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Abstract

The following report provides information about the activities on standardisation that the RESILOC Project has achieved. The activities include the completion of a joined European Committee for Standardisation Workshop Agreement (CWA) with two other European research projects and the preparation of four project related items/focus areas with the potential to be standardised. Moreover, the report describes the actions taken by the dissemination/standardisation WP of RESILOC to harmonise and mainstream these items to increase their impact and contribution to the project's sustainability.

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VI. List of Acronyms

Acronym	Meaning
ARCH	Advancing Resilience of Historic Areas against Climate Change
CCA	Climate Change Adaptation
CEN	Comité Européen de Normalisation (European Committee for Standardisation)
CERIS	Community for European Research and Innovation for Security
CMINE	Crisis Management Innovation Network
CoE	Council of Europe
CoU	Community of Users
CWA	CEN Workshop Agreement
DG Home	EC Directorate-General for Migration and Home Affairs
DIN	Deutsches Institut für Normung (German National Standardisation Body)
DoA	Description of Action
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DRS-01	EU Research Call: Disaster Resilient Societies 01
GA	Grant Agreement
JRC	Joined Research Centre
Risk SoS	Risk Perception and Behaviour Survey of Surveyors
RTG	RESILOC Trial Guidance
S4S	Stair for Security
SHELTER	Sustainable Historic Environments hoListic reconstruction through Technological Enhancement and community-based Resilience
STRATEGY	Facilitating EU pre-Standardisation process through streamlining and vAlidating inTeroperability in systems and procEdures involved in the crisis management cYcle
T	Task
TGM	Trial Guidance Methodology (DRIVER+)
UCPKN	Union Civil Protection Knowledge Network
WP	Work Package

The terminology used within this report is defined within the Base and Project Glossaries¹. The terms and phrases used within this document have the meanings described by the glossary unless explicitly described otherwise in the relevant text.

¹ <https://www.resilocproject.eu/publication/>



1 Executive Summary

Standardisation is part of the project's overall ambition to create impact. Together with communication, dissemination and exploitation, standardisation contributes to the project Objective 5. The initial contributions were limited to starting a CEN Workshop Agreement (CWA) on Terminology and the Resilience Indicators / Dimensions.

The project was not resourced to complete a pre-standardisation action on its own, which is why it collaborates with strategic partners to complete the task. In line with the strategic partnerships, the project completed a joined CWA with two other projects: ARCH (GA 820999) and SHELTER (GA 821282).

The CWA 17727:2022 City Resilience Development - Guide to combine disaster risk management and climate change adaptation - Historic areas was completed and published in October 2022. The CWA includes two key elements from the RESILOC project: (i) the use of indicators to operationalise local resilience, and (ii) the application of organised stakeholder involvement using Local Resilience Teams (LRTs) as proposed standards for assessing and improving community resilience.

Beyond the contractual obligation, the project identified four project-specific focus areas in which dedicated work towards pre-standardisation (harmonisation) was accomplished with the support of selected strategic partnerships during the project's lifetime. These focus areas include i) the RESILOC assessment procedure on community resilience (participative approach), ii) the coordination of terminology used (shared terminology), iii) the assessment of risk perception and adaptive behaviour, and iv) the RESILOC Trial Guidance Methodology.

They are considered as interesting, however not yet mature enough to be integrated in a CWA. Moreover, the selected focus areas have a clear relation to assessment and improvement of community resilience but may also become building blocks for standardisation in other EU projects and additional standards. To facilitate the transition into further standardisation efforts, related conclusions, recommendations and an outlook are provided at the end of each sub chapter on a focus area in this report.

Guidelines for the local resilience assessment procedure are expected to be published in early 2023. The Project will also provide a separate guidance on how to form LRTs and support them to success.

The terminology that was used in the project was synchronised with the other research projects in the DRS01 Cluster and escalated to higher institutional work of developing a shared terminology at EU and UNDRR Level. The work will be sustained beyond lifetime of the RESILOC project. The RAN will continue the alignment with UNDRR and the DRMKC.

The harmonisation and research cooperation for the assessment of risk perception and behaviour has been anchored in a DRS01 focus group which works in cooperation with the Risk SoS research group. This group works towards a harmonised catalogue of questions for assessing the risk perception and behaviour. RESILOC led the DRS-01 focus group and hosted an international conference on the subject. The project has developed a model and a survey that links adaptive behaviour and community resilience in the case of flooding.

The RESILOC Trial design (D5.4) proved that the Trial Guidance Methodology (TGM) required a substantial adjustment to become useful for trialling strategic tools. The Resiloc Trial Guidance (Trial Script) has achieved this and was successfully applied four trials and an impact case. This Guidance could be of value to other research and innovation actions at the EU-level.



2 Introduction

The RESILOC project proposed to include standardisation activities as a contribution to the project's impact and sustainability. It was initially planned to 'start a CEN Workshop Agreement (CWA)', as the singular outcome of its standardisation efforts.

During the project, it became evident that use of the limited resources towards "starting a CWA" was unlikely to provide the best possible contribution to the project's overall impact. Standards such as ISO or CEN can have a significant impact but can be difficult to influence within the limited time and resources. Particularly so when the project contains agile parts.

The process of assessing community resilience would benefit much from being standardised as it increases the potential for cross-fertilisation and exchange amongst communities as well as the aggregation of local data at regional/national level. Common resilience Indicators and a shared Terminology are important items to achieve more harmonisation. At the same time the diversity and preferences at the community level suggested to primarily focus on gaining acceptance for the core elements of the assessment amongst users.

To support this approach RESILOC decided to divert from the initial plan to have focus only on a CWA but also to isolate elements with standardisation potential and to prepare them for future standardisation efforts as well. This approach is not seen as a substitute for the initial objective of starting a CWA but rather adjustment of its focus to also include items that are relevant to the larger research community whilst being too immature to go into a formal pre-standardisation process yet.

This decision was made in correspondence with the REA through the Project Officer, based on the understanding that CWAs require sufficient resources and respective skills to build up the forward-looking big picture of standardisation. With no national standardisation body being represented in the RESILOC Consortium, it became unlikely that this path of pre-standardisation could have been more effective than one that can be combined with dissemination, communication and inter-project cooperation.

It was therefore decided to contribute as a non-leading partner to a joined CWA with other European research projects that provide the required resources. In this CWA RESILOC successfully contributed to two of its core elements i) the operationalisation of community resilience using resilience indicators ii) organising stakeholder engagement using LRTs. The achievement of finalising the CWA are described in [Chapter 6](#) of this report.

With a joined CWA and the co-produced items for future pre-standardisation the Project's standardisation strategy was effectively extended. It primarily aims to utilise the most appropriate channels of collaboration with other researchers and the end-user level to promote the acceptance of the multiple RESILOC practices for the assessment of community resilience with the long-term goal of developing a common European approach.

This report describes the items identified and the efforts applied to contribute most effectively towards impact through standardisation with the resources made available to the project in [Chapter 7-8](#).

3 Standardisation in RESILOC

3.1 General Approach

Standardisation activities in RESILOC are integrated into WP8 which captures Dissemination, Standardisation and Exploitation activities towards the uptake of the project's output results and to support project sustainability beyond its lifetime.

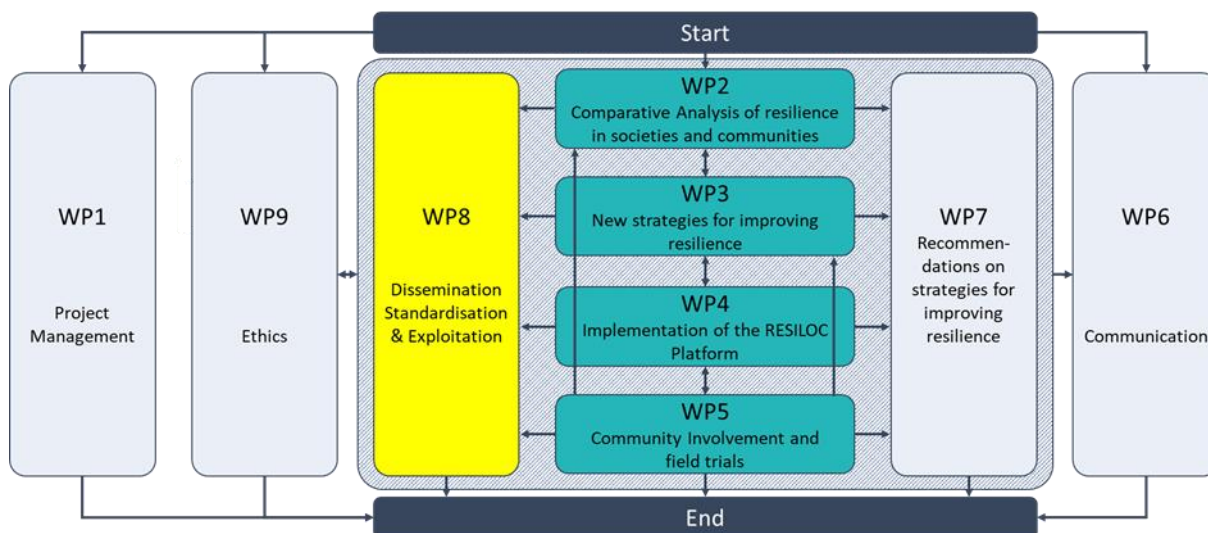


Figure 1 RESILOC PERT Chart

Within this as a general ambition, Standardisation follows a specific set of objectives to:

- Contribute towards a better understanding of local community resilience and establishing a pan-European approach to assess community resilience.
- Increase the impact of the RESILOC outputs and improve the positioning of its innovations in the field of local resilience assessments.

3.2 Standardisation Strategy

In order to contribute towards a common understanding of local resilience and to examine a generally accepted method of assessing it, researchers, as well as users, need to agree on a certain procedure and terminology. Efforts of pre-standardization are required to achieve this and it needs to be thought beyond a single project and its outputs. A collaborative effort of communities and strategic partners from research and innovation organisations is required to harmonise actions and needs that are currently expressed around local resilience. RESILOC alone as a project, was committed to contribute to the development of a pre-standard for an end-to-end process of resilience assessments. The RESILOC standardisation strategy was built upon the following sequence:

1. Identification of project-specific focus areas with relevance to pre-standardisation
2. Identification of strategic partnerships from science, the user level and the institutional level to multiply and accelerate standardisation effort in these focus areas
3. Identification of existing standards and pre-standardisation efforts to position the RESILOC focus areas within existing gaps
4. Use of dissemination activities to achieve the highest impact in gaining acceptance for the identified focus areas of the RESILOC community resilience assessments.

3.3 Impact and outcome

RESILOC wanted to achieve the most beneficial and practical **impacts** for the objectives articulated in [Section 3.1](#). However, it is important to mention that this had to be achieved within a constrained budget and with no standardisation body in the consortium. RESILOC was motivated to reach an accepted baseline for future standardisation activities. The actual impact and validation of this work was generated through the dissemination of the outputs from the focus areas on standardisation described in [section 7](#). RESILOC also included the experience from its framework into an ongoing standardisation effort (CWA) which was completed during the project’s lifetime.

The RESILOC Objective 5 states ‘Have an impact and define concrete steps towards a more resilient society’. Standardisation is expected to contribute directly to this. The impact will have to be delivered in the most appropriated combination of resources within the entire Work Package which contains three major Blocks:

Table 1 WP8 Tasks

Block	Task	Description
1) Dissemination	T8.1	Dissemination Plan
	T8.2	Dissemination Campaigns
	T8.3	Dissemination Events
2) Exploitation	T8.4	Exploitation & Business Plan
	T8.5	Benefits to the Society
3) Standardisation	T8.6	Standardisation

In combination with communication to policy makers and stakeholders (managed through WP6), the proposal foresaw these three blocks being the main drivers of project-related impact². The WP Lead and Task owners defined the degree to which the four individual drivers should contribute to the overall impact of the project at a meeting in Rome on 30 September 2021. Standardisation provides its contribution in line with the budget provided yet any type of pre-standardising activity, is uplifted by either Communication, Dissemination or Exploitation to gain acceptance with the stakeholders before becoming a standard.

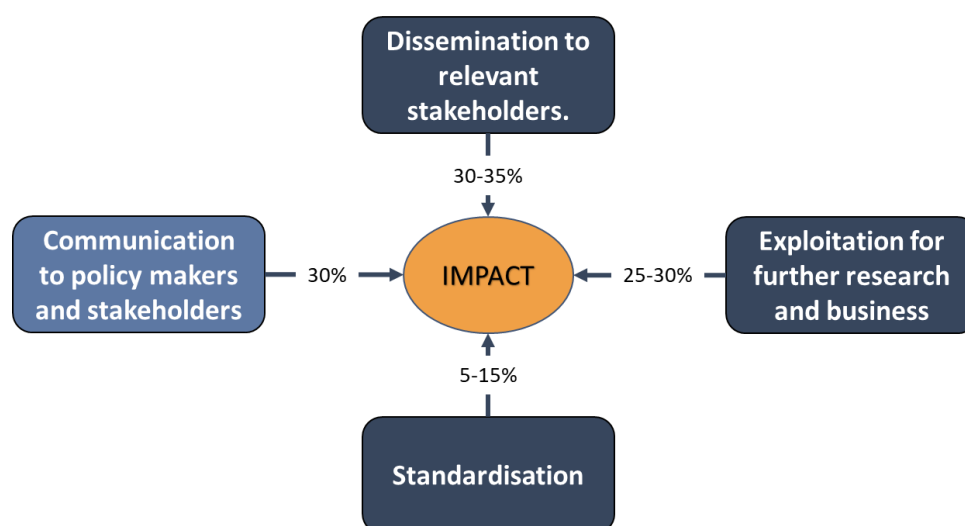


Figure 2 Drivers of Impact in RESILOC

² RESILOC DoA (Ref. Ares(2021)7720849 - 14/12/2021), Part B Section 1.3.1.3, p. 25

3.4 Reference to the strategy proposed in the GA

As described in the [introduction](#), the strategy and focus of the standardisation activity were adjusted according to the needs and knowledge gained during the first year of the project. The objective and contractual obligations, however, remained unchanged. The following adjustments are stated to provide reference to the current strategy over the initial segment within the GA:

- The objective of standardisation in RESILOC remains unchanged.
- Central goal remains to contribute to the project’s impact.
- The CWA was completed alongside the European research projects ARCH (GA 820999), as the lead project and SHELTER (GA 821282).
- CEN/ISO will remain a target group to the project’s dissemination activities with policymakers, scientists and the users being considered more relevant to reach the acceptance of a harmonised approach to assessing local resilience.
- The definition of Indices (Resilience Dimensions), the Resilience Indicators and the “resilience cube” (indicator matrix) remain important, yet will be embedded in the entire process of the assessment for which guidelines need to be produced.
- The identification of indicators for different resilience dimensions of a community remains central. The social dimension is providing the highest demand of harmonisation for the methods used to collect data on risk perception and adaptive behaviour.
- The definition of terms remains a central element with the focus shifting towards an institutional uptake from the Union Civil Protection Knowledge Network (UCPKN).
- The definition of project-specific focus areas is partially covering aspects from the GA and partially adding new elements from other research projects.

Figure 3 below illustrates the adjustments made to complement the planned pre-standardisation by shifting the focus towards user acceptance and harmonisation within the EU Environment including four focus areas for future standardisation.

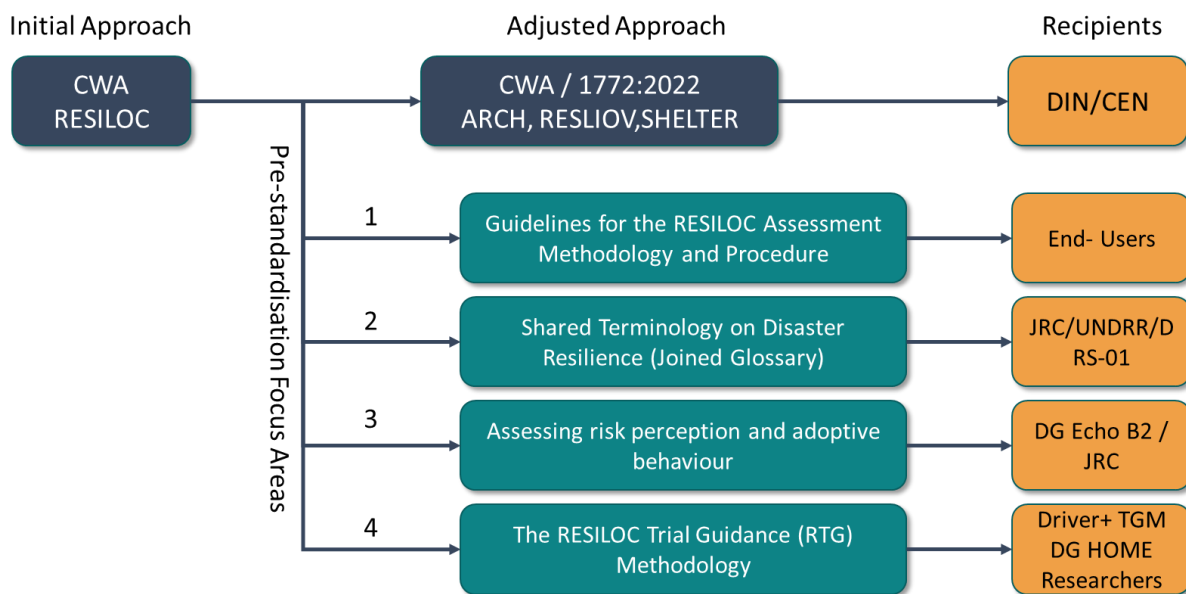


Figure 3 Adjusted approach on RESILOC Standardisation

4 Strategic Partnerships

To escalate the identified focus areas for standardisation (see Figure 3 above) to an impact generating level, the following strategic partners were selected and confirmed:

Table 2 Strategic partners for standardisation

Category	Partner	Topic / Function
Research and Innovation	BuildERS (GA 833496)	DRS01 Partner – coordinated research within DRS-01 Focus Group on risk awareness and behaviour
	ENGAGE (GA 882850)	DRS01 Partner – coordinated research within DRS-01 Focus Group on risk awareness and behaviour
	LINKS (GA 883490)	DRS01 Partner – coordinated research within DRS-01 Focus Group on risk awareness and behaviour
	RISK PACC (GA101019707)	DRS01 Partner – coordinated research within DRS-01 Focus Group on risk awareness and behaviour
	CORE (GA 101021746)	DRS01 Partner – coordinated research within DRS-01 Focus Group on risk awareness and behaviour
	ARCH (GA 820999),	Joined standardisation Efforts in CEN Workshop agreement on Indicators for community resilience and natural disasters
	SHELTER (GA 821282)	Joined standardisation Efforts in CEN Workshop agreement on Indicators for community resilience and natural disasters
	SmartResilience (GA 700621)	Members of the Advisory Board. Contribution of resilience indicators.
	Zurich Flood Alliance	Member of the RESILOC Advisory Board Contributions towards Local community assessment procedures
	STRATEGY (GA 883520)	Integrating RESILOC Efforts in STRATEGIES Connecting RESILOC to ongoing standardisation activities.
Platforms / Databases	S4S (GA 853853)	Receiving advise on the landscape of standards. Connecting RESILOC to ongoing standardisation activities.
	Risk SoS Research Group	Coordinated and collaborative research on risk perception and behaviour
Communities	CMINE (DRS-01)	Platform and network for joined terminology
	EU Barometer	Sustaining a standardised survey on risk perception beyond the project live time
	Commune Catania	Facilitation of the production of RESILOC Guidelines
	Commune Gorizia	Facilitation of the production of RESILOC Guidelines
	Tetovo Village	Facilitation of the production of RESILOC Guidelines
Institutions	Prov. West Achaia	Facilitation of the production of RESILOC Guidelines
	KamnikCommunity	Facilitation of the production of RESILOC Guidelines
	DG Home	Accelerator for a harmonised catalogue of questions and database for risk perception and behaviour.
Other	JRC	Integration of Assessment Process in Policymaking /Adoption of Terminology
	DIN	Information on existing standards and their relevance/ Implementing joined CWA
	DRIVER+ (RAN)	Integrating RESILOC Trial Guidance as a Spin-off the Trial Guidance Methodology TGM



5 Description of relevant standards

There are different standards and groups of standards that relate to the RESILOC Project.

All the standards listed in Table 4 below were considered relevant to the standardisation work carried out in RESILOC. A particular focus was put on the Working Group 3 group CENTC 391/WG 3 - CRISIS MANAGEMENT/CIVIL PROTECTION and the CENTC 465 Sustainable Cities and Communities.

At the time of this report there is no standard was considered for revision to include key findings from the RESILOC Project. The project was able, however, to identify two ongoing standardisation efforts out of which one was selected as suitable to benefit from the RESILOC research and innovation action (See [chapter 6](#) below).

The following table provides an overview of the standards reviewed:

Table 3 Review of relevant standards

<p>ISO 22300:2021 Security and resilience Vocabulary</p> <p>This standard provides definitions of what is meant by various terminology within the DRR domain.</p> <p>It includes definitions of various elements of the RESILOC concepts like community or community vulnerability but a clear definition of community resilience is not included yet.</p>
<p>ISO 22316:2017 Security and resilience, Organizational resilience, Principles and attributes</p> <p>Provides guidance on how to enhance organizational resilience for any size or type of organization.</p> <p>It addresses mostly organisational resilience, however, local authorities may be considered organisations, which may make the principles applicable to the resilience of a municipality.</p>
<p>ISO/TR 37121:2017 Sustainable development in communities — Inventory of existing guidelines and approaches on sustainable development and resilience in cities</p> <p>Provides an inventory of existing guidelines and approaches on sustainable development and resilience in cities.</p> <p>A guideline for resilience assessments may be added and/or RESILOC may seek inspiration on how to develop its guidelines to for the assessment process to integrate the large picture of standardisation at an early stage.</p>
<p>ISO 37123:2019 Sustainable cities and communities — Indicators for resilient cities</p> <p>This document defines and establishes definitions and methodologies for a set of indicators on resilience in cities.</p> <p>RESILOC to learn from or contribute useful indicators and methodologies for the local level.</p>
<p>ISO 22396:2020 Security and resilience, Community resilience, Guidelines for information exchange between organizations</p> <p>It includes principles, a framework, and a process for information exchange. It identifies mechanisms for information exchange that allow a participating organization to learn from others' experiences, mistakes and successes.</p> <p>His standard may help RESILOC to improve on the cross fertilisation of knowledge between communities and the trans-border cooperation. In a less, prominent way it may also support the way of thinking when discussing a general form of community involvement. For organised community stakeholders like NGOs.</p>
<p>CENTS 17091:2018</p>

**Crisis management - Guidance for developing a strategic capability**

The document provides guidance on good practice for crisis management to help the strategic decision-makers of an organization to plan, implement, establish, operate, monitor, review, maintain and continually improve a crisis management capability. It is intended for any organization regardless of location, size, type, industry, structure, or sector.

It contains a section on building a crisis management capability with a subsection on anticipation and assessment that could be enriched by RESILOC outcomes. Another section addresses strategic crisis decision making which is of relevance to RESILOC.

Systematic assessment of innovative solutions for crisis management - Trial guidance methodology (CWA 17514:2020 E)

This CEN Workshop Agreement (CWA) is based on the results of DRIVER+ (Driving Innovation for European Resilience) that was a research project funded by the European Commission. The aim of that project was to develop a rigorous yet pragmatic methodology for the assessment of innovative solutions in the area of crisis management (CM).

RESILOC based its Trial Guidance on the DRIVER+ Trial Guidance Methodology. It is thereby aspiring to embed the project's validation into a larger EU recognised framework which already reach pre-standard status. The deviations RESILOC took may lead to a richer knowledge base when the CWA advances further towards a full standard.

6 Joined CEN Workshop Agreement

RESILOC arranged a coordination meeting with the STAIR4SECURITY Project (GA 853853) expert group on 25 May 2021 to assess options for the project to contribute to ongoing standardisation efforts in the field of natural disasters. The development of the CWA 17727 *City Resilience Development - Guide to combine disaster risk management and climate change adaptation - Historic areas* was identified as the most suitable standardisation activity that could benefit from the project's input. Following the Kick-off Meeting RESILOC is being represented in the standardisation board through the following members of the RESILOC Project Consortium:

- | | |
|---------------------------|---------------------------|
| 1. Karsten Uhing | Project Manager (RESILOC) |
| 2. Vassilis Papataxiarhis | Risk Manager (RESILOC) |

CWA 17727 defines a Resilience Management Process. It describes the relationship between resilience management and DRM/CCA. The Kick-off Meeting concluded that, the CWA 17727 was a joint effort from the projects ARCH (GA 820999), as the lead project, SHELTER (GA 821282) and RESILOC (GA 833671). The work plan of the CWA was implemented as planned with finalising the CWA in May 2022, The Publication was delayed from July to October but still realised within the Project duration of RESILOC as planned.

The CWA contains a section on “Pre-disaster – Normal operating phase” which covers six steps as reflected in Figure 4. This section is the most relevant to RESILOC as it proposes a standard for the strategic planning for disaster preparedness. The CWA promotes the concept resilience indicators to operationalise the community resilience and the involvement of local stakeholders during the assessment process.

The six sub-chapters (marked in blue) provide guidance on how to:

- Prepare the ground
- Assess of vulnerabilities and risks
- Identify prevention, mitigation, adaptation and emergency response measures
- Assess and select measures and procedures
- Implement selected options measures and prepare emergency responses
- Establish monitoring, evaluation and learning processes

by defining/recommending:

1. Requirements
2. Recommendations
3. Indicators
4. Supporting materials and tools

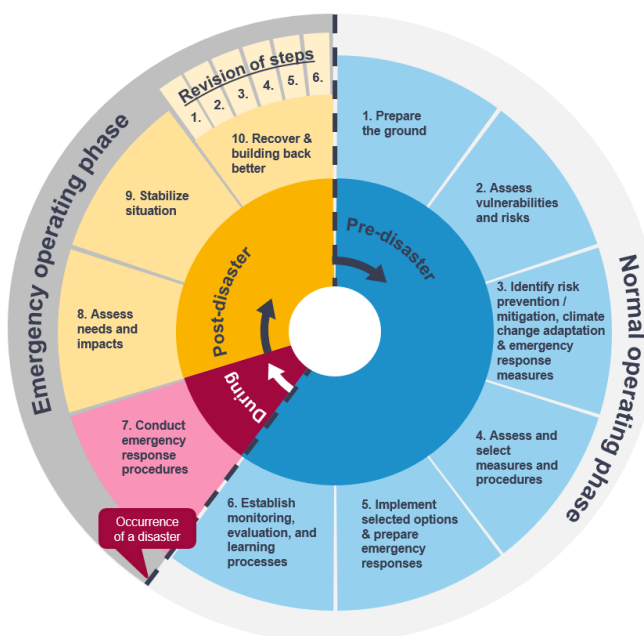


Figure 4 ARCH Disaster Management Circle



The CWA follows an inherent notion that all steps are based on extended community involvement (co-creation) using cross-sectoral “**resilience teams**” and that the local context needs to be addressed using **scenarios, indicators and local targets** to move from the assessment of local resilience to local resilience strategies³. The contribution of the RESILOC Project as a co-designing partner of the CWA strengthened this position. RESILOC also used the acknowledgments from the joined CWA to refine the ongoing development of the RESILOC assessment process. (Also refer to [Section 8.1](#) for RESILOC)

Prior to the participation to the CWA, RESILOC had defined three different outcomes the project could achieve from co-designing it:

1. The research results and experience gained through the RESILOC Project will be integrated into the ambitions of the development of the CWA as a joined effort of EU funded projects.
2. RESILOC and ARCH can commonly define indicators as part of the CWA.
3. The articulation of particular indicators and selected measures of assessment from the CENWS are applied in the RESILOC Field Trials.

At the end of the RESILOC Project Outcome 1 was completely achieved (*see table 2 below*). Outcome 2 was achieved partially within the workshops listed below. Outcome 3 was not pursued.⁴

Table 4 Participation in CEN/WS Events

Event	Date	Participant
CENWS Meeting (Kick-Off)	26.05.2021	Karsten Uhing
CENWS Meeting 1	07.07.2021	Vassilis Papataxiarhis
CENWS Meeting 2	02.09.2021	Vassilis Papataxiarhis
CENWS Meeting 3	05.10.2021	Karsten Uhing/Vassilis Papataxiarhis
CENWS Meeting 4	11.11.2021	Karsten Uhing/Vassilis Papataxiarhis
CENWS Meeting 5	19.01.2021	Vassilis Papataxiarhis
CENWS Meeting 6	05.04.2022	Karsten Uhing
CENWS Meeting 7 (Final WS)	28.04.2022	Karsten Uhing

The joined output of CWA 1772:2022 was discussed and presented during the final conference of the ARCH Project in Hamburg on 20.06.2022. RESILOC ARCH and DIN took the opportunity to also discuss on how the standard will continue to evolve.

The following steps were already achieved or will follow in the nearest future:

- The CWA was published on 10 October 2022 under: *CWA 17727:2022 City Resilience Development - Guide to combine disaster risk management and climate change adaptation - Historic areas*. It is available for download from the Website of the [European Committee for Standardisation \(CEN\)](#).
- CEN will, in addition to publishing the CWA on their website, forward the document to their 34 member-states and request a publication of the document on national level.
- The member countries can decide, if they want to offer the document on national level.

³ CWA 17727:2022 (10.10.2022) p.15f

⁴ The timing of the projects did not permit to wait for the CWA to be finalise before the RESILOC trials were executed. Indicators from the CWA were considered in the trials but there was no active attempt to integrate and validate them in line with the CWA pre-standard. The following events have been attended towards the submission of the CEN/CWS



- The corresponding standardisation organisations in Spain and Italy, were already contacted and the document will be made available in these countries soon. The translations to Spanish and Italian were already completed.
- The CWA will be checked and verified for the uptake towards a European Standard through the responsible Technical Committee [CENTC 465 Sustainable Cities and Communities](#)⁵ and ISO/TC 268. CEN Workshop Agreements are regularly reviewed and have a maximum lifetime of 6 years. In 3 years, DIN will contact the chairpersons of the CWA to either:
 - verify if the document will be transformed into another deliverable (e.g. European Standard (EN)).
 - confirm it for another three years.
 - revise it.
 - withdraw it from the market.
- The ARCH Team has already initiated a conversation with [CENTC 465 Sustainable Cities and Communities](#) in the frame of the projects liaison with this technical committee on transferring the CWA into another deliverable with a potentially higher consensus level and outreach (e.g. EN).
- A Task Force under CENTC 465 will be set up that will discuss the transformation of the whole “City Resilience Development” CWA series into another deliverable.
- The DRS-01 Cluster and other related research projects will be requested to keep the discussion on these standards ongoing.

Besides its partnership in CWA 1772:2022, RESILOC was also considering the participation in the CEN "Standardisation of Implementation Guidelines for evaluation and assessment reporting of exercises for crisis management" which was initiated and launched by the STRATEGY Project on 08 February 2022.⁶ Yet the decision was cancelled due to the limitation of resources and the difference in time horizons between the CWA process and the projects overall duration.

The project will, however share the final report with the four dedicated focus areas for future standardisation ([see Chapter 7 and 8](#)) with the strategy project to assess if some of the areas may be of interest for further adaptation.

⁵ Standardization in the field of Sustainable Cities and Communities, covering the development of requirements, frameworks, guidance and supporting tools and techniques. The proposed standardization plan will be developed to assist cities and community decision making, and support their implementation of sustainability and sustainable development. Standardization will focus on the development of a holistic and integrated approach in response to the needs of European Cities and Communities in both rural and urban areas. It is proposed that the standardization activities focus on: • the purposes of urban sustainable development as defined by ISO 37101 related to Sustainable Cities and Communities, namely resilience, attractiveness, well-being, social cohesion, preservation and improvement of environment, responsible resource use, aligned with the main pillars of sustainable development (economic, environmental and social), • all innovative approaches to solution and service delivery, designed for use by all Cities and Communities, Citizens and their interested parties as a means of achieving the sustainability of urban and rural development, with the aim of continuously improving solutions and services. and rural development, with the aim of continuously improving solutions and services.

⁶ <https://www.cencenelec.eu/news-and-events/news/2021/workshop/2021-12-14-cwa-crisis-management/>



7 Project-specific focus areas for “pre-standardisation”

The early planning for standardisation foresaw the standardisation of resilience related terminology, the resilience indexes (Indicators) and the correlation between Indexes (indicators). With a change in project design to an “agile” development process, the early standardisation of indicators became less favourable for the desired outcome. Furthermore, the feedback received from the users and policymakers indicated that the highest interest for standardisation concurs with the need for a local resilience assessment process (procedure) to harmonise understanding of community resilience as an applied concept with a shared terminology and the consideration of less tangible aspect like risk perception and behaviour.

7.1 RESILOC assessment procedure on community resilience

During the ongoing project, the process of local resilience assessments became the primary focus for “standardisation”. This includes, inter alia, the selection and definition of resilience indicators/proxies as well as their localization through local resilience teams.

The resilience assessment process is continuous and sources local, regional and national knowledge to achieve a visually aided evaluation of the resilience status quo in a given community. Ultimately, the assessment procedure aims at enabling community leaders to turn the obtained assessment into policy useful information.

The RESILOC trials, showed that higher impact can be generated when the assessment procedure is available to users in a general, applicable and understandable way. This experience was converted into validated assessment guidelines which can also be used for dissemination towards user acceptance and as a baseline for further standardisation actions and/or further research. The process for assessment of local resilience in RESILOC includes the following generalized steps⁷:

1. Stakeholder mapping and selection of local stakeholders (LRTs) to support the localised process.
2. Definition of the community profile.
3. Definition of locally relevant risk scenarios.
4. Introduction of the resilience assessment methodology to the LRTs (DIP framework).
5. Selection/definition of relevant local indicators and proxies per scenario (with LRTs), along with the creation of new local indicators and proxies if appropriate/useful.
6. Data collection for the indicators/proxies (populating the inventory with LRTs) through: available official statistical information (preferably localised and open source); survey data specifically conducted for the resilience assessment; expert estimations.
7. Definition of the relevance/direction/local target of indicators and proxies (with LRTs).
8. Analysis and interpretation of the cloud platform output (also using ‘what-if’ scenarios) (with LRTs).
9. Articulation and approval of a locally owned preliminary local resilience strategy (involving citizens).

Detailed information related to the achievements and outlook of pre-standardisation in the RESILOC Local Resilience Assessment Procedure (focused on LRTs) is listed in [Section 8.1](#)

⁷ Even though there were individual variations among the RESILOC trials, they were guided by an overarching process. This process is described in the steps above.



7.2 Terminology used

Terminology was one of the first components addressed in consideration of a CWA. While terminology is not a pressing matter for standardisation activities in RESILOC, it is still a challenge that organisations and citizens face when exchanging points of view about societal resilience and its distinct features. As a result, any action leading towards a common terminology in the DRR Domain would be considered beneficial.

RESILOC has addressed this opportunity by creating a shared environment within the Crisis Management Innovation Network Europe (CMINE) with key partners from other DRS projects working on a shared Glossary agreed originally amongst the DRS 01 Cluster members and, more recently, those forming the new Societal Resilience Cluster. The contributors were initially drawn from 4 projects which has now been extended to 6. Currently, actions are ongoing to extend this shared glossary to the institutional level and include further research clusters. Activities towards institutionalising the shared Glossary can be read in [Chapter 8.2](#)

7.3 The assessment of risk perception and adaptive behaviour

The study phase of the project has shown that risk perception and behavioural aspects vary considerably across Europe.⁸ There is no standardised method of assessing or evaluating risk perception and its influence on disaster risk reduction or resilience. This impression was confirmed via discussions with other research projects within the DRS-01 research cluster and the Risk SOS research group from January 2020 onwards. Feedback from EU Policy makers in DG ECHO and the JRC confirmed that a serious attempt towards harmonised methods as well as the definition of minimum standards in research or assessment on risk perception and behaviour is required to ensure that (research) data output is comparable and reusable. Such a harmonised methodology would also allow for a better assessment of patterns of risk perception across Europe and to identify any noticeable differences in relation to adaptive behaviour in response to particular types of disasters.

To this end, the Tavistock Institute, in collaboration with other project partners and members of the Risk SoS research group, developed a revised version of the 'risk perception' survey ran as part of Task 2.1 and carried out online surveys with representative samples of citizens in two areas – in the UK and Catania. Carrying out these surveys had several aims, including:

- 1) Improving the measurement of key constructs from the previous survey to develop robust measures of key concepts related to the assessment of risk perception and adaptive behaviour
- 2) Testing some of the assumptions made in the community-based adaptive behaviour and resilience model which was developed as part of Deliverable D2.1
- 3) Providing local data on the key constructs identified to feed into the assessment of resilience in the trial area of Catania.

Particularly the first of the three targets is relevant for the activities leading towards harmonised methods as well as the definition of minimum standards are listed in Chapter 8.3

⁸ RESILOC Deliverable 2.1 – Analysis on Risk Perception V4.0, 02.11.2020



7.4 The RESILOC Trial Guidance Methodology (RTG)

RESILOC has taken up the challenge of trialling a strategic tool within the field of disaster risk reduction. The project followed the initial ambition to embed its approach in an accepted EU Framework by deriving its applied process from the Trial Guidance Methodology⁹ which was one of the primary outcomes of the DRIVER+ Project (GA 607798).

The RESILOC case has clearly shown, however, that there are limits for the TGM to be applied when trialling a strategic tool.¹⁰ Processes that govern DRR and emergency management often span across multiple policy areas, as well as different levels and competencies within governance and government units. Thus, gaps although broadly definable before implementing tools like RESILOC, cannot be listed coherently and comprehensively, because many links need to be made. This unavoidable reality was used as an invitation to tailor an adjusted methodology which allowed the project to trial and validate the resiloc process and tools that promote a holistic approach on i) understanding, ii) assessing, and iii) ultimately contribute to strengthening community resilience. This approach, although it is slowly breaking a ‘glass feeling’ has not yet found an administrative & governance expression.

To this end, the RESILOC Trial Guidance has the potential to add real value well beyond the boundaries of DRIVER+ when it comes to the validation of research and innovation actions with potential user groups. The trial methodology may thus be of high value to similar projects. It is therefore planned to communicate the RTG to the target groups and other interested parties (e.g., RIA projects) through relevant channels such as CMINE after the project ended.

Activities related implementation of the RESILOC Trial Guidance are listed in [Chapter 8.4](#)

⁹ The TGM is in a process of standardisation with the pre-standardisation phase already completed (CWA 17514:2020 E).

¹⁰ C.f. Deliverable D5.4 RESILOC Trial Design



8 Report on standardisation activities within the focus areas

8.1 RESILOC assessment procedure on community resilience

The process of assessing community resilience is based on scenarios and the use of so-called resilience indicators. The use of these indicators has the potential to harmonise the method for making resilience quantifiable. This is technically possible because only a limited number of indicators are used for each dimension of resilience. In the best case, these indicators may be applicable to a wide range of communities and remain independent of the type of risk (scenario), but at the same time, can be further adapted to the specific risk selected. They are calculated based on a combination of localized and scenario-specific proxies which will have the capacity to provide a local measure for the general indicators.

In this context, indicators are considered a promising pre-standardisation item. The project has aggregated a list of indicators and trialled it in different communities in Europe. However, the study phase had already shown that the diversity of data available is inconsistent across Europe. This is one of the reasons why understanding local needs (local context) through a standardised process of co-production and co-creation is even more essential to define useful and understandable indicators, proxies and targets for which local communities are able to collect data. This means that the usability of the assessment tool will depend less on finding the universal indicator and more on harmonising the way of getting to the right indicator and the analysis of results which then lead to identifying possible actions to improve resilience.

8.1.1 Achievements

The concept of the RESILOC assessment process and its associated DIP Framework methodology was presented by different partners of the project in various settings¹¹:

- community of users (CoU/ CERIS) meetings
- technical sprints with partner communities
- local regional, national and international, bilateral meetings, conferences and workshops with experts and policymakers.

The feedback from different levels revealed that the methodology as well as the concept of the process are useful and needed to empower communities, irrespective of their size and given peculiarities to assess their local resilience. To make it applicable to different European communities, however, a clear guideline for local non-experts is required¹². This guideline can become part of the discussions on a new standard for community resilience assessments.

The process was successfully trialled in the four partner communities and one follow-up community. Based on the experience gained in the five communities, guidelines were developed to replace the role of the local facilitator, that was installed to support the process for the local community during the project's lifetime.

¹¹ Details about the dissemination activities on the RESILOC assessment procedure and related methodology can be obtained from Deliverable D8.4 Dissemination Report.

¹² Following this feedback, the standardisation meeting in Rome, held on 30 September 2021, agreed that the project would aim to produce a guideline based on the experiences made from its use cases (field trials) within the partner communities and disseminate it. The idea of the guideline was discussed with the Project Officer and perceived as a potential contributor to long term impact.



Besides the guidelines for the technical use of the RESILOC Platform, the project has demonstrated an efficient stakeholder engagement procedure using Local Resilience Teams (LRTs). The Project was successful in mapping relevant stakeholders for a co-creative / participative approach at the local level. Through this, relevant local stakeholders were involved in defining the relevant scenarios, indicators, proxies and preliminary local resilience strategies. The overall procedure of using LRTs was approved by the Council of Europe and discussed within the larger research community. Both policy makers and other researchers indicated great interest in the methodology. The use of LRTs was actively woven into the Projects CWA (please see [section 6](#)) and has the potential to be taken up for further standardisation action. For a wider use and acceptance, the concept of LRTs was coordinated with other research projects within the Horizon 2020 / Horizon Europe Cluster on Societal Resilience. Furthermore, the concept was presented and discussed with policy makers (DG ECHO) and researchers (JRC) who showed a great interest in the “project to policy” seminars.

A high-level description of the method of formation and use of LRTs¹³ can be found in Appendix B. The overall method of using LRTs in the process can also be found within the description of the trial sequence in Appendix C.

8.1.2 Conclusions, recommendations and outlook

RESILOC has developed and validated a process that helps communities to operationalise local resilience assessments. There are two main components to the process which are directly related to the Key Exploitable Results (KER) as expressed in the projects dissemination strategy. A technical description on the use of the Platform and the end-to end description of local stakeholder engagement to allow for a co-creative use of the Platform. Both items will be helpful for empowering communities to assess their resilience and to develop strategies to improve it.

As for the technical procedure to apply the RESILOC Platform for localised resilience assessments, a guideline will be published and disseminated to generate further impact and promote the harmonisation of assessment procedures towards the use of resilience indicators.¹⁴ The technical guidelines will help to scale the process up to wider acceptance, which will be important for further steps in pre-standardising the process.

The stakeholder engagement using Local Resilience Teams (LRTs) has shown to play a significant role in assessing resilience at local level:

- They allow for interpretation of indicators and proxies and adaptation to the local context based on their previous knowledge and capabilities.
- LRTs also encompass the role of “assessing what is not quantifiable”, based on local knowledge. Moreover, when the local interest is not satisfied by the tools, the LRTs may intervene by including new indicators or proxies in the analysis: in the Gorizia case, the diversity of representation within the LRT has allowed for a strong cross-fertilization among LRT members (i.e. technical cluster and social cluster members have different focus and knowledge), which has enabled the community to highlight gaps in the DIP framework and to enrich it with new proxies for the local context and for each of the scenarios selected. This represents an added value to reach data completeness and

¹³ The methodology is derived from the CoE approved [ReBuS – Resilience Building Strategies Toolkit](#)

¹⁴ These guidelines are planned to be published through Deliverable D4.4 after their approval in early 2023.



for the adoption of a more inclusive approach towards resilience building and emergency planning.

The trial implementation process in the RESILOC communities has shown the importance of community involvement in the resilience assessment process. This allows for a thorough analysis of results and identification of viable actions to be put in place to improve resilience, as well as to validate the work carried out by the project and the LRTs with the local communities so to ensure sustainability and ownership of objectives and actions.

LRTs have been considered a useful instrument by the committee of the regions, related research projects and policy makers at the EU Level. The promotion of the concept will be pursued by the International Institute for Sociology in Gorizia (ISIG) and is part of the project's recommendations to the three different levels of governance including local, regional/national and EU in Deliverable D7.3.

Following the projects conclusion, the assessment guidelines and the process for civic engagement enriching it will be published and communicated to the relevant DGs and brought to the attention of the Committee of the Regions.

8.2 The coordination of terminology used towards a shared terminology

The standardisation of terminology was one of the items already mentioned in the project proposal as an item that could benefit from standardisation. RESILOC researched resilience at the local level during the first year. It was assumed, that the work would lead to either confirmation or adjustments of the current terminology used in the Disaster Risk Reduction domain. This is particularly relevant as the concept of resilience is relatively new to disaster risk managers, and therefore, widely discussed from various angles. A shared terminology would support the need to harmonise the dialogue by creating a bridge between policy, research, practice, and the public.

The project has taken considerable steps to broaden the consensus around what's been called a base glossary. The latest version developed in conjunction with other projects operating in the Societal Resilience Domain and currently 6 projects are using it as the basis of their project glossaries. This work will continue well beyond the life of this project as the newest members to join the initiative have a further 4 years to take the work forward and to build upon what was started by RESILOC.

One of the standardisation projects commencing just as RESILOC ends is PEERS. This project has already agreed to continue the work of promoting a greater standardisation of the terminology products developed by ensuing projects.

8.2.1 Achievements

RESILOC started this work by developing a glossary of terms based on the UNDRR terminology¹⁵ that was enriched and agreed amongst the consortium partners. In a second step, the Glossary was extended to three additional projects from the newly formed DRS-01 Cluster which led to a separation of the Glossary into a common-to-all Base Glossary and a specific Project Glossary. The Base Glossary contains all terms on which the projects agreed and has a personalised section which can be referenced by projects that do similar work. Moreover, the Base Glossary can be considered usable for the entire domain of disaster-resilient societies.

¹⁵ <https://www.undrr.org/terminology>



The Glossary is being shared via the CMINE Platform and continuously supported and developed through the Resilience Advisors Network (RAN). Additionally, RAN has further developed the Base Glossary to include a broader range of DRS and CM definitions which projects can ‘pick and choose’ from. This has resulted in additions from WHO, UNOCHA, the Union Civil Protection Mechanism and many other sources. Projects are of course able to nuance or refine these definitions specific to their applications which results in some named project definitions appearing in addition. A simple process of filtering then generates a complete bespoke glossary for each project signed-up to the process and exports it to a Word document in their own ‘house’ style.

At the time of the report, DRS01 and DRS02 projects are using the glossary. The latest projects to integrated it are TeamAware (Grant agreement ID: 101019808), PARATUS (Grant Agreement ID: 101073954) and PEERS (Grant agreement ID: 101074040). The JRC are aware of the activity and have suggested integration of the work into the Commission’s overall ambition to harmonise the terminology used within the domain of secure societies. This will be followed-up beyond the conclusion of the RESILOC project.

The RESILOC Project has also developed public recommendations to the EU Level in which it proposes ways to consolidate a Resilience Glossary which paves the way for a standard approach in which to ‘observe’ resilience processes at community level (e.g., CRM components) and based on which to build future strategies. Part of the recommendations include that “the shared terminology can be achieved by actively supporting the translation of the Sendai Framework for Disaster Risk Reduction and of the UN DRR Terminology in a manner which would be clearer and commonly understandable.”¹⁶

8.2.2 Conclusions, recommendations and outlook

The clustering arrangement enabled through the Crisis Management Innovation Network Europe (CMINE) and the support of DG HOME’s Community for European Research and Innovation for Security (CERIS), connected DRS research projects to harmonise the glossary of terminology currently in use across the civil resilience sector.¹⁷ The Glossary of terms currently containing 300 terms, many from base glossaries such as the UNDRR, Red Cross and ISO standards. Others are from specific academic references and still others have been developed specifically by individual research projects and programmes.

To achieve better sustainability and acceptance of the shared terminology. RESILOC and the Resilience Advisors Network (RAN) have made a connection to the UN level to recognise the work done over the past years to promote the shared understanding of terminology to facilitate the understanding and communication of risks.

RESILOC and RAN were invited to join a UNDRR based working group which has been constituted as part of the EFDRR Roadmap Action Oriented Dialogues. The next meeting of the Group will take place on 28 February 2022 as a sub-regional dialogue on effective risk communication to be hosted by the government of Romania. RESILOC and RAN on behalf of the DRS-01 Cluster were requested to provide their support in conceptualizing the dialogue for this meeting that should start in early/ mid-November.

¹⁶ Cf. D7.3 – RESILOC Recommendation for a more resilient Europe

¹⁷ CERIS is already listed as reference terminology for the overall aspiration of the European Commission to harmonise the EU Disaster Risk Management Taxonomy
<https://drmhc.jrc.ec.europa.eu/knowledge/drm-taxonomy#disaster-risk-management-taxonomy>



To make the work of the shared terminology usable for or supportive of UN activities, RAN has started the submission process for a voluntary “Commitment¹⁸ (ID 20221005_001)” to advance the DRR agenda in the region. By this RAN will help UNDRR to take stock of this initiative to support the implementation of Sendai Framework by non-state actors as well as for the analysis and synthesis report that helps identify trends, gaps and emerging challenges in some areas which could contribute to developing future policy setting from UNDRR. Through this way RAN would be able to share your efforts and achievements with global DRR community and we would further promote it through our channels even after the RESILOC Project has ended.

To this end the project recommends the EU Level to “consolidate a Resilience Glossary which paves the way for a standard approach in which to ‘observe’ resilience processes at community level (e.g., CRM components) and based on which to build future strategies.” Further recommendations for the national and the local level regarding a shared terminology can be found in the Deliverable on recommendations towards policy makers in Deliverable D7.3.

¹⁸ <https://sendaicommitments.undrr.org/>



8.3 Harmonisation and research cooperation for the assessment of risk perception and behaviour in Europe.

The subject of measuring risk perception and behaviour is currently unstandardized amongst experts and research institutions within the EU. This became visible during the study phase of the RESILOC project, in which it was revealed that there was neither a standardised methodology to assess risk perception at the local level nor a clear link between risk perception and resilience that could be used to derive useful and robust resilience indicators. Therefore, the project saw the need to extend its proposed solutions for assessing risk perception and behaviour, as part of a community resilience assessment into a wider scientific discussion.

The project initiated a cooperation with the Risk SoS research group that unites behind the “European Conference of Risk Perception and Behaviour” (ECRP). In a second step RESILOC promoted the group within the DRS-01 research cluster and involved the sister projects into a continuous dialogue towards the harmonisation of research on the link between risk perception/behaviour and resilience within the societal resilience domain. With no tangible standard for assessing risk perception and behaviour in DRR¹⁹ so far, the cooperation between the two research groups striving to narrow such gap can be understood as a meaningful contribution towards pre-standardisation.

8.3.1 Achievements

RESILOC organised a first meeting with representatives of the Risk SOS Group²⁰ on the 17 January 2020. The meeting aimed to allow an early alignment of the project’s research with the ongoing attempts of harmonising the scientific concepts used and the methods applied for integrating the less tangible aspects of resilience into local resilience assessments. It also served the purpose of assuring the right scientific baseline to develop related resilience indicators and questionnaires that would help to collect the data to describe them. Moreover, the two organisers became permanent members of the Advisory Board on 10 February 2020.

A Team of RESILOC representatives continuously participated in a webinar series organised by the Risk SoS group throughout 2021. The webinar series was replacing the ERCP Conference during the Covid-19 lockdown and aimed to provide a platform for researchers to exchange research methods and results for the benefit of getting closer to a harmonised questionnaire for the assessment of risk perception and behaviour in Europe. RESILOC participated in the following working sessions:

Table 5 Participation to SoS Webinar Series

Session #	Date	Attended by
Session 1	14 January 2021, 10:00 – 12:00 CET	TIHR
Session 2	25 February 2021, 15:00 - 17:00 CET	TIHR, FhG
Session 3	13 April 2021, 15:00 - 17:00 CEST	FhG
Session 4	01 June 2021, 15:00 - 17:00 CEST	FhG, TIHR (presenting RESILOC)
Session 5	02 July 2021, 15:00 - 17:00 CEST	FhG

Following the 5th Session, RESILOC formed a focus group to concentrate on the joined research of “Assessing Risk Perception and Adaptive Behaviour” within the DRS01 research cluster. The initial groups consisted of members from the projects RESILOC, ENGAGE and

¹⁹ This was the output from a discussion with DG ECHOs Unit B2 during the European Civil Protection Forum 2022 in Brussels Belgium.

²⁰ The Risk Perception and Behaviour Survey of Surveyors (Risk-SoS) an independent group of experts that seek to accelerate the harmonisation of assessing risk perception and behaviour in Europe.



Risk PACC, which aimed at establishing a joined whitepaper covering the assessment of citizens risk perception for the improvement of disaster preparedness. By December 2021 all six active DRS-01 projects (see Table 6 below) had joined the focus groups and were engaging in the regular monthly webinars (see Table 7 below).

Table 6 DRS-01 Projects engaged in the DRS-01 RP Focus Group

Project Acronym	Grant agreement ID	Full Title
BuildERS	833496	Building European Communities' Resilience and Social Capital
RESILOC	833671	Resilient Europe and Societies by Innovating Local Communities
ENGAGE	882850	Engage Society for Risk Awareness and Resilience
LINKS	883490	Strengthening links between technologies and society for European disaster resilience
Risk PACC	101019707	Integrating Risk Perception and Action to enhance Civil Protection-Citizen interaction
CORE	101021746	sScience and human factOr for Resilient sociEty

The DRS-01 group joined the 2nd Conference on Risk Perception and Behaviour (ECRP21) in Paris on 21-22 October 2021. Part of the conclusions drawn from the conference was that, to date, scientific theories play a minor role in surveys on risk perception and behaviour in connection with disaster risk reduction.²¹

This has opened an interesting perspective for RESILOC to develop a theory-based model for assessing risk perception and behaviour as a contributor towards community resilience before developing a questionnaire to collect data for the related resilience indicators. To this end the conference included a workshop dedicated to the “development of a standardised risk perception survey”. The workshop concluded five major categories of questions to be harmonised within the research environment:

- **Awareness**
- **Knowledge/Information**
- **Evacuation/ Emergency Behaviour**
- **Previous Hazard Experience**
- **Actual and Perceived Exposure**

This work was an initial step towards a better reuse of previously collected data and to improve the comparability of risk perception and behavioural patterns within Europe over time.²²

Following this work RESILOC engaged in the development of a survey assessing community resilience with a focus on adaptive behaviour which is understood to be less dynamic as a (i.e. more robust) measure for community resilience. The concept of using adaptive behaviour allows researchers to build on a clearer link to community resilience through the analysis of its positive or negative impact on the community’s vulnerability.

²¹ Conclusions of the Second European Conference on Risk Perception, Behaviour, Management and Response - ECRP 2021, <https://hal.archives-ouvertes.fr/hal-03465539>

²² It is necessary to note that the reuse of previously collected data could become a break of ethical standards if the principles of transparency, accountability and consent of participation are not followed. Therefore, it is important that DRS-01 keeps this in mind and follows GDPR requirements to reduce the possible ethical break. For additional information visit the RESILOC Ethics How-to-Guide or the Ethics and H2020 Data Protection 14 November 2018 guide [here](#).

For RESILOC this work remained close to the development of indicators and proxies which were used to assess the social dimension of resilience in WP3. As part of the data to calculate the indicators is not available from statistical data the project had to develop tools to collect them (see Figure 5 below).

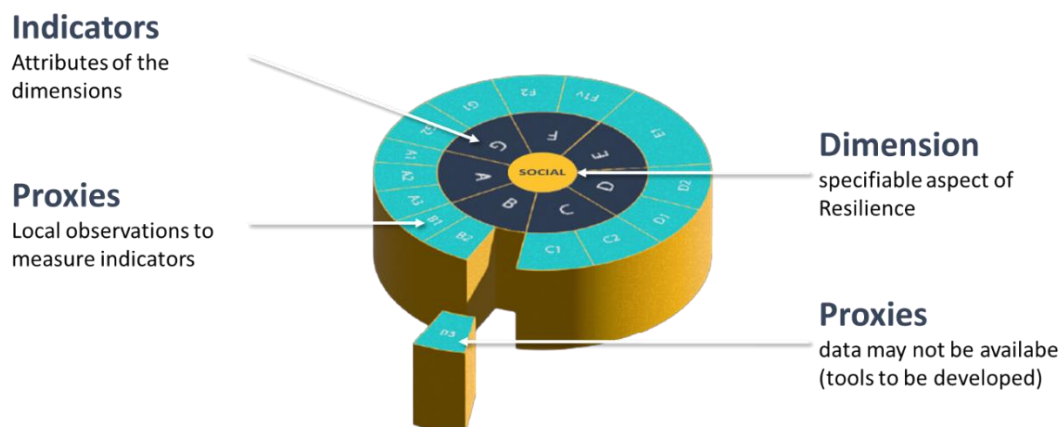


Figure 5 DIP Framework Social dimension- example

In D3.1, The project proposed seven indicators to assess the ‘social dimension’ of resilience as part of the RESILOC tool.²³ This was done based on:

1. An initial literature review on risk perception and related concepts, such as adaptive behaviour, carried out as part of D2.1
2. A review of literature of previous frameworks used to assess the social resilience of communities to disasters
3. The development of an initial definition of social resilience, indicators, and proxies
4. A review and validation of the indicators and proxies based on end-user and consortium partner feedback.

The final list of seven indicators included:

- **Community engagement**
- **Social Connectedness**
- **Trust in Authority**
- **Place attachment**
- **Community competence**
- **Adaptive behaviour**
- **Risk awareness**

The project proposed a preliminary list of proxies that could be used to collect data for each of these indicators – however, this list was not constructed in a scientifically robust way, but instead was based on some examples derived from previous frameworks, the previous survey on risk perception, or end-users’ suggestions. To translate this knowledge into an applicable tool for communities The RESILOC Project engaged on further research and development which included the continuous exchange with the experts from the focus group on “Assessing Risk Perception and Adaptive Behaviour. A series of webinars was organised as workshops to discuss and conclude on the first of the five proposed categories coming out of the 2nd ERCP Conference. The series was organised as a forerunner to the 3rd ERCP Conference in June 2022 which included two workshops on harmonised Questionnaires to assess risk perception and behaviour in Europe.²⁴

²³ RESILOC Deliverable 3.1 – RESILOC Resilience Indicators V7.0, 02.02.2022

²⁴ The results of the Webinars/Workshops and the Conference Workshops were collected and stored by the Risk-SoS Research Group.



The following Webinars were attended co-hosted and attended by RESILOC:

Table 7 Risk SoS Sessions on harmonised catalogue attended

Session #	Date	Attended by
Webinar on Exposure Questions	25.11. 2021 15:00-17:00 CET	Risk PACC, RESILOC, ENGAGE, LINKS, CORE, BuildERS, and Risk SoS Partners
Webinar on Evacuation and Emergency Behavior Questions	16.12. 2021 15:00-16:00 CET	Risk PACC, RESILOC, ENGAGE, LINKS, CORE, BuildERS, and Risk SoS Partners
Questions on previously experienced Disaster	24.02.2022 15:00-17:00 CET	Risk PACC, RESILOC, ENGAGE, LINKS, CORE, BuildERS, and Risk SoS Partners
Questions to capture response and adaptive behaviour	17.03.2022 15:00-17:00 CET	Risk PACC, RESILOC, ENGAGE, LINKS, CORE, BuildERS, and Risk SoS Partners
Lessons learned from risk perception and adaptive questionnaire design	05.05.2022 15:00-17:00 CET	Risk PACC, RESILOC, ENGAGE, LINKS, CORE and Risk SoS Partners
3 rd ERCP Conference Berlin Germany	13-14. 06. 2022	Risk PACC, RESILOC, ENGAGE, LINKS, CORE, BuildERS, and Risk SoS Partners

One of the main conclusions from the discussions within the DRS-01 Cluster and the Risk SoS research group was that devising such ‘indicators’ and ‘proxies’ for disasters in general is very difficult – instead, it is better to focus on a particular type of disaster and then to adapt the indicators and proxies to other disasters. For this reason, RESILOC focused its efforts on developing standardised indicators and proxies for ‘floods’ – as this is a very common phenomenon across Europe in recent years and was also of direct relevance to the Catania trial site.

The knowledge built up from the first two conferences and the series of webinars was accumulated and discussed during the 3rd ECRP Conference in June 2022 involving an international panel of 25 Experts from 9 different countries. In this setting the RESILOC project (the Tavistock Institute) took the opportunity to present and discuss the ‘community-based survey adaptive behaviour model of resilience’, which was developed as the basis of assessing the link between community resilience and adaptive behaviour based on qualitative data. The model was understood and approved to provide the basis for such work in Europe.

Furthermore, the Conference included two workshops of relevance to the harmonisation efforts towards minimum standards of assessing risk perception/awareness in Europe:

1. Workshop to build a common risk perception and adaptive behaviour questionnaire, by CY Cergy Paris University, France (Risk-SoS) – *based on the previous conferences and Webinars*
2. Workshop to build an adaptation questionnaire, by The Tavistock Institute, UK (RESILOC) – *based on the ‘community-based survey adaptive behaviour model of resilience’*

The next step was to devise a survey asking several questions that could be combined to measure each of these constructs or indicators and using various statistical techniques



(including factor analysis and reliability testing) to identify the key constructs with good item and scale statistics (to indicate that the particular questionnaire items are a reliable way of measuring each particular construct). The analysis was also used to identify the minimum number of items that could be used to measure each construct while maintaining sufficient robust item and scale statistics – this was a key criterion as based on end-user feedback, there is limited resources available to collect such data locally and, therefore, a clear preference for a small number of questionnaire items.

The questions were devised by examining the literature to identify previous surveys focused on flooding²⁵ as well as using or amending questionnaire items previously developed for the ‘risk perception’ survey focused on disasters in general. Based on this, an initial list of questions was compiled and presented as part of the European Conference on Risk Perception and Behaviour (ERCP 2022) in Berlin on 13-14 June 2022. As part of this, RESILOC conducted a workshop and asked other researchers to comment on the survey and provide suggestions. Following input from others, the survey was revised and undergone piloting of about 30 individuals. After further refinement, the survey was distributed via two commercial online survey providers in September 2022 – including a representative sample of 2000 residents across the whole of the UK and a smaller, but still representative sample of 405 residents of Catania.

The analysis of the survey data helped RESILOC to revise and refine the previous list of indicators and proxies proposed. The final list still included: ‘risk awareness’, ‘community competence’, ‘adaptive behaviour’ and ‘trust in authority’, but the analysis suggested combining community engagement, place attachment and social connectedness into a new indicator entitled ‘community cohesion’. Question items (‘proxies’) for each of these five revised ‘indicators’ and scale statistics are provided in Appendix C – with an indication of the minimum number of items/proxies needed to ensure good levels of such statistics.

Between the 2nd and the 3rd ERCP conference RESILOC informed and involve DG ECHO which is ambitious to harmonise the understanding of risk perception/awareness and the development of minimum standards in connection with the implementation of the Union Disaster Resilience Goals (to be published in early 2023). The connection has developed to a dialogue which was also extended to the entire DRS-01 Cluster. The cluster, led by RESILOC then arranged a common workshop to convey the messages and achievements made on risk perception and behaviour during the Civil Protection Forum 2022 in Brussels involving more than 300 practitioners and policy makers from across Europe.

8.3.2 Conclusions, recommendations and outlook

The survey applied in the RESILOC project provided robust scientific evidence that the social dimension of resilience (to floods) could be measured using the five indicators and a total of between 13 and 16 questionnaire items (with the adaptive behaviour question treated as one item). The Results from the RESILOC Projects provoke that these five indicators are therefore used more widely by other communities and scientific investigators across Europe to ensure that data outputs on such surveys are comparable and reusable. Revising the questions for different types of disaster scenario would also provide more scientific weight to these findings and provide useful comparable data. To anchor the project specific research results, RESILOC will provide a policy brief on how to enrich the assessment of social resilience at the local level using an adaptive behaviour survey, based on the ‘community-based survey adaptive

²⁵ Attems et al, 2020a; Attems et al, 2020b; Harries, 2012; Van Valkengoed & Steg, 2019; Ozaki & Nakayachi, 2020; Bubeck et al, 2018; Poussin et al, 2015; Papagiannaki et al, 2019; Lin et al, 2008; Grothmann & Reusswig, 2006



behaviour model of resilience’. The policy brief will be issued to DG ECHO DG Home the JRC and the DRS01/Risk SoS research group.

The DRS-01 Focus Group on risk perception and behaviour will continue to merge its research on risk perception and adaptive behaviour within the greater European research community. The work of the independent Risk-SoS Research group will continue. An additional pull-effect will be created through the European research action n. 101044374 - FiBeGa.: ‘ERC-2021-COG – joining the cluster in 2023. The action runs under the title ‘Filling the Behavioural Gap in Disaster Risk Reduction and Climate Change Adaptation’, which will provide the group with a guiding roll to researching the link between risk perception vulnerability and adaptation for a duration of 5 years. The next high-level exchange between the groups is planned during the 4th ERCP Conference in May 2023 in Bucharest, Romania.

The Dialogue with DG ECHO and the JRC will be continued through the joined research group (DRS-01 and Risk SOS focussing mainly on supporting the ambition of assessing and improving risk awareness in Europe as part of the Union Disaster Resilience Goals (UDRG). The next point of discussion will be the 6th annual Seminar of the DRMKC in Paris in November 2022.

In the previous report (D8.8) it was planned to have an atlas on risk perception and behaviour including the research results from RESILOC. This Idea was discarded.



8.4 The RESILOC Trial Guidance (RTG) Methodology

The RESILOC Trial Guidance Methodology is a procedure that was developed to implement the RESILOC trials. It was designed to overcome two challenges that currently don't have a harmonised/standardised solution at the EU level yet:

- Trialling a strategic tool
- Trialling a tool for a solution that does not exist yet and for which the gap to be addressed will only show after the trial is completed

8.4.1 Achievements

In line with the Grant Agreement, RESILOC has completed a general RESILOC Trial Design (D5.4)²⁶ and an accompanying Trial Validation Framework and operational implementation plan (D5.6 – specifying dedicated validation milestones focused on feedback gathering from both end-users and overall Trial Management Teams at in each of the four RESILOC communities).

Having considered as a starting point for the elaboration of the overall Trial Guidance an already existing and tested comprehensive trailing framework (i.e. Trial Guidance Methodology from Driver+) the project delivered evidence that such previous approaches are not optimal in light of a strategic tool, such as the one proposed by RESILOC.

In fact, the project was invited to share this knowledge with the Driver+ Network. Lead figures of the DRIVER+ Project (GA 607798) completed a book on the DRIVER+ findings, titled “Innovation in Crisis Management”. RESILOC contributed to *Part 4: Towards a paradigm shift in assessing innovative CM solutions - TGM Application in a Horizon Project*. The book was finalized in 2022 and will be available from February 2023²⁷. The text of the book describes the challenges which the methodology has met in the RESILOC project, which of its elements have survived the process and which have not.

To respond to the challenge of trialling a strategic tool, RESILOC developed a trial script (envisaging a two phased approach – capacity building and implementation, structured in specific trial steps and validation milestones) which could be implemented across the different trials for adequate conclusions and the validation of the method itself. The proposed trial structure provided room for adaptation for the different context specificities. In fact, in accordance with the different levels of maturity of RESILOC solutions at the different times in which the Trials were scheduled, and with the overall local context, each RESILOC community was able to adapt the Trial foreseen steps and related Validation data collection Tools and activities.

Moreover, it should be stressed that, given the overall project objectives, as well as its vision and mission that set a co-creation approach transversally to project development (i.e., elements enshrined in the RESILOC End-User engagement strategy, D2.8), the trial script has a highly participatory scope; it envisages the engagement of end-users and stakeholders (i.e., by means of the LRT component) throughout its development, with the ultimate goal of allowing for a co-produced identification of resilience strategic objectives, to be enshrined in a local resilience strategy; ultimately, the trial proposes as well the consultation/engagement of

²⁶ The design of the RESILOC field trials take much of the TGM and adjusts it to fit a much smaller-scale project without a well-defined solution throughout the design phase

²⁷ C.f. <https://www.routledge.com/Innovation-in-Crisis-Management/Fonio-Widera-Zweglinski/p/book/9781032189154>



citizens on the final outputs of the trial development (i.e., by means of the Citizens Jury methodology on the identified strategic objectives).

The trial script elaborated by RESILOC, together with its validation framework was applied to four community (field) trials, as well as and in an impact case of an early adopter community (i.e., extra trial performed on demand). The feedback from the communities and the local facilitators is promising and suggests that the process is to be considered for standardisation. The Trial Script and proposed Validation milestones and activities were assessed (i.e., complete validation report in D5.6) as flexible, adaptable and allowing for replicability and transferability. In fact, RESILOC registered 1 extra (not planned at proposal phase) in a neighbouring locality (i.e., Dve Mogili in BG) after the implementation of the originally planned one (Tetovo-BG).

The trial script offers a set of discrete implementation steps (the majority of which entailing participatory moments of consultation or co-production with community end-users, stakeholders, or citizens), embedded in separate stages, which are in turn embedded in phases. The process is sequential and allows for variations in the implementation procedure (e.g., whether the group work in the different steps to take place in person or online). Part of the steps in the script are dedicated to validation ensuring greater internal validity of the resilience assessment. A high-level description of the trial script can be found in Appendix D. A more detailed explanation of the model can be found in Deliverable 5.6 Field Trial Validation.

8.4.2 . Conclusions, recommendations and outlook

The early aspirations of basing the RESILOC trial guidance on the Driver+ related trial guidance methodology did not hold. Instead the RTG has helped to identify a way to complement the TGM towards trialling strategic tools. This knowledge is integrated into a book publication in a part describes the story of practical application and must therefore be understood as a valuable comment to the CWA 17514:2020 E ‘Systematic assessment of innovative solutions for crisis management - Trial guidance methodology’. Which is the Pre-standard defined by the Driver+ Project.

The actual output from RESILOC does not only provide an answer on how to trial a strategic tool, it also allows the users to commence a trial without a clearly identified gap. This can be of broader interest to research and innovation actions within the Horizon Europe Landscape.

Operationally, the following steps towards further standardisation are envisaged (and described in Appendix D to this report, and in D5.6):

- Phase 0²⁸ – Preparation – identifying reference points and setting the processes for the future application of the RESILOC framework, with a focus on:
 - Context – elaborating a general community profile.
 - Actors – Stakeholder mapping and LRT establishment.
 - Risk scenarios – identification of relevant scenarios.
- Phase 1 – Capacity building – structured in 3 stages, focusing on:
 - Transfer of knowledge towards the end-users.
 - Data gathering
 - Implementation of the assessment
- Phase 3 – Interpretation of the assessment

²⁸ Phase 0 was not reflected in the flowchart presented in Appendix D



9 Conclusion

The RESILOC project continuously followed a strategy to increase the overall project impact through pre-standardising activities. It was designed to contribute as much as possible to a forward-looking big picture for the standardisation of community resilience assessments and the development of localised strategies to improve it.

The initial intention of having a project-specific CWA for the resilience indicators and or terminology was corrected for a joined CWA with two other European research projects on community resilience, as the management saw no efficient use of resources without a standardisation body in the consortium. The joined CWA 17727 was published in October 2022, highlighting the use of local resilience teams and resilience indicators for local resilience assessments and strategy development. The potential impact will be the contribution towards the acceleration of the all-of society approach and the operationalising the concept of community resilience using for the local level.

The project also identified four items with the potential to be standardised which bring potential impact to research and the policy makers at different levels of governance. Amongst these items are guidelines for an indicator-based resilience assessment using the DIP Framework. This process allows communities to quantify different attributions of resilience before combining them towards a holistic resilience assessment. Resilience is a very dynamic and individualistic concept that is hardly being measurable. A guided process for the communities to assess resilience was considered most relevant from all trial communities, community representatives outside the consortium, policy makers and representatives' international frameworks. Deriving a standardised procedure with relevant stakeholders in the future is a useful step. The guidelines will be published and disseminated at the end of the project.

One of the most dynamic aspects of resilience is the actual behaviour of people in our societies. This behaviour depends on many very individual factors of influence. These factors are not only related to the culture and location of a community but also on the actual lifeworld. To include these aspects in a resilience assessment is very challenging RESILOC has developed a model and a model questionnaire that empowers community managers to collect qualitative data on this subject. The idea of assessing risk perception, awareness and adaptive behaviour is highly relevant to the European commission in relation with the disaster resilient goals.

Beyond the actual procedure for operationalising resilience and organising local stakeholders to support the assessment the general understanding of societal resilience across Europe is yet to be harmonised. The project took a path to work towards a shared terminology that not only covers community resilience but the larger picture of disaster resilient societies. It joined forces with six different research projects of the domain and extended the shared glossary to the science pillar of the Commissions Knowledge Network and the UNDRR. Both levels have ongoing ambitions to harmonise the terminology on Disaster resilience. RESILOC and the DRS-01 Cluster contributed to this by providing a pan-European context for this taxonomy.

Finally, RESILOC faced the challenge of trialling a strategic tool to validate the project's solution. The completion of the trial design has shown, that existing and agreed methodology at the EU Level from driver + cannot support this particular type of validation. Based on this acknowledgement RESILOC developed the RESILOC Trial Guidance which is likely to be of benefit to other projects. With the completed CWA and the four identified items for future standardisation, the standardisation strategy is considered to be successfully implemented. All items will be kept ready for future standardisation requests from the Commission and/or other projects.

VII. Appendix A: RESILOC ethics self-assessment sheet

RESILOC		RESILOC ethics self-assessment sheet			
<p>This document is a self-assessment sheet that must be filled out by owners of RESILOC deliverables. This is to ensure that research and/or development activities related to each project deliverable comply with requirements of RESILOC Guidelines on Ethics and Data Protection (GDPR).</p>					
<p>This RESILOC ethics self-assessment sheet must be used as part of each project deliverable that involves humans either in an active (e.g. data subjects) or passive (e.g. affected by tools) manner. Project reports (e.g. management or financial reports) are not required to undergo this ethics assessment.</p>					
<p>This document is an important exercise part of the RESILOC Ethics Framework as it allows the owner of each RESILOC deliverable to reflect on ethical consideration and data protection requirements in a structured and approved manner before submitting the document to the Commission for review.</p>					
<p>The document shall be used in line with the RESILOC Ethics Framework including the guidelines and procedures under deliverables D9.1 to D9.12 (all documents are made available on the RESILOC Own Cloud). The ethics self-assessment sheet must be included as the 1st Appendix A of the each RESILOC deliverable. In addition to filling out the sheet, authors must provide explanations of the answers given on the main table. Such explanations must be provided in the methodology section of the deliverable using the headline "Ethics Considerations and Data Protection". The ethics self-assessment sheets of private deliverables must be assessed through the responsible position within the issuing organisation. However, for public deliverables, the ethics self-assessment sheet must be approved by the RESILOC Internal Ethics Board. For that, please send this document to the Internal Ethics Board.</p>					
For Information or assistance contact:		helena.marruecos@iml.fraunhofer.de			
The self-assessment was conducted by:		The self-assessment was approved by:			
Name	Karsten	Name	Nadia		
Surname	Uhing	Surname	Miteva		
Institution	Fraunhofer IML	Institution	Fraunhofer IML		
Date	12.01.2022	Date	29.11.2022		
			yes	no	n/a
G	GENERAL				
a	Did the research for this deliverable involve the collection of personal data?				x
b	Does this deliverable, and the activities that have fed into it, comply with Regulation (EU) 2016/679 known as GDPR and 2002/58/EC Directive on privacy and electronic communications?				x
c	Does this deliverable, and the activities that have fed into it, comply with the relevant national data protection and privacy laws, codes of practice and guidelines?				x
d	Are there any ethics risk identified related to your work under this deliverable?			x	
1	Human Participation/ Informed Consent				
1.1	Procedures and criteria that will be used to identify/recruit research participants (D9.1)				x
a	Did the research for this deliverable involve the recruitment of research participants? <i>(this includes surveys and interviews)</i>				
b	Did you identify selection, inclusion, & exclusion criteria?				
1.2	Recruitment of respondents via social media (D9.4)				



b	Were special measures taken to ensure that the participants are adults?			
c	Did the research for this deliverable involve data collection using social media?			
d	Were measures taken to use only public profiles for the collection of data?			
		yes	no	n/a
1.3	Use of the informed consent forms and Info sheets to recruit research participants (D9.2)			x
a	Consent Form was issued			
b	Information sheet was issued			Issued in local language
c	Combined sheet was issued			
1.4	Use of the informed consent forms and information sheets on data processing (D9.9)			x
a	Consent Form was issued			
b	Information sheet was issued			Issued in local language
c	Combined sheet was issued			
2	Organizational measures			
2.1	Data Protection Officer or contact person (D9.5)			x
a	Do you have a Data Protection Officer or contact person for participants?			
b	Was this contact mentioned on the Informed Consent Forms?			
3	Technical measures			
3.1	Technical safeguard mechanisms for handling of personal data (PD) and special categories of personal data (SCOPD) (D9.6 / D9.8) (SCOPD include information such as ethnic origin, political opinions, data concerning health, etc. For more details see Article 9(1) GDPR).			x
a	Did the research for this deliverable involve the collection of SCOPD? (D9.6)			
b	Which mechanisms were used to safeguard the personal data collected?			
	pseudonymisation			anonymization
	encryption			other (specify in the line below)
	access restriction			
3.2	Data minimisation (D9.7)			x
a	Has as little as possible data been collected throughout the research process?			
b	If more data was collected than initially needed, did you ensure the data was deleted?			
3.3	Data profiling (D9.10)			x
a	Was or will the data collected in the deliverable be used for data profiling?			
b	Were all data subjects informed of the profiling and its possible consequences? (as part of the Inform Consent Form and the Information Sheet)			
c	Were sufficient measures in place to safeguard their fundamental rights?			
3.4	Processing of previously collected personal data (D9.11)			x
a	Did you obtain consent to use personal data from previously executed research?			
b	Are technical/organisational measures required to safeguard the rights and freedoms of the data subject according to EU and national legislation in place in your organisation?			
4	Other Issues of ethical concern			
a	Were there any other ethical considerations detected during the work of this deliverable that are not covered by the list above?	x		
b	If yes, please list the concerns below and elaborate on the related counter measures in the methodology section of this document			

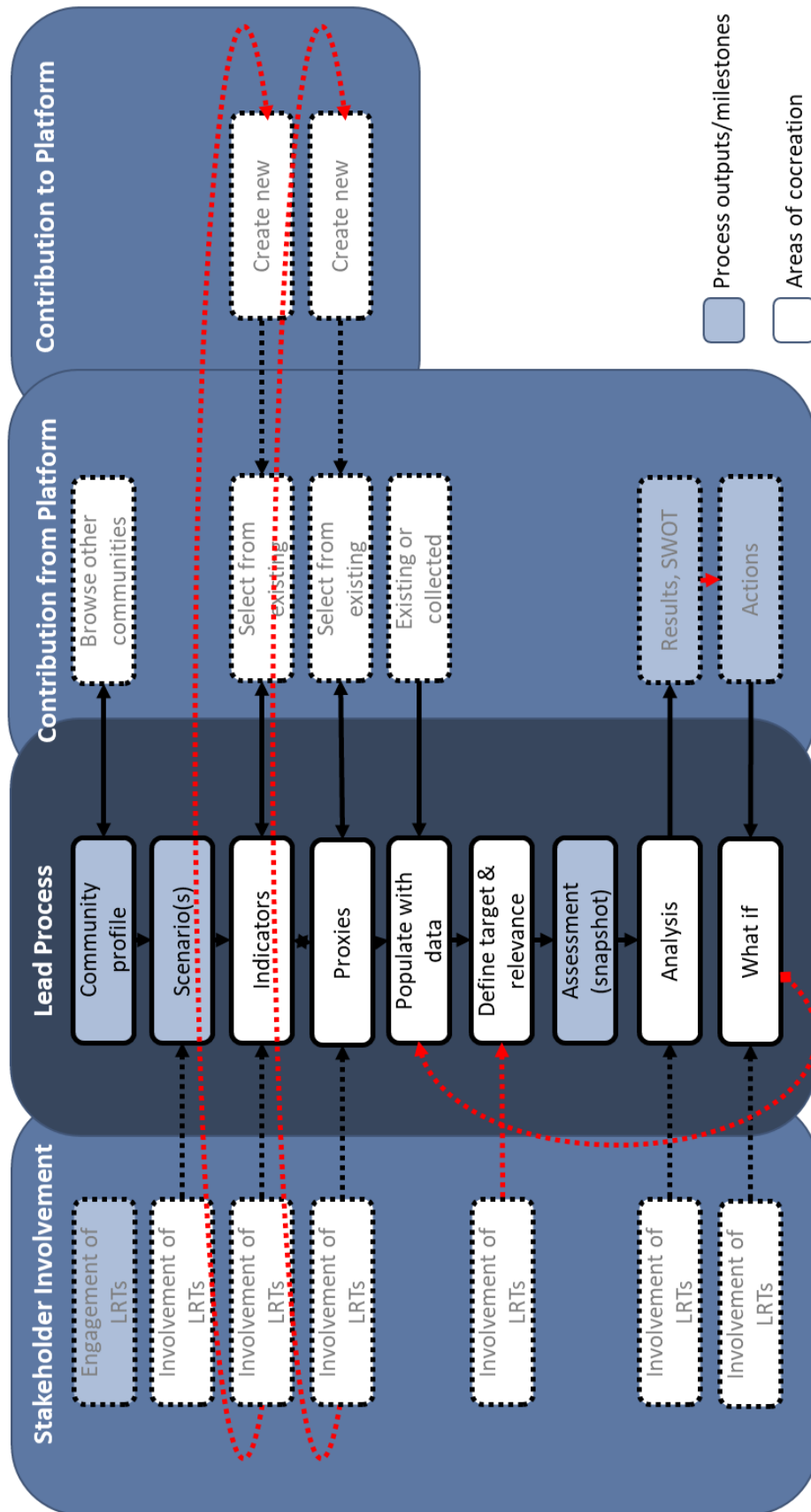


B cont.	<p>Neither the production of the deliverable nor its content implies direct ethical concerns as it is a report that describes actions taken and those that are planned. There are indirect concerns that relate to the outcomes of these actions. The following concerns were identified and are carefully considered and monitored throughout the course of the project:</p> <ol style="list-style-type: none"> 1. RESILOC completed a CEN CWA that will produce recommendations for the assessment and strategic planning of local resilience. RESILOC recommendations will contribute to the CWA at the risk that issues will be generalised. Such risk is considered in the RESILOC ethics guidelines as an unavoidable risk that goes with standardisations. The whole process of the CWA was governed by the DIN, which qualifies as a national standardisation body with high ethical standards. Furthermore, the outcome is now a pre-standard that will have to take additional checks and risk impact analysis before becoming a full standard. Also see Chapter 6 of this document. 2. The resilience assessment procedure will be provided as a guideline to potential users after the project. It is therefore important, that recommendations are compliant with the RESILOC ethics guidelines and do not create disadvantages to individuals within the local communities. The guidelines will be submitted as Deliverable 4.4, which will have to receive a duly ethics assessment before submission. 3. The harmonisation and research cooperation for the assessment of risk perception and behaviour shows an indirect ethical impact. The main reason is that questions are being used, were also used during the first RESILOC survey to assess risk perception. RESILOC is discussing with a larger group to use some of these questions or their design in a harmonised catalogue which should be anchored within DRS01 and eventually be situated at the level of the EU. All questions brought in from the RESILOC side were checked and approved by the RESILOC IEB. However, the project must be conscious of the fact that the scope of the questions may change. As the current leader of the DRS-01 Cluster, RESILOC will stress the necessity that any progress of the catalogue will receive an ethics' check before being part of a recommendation to users or policymakers. Additional comfort comes from the knowhow that the JRC, as the dedicated recipient of the catalogue, will have its own obligation to perform an ethics review before adopting the catalogue.
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5		Opinions/approvals provided by ethics committees and other experts						
5.1		Following documents received opinions/approvals provided by ethics committees and other experts for the research conducted for this deliverable.						
			yes	no		yes	no	n/a
a	Informed Consent Forms and Information sheet	IEB			EEA			
		DPO			LEB			
b	Questionnaires / Surveys	IEB			EEA			
		DPO			LEB			
c	Design /Methodology of research activity	IEB			EEA			
		DPO			LEB			



VIII. Appendix B: High-level process for the use of LRTs



IX. Appendix C: Results from the RESILOC Surveys

Table 8 shows that the ‘risk awareness’ indicator consisting of a four-item scale had a Cronbach’s Alpha of .85, indicating good internal consistency (for Catania the Cronbach’s Alpha was a bit lower at .76 which is still considered as acceptable). The scale can be reduced to three items by removing the second item, while still maintaining good/acceptable internal consistency and item-scale correlation (Cronbach Alpha of .84 and .76 in the UK and Catania respectively).

Table 8 Items of the ‘Risk awareness’ indicator

Risk perception ($\alpha = .85$)	Keep in short version
I expect to experience a flood over the next three years that will directly affect me	Yes
I often think about what it would be like to experience a flood	No
I am often afraid that I or a friend/family member/partner will be directly affected by a flood	Yes
Fear of a flood often influences my behaviour or decisions	Yes

As can be seen below (Table 9), the four-item scale for the ‘Trust in authority’ indicator has a good Cronbach’s Alpha of .88 (for both the UK and Catania survey). Reduction to three items is possible while maintaining good Cronbach’s Alpha (i.e., Cronbach Alpha of .82 and .86 in the UK and Catania respectively).

Table 9 Items of the ‘Trust’ scale

Trust ($\alpha = .88$)	Keep in short version
I trust the decision makers in my local authority	No
My local authority functions well	Yes
I trust my local authority to keep my property safe from flooding	Yes
I think there is good communication between the local authority and residents in my area	Yes

This new indicator of ‘community cohesion’ (see Table 10), based on a three-item scale revealed an acceptable Cronbach’s Alpha of .75 (and .74 for Catania). As it only consisted of three items there was no possibility of reducing it any further.

Table 10 Items of the ‘Community cohesion’ scale

Community cohesion ($\alpha = .75$)
There are people in my local area who can assist in coping with an emergency
The residents in my local area are actively involved in the community
I feel a sense of belonging to where I live



Table 11 presents the ‘community competence’ indicator as a four-item scale with a good Cronbach’s Alpha of .82 (and .79 for Catania). If necessary, the scale can be further reduced to three items by excluding the first item without significantly reducing the reliability of the scale (i.e., Cronbach Alpha of .81 and .79 in the UK and Catania respectively).

Table 11 Items of the ‘Community competence’ scale

Community competence ($\alpha = .82$)	Keep in short version
I believe that I can reduce the effects of a flood through my actions	No
I trust my own ability to protect my property during a flood	Yes
I feel confident that I can organise my actions in response to a flood	Yes
If there was a flood warning in my area, I would know what to do to keep safe	Yes

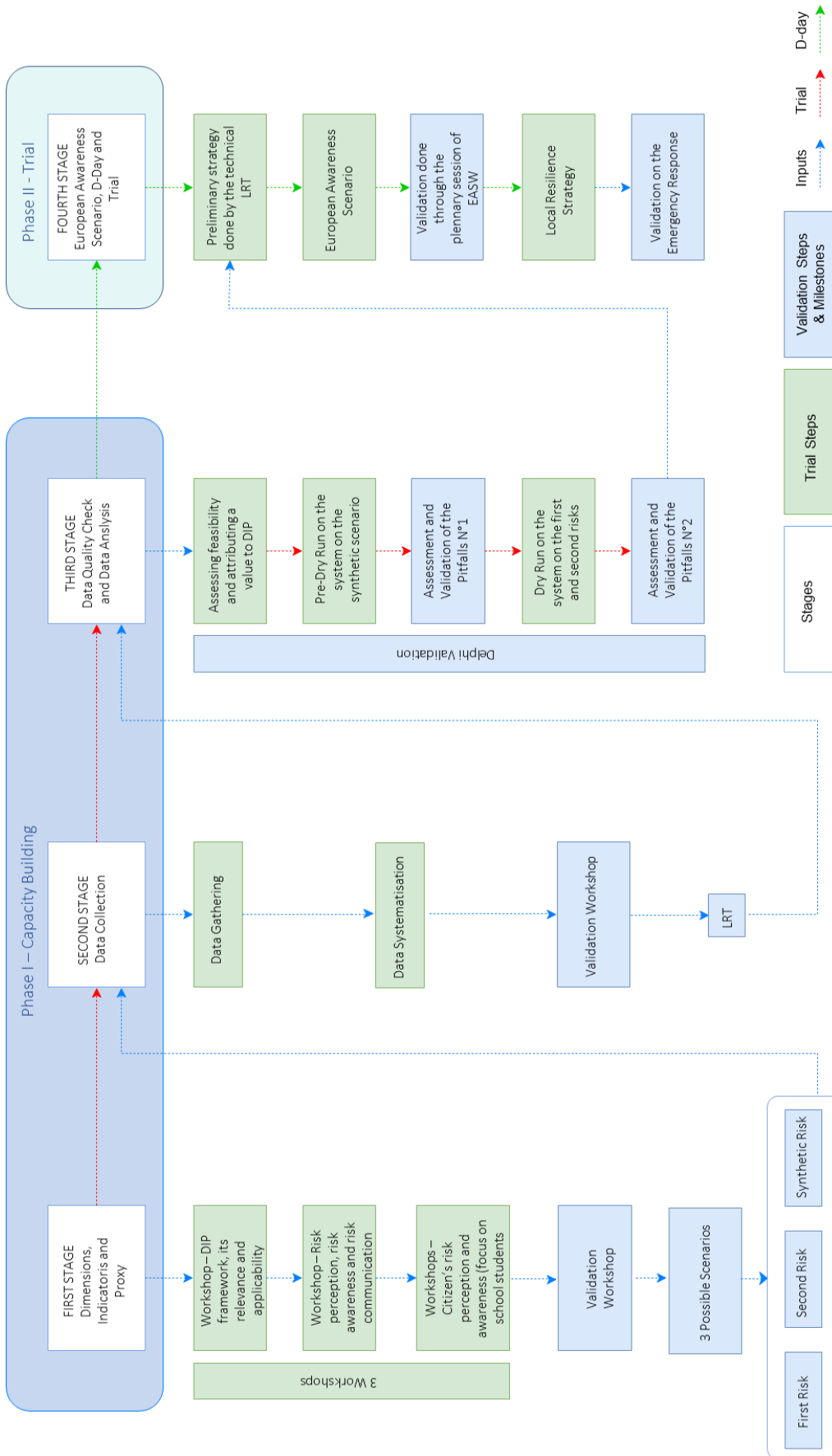
Finally, **adaptive behaviour** was measured using one question that asked respondents which of a list of flood protection measures they had implemented to protect themselves and their property:

- Talked to my neighbours about their flood experience
- Looked for information about what to do to keep safe during a flood
- Looked for information about my flood risk
- Participated in a local organisation that aims to prepare for floods
- Created a personal plan to be used in case of an emergency such as a flood
- Prepared an emergency kit for floods or other emergencies
- Bought insurance cover to protect me from the negative effects of floods
- Received first aid training
- Other (please specify)

The count of activities undertaken represented the level of adaptive behaviour (no weighting of the items was performed).

The analysis of the data for both the UK and Catania showed that most of these five constructs (used as indicators of the social dimension of resilience) showed statistically significant correlations ranging from relatively low to high. The strongest correlation was found between trust and community cohesion ($r=.58$, $p<.001$ in both the UK and Catania). Less strong correlations were found for risk perception with the other constructs, apart from adaptive behaviour where a medium correlation was detected.

X. Appendix D: RESILOC Trial Sequence.





Phase 3 - RESILOC Assessment

- Stage 3.1 Setting of RESILOC Inventory and Platform
- Stage 3.2 Data inputting
- Stage 3.3 Output assessment and simulation

Phase 2 - Data collection

- Stage 2.1 Data collection
- Stage 2.2 Data systematisation

Phases 1 - Preparation

- Stage 1.1 Community profile
- Stage 1.2 Establishing LRT
 - 1.2.1 Stakeholders' mapping
- Stage 1.3 Scenarios Identification
- Stage 1.4 LRT capacity building



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