that whilst information and data can be transferred from one actor to another, by mail, connecting databases or any other means that modern technology offers, knowledge cannot. Knowledge in fact is not an item, a commodity, but a complex mix of understanding, interpretation of facts and data, backed by each knower's culture, prior experience, intelligence, disciplinary and working background. Knowledge about a topic of common concern, such as mitigation or adaptation needs to be reconfigured in the mind of each knower, blending the knowledge that has been communicated through lectures, readings, personal or remote communications mediated through the multiplicity of today's devices and tools, with each person's interpretative capacity and vision of the world. As suggested by Resher (2009) knowing is both a personal and social effort, resulting not only in a number of acquired learnt lessons and subjects but also applied in real actions. Particularly in fields such as risk analysis and management where the objective is not only speculation about a remote reality but intervention to change the fate of envisaged scenarios, knowledge is expressed in action as stated by Zeleny (2006). So the knowledge that had to be investigated in the project is not only the scientific description and modelling of hazards and risks, but more broadly the different kinds of knowledge that are necessary to design and then implement risk mitigation and adaptation strategies. Knowledge types beyond (a) scientific knowledge are: (b) organizational knowledge, regarding how different organisations function, learn and adapt to new requirements and changing circumstances; (c) legislative knowledge, regarding rules, laws and normative structure that govern the definition of procedures, protocols and individual steps necessary to perform any kind of adaptive or mitigation activity; and, (d) the so called common knowledge, the knowledge developed by non experts, by those who are not in charge of some functions in the specific arena of concern. The various activities of the project evidenced quite clearly that stakeholders with different roles in the disaster cycle management, such as scientists, public officers, elected officers, managers of companies and insurers, NGOs and citizens' associations possess prevalently one type of knowledge but not exclusively. For example, also scientists possess common knowledge in spheres they are not experts of, public administrators and representatives of the business sectors as well as independent experts working for clearinghouses and associations may

show a quite deep understanding of frontier and state of the art scientific research (see Figure 1). What the project highlighted as a deficiency is the lack of sharing and exchange of knowledges among the various actors, the lack of opportunities to mix each other's expertise with that of the others in an operational way. This implies much more than presenting a paper at a seminar whilst it requires working closely together to accomplish shared goals. Here the issue of interdisciplinary work comes into play but not just addressing researchers from different fields, but the entire community made of independent and often disconnected knowers pertaining to the scientific world, to the private, public sectors, and to the civil society at large. The project has developed ideas and suggestions regarding how to enhance the possibility of knowers and knowledges to meet and more fruitfully achieve improved understanding, methods and ultimately risk mitigation capacity. Of outmost importance is the full consideration of the context in which knowledges are developed and exchanged. Such context is made of cultural, social, political and economic aspects that shape the environment in which decisions are made and implemented. In the following the relevance of the context will be discussed with particular reference to how the economic crisis that has affected Europe in the more recent years shapes the relationship between stakeholders and affects, not necessarily only negatively, knowledge production and sharing and, ultimately, following Zeleny, the capacity to mitigate and adapt at the very end.

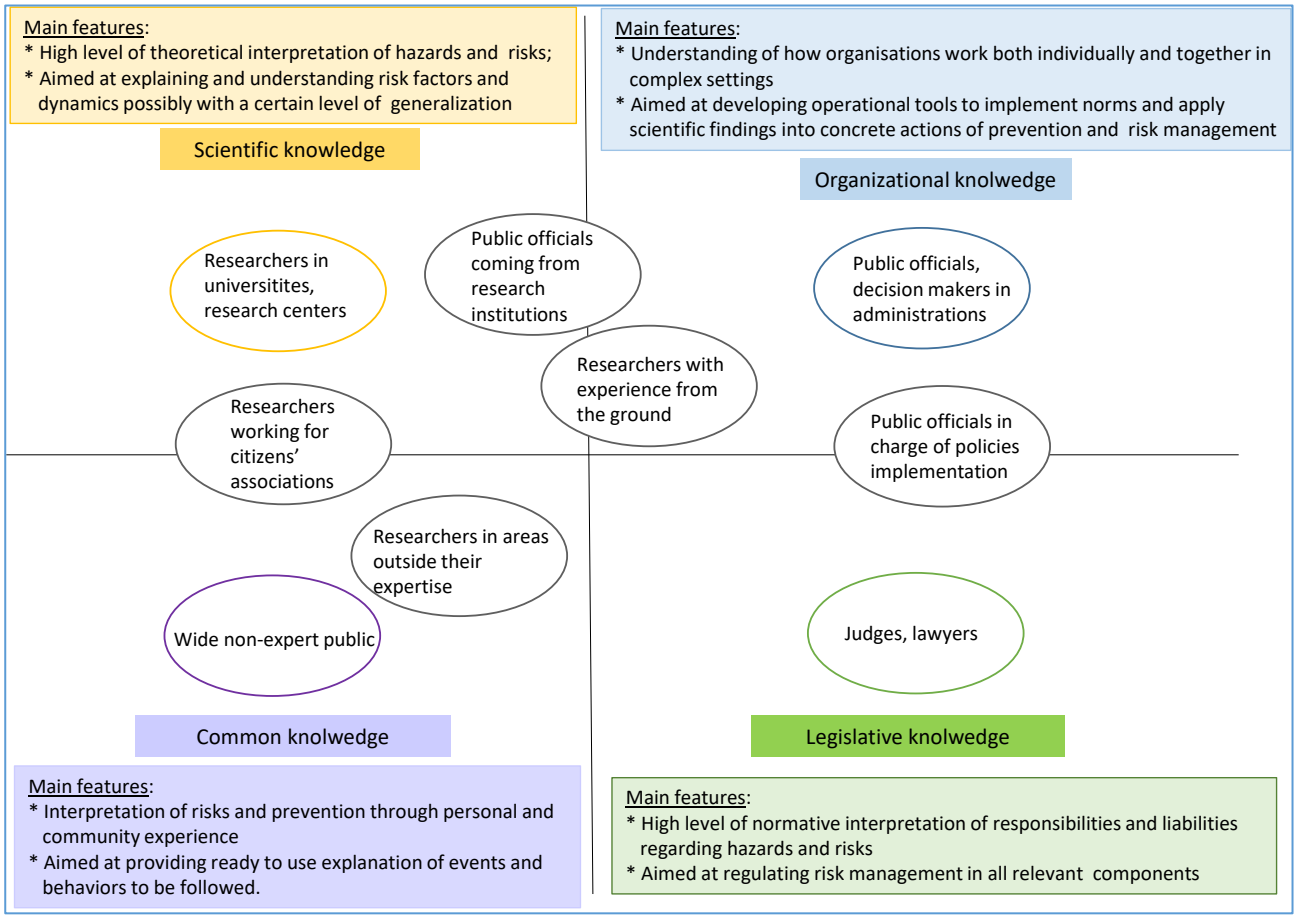

Figure 1. Positioning different knowledge types and different stakeholders according to their prevalent knowledge.

2. Has the financial crisis affected DRR and CCA?

The relevance of the deep economic crisis that has and still is affecting Europe since the subprime outbreak in 2008 on policies aimed at risk mitigation and management as well as on the implementation capacity in Europe was addressed by a specific task of the Know-4-drr project. The investigation highlighted a situation that is still valid, unfortunately, that one in which no literature is available to tackle the issue, no prior investigation has been carried out, no reflections on the topic have been conducted by other researchers. It is kind of interesting to see that the relationship between economy and risks is either associated to the monetization of damages and mitigation measures or to the connection poor=vulnerable but almost exclusively for developing countries. Such relationship was not investigated in developed/reach countries, considering how an economic crisis may lead to a different prioritarization of public policies. In fact, available articles relate to the shrinking of public and private expenditure in the health sector, but nothing is available for DRR and CCA and very little about environmental policies more broadly. This is the reason why the Deliverable of the project tackling the relationship between financial crisis and risk mitigation policies has focused on the Greek situation, reporting and analyzing the results of meetings with stakeholders pertaining to different social groups, such as NGOs, civil protection authorities, public administrations with responsibility in risk mitigation, researchers (see Dandoulaki et al., 2013).

Some journalistic reports commented that the shift from the Barroso to the Juncker Commission corresponded to a diminished emphasis on the centrality of environmental policies, that have been until then one of the pioneering areas of the European action. In the previous decades, Europe had become an important international player setting the benchmark at least in terms of legislation in a number of fields including the Seveso Directive, the fixation of ambitious targets for lowering carbon dioxide emissions, and more recently the Flood Directive. According to Tobin et al. (2015), the new appointment of the directorate on Climate and Energy has shifted the previously exclusive focus on climate change mitigation and adaptation to include more genuinely economic objectives. Others (WWF, see Green European Journal, 2014) asked why “structural adjustment programmes imposed on heavily indebted countries were not reviewed under the EU’s very own strategic environmental impact assessment legislation?”. However, when it comes to measure and state in uncontestable manner a reduced attention to environmental sustainability and risk prevention, things become more blurred and there are not definitive elements to hold critiques of this kind. In fact at closer look things are less clear cut and a more mixed situation emerges. In terms of expenditure for research, the topics of climate change adaptation and risk reduction have been shifted gradually in FP VII and definitely in Horizon 2020 to the DG Research/Environment to the Security Programme, previously set under the DG Enterprise and now under the DG Home umbrella. Calls focused on hazards have virtually disappeared in favor of more comprehensive calls aimed at covering relevant parts of the disaster management cycle, including calls for cost and benefit analysis of damage and mitigation, enhanced emergency planning, critical infrastructure protection, all now grouped under the Disaster Resilience topic. The shift from the DG Research Environment to the Security Programme implied also a different focus of calls, less oriented towards the analysis of physical hazards and more on vulnerability, resilience, and mitigation capacity topics. This has to be added to the more general tendency of of the Horizon 2020 Programme towards immediately usable research results

and technological innovation. Whilst those new orientations can be welcomed favorably, as they entail greater emphasis on risk management, on how to boost coping capacity and adaptation, and forces previously isolated and closed communities to open to other expertise and collaborate with stakeholders and service providers, it is also true that some research sectors have been marginalized by this process. For example large areas of expertise in the field volcanic and seismic risks have been confronted with a drastic reduction in funding opportunities. In the meantime, this new direction of calls is leading to neglect some ignorance areas that would still need even basic research to better understand hazards, vulnerability, and risk mechanisms.

Similarly, if policies have to be appraised on the basis of approved laws (Tobin et al., 2015), the relevant Decision on the new Community Mechanism passed in December 2013 cannot be neglected. It certainly constitutes an important piece of policy addressing the issue of risk preparedness, prevention and intervention capacity at large, comprising the obligation for Member States to carry out comprehensive multi-risk assessment and mapping at the national scale.

On the other hand, the resources that are committed within the European Commission to support and follow the implementation of new and old legislation in the DRR and CCA is sometimes stepping behind real needs. Personal communications with a number of stakeholders from the Commission and Institutions in charge of the implementation of the Flood Directive suggested for example the paucity of the staff appointed at the European Commission level implying outsourcing of what are considered as key functions to external agencies or event private consultants (for example Atkins, see Maidens et al., 2013). This has sometimes generated vivid frustration in national authorities that have been charged with the heavy responsibility of substantially creating from scratch or innovating deeply flood management strategies and policies. The shift from hazard centred analyses and mitigation measures toward more inclusive and comprehensive risk assessment and management strategies would have required more support from the research community as well as influential guidance from a solid and well established team based within the European Commission. The latter appointed with resources and personnel to coordinate discussions with a variety of stakeholders, including scientists, service providers, citizens associations, NGOs and in the meantime develop documents to support the Flood Directive implementation not only in terms of technical formats to be delivered but also proposing enhanced risk and vulnerability assessment methods and examples of good practices.

The situation at the country level is even more difficult to assess. An interesting report of the Finnish Environmental Agency (Science Daily, 2014) on the state of the environment issued in 2013 suggested that the economic crisis had an impact on some environmental factors. The report is an evidence of the fact that even though European countries were not affected by the financial crisis in the same way, still the negative impact of the crisis are felt and perceived in different domains even in countries that are richer and performing much better than others. Still, the impact of the crisis on specifically DRR and CCA policies is extremely difficult to assess in the absence of targeted studies and reports. The analysis of the Greek situation showed for example that as a consequence of the crisis all the emphasis was put back on emergency preparedness and intervention capacity, neglecting areas of longer term prevention the responsibility for which was spread among different authorities and jurisdictions. In the following paragraphs relevant issues that have emerged throughout the activity of the Know-4-drr regarding the effects, both real and suspected,

of the financial crisis on DRR and CCA capacities will be discussed. More specifically the aspects that will be tackled refer to: a) the experience in implementing the Flood Directive in Italy, that the living lab established together with the Po Riverbasin Authority permitted to capture; b) the initiative led by DG ECHO on the improvement of damage and losses databases to support more consistent risk prevention policies; and c) finally the interplay between public and private actors in the more recent years regarding activities aimed at DRR and CCA.

3. **The implementation of the Flood Directive: the example of the Po Riverbasin authority work to respond to the Directive's requirements**.

As mentioned in the articles that we have consulted regarding the relationship between the economic crisis and environmental policies, not only the effect of the crisis itself has to be accounted for but also the effects of the austerity imposed as the solution to the crisis. Austerity translated immediately into spending review and therefore shrinking public expenditure in a number of areas. In the case of the task of implementing the Flood Directive in Italy no extra budget was allocated by the Ministry of Environment to the River Basin Authorities in charge of the technical task of implementation. This meant the impossibility to mandate extra studies, more in depth coverage of flood risk analyses than what was already available under pre-existing legislation. Certainly Italy benefited from the very positive results of the Law 183/1989 that pioneered river basin management and from the different context in which the implementation of the Water framework Directive of 2000 was carried out. As already mentioned, we were able to follow closely the work carried out by the Po Riverbasin Authority that was one of the Know-4-drr project's successful living lab. The lack of financial resources and extra personnel appointed to the implementation of the Flood Directive has been negative in that it did not allow to carry out some further analyses that would have been necessary to fully respond the new requirements of the Flood Directive. For example it was not possible to extensively identify expected water depth in areas prone to flooding, and to develop enhanced risk assessment methodologies comprising vulnerability indicators in a fully satisfactory way.

Nevertheless the balance was not only negative: the impossibility to recur to external support put the whole responsibility on the shoulders of public officials whose competence and capacity was not fully acknowledged and exploited when money was available for external consultancy. It was certainly the capacity of the Po River Basin management team that achieved strong collaboration among a large number of regional and local authorities' personnel in charge of different aspects of flood risk assessment and management. Periodic reporting activities, seminars, meetings were held on all the steps required for the development of the documents to be delivered at the different deadlines to the EU. Even though with difference in quality and intensity among the different regions that are part of the largest Riverbasin of Italy, significant effort was made to make the plan as participatory as possible, involving local governments and developing a number of public communication events (called participatory forum) targeting different communities and social groups. Volunteering work was certainly carried out by a number of institutions including universities and research centers that were called to contribute to develop and validate methodologies that were selected at each phase.

4. The (re)new(ed) emphasis on loss and damage assessment in Europe and worldwide

As stated by Thieken et al. (forthcoming), the shift of emphasis from hazard modelling and forecasting towards more integrated risk assessment and management including the incorporation of vulnerability and resilience has put a new emphasis on damage and losses assessment. The lack of reliable damage estimates has been recognized since long time, so why now? There are a number of reasons for this. First because from enhanced damage assessment we can get knowledge on damage mechanisms and therefore on vulnerability and resilience factors, on their influence on the final outcome of a disaster event having certain characteristics. Second, because the analysis of damage in a broader view, not restricted to the physical impact on individual objects but enlarged to assets, sectors, systems, permits to grasp the full complexity of a disaster particularly when it occurs in a large urban area, where such systems are highly interconnected and interdependent. Third, because the issue of second and higher order damage can be, even though not easily, identified through back analysis whilst modelling relies on given assumptions that at a certain point need to be tested and verified in real cases. Fourth, because particularly for higher order damage, the issue of spatial scale, that is the ambit within which one has to restrict (or enlarge) the analysis is not a given but needs to be defined. The relevant scale depends on context sensitive relationships among sectors and systems and on the reliance on vital versus non vital infrastructures that may or may not have been affected.

There are also more practical reasons that explain the far greater attention than ever before payed to enhanced losses accounting. Having a more scientifically and technically sound method for collecting and analyzing damage permits certainly to better allocate and prioritize disaster recovery and reconstruction intervention. Second, getting a more standardized way of collecting damage also permits to program better resources that will be probably needed for the next years at the country or the European level. As an example the audit at the Senate held by the former head of the Italian Civil protection Franco Gabrielli is a very relevant example. Based on the last four to five years reporting provided by affected regions, he was able to summarize the need for funding to cover just the first emergency expenses as 2.9 billion Euros a year. This is not just a programming need but also responds to the significantly increased liability and transparency of public administrations in Italy that is partially an effect of the crisis. A significant pressure is put now on governments and on public bodies to be accountable for their expenditure and also careful in the way they spend money, including during and for emergencies.

Last but not least, improved damage data are fundamental to fine tune risk models, that can be tested against real data, against facts reported from affected areas and not just resulting from models often biased and heavily relying on sometimes incorrect assumptions. The final objective being to provide much more grounded on reality numbers to carry out cost benefit analyses, as the benefit in terms of reduced losses can be grasped in a much better way if such losses are known in depth. In the meantime, the increasing request of cost benefit analyses to maximize mitigation investments can be considered as a legacy of the crisis, even though the same idea of cost benefit analysis to support risk management is not new at all. In fact, it was already in the spirit of European legislations at the country level well before its introduction in the Flood Directive, see for example the so called Barnier law in France: (95/101) that was asking for mitigation measures at “acceptable economic costs”.

5. The role of the public/private interplay.

One important purpose for damage and losses accounting is to measure needs arising from the disaster, in terms of resources and means to be provided, and in particular compensation needs. In the past, at least in some countries like Italy where no insurance policy exists against natural hazards, the expectation of the population was that full coverage of damage will be guaranteed by the State, as solidarity aid following a calamity. This practice has been in place until very recently, and there is still the idea that such coverage will come sooner or later. However reality goes in a different direction, as with the financial crisis there is simply no possibility to create debt to fund full reconstruction and citizens have been left with partial and very limited compensation particularly in case of non- catastrophic events. The need to move towards a more financially sustainable practice, introducing insurance policy for private properties has been put forward by the European Commission (2013) and also by other international organizations (see The World Bank, 2014). Insurance is encouraged to make communities more resilient financially and better equipped to adapt to events that are likely to become more frequent, because of climate change in some areas, because of increased exposure and urbanization more generally.

The financial crisis and the solutions that have been conceived heavily built on "pure liberalist" perspective imply a general withdrawal of the State from many areas of welfare, and disaster risk management is certainly one of those. This shrinking role of the public sector in funding, investing and compensating in the disaster domain is echoed by the rhetoric of resilience. In fact the latter suggests, more or less implicitly, that communities should become more self reliant, capable of bouncing back to normalcy making use of their own resources while the State should act as a guarantee and last resort actor, not as the first line contributor to cover any damage and loss provoked by a natural event. And it is not surprising that insurance is considered as one key component of resilience of individual firms as well as the entire economic system. This is not necessarily bad, as making all actors in society including individuals and communities more responsible in the face of risks lowers misbehaviors such as moral hazards and negligence of even the simplest rules of self protection and sound locational decisions. The pressure to get insurance coverage more extended throughout Europe is contained in some relevant documents (European Commission, 2013; OECD, 2010) and puts pressure not only on governments but on insurance companies as well. The latter are certainly worried about the idea that coverage against natural calamities become compulsory or partially compulsory in countries like Italy exposed to virtually all natural hazards. The concentration of hazards in one region or country is a problem per se, that is certainly exacerbated by the fact that knowledge on those risks is not uniform neither spatially nor by hazard type. Spatially, because in some provinces and regions risk has been better studied and analyzed than others even in the same country. Differences exist also as far as different risks have been assessed in the same region, some may have been the object of focused research and applications more than others. In addition, from a more general perspective, it needs to be acknowledged that risk assessment capacity is not equally developed at a theoretical level for all hazards. These conditions create a heavy burden for those in charge of appreciating premiums for natural calamities and the overall necessary financial backup especially in regions that are exposed simultaneously to a variety of hazards.

The role of the private sector is not limited though to the insurance business. In the last decade the role of the private sector has increased in general resulting from the desire to invest in what is

labelled as social corporate responsibility. Such tendency is more frequent in large companies, however also small businesses often volunteer. Volunteering in fact is not conceived anymore only as funding initiatives, but increasingly as providing services of different kinds, depending on the nature of the business, to support various phases of the disaster cycle. For example in the more recent years the ICT sector has volunteered to various degrees in supporting emergency operations and also in promoting risk awareness campaigns in several regions.

6. Wrapping up

Based on what we have said in the previous paragraphs, it is time to wrap up and return to the main concern of the know-4drr project. What are the implications of what we have learned about disasters and risk management in times of crisis mean for knowledge management? What can be done to help those in charge of mitigation, the potential affected persons, and the various actors with stakes in risk assessment and management to make the best use of lessons learnt and of available knowledges?

6.1. The need to create a space for sharing and co-producing knowledge

The first thing of outmost importance is to create opportunities in real and virtual meetings to share experiences and knowledges of different kinds among the concerned actors in a way that will create trust and confidence in each other's understanding and views of risks and of how they can or should be mitigated. In the course of the project we have been said by a number of participants and we have also witnessed in living labs the fact that mutual trust and respect in each other's work has been corroded during the crisis. Media have exacerbated the situation by putting in bad light public officials, researchers, or other groups. Mining the public's confidence in some key stakeholders for risk reduction and climate change adaptation is certainly not positive and the trend should be reversed. Examples of mismanagement and fraud need to be combated of course, but the common opinion that has spread in the last years regarding the irrelevance of procedures and protocols in the name of a futile idea of efficiency should be revised. Instead, it should be better acknowledged that environmental problems in general and risk related in particular are complex and there are no magic solutions. A more mature awareness of such complexity has to be sought, leading to the involvement of a large community of actors with different expertise and holding different kind of knowledges to search for innovative and more satisfactory solutions. Technologies and material inventions can clearly help but will not suffice to set the very complex set of problems that we have highlighted, also because they would need to be adapted to different contexts, including contexts characterized by financial scarcity.

As some authors suggested (Cash et al., 2010), one obstacle to this kind of sharing derives from boundaries across communities and not only between let's say practitioners and decision makers but also among scientists with different disciplinary background. Carlile (2004) identifies three types of boundaries: syntactic, semantic and pragmatic. "Syntactic or information processing boundary" is encountered when there exist a knowledge "quantitative" gap among actors, or the qualitative differences easily complement each other, so that transfer of knowledge from one group (sub-group) to another may easily take place. Semantic boundaries are more difficult to overcome as they imply that different meanings and definitions come into the play as knowledge is qualitatively different among actors. The last type of boundary is the hardest to bridge as knowledge

needs to be transformed through negotiation and new forms of agreement among stakeholders must be found. In Figure 2 those boundaries are represented within the knowledge pyramid (Ackoff, 1989) that was used as an operational tool to highlight the difference between data, information, knowledge and wisdom in the risk domain (see Menoni et al., 2015).

The know-4-drr project showed in practice that even thought not easily, boundaries may be overcome by creating opportunities for stakeholders with different expertise and pertaining to different social groups to meet and collaborate together to achieve common objectives. Creating bridges in living labs for example proved to be successful because it permitted to solicit and free energy for innovation. The living labs facilitated the recognition of the novelty implied in a proposed approach or solution.

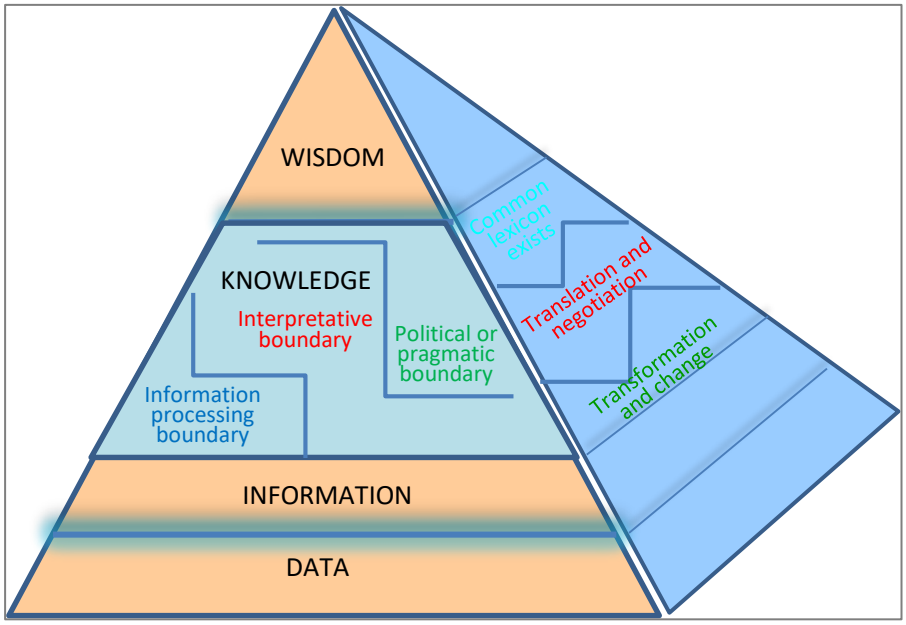

Figure 2. Representation of the knowledge boundaries in the knowledge pyramid that was used as a reference for the Know-4-drr project.

The Know-4-drr project went a bit further in the attempt to delineate the main feature of a knowledge management system. The latter has been conceived not just as a repository of available good practices and examples of how to do things in different domains of risk reduction, but also as a place where knowledge could be co-developed by a variety of remotely positioned stakeholders on given topics of common interest. The skeleton of the knowledge management system was built around the concept of “knowledge kits” as conceived by Butler et al. (2009).

In times of crisis the added value of such a system can be in its permitting to overcome the lack of individuals or groups who retired and have not been substituted in an organization with responsibility in disaster risk reduction and therefore cannot share anymore their experience with the newcomer or the youngest officials. A virtual place where to ask for an advice or learn how things have been done by others is one key component of a knowledge management system. A

requirement that has been put forward as critical refers to the open nature and open access of softwares and documents comprising the knowledge management portal. This is in line with the more recent orientation of the European Commission, particularly with results of research that have been publicly funded.

6.2. Making the best use of resources by reconciling climate change adaptation, risk mitigation and environmental sustainability

A second aspect that has emerged throughout the project as a very relevant issue to optimize in a clever way scarce resources relates to the reconciliation between climate change adaptation and disaster risk reduction strategies. The separation of the latter has no sense in many regards, at least when speaking of issues that are clearly common. Those refer for example to hazards that may be worsened in some places (or not) by climate change, to the analysis and assessment of vulnerability and resilience factors, and finally to the definition of integrated (when possible) of mitigation and adaptation measures. Reconciling climate change and risk reduction policies is particularly relevant at the ground level, at the level of public administrations, regional and local governments that hold responsibility in both fields. In local and regional governments the same officials are very often appointed for the two, most of the times because of lack of personnel or in general because it *makes sense* to do so from *an administrative perspective*.

Furthermore, when looking at the cost benefit instrument, because of the many uncertainties that affect most variables that are used to account for the costs and the benefits of adaptation against climate change effects and mitigation measures against natural hazards, it would be very relevant to reconnect those policies to environmental sustainability at large. Partly because implementation would take advantage of being able to show that benefits of certain measures go beyond what is “avoided damage” and include some real benefits that stand for themselves in terms of for example biodiversity conservation, recreational opportunities, greener landscapes, etc. In this case there are some limitations to what has been done until now: most mitigation or adaptation measures have considered structural, engineering works aimed at containing the severity or frequency or both of some undesired phenomena. It is somehow easier to show the multi-objective and multidimensional benefit of non structural mitigation measures, that are based for example on wise lan use and spatial planning. However very few if any example of cost benefit analysis carried out for non-structural mitigation have been performed insofar (see Schwarze, communication at UR), perhaps because it is not easy to determine the cost of lost opportunities of developing in a hazardous zone characterized by rich landscape amenities.

6.3. In the form of conclusion: seeking a format for forensic investigation of current and future events to detect potential effects of the financial crisis on damage and losses.

It may be relevant to conclude with a final reflection on the potential beneficial added value of the so called “forensic investigation” of the damage and losses registered and analyzed after a disaster. Such investigation is meant to identify key drivers and root causes that have produced a given outcome for an extreme event. We have already talked about the importance of such data for programming and prioritization purposes. The forensic investigation is aimed at analyzing the damage and losses to capture the relative weight of hazard’s characteristics, exposure, vulnerability and copying capacity in determining the events’ impact as surveyed on the ground. It

is interesting to mention that such forensic investigation has been tackled from different angles. The decoupling of risk components in post-events damage analysis has been carried out by engineers in charge of setting technically a case for judges (Loaiciga, 2001), by social scientists interested in evaluating the social and political drivers of disasters linking physical vulnerability to poverty, mismanagement, negligence (Oliver-Smith, 2016), by insurers (Keating et al., 2016) aiming at diminishing their own financial exposure by making their customers more resistant to hazards.

What is proposed here is to use forensic investigation to evaluate if and to what extent a policy of austerity and the economic crisis that forces individuals but also authorities to decide where to invest insufficient money, can be considered as one of the driver of increased damage and losses. If this is the case, it would be also relevant to assess if increased damages are mainly direct and physical or indirect and systemic. What would be required to carry out such an investigation is a common framework according to which collect and analyze damage data to be used in the upcoming calamities affecting in particular those countries that have been more affected by the crisis.

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