Shelter

Sustainable Historic Environments hoListic reconstruction through Technological Enhancement & community-based Resilience

D.6.5 Methodology for Local Knowledge Extraction

Version number	1
Dissemination level	PU
Lead partner	POLITO
Due date	30.11.2019
Type of deliverable	Report
Status	Delivered

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 821282

Published in the framework of:

SHELTER - Sustainable Historic Environments hoListic reconstruction through Technological Enhancement & community-based Resilience

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Revision and history chart:

VERSION	DATE	AUTHOR/EDITOR	COMMENT
1	21/11/2019	Rosa Tamborrino - POLITO Alessia Bertuca - POLITO Mesut Dinler - POLITO	First draft
2	25/11/2019	Alessandra Gandini - TEC	Review
3	27/11/2019	Louis Durrant - ULIEGE	Review
4	27/11/2019	Kim Anema - IHED	Contributions for section 3.4 and 4.4.
5	29/11/2019	Rosa Tamborrino - POLITO Alessia Bertuca - POLITO Mesut Dinler - POLITO	Final draft

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Glossary

Acronym	Full name
CA	Consortium Agreement
CCA	Climate Change Adaptation
CHM	Cultural Heritage Management
CS	Core Stakeholders
DRR	Disaster Risk Reduction
DRM	Disaster Risk Management
DoA	Description of Action
EC	European Commission
ES	Extended Stakeholders
HA	Historic Area
OL	Open Lab

1 Executive summary

This report represents the Methodology for Local Knowledge Extraction developed through the work done under Task 6.5, entitled “Methodology for Learning Historic Environments: Local Knowledge co-generation, awareness and capacity building.” The Task is composed of Subtask 6.5.1 “Local Knowledge generation” (POLITO), and 6.5.2 “Peer learning, awareness and capacity building” (IHED).

The main aim of the report is to define **a theoretical and practical framework** that contributes to the overall SHELTER knowledge building. This aim is achieved by framing how to include and take into account those informal knowledge and local factors that represent the peculiar long-lasting interaction of the communities with their environment. More precisely, the report contributes in specifying the concept of Local Knowledge, the Sense of Place through Peer Learning for both a territorial and urban approach on the matter of a range of Historic Areas with cultural natural/urban features and their resilience against climate change and natural hazards such as earthquakes, storms, floods, heatwaves, wildfire and subsidence. According to SHELTER Project, this theoretical and practical framework also deals with Historic Areas at different spatial scales, by including its tangible and intangible features as aspects of the interaction developed by societies and places. By building on existing definitions and literature, the report introduces a broader but targeted notion of Local Knowledge encompassing different kind/scales of Ecosystems of Historic Areas, diverse (per gender, age, vulnerabilities) perceptions, and a temporal perspective including dynamic of changes in community views and its composition (i.e. new and temporary residents). It outlines the definitions and identifications of those factors that can be defined as drivers of this peculiar enlightening and underestimated knowledge through a challenging methodological approach according to the main ambitions and specific objectives of SHELTER, by contributing to the SHELTER Knowledge Generation (WP2) and the SHELTER Community-based approach (WP6) and by developing a methodology to be implemented in Open Labs (OLs) (WP7). It finally provides tools for extracting Local Knowledge, Sense of place and Peer learning addressed to both core and extended local stakeholders in Open Labs.

The report thus contributes in advancing in both definition and application of methodologies for Local Knowledge and its extraction. From one hand, it enriches and specifies the concept of Local Knowledge and Sense of Place, introducing a new holistic perspective of the connection between a cultural and natural environments with communities, specifically addressing both territorial and urban Historic Areas and their resilience against climate change and natural hazards. On the other hand, the report delivered a set of collaborative methodologies and tools targeted to Open Labs specification, objectives and hazard exposure. It includes a set of face to face activities (survey and open discussions) and tools – mostly in digital format – for the Open Labs workshops. Capitalizing on the most effective collaborative methodologies and tools for gathering informal knowledge from local communities, the report delivers a highly adaptive methodology for the diverse Historic Environments.

2 Introduction

2.1 Aims and objectives

This report represents the Methodology for Local Knowledge Extraction developed through the work done under Task 6.5, entitled "Methodology for Learning Historic Environments: Local Knowledge co-generation, awareness and capacity building." The Task is composed of Subtask 6.5.1 "Local Knowledge generation" (POLITO), and 6.5.2 "Peer learning, awareness and capacity building" (IHED).

The main aim of the report is to define **a theoretical and practical framework** that contributes to the overall SHELTER knowledge building. This aim is achieved by framing how to include and take into account those informal knowledge and local factors that represent the peculiar long-lasting interaction of the communities with their environment. More precisely, the report aims at specifying the concept of Local Knowledge, the Sense of Place, and Peer Learning approach on the matter of both territorial and urban Historic Areas (HA) and their resilience against climate change and natural hazards such as earthquakes, storms, floods, heatwaves, wildfire and subsidence. According to SHELTER Project, this theoretical and practical framework also deals with Historic Areas at different spatial scales, by including its tangible and intangible features as aspects of the interaction developed by societies and places.

Furthermore, by building on existing definitions and literature, the report aims at contributing to an identification of those factors that can be defined as drivers of this peculiar enlightening and underestimated knowledge through a challenging methodology according to the main ambitions and specific objectives of SHELTER, by contributing to the SHELTER Knowledge Generation (WP2) and the SHELTER Community-based approach (WP6) and by developing a methodology to be implemented in Open Labs (OLs) (WP7).

Historic Areas in Europe refer to a range of different possible states including inhabited historic towns and buildings with its contexts in urban areas, as well as both natural and cultural territories including inhabited areas and archaeological sites. UNESCO definitions encompass some of them (see Glossary of World Heritage Term[1]). But all of them shape a diverse and rich '**place'**.

By dictionaries the term place is "a particular position, point, or area in space; a location". The academic literature has extended this significance also to mean the physical and human characteristics of a location[2]. This important geography understanding has been implemented through a transdisciplinary perspective, among which studies especially devoted to the built environment as a peculiar but pervasive human characteristic. By

[1] UNESCO World Heritage Centre (1996) *Information Document Glossary of World Heritage Terms*, Merida, Yucatan, Mexico 2-7 December 1996

[2] Yi-Fu Tuan (1977). *Space and Place: The perspective of experience*. University of Minnesota Press. Also see, John A. Agnew. (1987) *Place and Politics: The Geographical Mediation of State and Society.* Routledge.

these contributions the meaning of a place also encompasses spatial and life experiences[3].

As a place refers to a mental and a physical space, 'learning by historic environments' means to deepen the identification of each specific ecosystem, consisting of the strong relationships between a community and its environment. It also requires identifying specific methodologies able to gather all information that shape the Local Knowledge and the Sense of Place, as well as for the Peer learning. This report also provides some integrations about an urban/territorial perspective in defining Local Knowledge, and some specifications about formal and informal knowledge[4].

The specific objective of this report finally is to equip OLs with a common methodology for these aims, to be based on the most updated approach for fostering new developments beyond the state of the art. The report argues how the set of methodologies, activities and tools have been identified to be implemented in OLs for gathering Local Knowledge in Historic Areas. Its objectives also include methodologies for Peer learning and capacity building for different kind of stakeholders.

2.2 Relations to other activities in the project

The Methodology for Local Knowledge Extraction has been conceived as an integrated process with other project activities and has been discussed and agreed with SHELTER coordinator, WP6 leader, Subtask 6.5.2 leader, all OLs coordinators and other relevant partners. The methodology is strictly linked with other WPs and Tasks and in particular with:

WP2: The methodology for Local Knowledge Extraction contributes to the overall SHELTER knowledge generation to be performed in WP2. More in details, this report is linked to the methodology to be developed under Task 2.3 "Anatomy of Historic Areas" aiming at collaborative categorising cultural heritage (CH) assets according to HA factors relevant for assessment of their resilience and vulnerability. The outputs to be collected from local communities by implementing the Methodology for Local Knowledge Extraction will be indeed an important input for the design of the methodology for collective characterisation of CH assets. Moreover, the design of D6.5 methodology has been performed in connection with D2.1 on HA Resilience Structure.

WP6, WP7 and WP9: This report is strictly related and represent a fundamental piece of the overall SHELTER Community-based approach designed in WP6 and to be implemented in OLs according to WP7 objectives and following the instruction included in the Open Labs Management Plan (D9.2).

[3] Tim Cresswell. (2015). *Place: An Introduction.* Wiley Blackwell. Also see, Anne Buttimer, David Seamon (eds.) (1980). *The human experience of space and place.* London: Routledge, see also Renato BOCCHI, L'architettura come spazio mentale costruito, in Juhani Pallasmaa, Lampi di pensiero. Fenomenologia della percezione in architettura, pp. 191-198 Bologna 2011

[4] Knowledge acquired through personal experience, outside of the formal learning environments such as schools and training courses

WP1: most of the output coming from Local Knowledge extraction in OLs will be in digital format and will allow transferring the information into dataset and identifying metadata to be transferred into the Data Lake Model (T1.3).

2.3 Report structure

The report is structured as following:

- The first section on Local Knowledge is dedicated to developing a definition of Local Knowledge and Sense of place within the context of the SHELTER project
- The second section on Local Knowledge co-generation and extraction presents methodologies and tools for identification and extraction of Local Knowledge and Sense of Place elements related with resilience, as well as methodologies and tools for peer learning activities
- A third section on Local Knowledge datasets unpacks how information gathered will be translated in digital outputs easy to be transferred to the Data Lake.
- The last section is dedicated to update the methodology after collaborative implementation and testing in OLs (WP7).

2.4 Contribution of partners

POLITO: coordination of the Task, development of the Deliverable.

IHED: responsible of subtask 6.5.2, development of the section 3.4 and 4.4, link with Del 9.2

ULIEGE: Coordination of WP6, Reviewer, link with the whole WP6

TECNALIA: Coordination of the project, link with the whole project, Reviewer

OL Coordinators: revision and contributions for section 4.1, 4.2, 4.3

3 Local Knowledge Generation

3.1 Local Knowledge: definition and identification of the elements related with community resilience in historic areas

Local Knowledge refers to the set of knowledge, skills, know-how and practices that societies have developed over time, through a long-lasting interaction with their environment[5]. It founds on the awareness about the relevant contribution of traditional and Local Knowledge to science and technology systems of formal knowledge[6], and the purpose of preserving researching, cultivating and promoting this informal knowledge as an expression of the intangible cultural heritage.

As Local Knowledge is an empirical system, it is transferred through informal practices, vernacular customs or via oral transmissions. It is:

- Founded on individual and collective experience
- Based on biodiversity and environment peculiarities
- Dynamic, changing and adaptive
- Tuned to the local culture and environment
- Often tested over centuries of use
- Generally tested by users diverse per genders and ages in diverse times and conditions
- Embedded in community practices, institutions, relationships and rituals
- Held by individuals or communities
- Expression of a knowledge and a cultural value
- Expression of a local identity and collective memory
- Factor of local resilience

Local Knowledge corpus of understandings is established on a specific local wisdom that is strictly expressed by and connected with territories. UNESCO has especially promoted Local Knowledge in the aim of its inclusion in global climate science and policy processes [7]In this framework, it was associated to indigenous knowledge, representing those societies the cultural transmission of which is based on system of transmission different from formal knowledge systems. In this aim, the Report “Local and Indigenous Knowledge Systems (LINKS) in the context of a Global Society” (2001) provided an important general framework for local knowledge definition especially concerning the interactions of societies with their natural surroundings

[5] UNESCO (2019) Local and Indigenous Knowledge Systems (LINKS). Retrieved from http://www.unesco.org/new/en/natural-sciences/priority-areas/links/related-information/what-is-local-and-indigenous-knowledge/

6 UNESCO & ICSU (1999) ‘Science and Other Systems of Knowledge’, *World Conference on Science ,Budapest* and following Declaration.

[7] UNESCO (2018) UNESCO Policy document on Engaging with Indigenous People. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000262748

"Local and indigenous knowledge refers to the understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings".[8] For this purpose LINKS pilots novel methodologies to further understandings of climate change impacts, adaptation and mitigation.

This general common understanding of Local Knowledge originated by the need to include cultural transmissions not classifiable with defined criteria, such as Indigenous and Native people heritage[9]. Nevertheless, in addition to "natural surroundings" more ecosystems also developed Local Knowledge, among which historic environments. Local Knowledge definition thus needs to be extended to include an urban to territorial perspective, and related methodologies, according to the holistic approach of SHELTER Project on resilience of HA.

Other expressions such as *indigenous knowledge or traditional knowledge* are closely related, partly overlapping, or even currently mentioned as synonymous with Local Knowledge. In the context of the SHELTER project, the term Local Knowledge is more comprehensive. Building on UN's Food and Agriculture Organization (FAO)[10] definition, Local Knowledge is not confined to tribal groups or to the original inhabitants of an area. It is not even confined to rural people. Rather, all communities possess local knowledge – rural and urban, settled and nomadic, original inhabitants and migrants. As Local Knowledge embraces a larger body of knowledge systems, we can assume that it also includes those classified as *traditional*, while *indigenous* specifically refer to some groups or societies with system of transmission other than formal knowledge[11].

Current General Definitions[12]

Indigenous knowledge: this knowledge system is associated with indigenous people thus rather limiting for policies, projects and programmes seeking to work with rural farmers in general. Furthermore, in some countries, the term indigenous has the connotation of native people.

Traditional knowledge*:* this concept implies that people living in rural areas are isolated from the rest of the world and that their knowledge systems are static and do not interact with other knowledge systems.

Local Knowledge: a collection of facts and relates to the entire system of concept, beliefs and perceptions that people hold about the world around them. This includes the way people observe and measure their surroundings, how they solve problems and validate new information. It includes the processes whereby knowledge is generated, stored, applied and transmitted to others.

[8] Douglas Nakashima (2001), "Local and Indigenous Knowledge Systems (LINKS) in the context of a Global Society", In *Science and Tradition: Roots and Wings for Development.* Brussel: Académie royale des sciences d'outre-mer. Pp 167-172.

[9] UNESCO (2013) A*ustralia ICOMOS Charter for Places of Cultural Significance, The Burra Charter, 2013 (Burra Charter)*

10 FAO (2004). *Building on Gender, Agrobiodiversity and Local Knowledge: A Training Manual.*

[11] Ibid

12 Hilary Warburton, Adrienne Martin. (1999). *Local people's knowledge in natural resources research*. Chatham: Natural Resources Institute. Also see, FAO (2005). *Building on Gender, Agrobiodiversity and Local Knowledge: A Training Manual*. http://www.fao.org/3/a-y5956e.pdf

It should be noted that cultural heritage institutions pioneer to new kind of Local Knowledge identifications and extractions, in urban contexts as shown by their recent dynamism.[13] Some European museums and especially history city museums[14] for their nature of portraying urban changes (e.g. Stiftung Stadtmuseum of Berlin[15], Historical Museum of Frankfurt HMF[16]) are currently boosting and implementing participatory approaches. This approach allows ensuring a wider and more inclusive representativeness of cultural heritage assets. Moreover, they also show the need to take into account more open ethnic, social and gender neutral as a component of urban communities and its changes. Some experience also show that they aim to assume the issues of vulnerable and minority socio-cultural groups with lack of formal access to cultural networks[17].

Building on this literature and experiences and by taking into account an urban/territorial approach to HA, we can define Local Knowledge as the human capital of local communities that refers to both rural and urban communities. It is the main asset that comes from how formerly they invested in the struggle for survival, to produce food, provide for shelter, achieve control of their own lives, and then improve their style of life in a specific place. This knowledge is integral to a cultural complex that also encompasses language, systems of classification, resource use practices, social interactions, ritual and spirituality[18]. It is passed down from generation to generation and closely interwoven with people's cultural values. However, it also developed over time as it adapted continuously to a gradually changing environment.

Local Knowledge has provided significant contributions to global knowledge. This awareness has started to foster programs for surveying this useful as well as fragile knowledge while the need to define and articulated it better has become articulated through various kind of implementations.[19] SHELTER Project approach to community-based resilience in historic environments allows implementing this definition with new specifications and identifications especially addressed to survey the Local knowledge of historic areas on the matter of natural disasters at local levels.

In this aim, in addition to the local informal system of knowledge, we propose to take into account also the ***local formal knowledge***. It should be noted that the notion of Local Knowledge has been defined to take into account indigenous populations where

[13] Nina Simon, (2010), *The participatory museum*, Museum 2.0.
[14] Jelena Savic (ed.), (2019). *The Future of Museum of Cities, Book of proceedings. CAMOC Annual Conference 2018.* CAMOC & ICOM.
[15] https://www.en.stadtmuseum.de/
[16] Jan Gerchow, "How To Become A Relevant Place In The City? The New Historical Museum Frankfurt" In Jelena Savic (ed.), (2019). *The Future of Museum of Cities, Book of proceedings. CAMOC Annual Conference 2018.* CAMOC & ICOM. pp. 88-94. Also see, Katharina Böttger, Erica De Abreu Gonçalves, "Frankfurt there, now and digital: participation and citizenship at the historical museum of Frankfurt". Retrieved at https://ler.letras.up.pt/uploads/ficheiros/17493.pdf.
[17] Christina Kreps (2013) *Liberating culture: Cross-cultural perspectives on museums, curation and heritage preservation*, Routledge.
[18] International Union for Conservation of Nature (IUCN) (2013) Cultural and Spiritual Values of Protected Areas. Retrieved from https://www.iucn.org/commissions/world-commission-protected-areas/our-work/cultural-and-spiritual-values-protected-areas
[19] DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS Division for Social Policy and Development Secretariat of the Permanent Forum on Indigenous Issues, INTERNATIONAL WORKSHOP ON TRADITIONAL KNOWLEDGE, Panama City, 21-23 September 2005.

other predominant culture created identities only referable to its groups[20]. The lack of written transmission of some natives has also generated the needs of taking into account these cultures through new modalities for shaping this information (e.g. records, participatory processes). On the other hand, the global word and ICTs facilities also create another kind of risk of underestimating the production of knowledge at local level. Local publications, such as newspapers, magazine and journals that have a local diffusion as well as other information stored in local libraries and institutions and not digitized, in fact, are a complementary aspect of a local knowledge[21]. Considered this, we also suggest gathering *local formal knowledge* through collaborative methods. Although the local formal knowledge bases on formal transmission, this kind of information is as difficult to reach as relevant[22]. Because of the context of its production that is strongly connected to the local area, it represents a complementary local expertise that need to be collected too[23]. In the proposed methodology informal local knowledge thus meets formal knowledge for building a new knowledge molded on the peculiarities, diversities and richness of historic areas and generated, produced, diffused, and shared at local level.

3.2 Sense of Place: definition and identification of the elements related with community resilience in historic areas

The 'Sense of the Place', together to the Local Knowledge, builds on the holistic view of a cultural and natural environment with the community inhabiting it. It includes some subjective **perceptions** of the place **and feelings** originated by it. As individuals' factors, perceptions and feelings are variable and can be influenced by different elements according to gender, social issues, ages, beliefs, or education. They include some relevant emotional, unaware but cultural feelings as the sense of roots, continuity and ownership with relevant effects on personal and social solidity, solidarity, continuity and socio-cultural cohesion.

Perceptions and feelings about the place are propagated and transmitted through domestic and social practices within the community. On one hand, they create collective feelings and memories, on the other hand, they foster to develop an individual and collective 'place attachment'. The place attachment contributes to the fundamental question about "Who am I?" and includes the degree of dependence on a place. In a study recently published in Ecology and Society[24], Vanessa Masterson with other colleagues highlight that the Sense of place refers to both meanings and attachments individuals or groups hold for a specific place. They claim that a focus on both the

[20] UNESCO (2013) A*ustralia ICOMOS Charter for Places of Cultural Significance, The Burra Charter, 2013 (Burra Charter)*
[21] Michael A. Williams (1996). *Researching local history: the human journe*y. London: Routledge.
[22] Clarke A. Chambers (1984), "The "New" Social History, Local History, and Community Empowerment", *Minnesota History* 49, pp.14-18. Also see the special issue of the journal *Daedalus,* vol.100, issue 1, *Historical Studies Today*. In particular, see Eric J Hobsbawn, "From Social History to the History of Society", *Daedalus* 100 (1) pp.20-45. and Pierre Goubert (1971) "Historical Studies Today". *Daedalus* 100 (1) pp. 113-127. Also see Michael A. Williams (1996). Researching local history: the human journey. London: Routledge.
[23] Pierre Goubert (1971) "Historical Studies Today". *Daedalus* 100 (1) pp. 113-127.
[24] Venessa Masterson, et al. (2017) "The contribution of sense of place to social-ecological systems research: a review and research agenda." *Ecology and Society*.

attachment and the place meaning can help clarify opportunities and obstacles for collaborations between different interests which in turn affect stewardship and transformative capacity.[25] Their study focuses on what people care about and what motivates them to engage in solving sustainability issues. Other contributions integrate "partnerships, governance, funding, policy and evaluation" in these kind of interrelations between people and places to encompass for reflecting on motivation in "place-keeping"[26]. According to the study, tools and assumptions from sense of place research offer the opportunity to gain a more nuanced understanding of how people respond to environmental changes in a place. As place attachment encompasses an emotional connection with a place, it can also create the capacity to react in case of risk. The instinctive personal reaction is increased by the sense of protection not only for the family shelter but also for the common shelter which includes all components of a living place (the cultural and natural environment with the community inhabiting it).

The Sense of Place, finally, comes out as an aspect that we can link to Local Knowledge in order to achieve a full understanding of the interactions between communities and their environment in the aim to assess and foster social resilience. Although subjective, individual understandings of places are mostly collective and shared, they form through social experiences as much as individual ones. Beyond this recognition nevertheless, in the aim of 'learning historic areas', we need to take into account its own specificities. A place refers, in fact, to a mental and a physical space. An attribute of a place can be defined and identified to be linked to the perceptions and feelings they generate.

We identify, thus, the Sense of Place as constituted by common understandings/believes/feelings of (i) physical features of a site both natural and resulting from historical layers (geomorphological, topographical, morphological features); (ii) some invariants of the historic area in collective memory due to its origins and historical and cultural developments; (iii) special features that can be better specified in the context of SHELTER Project as socio-cultural perceptions and memories on the matter of local risks and past natural disasters.

Through this new articulation of factors defining the Sense of Place, the shaped methodologies enable the OLs to implement its identifications through participatory activities with its stakeholders by taking into account peculiarities of the different historic areas.

3.3 Local Knowledge, Sense of Place, and Resilience against Climate Change and Natural Disasters

In the Local Knowledge Global Goals[27], the UNESCO has highlighted the elements of importance of Local and Indigenous Knowledge to be linked to climate change and

[25] Ibidem

[26] Nicola Dempsey, Mel Burton (2012) "Defining place-keeping: The long-term management of public spaces", *Urban Forestry & Urban Greening*, 11 (1), pp.11-20.

[27] UNESCO's Local and Indigenous Knowledge Systems Programme (LINKS). (2017). *Local Knowledge Global Goals.* Retrieved from http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/pdf/ILK_ex_publication_E.pdf

natural disasters. Among these, there are some recommendations that we can assume to be implemented. Furthermore, the relationships between Local Knowledge and resilience against natural disasters has developed several interests in recent years. The report of International Strategy for Disaster Reduction (2005)[28] highlights Local Knowledge potential to improve disaster risk reduction strategies by identifying some primary arguments:

- Various local practices proving valuable against natural disasters can be transferred and adapted to other communities in similar situations
- An incorporation of Local Knowledge sources into existing knowledge and policies encourages the participation of the affected community and empowers its members to take the leading role in all disaster risk reduction activities.
- The information contained in Local Knowledge can help improve project implementation by providing valuable information about local context
- The non-formal means by which Local Knowledge is disseminated provides a successful model for other education on disaster risk reduction.

Taking this into account and protecting this useful as well as fragile knowledge has created the need to define and articulate it better. Beyond these acquirements, some more contributions are required on the matter of historic areas in
order to take into account urban/rural historic areas of the SHELTER Project to be implemented at different scales.

According to the aim of developing a methodology for historic areas, we define Local Knowledge as:

An adaptive knowledge for variability and change: As underlined by the UNESCO recommendation, Local Knowledge is not a static body of "traditional" information. Communities have always been confronted with environmental variability, unpredictability and change. Local Knowledge is thus a dynamic system that is collectively and continuously re-visited, refined and shared across a web of social actors. Because of this property, it maintains its adaptive capacity and vitality and bears a resemblance to science. On the other hand, science is also based on a codified body of data that always need to be updated. While acknowledging the wisdom of their elders, indigenous and local knowledge holders emphasize the central role of their own learnings and experiences. In this manner, successive generations adapt and transform their understandings in the face of environmental variability and change. This inherited attitude needs to be reconsidered because of the pushing trend of the world globalization, and to avoid any interruption in its continuing transmission.

***A Community-based assessment of global climate changes*:** Observation and interpretation of meteorological phenomena have guided the activities of local

[28] International Strategy for Disaster Reduction (ISDR). (2008) *Indigenous Knowledge for Disaster Risk Reduction: Good Practices and Lessons Learned from experiences in the Asia-Pacific Region*. Retrieved from https://www.unisdr.org/files/3646_IndigenousKnowledgeDRR.pdf

communities for millennia. Planting and harvesting, transhumance or herd migration, and the timing and locations of hunting, fishing or gathering are dependent on detailed understandings of weather and climate. Local Knowledge contributes to climate science by offering observations and interpretations which allow refining spatial scale and add considerable temporal depth. Elements of significance to local livelihoods that are not considered by scientists become highlighted from this detailed point of view. The Intergovernmental Panel on Climate Change (IPCC) in the Summary for Policymakers of its Fifth Assessment Report (2014) concluded that: 'indigenous, local, and traditional knowledge systems and practices, including indigenous peoples' holistic view of community and environment, are a major resource for adapting to climate change'. This approach also includes urban communities and their observation and reactions to risks and natural disasters in urban environments. Problems of subsidence and flooding affected in time especially some specific urban areas and monuments, that allow generating a specific local knowledge that also is a relevant contribution to assessment of global climate change.

An element of resilience in a world of change: Small population size, isolation and social transformations bringing challenges and affecting specific vulnerable groups contribute to the communities' vulnerability to economic, social and environmental impacts that are exacerbated by climate change. Indigenous peoples and some populations have been admitted as particularly exposed and sensitive to climate change impacts due to their resource-based livelihoods and homelands in marginal environments, this exposure also concern some rural areas. Furthermore, despite their high exposure and sensitivity, indigenous peoples have always actively responded to climate change, showing great resourcefulness (e.g. Native Inuit people). For these reasons, Local Knowledge has to be admitted and enhanced everywhere as a factor of resilience of local communities. Adaptation is rooted in local knowledge, social systems, and cultural values and attitudes. Strategies include maintaining genetic and species diversity in crops and herds, mobility, diversified use of landscapes, and livelihoods based on use of multiple resources. Traditional systems of governance and social networks reinforce the ability to respond collectively to change and build resilience.

An element for monitoring bio and cultural diversity loss: Literature underlines as indigenous peoples are often well positioned to observe and understand local ecosystems. Many indigenous peoples live in remote areas, so they are better placed than scientists to provide detailed information on local biodiversity. Many lives in areas that have high biodiversity values. Their ways of life and knowledge systems depend on close interactions with nature, and observations of the animals and plants on which they rely. As knowledge is garnered throughout a lifetime, and enhanced by oral history passed down through generations, indigenous peoples often also have knowledge of changes in biodiversity over many decades or even centuries. By working with many communities over a wide area, a picture of biodiversity trends over whole regions can be achieved. This ability in observing the territory can be extended to people living other different kind of Historic Areas. Local communities are similarly well positioned to observe and understand their local urban or territorial ecosystems. Local knowledge and

its characterizations such as oral history and social memory plays an important role in preserving cultural diversity multi-cultural heritage assets that otherwise will be lost. This relevant contribution of informal knowledge to the cultural heritage is confirmed by some museums and other cultural institutions that are including in their collections oral testimonies and social memories. By taking also advantage from the opportunities offered by the new technologies, they're also creating new digital born collections through participative projects in order to integrate a broader notion of cultural heritage preserved in museums and collective memories. According to this implementation of local knowledge, participative approach are required in order to allow ensuring a wider participation and representativeness through more inclusive cultural heritage understandings.

A factor for co-managing spaces and projects Some implementation plans of indigenous and local knowledge provided information about how indigenous homelands and territories recognize the greater part of the world's biodiversity. Local communities manage natural resources through their own customary institutions and in some cases, enhance biodiversity by transforming landscapes. Today it is increasingly recognized that the conservation of threatened species or protected areas requires the development of partnerships with indigenous peoples and local communities. The same approach also is important for managing and keeping places in wider terms. As much as state-indigenous co-management regimes benefit from in-depth indigenous knowledge about natural resources that complements scientific understandings, in historic environments governance plans at different levels have to benefit from all local community (urban/rural) in-depth knowledge by making local people crucial actors in research, monitoring and awareness-raising.

An element for monitoring / enhancing local identities in rural and urban historic areas: Local Knowledge is a factor of uniqueness in the world globalization. It allows to understand the long-lasting human interactions with territories in historic areas. The adaptation to local natural conditions (climate, topography, geomorphology, natural infrastructures etc.) also concerns ways and processes of urbanization in space – both urban and rural areas at scale of cities and territories –, and changes in time. It concerns the awareness of local resources (water and food supply, connections, materials, etc.) as well as the local abilities gained in using local resources for creating and improving ways of living (water and soil managing, building, maintaining, trading, producing, structuring, moving, connecting, etc.). It also affects the observation of local hazards and natural risks (areas more affected, weakness, fragilities in building, specific social vulnerability, etc.). It finally is about the systems for transferring know-hows and skills (informal learning practices, customs, etc.), and the community-based intangible heritage values.

A factor for societal local co-organization against risks Local Knowledge is also created by learning from past events. For this reason, local societies, in different urban and territorial contexts, also have developed their alarm systems, local indicators, traditional recovery systems. Furthermore, a system of societal organization at local level

can be quite different from a general global understanding. This form of organization community self-produced also include informal ways of collaboration and neighborhood solidarity, better fitting with peculiarities of their places and rooted in the collective feelings. Co-managing spaces at all stages of disasters management cycle is always relevant for achieving the best results and needs to take into account the Local Knowledge developed in this matter.

An element for monitoring local vulnerability and social inclusiveness Local Knowledge is owned by member of local societies diverse per gender, age and vulnerability. It allows understanding power relationships and the level of inclusiveness in the community.

A factor activating social participation Local knowledge is a shared asset owned by the community as a whole. It fosters peer learning and a common sense of belonging to community. Incorporating Local Knowledge sources not only enrich existing knowledge but also encourages the actively participation and engagement of interested/affected communities and empowers them to take an active role in solving community problems and challenges.

KEY POINTS
An adaptive knowledge for variability and change
A Community-based assessment of global climate changes
An element of Resilience in a world of change
An element for monitoring bio and cultural diversity loss
A factor for co-managing spaces and projects
An element for monitoring/enhancing local identities in rural and urban historic areas
A factor for societal local co-organization against risks
An element for monitoring local vulnerability and social inclusiveness
A factor activating social participation

According to the aim of developing a methodology for historic areas, we define the Sense of Place to be linked to:

Landscape perception. Places as part of historic environments are perceived as cultural natural or urban landscapes. The landscape perception of a person or a community builds on experiences he/she/they had with it and the modalities of past interactions. The places' perception is influenced by layered previous perceptions of the same place and creates expectations and roles (i.e. what other people tell/told us about it, or what we've read/looked at/understood about it)[29]. Education and external point of views thus influence individual/collective opinions about a place

[29] Yi-Fu Tuan (1974) *Topophilia: a Study of Environmental Perception, Attitudes, and Values.* Columbia University Press.

Human interactions with the environment. Sense of place builds upon human interactions with its environment. The environment affects the sense of place by constraining or enabling our experiences.

Collective attachments. Although attachments and meanings to a place are subjective, they vary in patterned ways. Methods from Sense of Place help reveal how groups of people share the same attachment to a place.

Resilient behaviours. These patterns in attachment and meanings can help to predict specific types of both individual and community behaviours, especially during times of change, crises or risks. Attachment to a place does not automatically ensure that all people work to improve their place in the same ways. Strong attachment to a place can even be a barrier to change for improvement. But the resilience connected to the Sense of the place can help to assess reactions at all stage of disasters cycle.

Sense of solidarity and collaboration. Place attachment also fosters a sense of belonging to an ecosystem the components of which are the environment and the community. These feelings foster a collaborative attitude and active involvement especially useful in critical conditions.

Cultural values and memories in historic areas' resilience. The perception of a place and following feelings and behaviors can be different in historic areas where collective memories and cultural values strongly contribute to link the community, and community to its natural/cultural environment, the community and temporary residents interested in cultural heritage of local areas.

KEY POINTS
Landscape perception
Human interactions with the environment
Collective attachments
Resilient behaviours
Sense of solidarity and collaboration
Cultural values and memories in historic areas' resilience

To sum up, Local Knowledge and Sense of Place of historic environments provide a sort of lessons that can be learnt for implementing a community-led resilience. With this purpose and according to the definition provided, we have identified a set of methodologies, activities and tools for gathering and extracting Local Knowledge and Sense of Place elements in SHELTER HAs. Detailed information about this is provided in Section 4. The activities will be implemented in the five OLs with local stakeholders (both

Core Stakeholders – CS and Extended Stakeholders – ES[30]) from urban to territorial scale (Building, District, City, Region, Cross-regional).

3.4 Local Knowledge, Peer Learning and Capacity Building

In the framework of the SHELTER project, collaborative activities are promoted, particularly among the five OLs, to boost a continuous exchange of (local) knowledge and best practices and to facilitate peer-learning processes between them. Peer learning is about learning together, and in the context of the SHELTER Open Labs this condition is integrated in a structured approach to knowledge exchange. This approach involves three steps: (1) matching of peers based on the outcomes of the 1st local workshops, (2) choosing the appropriate method for exchange based on OL features and topic (while supporting implementation), and (3) monitoring impact on both the OLs and the SHELTER project in general.

In this framework, Learning by Historic Environments is facilitated. Each OLs will indeed offer an environment in which participating stakeholders (both Core Stakeholders and Extended Stakeholders) will exchange and co-generate knowledge, and in which capacity building and awareness raising are seen as tools to enhance resilience. Together with innovative tools like IMMERSITE and the data driven platform capacity building will be used, to make scientific knowledge accessible to local authorities, business and citizens. The other way around is, in the context of SHELTER, just as important: Local knowledge, embedded with local stakeholders, will be made accessible to scientific and technical project partners. Capacity building can take many forms, between the most obvious forms are training and workshops to enhance respectively the explicit and tacit knowledge of individuals. Known tools to enhance the capacities of organisations and enabling environments are dialogues, peer learnings and learning-by-doing. Awareness raising can also be seen as a capacity development strategy; it is a way to enhance the capacity of the public on specific topics. Each Open Lab will follow its own, tailored, capacity building trajectory. Content and topics for all capacity development activities will be derived from the existing (local) knowledge base between the SHELTER project partners and stakeholders. The trainings and other instruments that will be developed will be available for, and actively shared with other Open Labs and project partners to learn from via the Peer Learning network. The monitoring and evaluation system that is used to support meta-learning and monitor the impact of the peer learning between OLs, will also be used to monitor the impacts of capacity building activities within the Open Labs.

A more elaborate description of the principles followed and the activities planned for the SHELTER capacity building and peer learning approach, can be found in the Open Lab Management Plan - D9.2.

[30] For description of each OL stakeholder composition wee D9.2 of SHELTER project.

4 Methodology for Local Knowledge co-generation and extraction

According to the provided definitions, a set of methodologies, activities and tools have been identified to be implemented in OLs with the engagement and participation of local stakeholders both CS and ES. All of them specifically address historic areas and resilience factors against climate change and natural disasters.

As an empirical knowledge, which hasn't ever been codified but transferred via oral transmission and practices, Local Knowledge needs to be extracted and gathered directly from the social actors owning it. All these methodologies push participatory approaches by collaborative working according to the literature acquirements that highlight the need of sharing informal knowledge and the importance of experiences.[31] They include the following steps in the OLs participatory workshops:

- Knowledge discovery by questioning and surveying through preliminary tools
- Knowledge capture by mapping and shaping through creative tools
- Knowledge sharing through participatory activities and collaborative tools
- Knowledge application by collecting Local Knowledge data for the Local Knowledge dataset

Recent research focuses on categories of knowledge, as well as implications between formal and informal knowledge.[32] For the reasons argued above, this research framework, we include formal knowledge concerning documentation that refers to local history, locally produced and stored, unlikely accessible via usual diffusion dissemination channels, in methodologies for Local Knowledge generation.

4.1 Methodologies for Local Knowledge co-generation and extraction

Here below we present methodologies that we have identified as suitable for extraction of traditional know-hows, practices, experiences and skills developed over time by local communities. The following points, present Local Knowledge specific aims and features, as well as specific objectives and related methodologies for extraction. They have been conceived taking into account SHELTER OLs specific objectives, OLs community composition and risk/hazard exposure.

- **TRADITIONAL SKILLS AND PRACTICES RELATED TO HUMAN AND ENVIRONMENT INTERACTION**

Local communities have been traditional conceiving practices in relation of their environment, such as water management practices, soil management, land uses and agricultural practices. In the context of territories, these practices include old traditional

[31] Andreas Werr, Torbjörn Stjernberg (2003), ''Exploring management consulting firms as knowledge systems'', *Organization Studies*, 24 (6), pp. 881-908

[32] Sirje Virkus, *Knowledge Sharing Systems* website, Institute of Information Studies, Tallinn University 2012 https://www.tlu.ee/~sirvir/Information%20and%20Knowledge%20Management/Knowledge%20Sharing%20Systems/index.html

water-management and water-conservation systems, traditional techniques for irrigation, specific water conservation techniques, freshwaters and saltwater and fisheries management; sustainable soil conservation practices, effective soil-fertility enhancement practices; various environments favourable practices, identification of local indicators to determine favourable times to prepare plant and harvest gardens, local methods of sowing, seedling and care, farming and cropping systems, traditional methods of processing and marketing and plant protection systems, traditional knowledge for forest management and conservation, range management, forestry, agro-forestry, woodwork. In urbanised contexts, these practices also include water management/conservation systems, buildings/infrastructures disposals for draining water; systems against fire propagation and flames extinguishing. They also encompass the knowledge of soil stability, ordinary management of rivers banks, canals, natural and artificial channels, shelter systems from flooding, and favourable times for works.

The specific objective of this survey is to highlight knowledge based on layered interactions with natural resources, long-lasting practices and uses, historical main livelihoods and eventual changes of recent livelihoods. The survey will also highlight local practices to preserve natural environment from extreme climate and from natural disasters.

The methodology we have identified to extract this Local Knowledge aim foresees (i) questioning and (ii) mapping practices and places with specific relations to long-lasting uses, habits and customs related to natural environment.

This Local Knowledge specification is particularly relevant for OLs at regional/cross regional and city/district scale. The survey should be addressed to OL Extended Stakeholders, to involve in the extraction wider community representatives.

- **TRADITIONAL SKILLS AND PRACTICES RELATED TO BUILT ENVIRONMENT**

Local and indigenous communities developed over generations also practices related to the built environment, that is to say the human-made space in which people live and work. These practices include construction and building techniques, traditional materials used, architectural traditional practices, traditional maintenance and conservation techniques. This Local Knowledge specification aims at identifying local awareness of an historic area and traditional competences of historical building.

The methodology to extract this kind of information is: (i) questioning about diversified skills for traditional building techniques and local/natural mines and other resources for building materials; (ii) crowdsourcing visual and textual materials.

This Local Knowledge specification is relevant for all OL and in particular for those at city/district/building scale. The survey should be addressed to OL Extended Stakeholders, to involve in the extraction wider community representatives.

- **LOCAL ORIENTATION, MOBILITY AND RISKS**

Local communities, by interacting with their natural and built environment, have developed specific know how and attitudes in moving through their territories, reach places and find shelters, also in situation of risk. This Local Knowledge specification include mobility practices and infrastructures development practices.

The methodology to extract this kind of information foresees (i) questioning about major existing connections able to allow facing risk events, their level of risk exposure during hazard conditions, level of reachability of scattered houses/villages, possible (ii) collaborative shaping/design/identification of alternative connections during natural disaster events.

This Local Knowledge specification is particularly relevant for OLs at city/regional and cross-regional scale. The survey should be focused according to specific risk. The survey could be implemented involving both CS (core stakeholders) and/or ES (extended stakeholders).

- **TRADITIONAL PRACTICES RELATED TO RISK AND DISASTER MANAGEMENT**

Over generations of exposure to natural disasters, local communities have developed traditional and local know-how and practices to prevent risks and deal with/recover after natural disasters such as earthquakes, storms, floods, heatwaves, wildfire, subsidence. Even if most of disaster events has worsened in terms of quantity and effect because of climate change, they occurred over time and local communities structured their own strategies to cope with them. These practices include traditional alarm systems, local indicators and systems of monitoring, traditional recovery systems, traditional techniques of observation of meteorological phenomena[33].

Specific objectives of this Local Knowledge specification are to identify local indicators and risk/disaster management practices.

The methodology to extract this kind of information foresees: (i) questioning about traditional alarm systems, traditional meteorological observation, traditional recovery system – to be tailored according to type of hazard exposure: (ii) identifying and shaping areas/routes/buildings at risk and/or that have been affected by disasters.

This Local Knowledge specification is relevant for all OLs. The survey should be focused according to specific risk. The survey could be implemented involving both CS (core stakeholders) and/or ES (extended stakeholders).

- **OBSERVATION AND INTERPRETATION OF LOCAL RISKS' SIGNS**

In order to deal with risk management, local communities have developed own systems of observation and interpretation of signs and symbols, specifically related to natural indicators (traditional symbols, hydrogeological symbols, biological symbols,

[33] B.T. Hanyani-Mlambo & Paul Hebinck, (1996) "Formal and informal knowledge networks in conservation forestry in Zimbabwe." *Indigenous Knowledge and Development Monitor* 4 (3), pp. 3-7.

anthropomorphology signs). This Local Knowledge specification aims at identifying local signs and symbols specifically related to risk indicators. To do so, the methodology foresees to (i) collect and (ii) represent traditional risk signs in local understandings.

This Local Knowledge specification is relevant for all OL, especially those at regional scale. The survey should be addressed to OL Extended Stakeholders, to involve in the extraction wider community representatives.

- **LEARNING FROM PAST DISASTERS, CHRONIC ISSUES AND NEW HAZARDS FOR CLIMATE CHANGE**

Local Knowledge has also been a created by learning from past disaster and chronic situations of risk. Alarm systems, local indicators, natural resources management systems and practices of prevention and recovering after disasters came from what communities have learned from past experiences. This includes signs and indicators that have been tested and experienced during disaster events and community and individual reactions against situation of crisis. Specific objective of this Local Knowledge specification is thus to survey experienced events. To do so, the methodology proposed foresees to (i) collect and (ii) represent all information about experienced disasters, individual and community reactions, local initiatives for disaster management, local understanding of the occurrence.

This Local Knowledge specification is relevant for all OLs. The survey could be addressed to OL Core Stakeholders or Extended Stakeholders.

- **ORAL HISTORY, NARRATIVES, RITUALS, RELIGIOUS PRACTICES RELATED TO RISKS**

Local communities have developed over years local storytelling, narratives rituals and practices – both religious and secular. Oral history, narratives and rituals represent valuable cultural documentation telling people beliefs and their own representation of risk. This specification of Local Knowledge aims at surveying community knowledge coming from a long-lasting cohabitation with risks, their reactive attitudes and informal preparedness practices.

The methodology to do so foresees the (i) recognition and (ii) representation of traditional proverbs and rituals, as well as main relevant events for local history.

This Local Knowledge specification is relevant for all OLs. The survey should be addressed to OL Extended Stakeholders to involve wider community representatives.

- **LOCAL LANGUAGE RISKS AND OLD / NEW HAZARDS DEFINITION**

Local languages, that most of the times are different from national and official language, play an important role and tell us something important about the relation between community and environment at risk. This Local Knowledge specification includes vernacular language, toponomy and etymology. The objectives are to identify specific terminology for natural elements and risks and assess local awareness of risk. The methodology to do so foresees (i) listing name of hazards, risks and disaster in local

vernacular language; (ii) assessing common/different understandings in close boundaries areas.

This Local Knowledge specification is relevant for all OLs, especially cross-regional. The survey should be addressed to OL Extended Stakeholders to involve wider community representatives.

- **GOVERNANCE AND SOCIETAL ORGANIZATIONAL PRACTICES**

Communities have organized themselves over time of exposure to risks to be better prepared to deal with natural disasters both during and after the event. This has led to different institutional, governance and organizational practices – including also civil and volunteers' initiatives - related to risk and disaster management, from neighbour/local level to national and cross-regional/cross-national. This specification of Local Knowledge aims at surveying institutional awareness to openminded intersectoral collaboration and support to intergenerational links and volunteers' initiatives.

To do so, the proposed methodology is addressed at (i) questioning and (ii) conceptual mapping of organizational aspects and political/institutional practices for public well-being in historic perspectives, local services developments, volunteers' initiatives, socio-cultural associations supporting informal knowledge transmission (laboratories for capacity building activities and skills development, traditional crafts workshops), role of elderly in knowledge transferring within communities.

This Local Knowledge specification is relevant for all OLs, especially at cross-regional scale. The survey should be addressed to OL Core Stakeholders.

- **SENSE OF SOLIDARITY TOWARDS VULNERABLE GROUPS**

While facing risks and disasters, communities have shown different degrees of attitudes in preparing and protecting specific vulnerable groups that – because of specific conditions – could be over exposed to risk and could find themselves in disadvantageous situation in case of natural disaster. These could be vulnerable socio-cultural groups (low income families living in peripheral areas with lack of infrastructure or connections, groups belonging to ethnic/cultural/language minorities with fewer access to alarm systems or communication channels, migrants with linguistic or other type of barrier, etc) or groups interested by specific needs, for example families with little children (especially if single parent families) or elderly, isolated elderly, people with disabilities or specific diseases[34].

Specific objective of this Local Knowledge specification is to survey community awareness regarding vulnerable groups in risk conditions and attitudes/level of concern of community members towards specific needs. To do so, the proposed methodology is addressed at (i) questioning and (ii) mapping community awareness of vulnerable groups' specific needs in case of natural disasters, solidarity practices to support them

[34] Pernilla Malmer (2017) *International Exchange Meeting for Mobilisation of Indigenous and Local Knowledge for Community and Ecosystem Wellbeing.* Stockholm Resilience Centre. Retrieved from http://swed.bio/wp-content/uploads/2017/05/Walking-Workshop-Report-Hin-Lad-Nai.pdf

and long-lasting support and volunteers' initiatives (associationism and charity initiatives).

This Local Knowledge specification is relevant for all OLs. The survey should be addressed to OL Extended Stakeholders to involve in the survey wider communities' representatives.

- **GENDER PERSPECTIVE**

In the matter of social inclusion related to risk and disaster management, also gender equality issues play an important role and tell us how community as a whole deals and copes with risk. This Local Knowledge specification aims at surveying gender balance in the community and community concern regarding gender issues, with a particular focus on resilience against natural disasters. To do so, the proposed methodology is addressed at mapping gender balance and equal opportunities in management teams of organisation, associations and volunteers' management groups dealing with risk and natural disasters.

This Local Knowledge specification is relevant for all OLs. The survey could be addressed to OL Core Stakeholders or Extended Stakeholders.

- **LOCAL FORMAL KNOWLEDGE**

The survey includes also local formal knowledge, that is to say that written knowledge that refers to local history and specificities, it is locally stored (not digitised or included in international archives) and not easily accessible for non-local people/researchers. The main objectives of this Local Knowledge specification are to survey formal knowledge transmitted exclusively at local level. To do so, the proposed methodology foresees (i) questioning and (ii) mapping local chronicles and pamphlets and/or other local ways to collect data and local journals.

This Local Knowledge specification is relevant for all OLs. The survey should be addressed to OL Core Stakeholders.

SURVEYING LOCAL KNOWLEDGE

Local knowledge refers to skills developed by societies through a long interaction with their environment, and/or developed by direct experience, transmitted through generations through informal practices, vernacular customs or oral transmissions.
The activities will allow extraction and identification of traditional know how, experiences, specific skills and practices from local communities, focusing especially on local and traditional knowledge on risks, disasters, and resilience factors.

It should be noted that the notion of local knowledge has been defined to take into account indigenous populations where other predominant culture created identities only referable to its groups. The lack of written transmission of some natives has also generated the needs of gathering information through new modalities. Nevertheless, written documentation that refers to local history, locally stored and improbable accessible can also provide local specific information. Considered this, we also suggest gathering local formal knowledge through collaborative methods.

Aim	Keywords	Specific Objectives	Methodology	Open Lab/Case study	Target Group (Core Stakeholders CSo Extended Stakeholders ES)
DEFINING TRADITIONAL SKILLS AND PRACTICES RELATED TO HUMAN AND ENVIRONMENT INTERACTION	Water management Soil and land uses Agriculture, Forestry, Forestry Management	Highlight knowledge based on layered interactions with natural resources, long-lasting land uses, historical main livelihoods,	Questioning and mapping practices and places with specific relations to long-lasting uses, habits and customs about Water management Soil nature and land uses Livelihoods Traditional Periodic ordinary maintenances techniques	Finalised for Regional/ Cross-regional OLs Or for Cities/Building OLs	ES

		eventually changes of recent main livelihoods	And *Agriculture- Soil /Forests traditional* maintenances, Collaborative practices		
DEFINING TRADITIONAL SKILLS AND PRACTICES RELATED TO BUILT ENVIRONMENT	Construction techniques Traditional materials Traditional maintenances and conservation techniques	Identifying local awareness of an historic area and competences for historical building	Questioning about diversified skills for: Traditional building techniques, Local/natural mines and other resources for building materials, Crowdsourcing of materials visual and textual	ALL Cities/Building OLs	ES
TRACING LOCAL ORIENTATION, MOBILITY AND RISKS	Mobility Infrastructures	Identifying local knowledge of moving in their territory, and reach places in situation at risk	Questioning about: Major connections in situation at risks, its level of risk in hazard conditions, alternatives streets, how to reach scattered houses/villages. Shaping alternative connections in hazard conditions	Cities/Regional/cross-Regional OLs (focus on a disaster according to OL)	CS/ES
IDENTIFYING TRADITIONAL PRACTICES RELATED TO RISK AND DISASTER MANAGEMENT	Alarm systems Local indicators Traditional recovery systems Observation of meteorological phenomena, New hazards	Local risks indicators and societal organisations	Questioning about: Traditional alarm systems for •*(specify hazard according to OL)* Traditional Metereological observation and alarm system for •*(specify hazard according to OL)* Traditional recovery systems after •*(specify hazard according to OL).* Shaping areas/ routes/buildings affected by risks	All (focus on a disaster according to OL)	CS/ES

	due to the climate change				
TRACING OBSERVATION AND INTERPRETATION OF LOCAL RISKS' SIGNS	Traditional symbols Hydrological Biological Anthropo-morphological signs	Local risks specifically related to natural indicators	Collecting and representing traditional risk signs in local understandings	All Regional OL	ES
UNPACKING THE LEARNINGS FROM PAST DISASTERS AND CHRONIC ISSUES	Experienced signs and indicators Community resilience Individual reaction	Surveying experienced local risks and disasters	Collecting and representing all Information about experienced disasters, reactions, individual/local initiatives for disaster management, and local understandings of the occurence	All	CS/ES
DEVELOPING ORAL HISTORY, NARRATIVES, RITUALS, RELIGIOUS PRACTICES RELATED TO RISKS	People beliefs	Surveying community knowledge of a long-lasting cohabitation with risks, reactive attitudes, and informal preparedness	recognition and representation of traditional proverbs, rituals; Main events in relevant for local history	ALL	ES
PROFILING LOCAL LANGUAGE RISKS AND HAZARDS DEFINITION	Vernacular language Toponomy Etymology	Ecosystem risks/disasters terminology and local knowledge of levels of risks	Listing names of hazards, risks, disasters type in local vernacular language Common/different understandings in close boundaries areas	ALL Cross-regional	ES

DEFINING GOVERNANCE AND SOCIETAL ORGANIZATIONAL PRACTICES	Governance Societal organisation	Surveying institutional awareness to openminded intersectoral collaboration and supports to inter-generational links and volunteer initiatives	Questioning and Conceptual mapping about: Organizational aspects and Political practices for public well-being in historic perspectives, Local services developments, Volunteers, socio-cultural Associations Supports to Informal Knowledge' transmission (laboratories for skills, traditional crafts schools) Role of the elderly in the community	ALL Cross-regional	CS
PROFILING THE SENSE OF SOLIDARITY TOWARDS VULNERABLE GROUPS	Social inclusion Solidarity Associationism Volunteering Charity	Surveying community awareness regarding vulnerable groups in risks conditions and attitudes towards specific needs	Questioning and mapping awareness of vulnerable groups' needs in risks conditions, solidarity practices towards them and long-lasting volunteer initiatives	ALL	ES
DEFINING GENDER PERSPECTIVE	Equality Equal opportunities Democracy	Surveying (i) gender balance in the community, and (ii) community concern regarding the gender issues	Mapping gender balance in management teams, in risks related organisations/associations/volonteers groups. Questioning about	All	TS (i) ES (ii)
DEFINING LOCAL FORMAL KNOWLEDGE	Local history Local archives Not digitised data	Surveying formal knowledge transmitted exclusively at local level	Questioning about local chronicles and pamphlets, other local ways to collect data and local journals.	All	TS

Table 1. Surveying Local Knowledge

4.2 Methodologies for identification and extraction of Sense of Place elements

Below is an array of methodologies identified as suitable for surveying the community Sense of Place, framed as a physical and mental space. The main objective is to explore the ways in which Sense of Place is shaped, nurtured and experienced, and its effects in terms of community resilience against natural disasters The proposed activities will survey two main aspects: (i) they will identify how some invariants and long-lasting collective memories have created a shared understanding of the place in the community; (ii) they will assess commitment and engagement of community. The survey will allow community members to discuss and shape a shared image of the place, while sharing awareness, understandings and concerns about it.

The following points present Sense of Place specific aims and features, as well as specific objectives and related methodologies for extraction of its main factors. They have been conceived taking into account SHELTER OLs specific objectives, OLs community composition and risk/hazard exposure.

- **ECOSYSTEM DEFINITION**

This Sense of Place element aims at identifying the “Ecosystem”, that is to say the fundamental features of the natural and cultural environment, at urban/regional/cross-regional scale, while identifying links between community cultural and natural environment links. The identified methodology to do so foresees (i) questioning about genetic and species diversity in terms of natural features (grounds, plants, animals, natural resources); (ii) questioning and localizing physical features (geomorphology, topography and morphology), ecosystem function and areas affected by natural risk.

This Sense of Place specification is relevant for all OLs and should be addressed to OLs Extended Stakeholders to engage wider community representatives.

- **HUMAN INTERACTIONS WITH THE ECOSYSTEM**

This specification aims at surveying the relationship between community and natural landscape from one side, and community and urban landscape from the other side. At regional and cross regional scale, the objectives are to (i) define urban cultural perception in big contexts and (ii) identify diversified uses of landscapes, areas and live hoods. At city and district scale, the objective is to define urban landscapes perception in urban historic areas. To do so, the proposed methodology foresees the shaping of forms, signs, symbols about common understanding and visual characterization of natural cultural areas and urban features.

This Sense of Place specification should be addressed to OLs Extended Stakeholders to engage wider community representatives.

- **COMMUNITY HISTORICAL AND CULTURAL PERCEPTION OF THE PLACE**

This Sense of Place specification includes community perception and awareness of the history and cultural heritage of the place, with reference to the ecosystem beginnings, the historical fundamental layers, cultural identities and memories and identification of protagonist and heroes, including also local legends and myths. It also encompasses a time perspective in relation to the resident community and temporary residents. Peoples change perceptions over time and history and the perception of the people at this current time also need to take into account changes in its composition (youth/elderly; gender), new residents (e.g. migrants) and temporary resident perceptions (e.g. tourists). The objectives are to identify cultural layered attachments by surveying invariants in social and collective memory of the past, and tangible and intangible cultural meanings attributed to buildings/objects/places/practices. The proposed methodology to do so foresees (i) recognizing and (ii) exploring shared understanding of the tangible and intangible cultural heritage elements; (iii) creating collective storytelling (iv) collecting images about past developments, actors playing roles for creating a shared framework about identities, memories and heritage, including also individual memories extracted from old postcards, photos.

This Sense of Place specification is relevant for all OLs and should be addressed to OLs Extended Stakeholders to engage wider community representatives.

- **LOCAL CULTURAL HERITAGE AWARENESS**

This specification is addressed to analyse and identify local identities and related social resilience, by highlighting the social impact of cultural heritage. To do so, the proposed methodology foresees (i) surveying the levels and articulations of cultural heritage understandings in the area by (ii) collaborative mapping of the most relevant sites, (iii) questioning the perceived uniqueness of the sites in defining the sense of belonging.

This Sense of Place specification is relevant for all OLs and could be addressed to OLs Extended Stakeholders or Core Stakeholders.

- **COMMUNITY RISK PERCEPTION**

This sense of place specification is addressed at surveying community perception of risk, and community sense of solidarity and neighbourhood in situations at risk. The objectives are to survey risk awareness and increase social resilience. The proposed methodology foresees to (i) question about and (ii) localize memories of past events and emotional attachment to places at risk; (iii) shape memory itineraries and devotional routes; (iv) collect relevant photos and postcards.

This Sense of Place specification is relevant for all OLs and could be addressed to OLs Extended Stakeholders or Core Stakeholders

- **SENSE OF SOLIDARITY TOWARDS VULNERABLE GROUPS**

This specification is addressed at surveying community inclusive/exclusive attitudes, identifying physical and/or socio-cultural barriers and cross-generational issues. Issues of social inclusion, accessibility and multiculturalism will be addressed by the survey. The proposed methodology foresees to question about physical barriers and the sense of otherness, as well as about specific generational vulnerabilities.

This Sense of Place specification is relevant for all OLs. It could be addressed to OLs Extended Stakeholders or Core Stakeholders.

- **GENDER EQUALITY AWARENESS**

While surveying community attitudes in terms of inclusiveness, specific attention should be paid on gender issues. This specification of the Sense of Place aims at surveying gender equality and equal attitudes in the place by leading community members in questioning about gender barriers, discriminations and differences in exposure to risks.

This Sense of Place specification is relevant for all OLs. It should be addressed to OLs Extended Stakeholders.

SURVEYING THE SENSE OF PLACE

The “Sense of the Place” builds on the holistic view of cultural and natural environment with community. It includes some subjective perceptions and feelings. Nevertheless, these individual/collective understandings are based on some specificities of places that can be defined, identified and extracted though participatory activities.
As the place refers to a physical and mental space, the sense of place is due to common understandings/believes/feelings of (i) physical features of a site both natural and resulting from historical layers (geomorphological, topographical, morphological features); (ii) some invariants of the historic area in collective memory due to its origins and historical and cultural developments; (iii) special features on the matter of local risks and past natural disasters.
Activities will survey two main aspects: first it will identify how some invariants and long-lasting collective memories have created a shared understanding of the place in the community; second, it will assess commitment and engagement of community. They will allow community to discuss and shape a shared (physical and mental) image of the place, while sharing awareness, understandings and concerns about their place. It will allow understanding of inhabitants’ feelings about quality of life, health, safety, property related to the place against environmental threats and hazards. It will explore the ways in which Sense of Place is shaped, nurtured and experienced within the context of local community. External contributions also come from temporary residents (such as tourists).
The main objective of this survey will be to identify the effects of the sense of place on community resilience, while identifying the main factors.

Aim	Keywords	Specific Objectives	Methodology	Open Lab/Case study	Target Group (Core Stakeholders CS o Extended Stakeholders ES)
DEVELOPPING ECOSYSTEM DEFINITION AT DIFFERENT SCALES	community-cultural and natural	Identifying the Ecosystem: features and very important	Questioning about genetic and species diversity/peculiarity of: (i) natural features	all	ES

AND URBAN/TERRITORIAL CONTEXTS	environment links	aspects of natural and cultural (urban/regional/ cross-regional) landscapes;	(grounds/plants/animals/ /natural materials for building) Questioning and localizing (ii) physical features (geomorphology topography, morphology) (iii) risks areas		
IDENTIFY HUMAN INTERACTIONS WITH THE ECOSYSTEM BY A TERRITORIAL APPROACH	Relations between community and **natural** landscape; ecosystem function	Defining urban cultural landscape perception in huge contexts. Identifying diversified uses of landscapes, areas, and livelihoods	Shaping forms, signs, symbols about common understanding and visual characterization of natural cultural area.	Regional/cross-regional	ES
IDENTIFY HUMAN INTERACTIONS WITH THE ECOSYSTEM BY AN URBAN APPROACH	Relations between community and **urban** landscape	Defining urban landscapes perception in urban historic areas	Shaping forms, signs, symbols about common understanding and visual characterization of urban (city scale or building-surroundings scale) features.	Building/city	ES
UNPACKING COMMUNITY HISTORICAL AND CURRENT CULTURAL PERCEPTION OF THE PLACE	Ecosystem beginnings, historical fundamental layers, cultural identities and memories, protagonists and heroes, Perception from non-	Identifying cultural layered attachments by surveying invariants in social and collective memory of the past, and tangible and intangible cultural meanings	Tangible and intangible cultural heritage elements recognition and shared understandings. Creating a common storytelling, collecting images about past developments, actors playing leading roles for creating a shared framework about identities, memories and heritage, including individual memories through old postcards, photos…	All	CS/ES

	locals/temporary residents	attributed to buildings/objects / places/practices/			
DEFINING LOCAL CULTURAL HERITAGE AWARENESS	Cultural Heritage Glocal	local identities Social Resilience	Surveying the levels and articulations of cultural heritage' understandings in the area by mapping the most mentioned sites, questioning the perceived uniqueness of the sites in defining the sense of belonging.	All	CS/ES
IDENTIFYING COMMUNITY RISK PERCEPTION AND SENSE OF SOLIDARITY	Natural risks Human behaviours Neighbourhood	Risk awareness and resilience increase	Questioning about and localising memories of past events, emotional attachments to places; shaping memory itineraries, devotional routes; collecting photos, postcards, …	All	ES
TRACING SENSE OF SOLIDARITY TOWARDS VULNERABLE GROUPS	Inclusiveness Physical or socio-cultural barriers Cross-generational issue	Social Inclusion Accessibility Multiculturalism Assessing social resilience Level of associationism	Questioning about physical barriers, and the sense of the "other" as well as specific generational vulnerabilities	Dordrecht OL (All)	CS/ES
PROFILING GENDER EQUALITY AWARENESS	Equal attitudes	Surveying gender perspective in the area	Questioning about gender barriers and gender differences in exposure to risks	Dordrecht OL All	ES

Table 2. Surveying the Sense of Place

4.3 Tools for Local Knowledge and Sense of Place extraction

Tools presented in this section aim to extract above-mentioned aspects of local knowledge and sense of place in a creative and engaging way. The common aspect of these tools is that they are mainly digital tools and they all activate participative processes in a creative and entertaining way ensuring the maximum input from each participant. These tools will be used by two main stakeholder groups that are already defined in the Open Labs Management Plan as 'Core Stakeholders (CS)' and 'Extended Stakeholders (ES)'. The Coordinator Partner of each Open Lab is expected to discuss, evaluate, and select a set of tools that may answer the needs of their Open Labs. This process should consider the specific hazards, the scale, and the objectives of each Open Lab.

- Word Clouds: The main objective of this tool is to provide a first step to highlight some basic keywords. Word clouds help visualization of a text that the more frequently used word appear with a larger font. To use this tool, there are online freely available tools that automatically generates the word cloud. Among them, the most functional ones are https://www.wordclouds.com/, https://worditout.com/. However, any other word cloud tool will also function.

The target group is both CS and ES. The Open Lab Coordinator should assign a responsible to extract the text (can be taken from the Description of Action [DoA] or the coordinator may propose a different text) and generate the word cloud.

A world cloud generated using a small text for Dordrecht from pag 18 of the DoA.

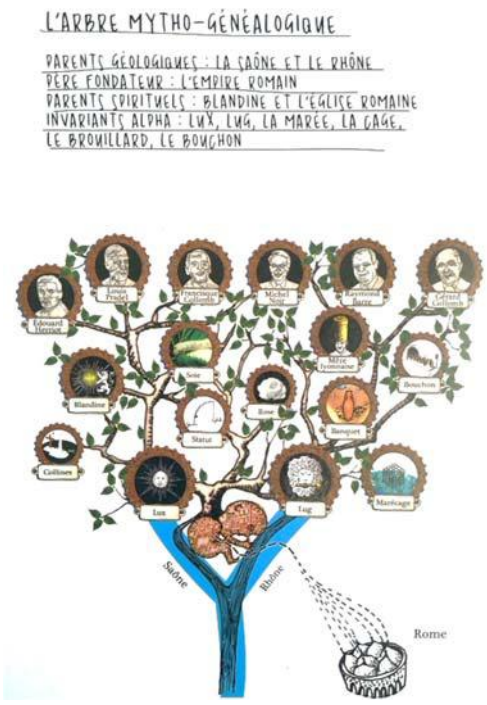
Mental mapping: The main objective of this tool is to present an introductory tool as a first step of more complex tools that are mentioned below. For this tool, participants are given large empty sheets (A0 or A1) and they undertake a "sketch mapping" session following indications from the moderator creating a mental map of their area.

The target group is both CS and ES. A moderator should lead participants guiding what elements to map (i.e. the most significant natural features, the most significant infrastructures, etc.). Proposed time for this session is half-day. The outcome should focus on risks and local information.

Online Survey: The main objective of this tool is to provide an introductory and complementary tool to ask direct questions to participants and have a general idea of their approach. For this tool, a questionnaire/survey should be prepared before the session using one of Online Survey Tools, the most efficient ones are **Survey Monkey, Zoho Survey**, **eSurvey Creator**, **FreeOnlineSurveys**. Participants will use their smart phones or other devices to fill the survey. Each OL coordinator can choice how to deepen the matter through questions according peculiarities and scale of places.

The target group is both CS and ES. A moderator is only needed at the beginning and in the case that participants have questions about the survey itself not to assist with answers. Proposed time for this session is 20 minutes. The final outcome should focus on memories, local understandings and risks.

Genealogical Ecosystem Tree: The objective of this tool is to map and visualize the diverse interaction of environmental and cultural features of the area with a historical perspective. It helps to understand both Sense of Place and Local Knowledge.



An example of a Genealogical Ecosystem Tree of the city of Lyon. Source: Lyon sur Le Divan: Les mpètamorphoses d'une ville. 2017, Lyon History City Museum

This tool can be thought as a Genealogical Tree adapted to buildings, districts, cities, regions, and cross-regional areas. The roots of the tree represent the main natural features (i.e. rivers, mountains, plains, etc.); the trunk represents the founders/first settlers of the area (i.e. the Romans, the Greeks, the counts of Holland, etc.), main branches represent historically or spiritually significant monuments/protagonists/sites, and branches represent the invariable elements that define the character of the city (i.e. the local food, the symbolic elements of the city, etc.). This representation scheme is a suggestion and it can be reconsidered or elaborated according to the needs of the Open Lab.

The target group is both CS and ES. A moderator should lead the session guiding participants and filling an empty genealogy tree template. The proposed time for this tool is a half-day workshop. The outcome should focus on memories and local interactions.

Participatory 3D Digital Modelling: The objective of this tool is to extract Local Knowledge by a collaborative process. To use this tool, a digital topographic 3D model should be prepared beforehand by a responsible who has a high level of expertise with the necessary software. The SketchUp software can be utilized since it has a user-

friendly interface. During the session, the participants should discuss and collectively fill the 3D model by adding natural features (river, lake, etc.), significant public areas (public park, square, etc.), significant buildings (the main church, historic edifices, public services, etc.).

The target group is both CS and ES. There should be two persons to use this tool: a moderator and a software user. A strong computer should be used with projection to make all the participants to follow and simultaneously intervene to process. The proposed time for this tool is a half-day workshop. The outcome should focus on buildings/areas/sites under risk.

Collaborative mapping: The objective of this tool is to extract Local Knowledge by a collaborative process. To use this tool, all participants should have a Google account, and they should co-generate a Google My Map following the instructions of the moderator. The moderator will create layers and then each user will simultaneously add new features inside the layer.

The target group of this tool is CS. During the session, a computer and a projector is needed for active participation and each user should use their own smart phones or computers. The proposed time for this tool is a half-day workshop. The outcome should focus on buildings/areas/sites under risk.

DNA of place and risk: The objective of this tool is to creatively map individual data on perception of the area to extract a collective notion of Local Knowledge. To use this tool, similar to collaborative mapping, each participant should have a Google account, and they should co-generate a Google My Map by uploading individual photographs, videos, songs, texts, etc. georeferencing their own experiences.

The target group of this tool is the CS. During the session, a computer and a projector is needed for active participation and each user should use their own smart phones or computers. The proposed time for this tool is a half-day workshop. The outcome should focus on memories and local information.

Realtime Participative Storytelling: The objective of this tool is to extract Local Knowledge through a creative participative process. To use this tool, participants will form groups of 3-4 people and in each group, participants will design a poster regarding their areas and risks. Each participant will be connected online to the poster making platform and each one will be able to add/remove/change the contents of the poster. The most efficient tools for online poster/board making are **RealTimeBoard**, **Conceptboard**.

The target group of this tool is CS. During the session, participants will use their own smart phones/computers. The proposed time for this tool is a half-day workshop. The outcome should focus on local information and risks.

Story Map: The objective of this tool is to creatively and collaboratively creating a community narrative regarding. Story Map is a tool to communicate a story (optionally georeferenced) following a linear and structured narrative making use of photographs,

videos, songs, texts, etc. in a visually rich and appealing way. To use this tool, participants should form a group of 4-5 participants and each group should have a moderator. The moderator should use the online program Story Map (http://storymap.knightlab.com/) receiving indications the group members. It is important that the moderator is familiar with the tool beforehand.

The target group of this tool is the CS. During the session, each group should have a moderator, and a computer with projection. The proposed time for this tool is a half-day workshop. The outcome should focus on memories and local information.

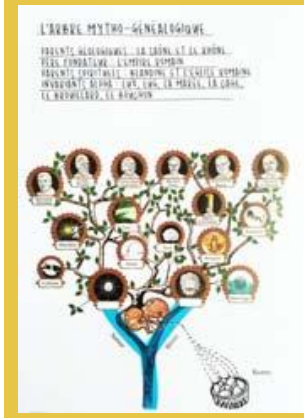
Agent-based Modelling (ABM): The objective of this tool is to visualize and map the interactions between different agents using a computer modelling. The application of Agent-Based Models (ABM) has successfully been used for simulating human complex behavior in general, and in particular within the context of traffic-related decisions. Some scientific publications show the appropriateness of the use of this kind of model to simulate social behavior of drivers[35].

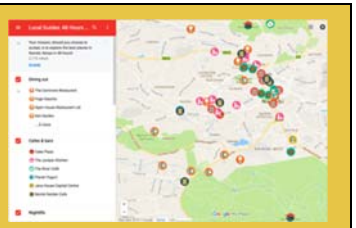
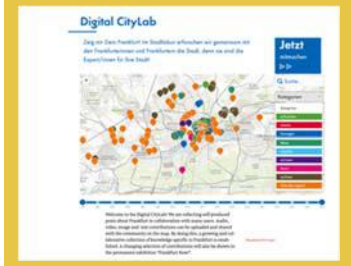
This tool has the capacity to simulate complex behaviors and it enables connection between geographical databases through a Geographic Information System (GIS) extension, fundamental for spatial analysis.

The target group of this tool is both CS and ES. A computer, projection, and Open Source GIS Software (i.e. QGIS) is needed. A moderator is needed to lead the discussions and use the software. Proposed time for this tool is preferably a full day.

[35] Eric Bonabeau, (2002) “Agent-based modeling: Methods and techniques for simulating human systems”, Proceedings of the National Academy of Sciences May 2002, 99 (3), pp. 7280-7287.

TOOLS ANALYSES FOR THE SENSE OF PLACE AND LOCAL KNOWLEDGE								
Tool	**Specific Objectives**	**Description**	**Target Group**	**Materials**	**Moderator**	**Proposed Time**	**Keywords to Extract**	**Samples**
WORD CLOUD	introductory tool as a first step of more complex following process	The online wordcloud tool (WordArt.com) to highlight mostly used words. These words will be used as the first step before utilizing other tools.	CS ES	A strong dictation tool, Online wordcloud generator.	No moderator is needed but a responsible to run the equipment.	1 hour	Risks	
MENTAL MAPPING	introductory tool as a first step of more complex following process	Participants are given A0 or A1 black papers. They make a “sketch mapping” by following the moderator. Participants can be divided to groups.	CS ES	Empty A0 or A1 sheets. Colour pens.	Moderator will only ask the questions.	2 hour	Local understandings	
ONLINE SURVEY	an introductory tool as a first step of more complex tools	A questionnaire /survey should be prepared before the session Online Survey Tools, the most efficient ones are **Survey**	CS ES	Personal devices (smart phones or computers)	Moderator is needed only for initiating and finishing	20 minutes	Memories Local understandings Risks.	

		Monkey, **Zoho Survey**, **eSurvey Creator**, **FreeOnlineSurveys**.			the session.			
GENEOLOGICAL ECOSYSTEM TREE	mapping diversity of environmental and cultural diversity	Participants will create genealogical tree for their areas. A moderator will lead. The tree will consist of: • Natural features • Founders/first settlers • Characteristic elements • Invariables	CS ES	the template of the genealogical place tree	Moderator will lead discussions and fill in the empty template.	Half-day workshop	Memories Local understandings	
PARTICIPATORY 3D DIGITAL MODELLING	Local Knowledge extraction	Participants will indicate physical features of their area on a digital 3D topography. A moderator will lead the session, and another person will use software on projection.	CS ES	A strong computer with SketchUp, projector.	Moderator 1 will lead the discussions, Moderator 2 will use the software.	Half-day	Main features of the area Relationship with nature	

COLLABORATIVE MAPPING	Local Knowledge extraction	Participants create Google account to collaboratively create a Google MyMap. The moderator creates layers and then each user simultaneously map their own features inside layers.	CS	A computer and projector. Participants can use their own smartphones/ tablets/ computers or create groups.	Moderator will guide discussions, create layers and be the owner of the map.	Half-day	Areas of risk	
DNA OF PLACE AND RISK	creative mapping of individual and collective local data and perceptions	Participants create Google account to collaboratively create a Google MyMap. Each individual upload their own visuals (photo, video, text, song, etc.)	CS ES	A computer and projector. Participants can use their own smartphones/ tablets/ computers or create groups.	Moderator will only ask the questions.	Half-day day	Memories Local information	
REALTIME PARTICIPATIVE STORYTELLING	Local Knowledge extraction	Participants will design a poster regarding their areas and risks being connected online to the poster making platform The most efficient tools for online poster/board	CS	Participants will use their own smartphones/ tablets/ computers	Moderator is needed to start the discussions.	Half-day	Local Information Risks	

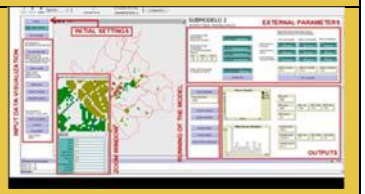
		making are **RealTimeBoard**, **Conceptboard**.						
STORY MAP	creating community narratives	Participants form groups. Each group has a moderator, and they create narratives using Story Map software. The narratives are based on events and places.	CS ES	A computer and projector for each group.	Moderator will guide discussions and use the software.	Half-day	Memories Local information	
AGENT-BASED MODELLING	Method of computational modelling that simulate interactions among AGENTS with the purpose of viewing the effects on the system as a whole.	It enables simple connection with geographical databases through a Geographic Information System (GIS) extension, fundamental for spatial analysis.	CS ES	Computer, projector, Software Open GIS	Moderator will guide discussions and use the software.	Half-day		

Table3. Tools Analyses for The Sense of Place And Local Knowledge

4.4 Methodologies and tools for Peer learning, awareness and capacity building

Here below we present methodologies that we have identified as suitable for ensuring Peer to Peer Learning between the stakeholders, project partners and possibly broader communities of the different Open Labs.

Peer learning methodologies are often tailored for an educational context, in which the peers are actual students enrolled in a study program. The methodologies presented below are selected on experience with professionals and practitioners, applicability in different contexts and independence of organizational structures. Peer learning can have a multitude of objectives, in the tables presented below we focus on four categories: (1) knowledge exchange, (2) knowledge generation, (3) knowledge assessment and (4) (joint) problem solving. In the first category peers share knowledge with each other that one of them already haves, while in the second category new knowledge is generated by the work and discussions between peers. In the third category the value of knowledge (often of a third external party) is assessed for a particular context or situation. Finally, in the fourth category all available knowledge is being used to address an issue that one or both of the peers are dealing with. In every peer learning process, independent of its objective, the mutual trust between peers is essential to voice and respect different perspectives and therefore for the quality of the outcomes. This trust can be created by introducing interdependence between peers, by joint activities or other types of engagement.

Tools presented in this section aim to facilitate trust and learning between peers. The selected tools can be used to create consensus or to facilitate focused and in-depth discussions, depending on the learning objective. The online tools listed in the table below have additional value. Online discussions are less confrontational than offline discussions, because they provide the participants with extra time to consider arguments. Online contact between peers is especially relevant in the context of the SHELTER Open Labs, because it can bridge physical distances. Although the tools described here are specifically selected to facilitate the peer learning process, many of them can serve multiple purposes. These tools will reinforce, and at some point partially overlap, the tools and instruments that will be used for capacity building within the Open Lab communities, described in D9.2. The selection for this table was made based on the expected fit of the selected tool with the five Open Lab communities and their learning objectives.

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ENSURING PEER TO PEER LEARNING					
Aim	Keywords	Specific Objectives	Description	Open Lab/Case study	Target Group (Core Stakeholders CS o Extended Stakeholders ES)
Knowledge exchange	Directional interaction (senior-junior)	Peer tutoring, - modelling, - monitoring or - assessment	**Peer Assisted Learning (PAL):** one OL helps another or a limited number of other OLs on specific tasks	All	CG, (EG in expert role)
Knowledge exchange	Healthy competition, Engagement	Interdependence, Individual responsibility	**Teams-Games-Tournaments:** combines cooperation within the team (OL or thematic overarching) with competition between teams	All, provided that the peers are well-matched	CG
Generation of knowledge	Positive interdependence, Engagement	Collective learning, Mutual trust, Individual accountability	**Jigsaw**: two types of grouping; first OLs are in heterogeneous teams and then reshuffled in thematic groups	All, provided that the peers are well-matched	CG, (EG in expert role)
Generation of knowledge	Engagement, joint activity	Interdependence, Individual responsibility	**Group Investigation:** teams work on sub-themes to investigate a common goal	All, provided that the peers are well-matched	CG, (EG in expert role)

Generation and exchange of knowledge	Cooperative learning, communicate forward	Positive Interdependence, Individual Accountability and Personal Responsibility	**Learning Together (joint action):** OL work in small groups on a task that includes a joint product like a team presentation/report	All	CG
Knowledge exchange and assessment	Joint reflection	View from different perspectives, purging of experiences and knowledge	**Constructive Controversy:** discuss, argue and refute counter arguments, reverse perspectives, agree on the best reasoning.	All, provided that the peers are well-matched	CG
Knowledge assessment	Engagement, joint activity	Build trust, assess experiences and knowledge between partners	**Complex Instruction:** Groups rotate tasks and stations to understand the concept from different perspectives, media and modes.	All, provided that the peers are well-matched	CG
Problem solving	Joint activity, communicate forward	Joint problem solving, share best practices	**Reciprocal Teaching:** Cognitive functions / mental operations for problem solving are transformed into team roles	All	CG, (EG in expert role)

Table 4. Ensuring Peer to Peer Learning

TOOLS ANALYSES FOR PEER LEARNING

Tool	Specific Objectives	Description	Target Group	Materials	Moderator	Proposed Time	Keywords to Extract	Samples
Large group meetings	Create consensus	The meeting needs to have (1) a clear purpose, (2) give correct and the right information so that participants make informed decisions, and (3) structure processes to support activities that must take place (i.e. agenda)	CS+ES	Meeting room, computer, beamer (conference speaker)	Yes	Half-day workshop		
Small group meetings	Focussed and in-depth discussions	This type of meeting is smaller and therefore in addition to above: everyone in the group needs to be heard, and no one to dominate. The atmosphere must be open where nobody is judged or criticized beforehand.	CS / ES (thematically)	Meeting room	Preferred, but not necessary	between 2 and 8 hrs		

Blog writing & commenting	Extra time to consider arguments	Choose a topic, create a attractive headline. Draft the body in a single session or gradually per paragraph. Explain or avoid complex topics and keep it attractive by adding images	CS (& ES if appropriate)	Online collaboration tool	Yes	Online, no physical meeting needed		
Online networking	Easy contact: bridge physical distances	Share relevant and interesting content, and actively ask questions and comment on people in your online (social) network. However, keep in mind that online networking always needs to go parallel with physical meetings.	CS (& ES if appropriate)	Online collaboration tool	No	Online, no physical meeting needed		
Peer-produce assessment products (i.e. review templates)	Create consensus on boundary conditions of project outcomes	Collectively established boundary conditions and standards to review the project outcomes	CS	Meeting room	Preferred, but not necessary	Half-day workshop		

Peer-produce knowledge products	Generate knowledge and even out knowledge level between partners	Knowledge products can range from papers, to manuals and reports. It is important that they are always collectively developed and checked by other peers in a peer-review process.	CS / ES (thematically)	Meeting room, online collaboration tool (preferably)	Preferred, but not necessary	Combination of meetings (2hrs/meeting) and online collaboration		
Discuss externally produced knowledge	Even out knowledge level between partners and create consensus	Collectively assess the available knowledge outside the project, and review together the quality and relevance for the OL.	CS / ES (thematically)	Meeting room, externally produced relevant knowledge	Preferred, but not necessary	Half-day workshop		
Paired engagement	Thematic, in depth exchange of knowledge and experience.	With a shared interest or concern on a specific theme, two peers are paired to share problems, exchange views, understand their different viewpoints or mentor one another. This twinning partnership can bring many benefits to both of the participants.	CS	Well-matched OL pairs	Yes, only at the start	Depending on the context. starts at 1 hr, could also be 'ongoing'		
Multi-peer self-	Create trust and level knowledge	Reflect and assess produced project outcomes in a group of peers	CS	Project outcomes produced by partners	Yes	Depending on the context. starts at 2 hrs, could also be 'ongoing'		

assessment	level and expectations between partners							
Joint peer activities	Create trust and generate (shared) experiences	Activities that support the joint generation of knowledge through practical activities.	CS (& ES if appropriate)	Transport, 'local leader'	No	between 2 and 8 hrs		
Site visits	Share experience and create consensus	The site visits are hosted by the executers of the specific projects, and a guide will be arranged which is an expert for the site itself. Safety will always be the number one priority in site visits.	CS (& ES if appropriate)	Transport, Guide	No, a guide is needed	between 2 and 8 hrs		
Formal training sessions	Raise knowledge level and share experience	The trainer is an expert in the topic of the session, and has both the required knowledge and didactical skills to effectively disseminate his experience.	CS / ES (thematically)	Trainer, meeting room	Yes	between 2 and 8 hrs		

Table 5. Tools Analysis for Peer Learning

5 From Local Knowledge information to Local Knowledge datasets

All the tools that are introduced for Local Knowledge extraction in Open Labs are digital tools. Utilizing digital tools, in addition to engaging participants in a very creative way ensuring active participation with maximum input, is very beneficial also to transfer Local Knowledge to various data formats that can easily be stored and accessed in datasets. Each tool produces a digital product, therefore Local Knowledge becomes converted to a dataset that can directly be stored in the Data Lake Model without the need of a second step for complex conversion. Moreover, some of the tools, such as Word Cloud, can also be utilized to define metadata of these digital products.

6 Refining and updating the Methodology for Local Knowledge co-generation after collaborative implementation in Open Labs

The presented methodology will be updated after testing and collaborative implementation in Open Labs, in connection with D9.2 and overall WP7. OL Coordinators and other representatives have been involved at methodology design stage, by providing feedbacks and by contributing in identification of most suitable methodologies and activities for Local Knowledge and Sense of Place elements extraction. Beside this, the testing on field and the engagement of wider community representatives will represent a valuable opportunity for refining the overall methodology. Insights from implementation will be taken into consideration for the development of D2.3 “Anatomy of Historic Areas”, in strictly connection with this report.

7 Conclusions

By providing the methodologies for building the Local Knowledge and the Sense of Place in HA piloting the SHELTER approach to Sustainable Reconstruction of Historic Environments, the present report contributes to the SHELTER Project theoretical and practical methodological framework. In this context it shapes the methodologies and tools for the extraction of informal knowledge, through peer learning and capacity building, in a range of Historic Areas characterised by cultural natural heritage. Building on existing definitions, it contributes to extend the informal knowledge definition for learning by the variety of historic environments to be surveyed at different scales. According to the holistic approach of SHELTER Project, both territorial and urban, it makes available coherent methodologies to the five Open Labs for exploring, identifying, gathering, and building community-based resilience against natural disasters.

From one hand, the report enriches and specifies the concept of Local Knowledge, Sense of Place and Peer Learning approach, building on the state of the art for introducing a new holistic perspective of the connection between cultural and natural environments with communities. It specifically addresses those concepts on the matter of both territorial and urban Historic Areas and their resilience against climate change and natural hazards such as earthquakes, storms, floods, heatwaves, wildfire and subsidence. While Local Knowledge definitions and identifications have been focused on the interactions of societies with their natural surroundings (UNESCO), this report integrates recent experiences in urban contexts and a field of local formal knowledge locally produced, stored and not accessible through a global approach. The outcome, finally, outlines a broader notion of Local Knowledge as the human capital of all local communities. New definitions and identifications as well as related methodologies for learning by Historic Environments result accordingly, applicable to both rural and urban communities from the scale of architecture surroundings, to cities, to regional area, to cross-regional areas. It also includes gender, ages and vulnerable people perspectives in better defining a ‘Sense of Place’.

The provided methodologies also introduce a time perspective. By the literature, this informal knowledge is integral to a cultural complex that also encompasses language, systems of classification, resource use practices and social interactions, it passed down from generation to generation and it adapted continuously to a gradually changing environment. In addition, the methodologies made available by this report take into account changes in times in perception of places of a community, and the diverse perception of new (e.g. migrants) and temporary (e.g. tourists) residents.

On the other hand, the report delivers a set of innovative methodologies with tools targeted to Open Labs specification, objectives and hazard exposure. Capitalizing on the most effective collaborative methodologies and tools for gathering informal knowledge from local communities, a highly adaptive methodology has been designed and presented for Core stakeholders and/or Extended stakeholders of each Open Lab. It includes a set of face to face activities (survey and open discussions) and tools for Local Knowledge and Sense of Place extraction – in digital format – and for Peer Learning and

Capacity Building activities to be used during Open Lab workshops under the mediation of the coordinator. The digital format will allow digital results data to easily be transferred into the Data Lake. Moreover, some of the tools allow the definition of metadata for the datasets. The tools and activities have been articulated and diversified specifically addressing historic areas specificities. By suggesting to local communities to identify the most appropriate combination of activities and tools, it is highly adaptive to local specificities and replicable to different context.

The provided methodologies and its framework will be refined and updated according to implementation results.

8 References

Alan J. Wood, et al. (2010) "Informal knowledge processes: the underpinning for sustainability outcomes in EIA?." *Journal of Cleaner Production.* 18(1), pp. 6-13

Andreas Werr, Torbjörn Stjernberg (2003), ‘‘Exploring management consulting firms as knowledge systems’’, *Organization Studies*, 24 (6), pp. 881-908

Anne Buttimer, David Seamon (eds.) (1980). *The human experience of space and place.* London: Routledge

B.T. Hanyani-Mlambo & Paul Hebinck, (1996) "Formal and informal knowledge networks in conservation forestry in Zimbabwe." *Indigenous Knowledge and Development Monitor,* 4(3), pp. 3-7.

Christina Kreps (2013) *Liberating culture: Cross-cultural perspectives on museums, curation and heritage preservation*, Routledge.

Clarke A. Chambers (1984), “The "New" Social History, Local History, and Community Empowerment”, *Minnesota History* 49, pp.14-18.

Department Of Economic And Social Affairs Division for Social Policy and Development Secretariat of the Permanent Forum on Indigenous Issues (2005), *International Workshop On Traditional Knowledge.*

Douglas Nakashima (2001), “Local and Indigenous Knowledge Systems (LINKS) in the context of a Global Society” In *Science and Tradition: Roots and Wings for Development.* Brussel: Académie royale des sciences d'outre-mer. pp 167-172.

Eric Bonabeau, (2002) “Agent-based modeling: Methods and techniques for simulating human systems”, *Proceedings of the National Academy of Sciences May 2002*, 99 (3), pp. 7280-7287.

Eric J Hobsbawn, (1971). “From Social History to the History of Society”, *Daedalus,* 100 (1) pp.20-45.

FAO (2004). *Building on Gender, Agrobiodiversity and Local Knowledge: A Training Manual*.

FAO (2005). *Building on Gender, Agrobiodiversity and Local Knowledge: A Training Manual*. http://www.fao.org/3/a-y5956e.pdf

Hilary Warburton, Adrienne Martin. (1999). *Local people's knowledge in natural resources research*. Chatham: Natural Resources Institute.

International Strategy for Disaster Reduction (ISDR). (2008) *Indigenous Knowledge for Disaster Risk Reduction: Good Practices and Lessons Learned from experiences in the Asia-Pacific Region*. Retrieved from https://www.unisdr.org/files/3646_IndigenousKnowledgeDRR.pdf

International Union for Conservation of Nature (IUCN) (2013) *Cultural and Spiritual Values of Protected Areas*. Retrieved from https://www.iucn.org/commissions/world-commission-protected-areas/our-work/cultural-and-spiritual-values-protected-areas

Jan Gerchow, “How To Become A Relevant Place In The City? The New Historical Museum Frankfurt” In Jelena Savic (ed.), (2019). *The Future of Museum of Cities, Book of proceedings. CAMOC Annual Conference 2018.* CAMOC & ICOM. pp. 88-94.

Jelena Savic (ed.), (2019). *The Future of Museum of Cities, Book of proceedings. CAMOC Annual Conference 2018.* CAMOC & ICOM.

John A. Agnew. (1987) *Place and Politics: The Geographical Mediation of State and Society.* Routledge.

Katharina Böttger, Erica De Abreu Gonçalves, “Frankfurt there, now and digital: participation and citizenship at the historical museum of Frankfurt”. Retrieved at https://ler.letras.up.pt/uploads/ficheiros/17493.pdf.

Michael A. Williams (1996). *Researching local history: the human journey*. London: Routledge.

Nicola Dempsey, Mel Burton (2012) “Defining place-keeping: The long-term management of public spaces”, *Urban Forestry & Urban Greening*, 11 (1), pp.11-20.

Nina Simon, (2010), *The participatory museum*, Museum 2.0.

Pernilla Malmer (2017) *International Exchange Meeting for Mobilisation of Indigenous and Local Knowledge for Community and Ecosystem Wellbeing.* Stockholm Resilience Centre. Retrieved from http://swed.bio/wp-content/uploads/2017/05/Walking-Workshop-Report-Hin-Lad-Nai.pdf

Pierre Goubert (1971) “Historical Studies Today”. *Daedalus* 100 (1) pp. 113-127.

Renato BOCCHI, L’architettura come spazio mentale costruito, in Juhani Pallasmaa, Lampi di pensiero. Fenomenologia della percezione in architettura, pp. 191-198 Bologna 2011

Sirje Virkus. (2012) *Knowledge Sharing Systems*, Tallinn University, Institute of Information Studies. Retrieved from https://www.tlu.ee/~sirvir/Information%20and%20Knowledge%20Management/Knowledge%20Sharing%20Systems/index.html

SCO & ICSU (1999) *‘Science and Other Systems of Knowledge’*, *World Conference on Science* ,*Budapest*

Tim Cresswell. (2015). *Place: An Introduction.* Wiley Blackwell.

UNESCO (2013) A*ustralia ICOMOS Charter for Places of Cultural Significance, The Burra Charter, 2013 (Burra Charter)*

UNESCO (2017) *UNESCO’s Local and Indigenous Knowledge Systems Programme (LINKS) Local Knowledge Global Goals.* Retrieved from http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/pdf/ILK_ex_publication_E.pdf

UNESCO (2018) *UNESCO Policy document on Engaging with Indigenous People*. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000262748

UNESCO (2019) *Local and Indigenous Knowledge Systems (LINKS).* Retrieved from http://www.unesco.org/new/en/natural-sciences/priority-areas/links/related-information/what-is-local-and-indigenous-knowledge/

UNESCO World Heritage Centre (1996) *Information Document Glossary of World Heritage Terms*, Merida, Yucatan, Mexico 2-7 December 1996

Venessa Masterson, et al. (2017) "The contribution of sense of place to social-ecological systems research: a review and research agenda." *Ecology and Society,* 22 (1) pp.49-63.

Yi-Fu Tuan (1974) *Topophilia: a Study of Environmental Perception, Attitudes, and Values.* Columbia University Press.

Yi-Fu Tuan (1977). *Space and Place: The perspective of experience*. University of Minnesota Press.