COBACORE

Community Based Comprehensive Recovery

Grant Agreement № 313308

D1.1 Scope and Requirements

WP1 : Domain analysis, scope and requirement

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Deliverable Title	Domain Analysis, Concept and Requirements
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Executive Summary:

Deliverable 1.1 outlines the COBACORE concept based on the domain analysis conducted in work package 1. From this domain analysis a set of cases fitting the criteria determined by the consortium are analyzed. From this analysis specific attention was given to the involved actors in the disaster response operations. While many different persons and stakeholders can be identified, they can be classified in three major groups, based on their background and relation to the disaster. The first group are the affected communities the people in need and have a demand for supplies and services. Second there is a group of professional responding organizations, varying from local emergency r own abilities to rebuild after a disaster. It also includes the skills and resources provide by so-called spontaneoudes for example people close to the affected area or supporting the relief operations remotely, providing relief, supplies and services to the affected community. These three groups, overlapping to a certain extent, can jointly make a significant contribution to aiding the affected community not only in their direct and direst needs but also providing certain skills and resources to rebuild the stricken communities. A strong connection between the involved parties, facilitated by information and knowledge exchange, improves the efficiency and effectiveness of disaster response and recovery operations.

From the analysis we conclude that there are significant opportunities to further take advantage of the resources and skills of spontaneous volunteers and responding communities, the capacities existing in the affected community and the resources of the professional organizations. However in order to tap into this potential and bringing the different involved stakeholders together, interaction will have to be facilitated. Among these interactions is the situational awareness, an overview of what parties are involved in the operations, to what extent, where they are operating and what their capabilities are, but also includes an overview of the needs of the affected community. Next communication between these involved parties should be facilitated, allowing the various stakeholders to inform each other, such communications also enable the redirection or mobilization of resources to areas in need. Finally strong connections between the involved stakeholders also enable professional organizations to build additional capacity among the affected and responding communities for example by training.

Deliverable 1.1 describes and examines these interactions in more detail. It continues to outline at a high-level how these interactions would could be translated to the requirements for a platform that could facilitate such interactions. The outcome of this domain analysis, concept and requirements outline is explored by other work-packages in more detail.

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1 Introduction

Deliverable 1.1 is the result of the work conducted by the consortium in the first 12 months of the **Co**mmunity **Ba**sed **Co**mprehensive **Re**covery-project (COBACORE). While formally the responsibility of the work package 1 (WP1), the deliverable presented here is based on the input work and analysis from all partners and consortium members. Deliverable 1.1 aims to bring the outcomes of various discussions within and between the work packages, the (internal) deliverables, together with its own analysis in order to present one uniform description and outline of the COBACORE. Although presented by WP1, the deliverable is the result of a joint effort of the consortium and will form the base for other work packages to build upon.

Deliverable 1.1 describes in more detail the challenges and opportunities identified in the domain of disaster response and recovery. In particular the challenges and opportunities faced by the changing landscape of disaster response and recovery operations. This includes the emphasis on improving the resilience -the ability to resist damage and recover quickly- of the affected community and their own abilities to rebuild after a disaster. It also includes the skills and resources provide by so-called spontaneous volunteers who are –facilitated by advancements in information technology such as social networks– responding to the needs of the affected community. The increased complexity of the disaster response and recovery organizations also requires a new approach towards the exchange of information. An exchange where information is not following only from the affected community to the responding professionals but also vice versa and includes exchange with the responding volunteers. In this deliverable these issues are explored in more detail, opportunities and requirements are identified and a base for the current concept of the COBACORE platform is provided.

This document outlines the COBACORE concept as a platform, method and tool for facilitating comprehensive recovery, supporting the responses of professionals, affected communities, professional volunteers, and spontaneously organized groups. Starting with the 2013 German Flooding as an illustration, the document continues to explore several cases based on the selected scope and focus by the consortium, the Description of Work (DOW) and its advisory members. This document continues to describe the issues that are related to the changing types of responses. It continues to outline the identity of the actors and stakeholders, their motivations, methods, and the related issues COBACORE aims to address. Furthermore the document describes the high-level functions we envision the COBACORE platform to provide, augmented by technical and non-technical requirements resulting from these functions and the domain analysis.

The contents of this document as well as the concept itself are built on research, involving various stakeholders, the analysis of cases, results from other work packages and (initial) evaluations with representatives of the mentioned user groups. While this approach ensures a well-considered and grounded concept, described in this document future insights and evaluations might suggest further refinements and/or additions to this concept.

1.1 Relation to project and work packages

This document aims to provide the consortium with a clear vision of the COBACORE platform and the direction towards it. The deliverable therefore is not only built upon the own internal analysis of WP1 but also includes the outcome of discussion within and between the various partners of the COBACORE consortium, including the internal milestones, discussion at workshops and online discussions.

The concept outlined in this document is intended to guide the various work packages in their individual efforts and ensure a common vision is established. Deliverable 1.1 aims to provide the partners in the COBACORE consortium, and other stakeholders, with a clear context and understanding of the domain of community driven disaster response and recovery. In addition, based on the analysis of several cases several key issues are identified, along with the various functions that the platform should fulfill in order to successfully address these issues. The more detailed description of how these functions are implemented (WP3), the information perquisites (WP2) and user-interfaces (WP4) are described in other deliverables (see *related documents*).

1.2 Related documents

There are several related documents, on which deliverable 1.1 is built. The following documents provide more details and insights on the various sections introduced in the document. For more details we refer to these specific documents.

1.2.1 Internal WP1 documents

- **End user perspective community based needs assessment**
  This document describes the various end-level perspectives: the individuals from the affected community, volunteer-driven responding organizations and the professional responding organizations. For each of these levels the document details the potential benefits the COBACORE platform could provide, how to incentivize that level and the desired (high-level) usage expected.
- **State of the art**
  This document explores the tools, methodologies and practices currently employed. The goal is to identify what initiatives are in place and how these initiatives are related to the COBACORE project. The outcome will help to assess with which systems and to what extend COBACORE can align with the existing tools. Furthermore it will help to identify any 'gaps' that COBACORE could fill and demonstrate its added value in the current ecology of disaster management systems and initiatives.
- **Case descriptions**
  The cases presented in this document are initially a descriptive account of several disasters that have occurred and have been studied over the past decade. These cases will be used in further research to uncover the more detailed analytical requirements, to verify the direction and functionality of the COBACORE platform and to demonstrate the value COBACORE potentially provides. The cases are used to answer specific question from other WPs, but are also means for those packages to consider their options in representative cases.
- **Milestone 1.1**
  Milestone 1.1 describes the 'background' in which the COBACORE development takes place. This concept milestone is send out as an internal document to provide all the members with what has been established by WP1 as a common understanding to the problem areas, and continues to provide cases to test the ongoing work and future decisions. The information presented in this document originates from various discussions with and input obtained from other WP-members as well as the DOW.

- **Milestone 1.2**
  This intermediate document outlines the COBACORE concept as a platform, method and tool for comprehensive recovery, supporting the responses of professionals, affected communities, professional volunteers, and spontaneously organized groups. The document describes the issues that are related to the changing types of responses and identifies opportunities for COBACORE to act upon and to provide an innovative solutions for. Input for Milestone 1.2 is collected from the consortium members, case analysis and interview with stakeholders and advisory members.

1.2.2 Deliverables

In addition to the internal documents from Work Package, this deliverable also includes input from the (underlying discussions and work of) deliverables of other work packages. In particular D1.1 has a strong –mutual– connection with the following deliverables.

- **D2.1 Data identification**
  An important part of the COBACORE platform is the exchange of information between the various involved stakeholders. This information exchange is facilitated by the data that are relevant for the various users of the COBACORE platform. In order to process this information and data a proper structure is needed.
- **D3.1/MS3.1 Functional behavior**
  From the issues and functions presented in this document we distill the various functions that the platform is required to provide in order to address these issues and make use of the potential. The deliverables from work package describe in more detail how these functions work.
- **D4.1 Platform requirements**
  The platform requirements outline the capabilities of the platform in order to provide the described functions and details. This includes for example the underpinning technical infrastructure and the abilities the platform should provide for example in terms of user interface and interactions.
- **MS4.1 / MS 5.1 Intermediate evaluation & Performance indicators**
  The outcome of the domain analysis and the resulting opportunities and issues are used by Work package 5 in their deliverables to base the indicators and evaluation setup upon. Vice versa, the outcomes of the evaluations undertaken by Work Package 5 help to assess the validity of the outcomes of Work Package 1 described in this deliverable. This assessment is included in part in this deliverable.
- **D6.2 Report on exploitation opportunities.**
  The outcomes of the concepts presented in this document also provide a direction for the dissemination and use of the system. Specially the identification of the (potential) users, stakeholders and the incentives to adopt the system. Along with the identified added value the outcomes aid in identifying opportunities for exploitation.

1.3 An example: the 2013 Flooding in Germany

The spring weather preceding the flooding had been wet in the region, and May 2013 had been one of the three wettest in the last 156 years in Austria, together with the years 1962 and 1965. Austria saw twice as much rainfall as average during the month resulting in the ground in the region becoming saturated. Soils in Germany were showing record levels of moisture prior to the rains. The already saturated soils led to greater runoff when the rains began.

After several days of heavy rain between the 31st of May and the 2nd of June 2013, floods occurred along several of the major rivers across central Europe. Germany was among those countries worst hit by the floods, see **Error! Reference source not found.**. Flooding and associated damages in Germany primarily affected its southern and eastern federal states. The continued rainfall and the limited capacity of the soil to absorb more water, lead to the increase of flooded area. From the 3rd of June, an increasing number of areas were declared disaster zones, particularly in Bavaria, Saxony and Thuringia. After the heavy rain from late May/beginning of June, other sporadic showers and rainfall kept the risk of further flooding at a high risk level for several days and thereby prolonged the acute phase of the disaster. In some areas, the levels of flood waters in Germany even exceeded those of the 2002 floods along the banks of the Elbe and Danube rivers, which had previously been described as 'once in a century' floods.

During the first week of June, the local fire brigades deployed about 43,500 relief forces to affected communities. By the 9th of June 2013 the number of deployed firemen had increased to 75,000 and also included personnel from unaffected federal states. Support was provided by the Federal Agency for Technical Relief (THW), a civilian protection agency consisting of nearly 85.000 members of which 99% are volunteers. THW was active in all areas affected by the floods between the federal states of Bavaria and Mecklenburg-Western Pomerania with more than 6,000 of its relief forces. Besides measures for safeguarding dikes and sandbag installations for flood protection, the focus of THW lay on technical and logistical support. On average about 3,000 to 4,000 volunteers from nine state associations of the German Red Cross (GRC) were reported to be deployed to the command and situation center of the national headquarters of the GRC during its activation between the 4th and 13th of June 2013.

Figure 1: Flooding and risk areas during spring/summer 2013

1.1.1. Community response

As during the flood of 2002, thousands of citizens joined in the response. Many of the volunteers were members of the resilient community, who were affected by the flood and tried to help themselves in recovering. They became active autonomously to rescue their own houses and other goods of the municipality. Additionally, numerous volunteers from unaffected areas and even from other regions arrived on site to provide assistance as part of the crisis response to the floods. Most of them were spontaneous volunteers, without a specific background or training; mostly they arrived on site in reaction to requests for assistance that were posted on different Facebook group pages. In several of the flood-affected regions in Germany numerous Facebook groups were created which were heavily frequented within a very short period of time. Via these Facebook groups volunteers were mobilized and affected people informed about the on-going situation. The Facebook groups did not only call for help, but also posted offers of help and other important up-to-date information about the developing situation. As a consequence high numbers of spontaneous volunteers could become active within almost real time at places where assistance was needed. The Facebook group “Elbpegelstand”, for example, reached more than 70.000 likes within the first days of the acute disaster response phase. In this context, it has to be noted that one post reaches up to 3 million Facebook-users through sharing the post (German Red Cross Study, 2013). In Dresden alone, 5.000 citizens organized themselves via social media such as Facebook and Twitter. The three mostly frequented Facebook groups in Dresden/Saxony were “Elbpegelstand”, “Hochwasser Dresden” and “Fluthilfe Dresden”.

During recovery phase it was more difficult to raise awareness and mobilize volunteers. In this phase public/ medial interest decreased and public awareness of still existing needs was not fully given. Employers were often willing to grant a leave from work without a loss of payments in first response, but these arrangements were more difficult to make during recovery phase. In a consequence of decreased awareness, donations in kind decreased as well.

1.1.2. Challenges

Besides the aforementioned provided support, resources and capabilities of the spontaneous assistance being mobilized via social media, one should also consider its weaknesses and limits. A very big disadvantage of this “grass-root-approach” lies in the fact that this spontaneous assistance is very hard to maintain oversight in real time and therefore also hard to monitor with regard to the overall crisis situation. Furthermore, not only important information but also false or obsolete information and rumors were very quickly disseminated. As a consequence, there was often an overflow of volunteers on “sites of deployment”.

Another problem that became obvious during the disaster response phase in the city of Dresden and its surrounding areas relates to the fact that it was predominantly central places and other hot spots of the city which were frequented by the spontaneous volunteers; peripheral and rural areas were visited much less. Also, there was the problem that the sandbag installations in many places were unstable and could not withstand the water pressure because they had been built up without the necessary expertise or without instructions by professional forces. Moreover, there were risks of injury and infection in many areas due to contaminated water or missing protective measures such as work gloves.

1.1.3. Opportunities

The support of affected and non-affected citizens during the floods of 2013 was not only an important sign of solidarity and social cohesion, but also an effective contribution to civil protection. The help of spontaneous volunteers was not just a minor nicety: while not all initiatives were equally successful, it can be said that the actions undertaken have considerably disburdened the workload of the rescue forces like the fire brigade, THW and the relief organizations.

Without this effective staff reinforcement the necessary measures being conducted by deployed civil protection forces would have taken much more time, especially with respect to building up sandbag installations which requires considerable time and resources. This would have led to a higher impact of the floods and the damage left behind would have been much more serious.

Experience reports by both spontaneous volunteers and staff of civil protection organizations have shown that target-oriented coordination and steering of both the requests and offers for assistance and the volunteers themselves during the disaster response operation would be very helpful. This includes the close coordination of cooperation between spontaneous volunteers and professional civil protection forces.

Additionally it becomes obviously that success of crisis management during recovery phase and public awareness are inseparably linked. In order to ensure an overall improvement of all actors during recovery phase, public awareness needs to be raised simultaneously.

2 COBACORE Domain

This section presents the analysis of the domain and the context of COBACORE. In this section the approach towards the domain analysis is introduced. Next the various dimensions explored in the classification of the disaster examined is explained in more detail. From these dimensions, combined with the outline of the DOW, the specific scope and focus for the COBACORE project are chosen. In turn, for these scope and focus specific case-studies are chosen and examined. The results from the case-studies are used to identify specific issues, challenges, opportunities COBACORE aims to overcome or utilize.

2.1 Approach

As various types of disasters are of interest to the COBACORE community, the scope (which type of disasters are of general interest for the COBACORE community) and focus (which type of disasters are the most prominent for analysis and development of the COBACORE platform) help to prioritize in this process. In order to build to select the appropriate scope and focus for further exploration and build an initial understanding of the domain. The study conducted is based on the two existing research methodologies (Benbasat, I., Goldstein, D. K., & Mead, M. 1987) a longitudinal, top-down approach, starting from a high-level perspective on disaster and narrowing down to a relevant scope and a latitudinal, bottom-up approach starting from the user-perspective, identifying various information needs, user-roles and the corresponding requirements. Both views are connected through the cases selected, illustrating how these perspectives converge and providing the context for further research. These perspectives and their relation are illustrated in Table 1. A more extensive description of this method and (ongoing) approach is described in the 'Work package Approach v1.3' document.

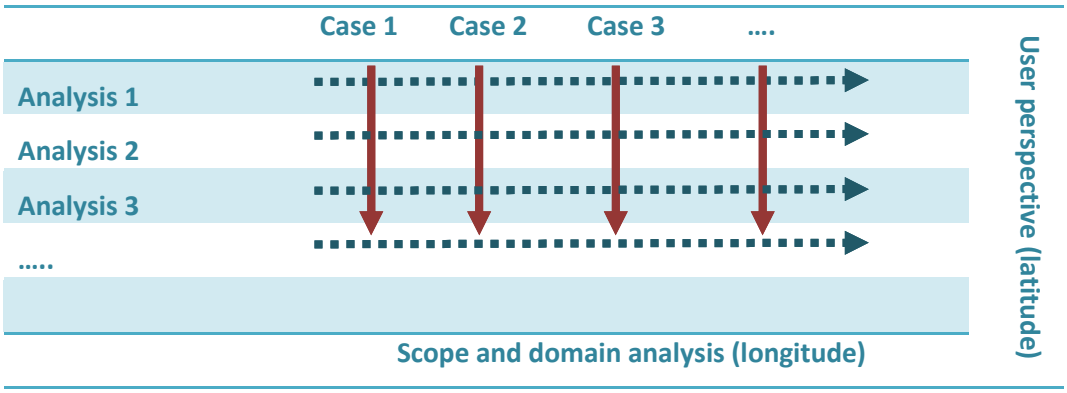


Table 1. Various views to identify and analyze the COBACORE problem domain

The scope and the focus on the COBACORE project is described first and has been established through a process of (online) brainstorming and refinement. Members have been asked to provide various factors that can be used to classify a disaster, along with the related factors (categories). Next to using the DOW, and inter-work package meetings we discussed the appropriateness of the intended COBACORE system for each factor. Through discussions we determined (1) which factors are relevant for the domain definition, (2) for the relevant factors determine the categories that apply to COBACORE, (3) describe for those categories how they relate to COBACORE. This brainstorm, refinements and selection process resulted an initial selection of the scope and focus for COBACORE, which is then verified in partial evaluations.

At the same time an analysis is conducted from a user perspective. As part of the consortium, the Red Cross organizations provide valuable input to determine who could benefit from a system and how these benefits would be established. This analysis provides insight into the various groups of users of the involved members of the recovery and how the groups could interact with the system. This helps to position the COBACORE system in a typical scenario.

Finally several cases representative of the scope and focus help to illustrate the chosen problem domain. These cases are described in terms of the chosen (relevant) factors, in addition to a general description. The resulting documents provide the option to ground the COBACORE project in practice and in addition to the domain exploration- will be used in the further analysis based on the research and requirement needs of the consortium and other work packages.

In the next stage more emphasis will be placed on the current state of the needs assessment and community based recovery tools. The results will help to identify gaps in the current 'tools-landscape'. Combined with the results from other analyses will form the base for the requirements and objective of the COBACORE project.

2.2 Domain analysis

To decide upon which type of disasters are of particular interest to the COBACORE community, key factors along which disasters can be 'ranked' have been identified. Each factor carries 5-6 dimensions that cover the full spectrum of possible scenarios for a disaster. Within these 5-6 dimensions, each factor will have a scope and focus, illustrated in Table 2.

2.2.1 Affected population

"People who are adversely affected by a crisis or a disaster and who are in need of urgent (humanitarian) assistance" (WHO, 2013)

Affected population	International	Nationwide	Province / State	Municipality	Local community	Individual family

The dimension ranges from an international, large scale disaster in which a disaster affects the population located in multiple countries and regions. The smallest dimension within the affection population factor is a single affected family.

For the COBACORE project, the scope of this dimension spans from a nationwide disaster to a local community. Although it is acknowledged that, a cross-border disaster is of particular interest to the COBACORE platform, the assumption is that most relevant findings are to be found when not only focusing on large, international disasters. Participants during the partial evaluations confirmed this assumption, as large scale disasters occur less frequently.

Large, international disasters are comparatively rare in frequency and involve a very particular, specific type of actor, for example the United Nations. WP1 members found that most relevant findings can be found when scoping more on somewhat smaller, but more frequent disasters that take place on a local community scale, up to a nationwide disaster affecting multiple local communities. This could also include communities located in different countries (cross-border crises), but is distinct from disaster affecting an entire nation. Within this scope, the main focus will lie between the provincial or state level in which multiple communities have been affected. A province is a territorial unit, almost always an administrative division, within a country or state.

2.2.2 Impact on beneficiaries

"The overall effects, direct or indirect, of a disaster on the well-being of a population" (WHO, 2013)

Impact on beneficiaries	Immediate loss of life	Potential loss of life	Major disruption	Service Replacement	Delay/Expedition	Minor Inconvenience

This factor has six dimensions ranging from immediate loss of life to minor inconvenience. The scope within this factor ranges from immediate loss of life to delay/expedition for a community. 'Immediate loss of life' means multiple deaths as a direct consequence of the disaster, whereas 'Potential loss of life' implies a direct threat to the survival of members of the population. 'Major disruption' means a delay in the continuity of primary goods and services provision (i.e. food, water, shelter, security, health), while 'service replacement' means a delay in the continuity of secondary goods and services provision (i.e. psychosocial, finance, transport). 'Delay/expedition' then implies a slowdown in the provision of tertiary needs (i.e. entertainment, leisure). The reason for this relatively broad scope is that the COBACORE platform, aiming at *comprehensive* recovery, can facilitate exchange between the affected and supporting communities in many instances which do not necessarily have to be due to major societal disruptions.

The most potential added value in the analysis can be found by scoping the COBACORE platform towards cases where there is a significant chance for casualties and wounded within a major societal disruption; during those cases exchange between the affected and supporting communities is currently the 'least optimal'. Minor disruptions, such as very local incidents or limited impact on the population, can currently be quite well handled by affected communities without the help of any external supporting communities via a platform such as COBACORE. Mainly because in these situations communities rely on existing structures such as emergency services. Furthermore in the partial evaluations it was shown that the specific needs should not be defined too much up front, instead leave it to the public to come up with suggestions for how affected and supporting communities can support each other.

2.2.3 Economic impact

"Loss of income due to disaster-caused destruction" (FEMA, 1992)

Economic impact	XXL (10e9 €)	Extra Large (10e7 €)	Large (10e6 €)	Medium (10e5 €)	Small (10e3 €)	None

This factor has five dimensions ranging from high economic costs (>10 MEU) to a small amount of costs (<10K EUR). The amount of costs includes all economic damage (insured and uninsured) and aftermath effects of a disaster. The economic damage of a disaster is highly dependent on the location where a disaster takes place; the economic scope is defined here is based on the economic losses in disasters occurring over the past decade in Western Europe[1]. This yields quite a broad range and includes a wide variety of disasters from an economic viewpoint.

The focus of the economic value is closely tied to the factor 'impact on beneficiaries'. The focus will lie between large (1 MEU) and medium (100K EUR) disasters, as these are more common among provincial/state level communities. Participants during the partial evaluations confirmed this assumption, as large scale disasters with a large economic impact occur less frequently.

[1] http://www.emdat.be/

2.2.4 Time horizon

"Estimated length of time for a recovery plan to complete"

Time horizon	Ongoing	Months	Weeks	Multiple days	1 day	Hours

This factor has six dimensions ranging from a very brief, one-hour recovery period (which can still have a high economic impact such as a tsunami or hurricane) to long-running recovery, in for example 'creeping' disasters such as effects from climate change.

The scope within this project is between the dimension 'ongoing' and 'multiple days', as a shorter societal disruption is less in need of new ways for exchange between supporting and affected communities. The focus of this project is on recovery periods that take place between months and weeks, as a future COBACORE platform will require some time to start up the exchange between supporting and affected communities. Thus, this includes not only the immediate 'relief' phase after a disaster, but also the 'recovery' phase in which the needs of affected communities change from basic needs (WASH, Shelter, Food, Health) to needs that help to re-establish livelihoods (seeds, water pumps, roads, electricity, transport) of affected communities. Note that the phases "relief" and "recovery" are defined in section **Error! Reference source not found.**.

2.2.5 Complexity of response

"The level of systematic utilization of instruments to deliver humanitarian assistance in a cohesive and effective manner" (WHO, 2013) [2]

Complexity of response	Cluster coordination	Multiple organizations	County / Providence	Municipality	Emergency services	Citizens

This factor ranges from 'cluster coordination' to 'citizens' who can take care of themselves within the village community. 'Cluster coordination' means a certain minimum of agencies involved per sector (such as WASH, Shelter, Emergency Telecommunications), while 'multiple organizations' implies approximately 10-20 involved agencies across sectors. 'Country/province' level implies a response on 'federal level' with approximately fewer than 10-15 agencies involved. The fourth dimension, 'municipality' implies a regional response within a single municipality, while 'emergency services' means a response from the policy, fire brigade or ambulance which does not require extensive coordination during the response.

The scope of the complexity for COBACORE is on disasters where multiple organizations work together within a larger (urban) community. The focus is on a country/province level, for the same reason as mentioned previously in 2.2.1; the current assumption is that most relevant findings are to be found when not only focusing on large, international, low-frequency disasters. This was furthermore confirmed during the partial evaluation sessions.

2.2.6 Level of preparedness

"Activities and measures taken in advance to ensure effective response to the impact of hazards" UN/ISDR (2004)

Level of preparedness	Systems-active	Systems-standby	Strategy/plan	Training / preparedness	Basic response	None

[2] Alternative: number and type of agencies, tasks, capabilities and their interdependencies that are difficult to predict, manage, design, and/or change during a disaster

This factor ranges from a population which is continuously running disaster monitoring and management systems, to a population which is unaware and fully unprepared to any kind of disaster. More specifically, 'systems-active' is the highest level of preparedness which implies that the community continuously has emergency management systems fully prepared, staffed and up and running. The second dimension 'systems-standby' is similar, but now systems are not continuously actively running and fully staffed. 'Strategy/plan' implies that the community is aware and trained in various responses in different crisis scenarios. 'Training / preparedness' means that the community has gone through different training scenario's that are not part of an overall response planning, but individual are aware on personal and smaller group level how to respond. 'Basic response' implies a lower level of training of the population in disaster response; mainly personal lifesaving skills and standard response scenarios.

The scope for the COBACORE project is in this case quite broad, as most communities contain both unprepared and better prepared citizens among them. Some communities are certainly better prepared than others (also because of increasing focus on Disaster Risk Reduction in both developing and developed countries) and therefore a specific focus is on communities that have a general plans and systems setup or on standby, prior to the moment a disaster strikes. In these cases the COBACORE platform will not have to be set up when a disaster has already occurred, but could be standing by, for example supported by volunteers and filled with baseline data.

2.2.7 Data availability

"The degree to which databases and information systems correctly and timely record, transmit and report data transactions"

Data availability	Extensive, structured and up-to-date	Multiple data-sets	Basic, structured data	Unstructured / Dispersed data	Limited data available	None

This factor ranges from no data available to multiple data sets that are aligned, structured, up-to-date and ready for analysis via an information exchange platform such as COBACORE. The first dimension is 'Extensive, structured and up-to-date' which implies live disaster and recovery data registration and dissemination via a clear and pre-agreed dissemination hierarchy. 'Multiple data-sets' implies that disaster data registration and dissemination takes place via a less organized dissemination hierarchy, but recent data nevertheless is still available from multiple sources. 'Basic, structured data' means somewhat organized data sets which only contain basic information categories and elements (i.e. location, affected persons, deaths) that is sent with a certain level of delay from the affected area. 'Unstructured / Dispersed data' is similar in this regard on the contents of the available data, but in this dimension fully lacks a structure which facilitates organized dissemination to the user groups. Furthermore, this data is delayed in time even more and has thus lost some of its value to be of relevance for the COBACORE user groups.

The scope within this project lies on disaster situations where all types of data sets are included; a particular focus will be on situations where limited data is available (immediately after a disaster), but also situations where multiple, nonaligned data sets are available for further analysis. The reason for defining this scope is mainly because in both situations the COBACORE platform will (ideally) be able to provide added value in relief and recovery phases between both affected and supporting communities. During partial evaluations representatives from the community groups indicated that this varied heavily per crisis situation and also per European country the level of data availability is quite differential as well as the sources (government, municipalities, GOs, NGOs, etc) available to obtain this data from.

2.2.8 Global frequency of event

"The rate at which a crisis occurs or is repeated over a particular period of time"

Global frequency of event	Once per 50 years	Once per 10 years	Annually	Monthly	Weekly	Daily

This factor ranges from once per 50 years (i.e. San Francisco Bay Area earthquake) to daily disasters that occur somewhere in the world (droughts, floods, winds, riots).

For COBACORE, the scope is on all types of frequencies of disasters, as all these disasters carry relevant elements that help to shape the COBACORE platform further. The focus is on disasters that occur on a yearly to once-per-10-years type of disaster.

2.2.9 Environment

"The setting or conditions in which a disaster occurs"

Environment	Western urban	Western suburban	Western rural	Developing urban	Developing rural	Uninhabited

This factor ranges from uninhabited to western urban dimensions. The scope here logically lies between all disasters in which people are involved, so from western urban to developing rural environments. However, the assumption here is that a COBACORE platform can add most value to a situation in which a high number and various types of data sets are available and where there is a mismatch between the supporting and affected communities. Based on that assumption, the focus in the COBACORE project will lie on western urban and western (semi/) suburban areas. This was confirmed during the partial evaluations.

2.2.10 Event formation

"A specified state of growth or advancement of a crisis" (Relief web, 2011)

Event formation	Fast-blaze	Sudden on-set	Developing situation	Slow burning	Creeping / Silent	Predictable

This dimension ranges from fast-blaze (i.e. a tsunami hitting an urbanized coastline) to predictable disasters (i.e. yearly floods after a monsoon).).The first dimension, 'fast-burning', means a hazard which starts suddenly and expands quickly in size/impact in the affected area. A 'sudden on-set' disaster start quickly, but develops itself at a lower speed in the affected area. 'Developing situation' implies an 'average' start of a certain event and an 'average' expansion throughout the affected area. During a 'slow-burning' disaster one is not fully aware (underestimates) the development speed of the hazard taking place. 'Creeping / silent' means that one is almost unaware of the crisis taking place (except when carefully observing). A 'predictable' disaster then, is an event where one is familiar with the frequency and development speed when the event occurs.

The scope ranges from fast-blaze to silent/creeping disasters as these are all relevant for findings lessons for the development of the COBACORE platform. The focus in this project is on fast-blaze and sudden onset disasters, where there is some level of pre-existing agreements on how affected and supporting communities will self-organize themselves (see the factor 'level of preparedness'). On the other hand, not everything should already be 'neatly' planned when a disaster strikes, as then the need for a supporting platform such as the COBACORE platform will not create any significant added value.

2.3 Scope and focus

Based on the outline of the various factors presented in the previous section, we can identify as specific scope and focus for COBACORE. Each factor carries 5-6 dimensions that cover the full spectrum of possible scenarios for a disaster. Within these 5-6 dimensions, each factor will have a scope and a more specific focus, illustrated in Table 2. While this scope and focus aid to consortium to focus their research, development and dissemination efforts, it is not sharp outline used to segregate what is relevant or not. Rather, the scope and focus help to focus discussions and create a common understanding within the consortium of the targeted types of disaster. In the course of the project, and in specific instances, deviations or changes may still occur in the set scope and focus.

For more details on the considered factors, categories and analyses view the schematic overview included in annex A of this document.

	Scope		Focus
	Min	*Max*	
Affected population	Multiple entities	Nationwide	Municipality
Impact on beneficiaries	Needs no longer fulfilled	Loss of life	Elementary needs
Economic impact	Small (10^3 €)	XXL (10^9 €)	Medium (10^6 €)*
Time horizon	1.5 Day	Multiple years	1 month to 1 year
Complexity of response	Municipality	Multiple unbounded organizations.	County / Province*
Level of preparedness	None	System active	System ready to deploy
Data availability	Data must be generated	All data is accessible	Base data is available
Frequency of events			1-5x per year
Environment	Rural	Urban	Western urban
Event formation	Creeping/Silent disaster	Fast-blaze	Sudden on-set

***The exact value or description will be country-depended. These figures used here are indicative for a mid-sized EU country**

Table 2 Contextual Scope & Focus

For each of the considered dimensions a scope and focus have been identified. The scope helps to consider cases where the COBACORE platform could be implemented and provides added value. In other words, all situations that platform should be able to cope with. The focus helps to determine which cases and situations are exemplary for the platform and in which it will excel. The focus helps in demonstrating the added value and dissemination of the results of the COBACORE project.

Based on the various discussions we have determined that the fitting scope for the COBACORE platform is in the western urban area. The scope of COBACORE will be on disasters that affect the area of a municipality (or greater), in which the needs of the affected population are no longer fulfilled. Furthermore the event should affect a population size that could be classified as a community (i.e. more than a family). Furthermore COBACORE focusses on disaster in which multiple organizations are responding but some existing control structure remains (i.e. no full 'international cluster implementation'). Finally the recovery time horizon of the COBACORE platform extends beyond the initial response and applies to situations in which the recovery takes weeks or longer.

2.3.1 Flexibility

Given the determined scope and focus, the platform needs to be flexible enough to adapt to a multitude of situations. First there are different deployment scenarios, which ask for flexibility in the dissemination and evaluation for the project (WP6 and WP5) For example involving different levels of response, ranging from municipalities to state wide responses. The event formation scope dictates that the system should be employable in both rapid-deployments as well as in ongoing disaster in which routines have already been established.

On the other hand there are factors that are important to consider in terms of information framework and functionality. For example the various levels of coordination considered ask for flexibility in terms of the users considered. This applies even more to the data factors as we consider situations in which no-data is available to situations where various data source are available.

2.3.2 Time horizon

During the different stages of a crisis, the COBACORE system has the most added value between the immediate relief phase and the recovery phase. This implies that the main focus of the COBACORE system is on the early recovery phase. In the figure below, the early recovery phase where COBACORE has the most value/impact is marked in red.

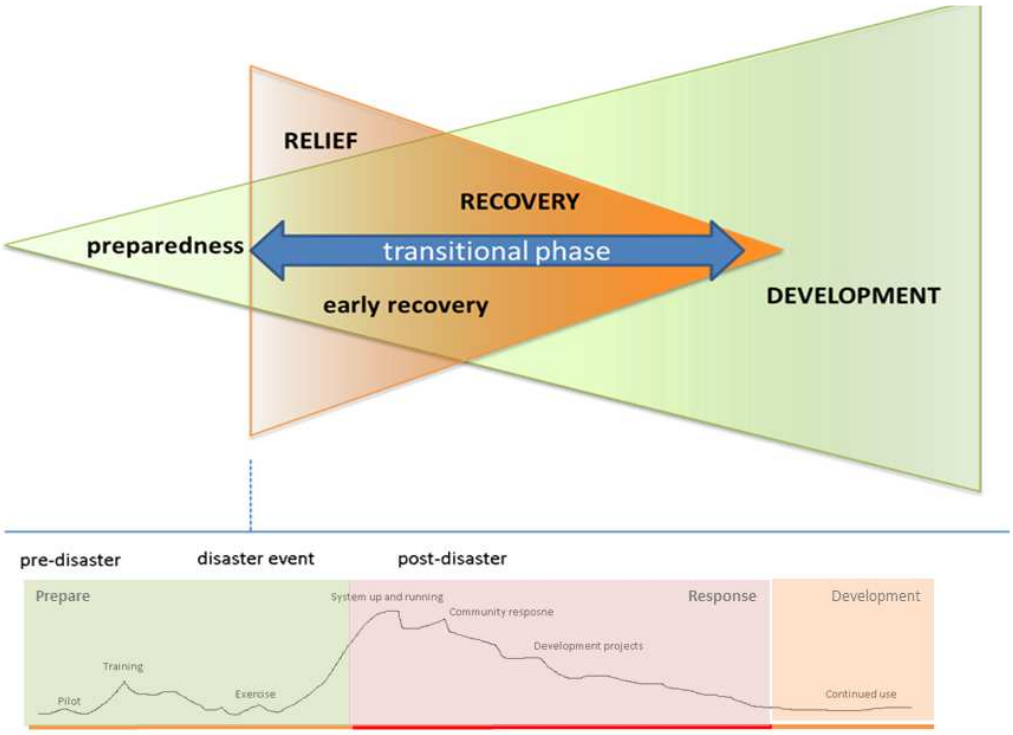


Figure 2: Position in Time

Although for a wide variety of crisis scenarios the exact added value will vary and the transitional phase between relief, early recovery and recovery is highly fluent, literature and field experiences show that bridging the early recovery gap (or LRRD in humanitarian terminology: Linking Relief, Rehabilitation and Development) is the most urgent need and most practical from a user perspective.

The main reason for the focus on the early recovery gap is that current crowd-enabled information processing tools require time to tailor and cannot be deployed straight into a disaster situation. Setting up context-relevant automated classifiers for short contextual strings, classification and information extraction requires time for translation into the relevant context. Although pre-setup information analysis frameworks can be helpful in limiting response time, it is deemed unrealistic to aim to deploy a COBACORE system in the directly after a disaster occurs.

The main reason for not seeing COBACORE's main application well into the development phase is that in that stage, the information density has already gone down and regular information channels are sufficiently able to ensure that the main issues as identified in the previous section are covered. On the other hand, the system as proposed now does not have to limit itself to response or recovery. It is a useful tool to gain insight in the vulnerability of communities (and in where to deploy action) in 'peace time' as well. A permanent presence will also add to its credibility, its accuracy and the 'find-ability' of the platform.

An important note to consider is that the willingness of spontaneous volunteers to help generally has a very short lifeline. A few days (weeks in case of large event) after the event people will have returned to their daily lives and will not actively be looking for things to do to help anymore. One of the added values of COBACORE might be that the ongoing needs of the affected community are better visible/understandable and will therefore prolong the lifetime of the attention and motivation of the responding public.

2.4 Case studies

Several cases were considered to be analyzed and what is expected was defined by methodology and questions, also what to be learned from them. Main focus was put on the five cases and on preparing the case studies (*under internal evaluation now – and in attachment of this document*)). In this section we briefly introduce three cases and the summarized conclusions. More details can be found in the related documents. In addition other cases are currently being examined. For example Buncefield (GB) Industrial Accident (2005), Japan Fukusima-DaiNi (2011) and severe weather cases in Europe and US.

Methodology

For all of these cases the following topics will be examined in more detail. Some of these specific research questions are based on the requests from other WPs.

Descriptive

- Description, disruption, area, responding organizations, coping mechanism
- Describe affected population, what are the needs.
- What tools were used, for example for needs assessment and coordination?
- How is the community involved?
- What are the lessons learned for COBACORE?

Analytical

The questions below are used to both describe the problem and desired situation for the selected cases at hand:

- What processes of needs assessment for community based comprehensive recovery could be improved? When and where does this process take place?
- Who are the users? (both from affected community and supporting community, see DOW Figure 1: COBACORE bridges different communities active in post-disaster recovery)
- What information needs do they have for each user and can they provide?
- Where, when and how is the information provided or assessed by the user?
- Who are the stakeholders (other than direct users)? (both from affected community and supporting community
- How could we assess the performance (impact) of the COBACORE solution in the problem described (key performance indicators for WP5)?
- What are the state of the art practices, tools , methods and standards used in needs assessment, information sharing and community involvement, and what is missing (related to question above on purpose of COBACORE)?

2.4.1 Italy Earthquake 2009

L'Aquila earthquake occurred on Monday 6 April 2009 at 3:32 am. It measured 6.3 on the Moment Magnitude Scale and according to Akinci 27 the main shock has been recorded by fifty-eight accelerometric stations: the highest number of digital recordings ever obtained in Italy for a single earthquake. […] Very high values of peak ground acceleration were recorded near L'Aquila town center (5 stations at zero distance from the fault) with a station reaching at 0.63g value 28. " It was the deadliest earthquake in Italy since the Irpinia one in 1980 (in the Campania Region), when a 6.9 magnitude earthquake killed more than 2,900 people. In L'Aquila, 308 people died in the main shock, 202 of which in the metropolitan area, and about 1500 were injured. Despite its moderate strength, the earthquake had a devastating impact on the medieval city of L'Aquila and on its surrounding villages – especially Onna, where 40 people died. The Global Risk Miyamoto estimated in 2009 the overall damage caused by the earthquake at about USD 16 billion. Mostly involved was Italian Red Cross and Italian governmental Civil Protection Authorities (in the province of L'Aquila the Department of Civil Protection, a national DiComaC (Centre of Direction for Command and Control), established a geographical pattern based on the cascading principle of command centers, in which the Mixed Operations Centers (COMs) in larger settlements act as points of reference for the Municipal Operations Centers (COCs) in the smaller towns) in places the Italian Armed Forces. International aid was firstly refused. Mobile kitchen providing 10,000 meals per day with a team of 16 Red Cross humanitarian operators and 30 volunteers.

According to Alexander (2010) In Italy there is a tendency not to plan and not to understand the purpose of planning, which should enable rather than restrict by coordinating the rational use of resources. Another problem concerns the functionality of transitional settlements. At L'Aquila these are lacking in socio-economic resilience and planned according to criteria that are far too restrictive, especially regarding access to employment and services.

Also for example at the local university 28,000 students left without access to the university education. The centralization of power during the management of the emergency can result in a successful intervention just after the disaster;

In the very first weeks after the disaster and during the state of emergency, this power's centralization can lead to top-down and closed decision-making process, which can have a major impact later on. As the case of L'Aquila earthquake shows, decisions taken during the emergency phase had a tremendous impact on the opportunity of rebuilding the city.

2.4.2 Czech Republic Floods 2002

Floods of 2002 in Czech Republic, mainly Prague, accrued during August (12-18), 2002. Prague received significant damage from what were deemed to be the worst floods ever to hit the capital in last several hundred years. Heavy rainfall from storms that crossed central Europe during early August triggered sequential flood waves along two major river systems. The flood waves moved down the Vltava, Labe and Elbe rivers in the Czech Republic and Germany (the same part of the year also down the River Danube through Austria). The flow of Vltava culminated at 5300 m^3/s, 20% more than during the last big flood of the year of 1845. Among the regions of the capital city most severely affected were: Karlín, Kampa and Holešovice, where there was significant risk of building collapse. Most of Prague's art work was saved due to advanced warning of high water levels, however there was significant damage to the Prague Metro subway system, much of which was completely flooded.

The great disaster such as flood 2002 should lead government to develop reconstruction and rehabilitation plan (for affected regions). The report of 6th of February 2003 is certain that the recovery plan was not prepared and is not done fully until 2013. So the preparation and prevention phases were not done properly and in full effect (not all possibilities were used).

The impact on economy of the Czech Republic was significant (comparing to the Czech economy), an estimated cost of 3 billion Euro in Czech Republic, 1/3 in Prague (1 billion Euro) was evaluated.

The effort of preparing a new legislation – Act of Building Requirements, to prevent construction of new buildings within the floodplain, was not even finalized before 2012, and finally approved in 2012 with not full requirements from prevention needs point of view.

Conclusions made according to Rahman, 2005 who identified the strategies developed in Czech Republic:

- developed a flood simulation system – LISFLOOD,
- Ministry of Informatics was established as a central government body for ICT,
- improvements made in the department of crisis management (Ministry of Interior),
- improvements made in the Czech telecommunication office,
- implemented International Emergency Preference Scheme (IEPS).

2.4.3 Katrina (USA) Katrina 2005

Hurricane Katrina formed over the Bahamas on August 23, 2005 and crossed southern Florida as a moderate Category 1 hurricane, causing some deaths and flooding there before strengthening rapidly in the Gulf of Mexico. The hurricane strengthened to a Category 5 hurricane over the warm Gulf water, but weakened before making its second landfall as a Category 3 hurricane on the morning of Monday, August 29 in southeast Louisiana. It caused severe destruction along the Gulf coast from central Florida to Texas, much of it due to the storm surge. The most significant number of deaths occurred in New Orleans, Louisiana, which

flooded as the levee system catastrophically failed, in many cases hours after the storm had moved inland. Eventually 80% of the city and large tracts of neighboring parishes became flooded, and the floodwaters lingered for weeks. However, the worst property damage occurred in coastal areas, such as all Mississippi beachfront towns, which were flooded over 90% in hours, as boats and casino barges rammed buildings, pushing cars and houses inland, with waters reaching 6–12 miles (10–19 km) from the beach. Considering the scope of its impacts, Katrina was one of the most devastating natural disasters in United States history.

To the Department of Homeland Security was recommended developing of robust donations and volunteer management software system standard and also identifying of what Federal, State, or local support NGOs will need to sustain operations (sanitation, electricity, food, and water). Coordination of any kind help (volunteers, charitable organizations, donations from foreign countries) should be strengthened mainly on the government's levels.

The American Red Cross (ARC) and Department of Homeland Security (DHS) are authorities with long-standing experience providing mass care and shelters during disasters, however ARC their status as a non-government organization limits their access to Federal planning meetings. DHS and ARC should strengthen their planning and operational relationships with Department of Housing and Urban Development in all phases of a disaster (preparation, response, recovery and rebuilding). HUD, DHS and ARC must develop a close working relationship, not just during crises. During non-emergency times, they must jointly plan for mass care and housing during disasters. In conjunction with other Federal agencies, they must train for disasters and conduct exercises to evaluate the response readiness of the Federal government.

Evacuation of people to Superdome and followed accommodation was not completely mastered, because there were too many people and after few days they have big problems with providing of basic services and big problems with hygiene (that could result in health problems). This everything happened because there were difficulties with evacuations from Superdome to the safety areas. There was and still is a lot of discussion and criticism about especially the response to the Katrina disaster.

2.4.4 Buncefield oil disaster

Early on Sunday 11 December 2005, a series of explosions and subsequent fire destroyed large parts of the Buncefield oil storage and transfer depot, Hemel Hempstead, and caused widespread damage to neighboring properties. The main explosion took place at 06.01:32 hours and was of massive proportions. It was followed by a large fire that engulfed 23 large fuel storage tanks over a high proportion of the Buncefield site. The incident injured 43 people. Fortunately, no one was seriously hurt and there were no fatalities. Nevertheless, there was significant damage to both commercial and residential properties near the Buncefield site. About 2000 people had to be evacuated from their homes and sections of the M1 motorway were closed. The fire burned for five days, destroying most of the site and emitting a large plume of smoke into the atmosphere that dispersed over southern England and beyond.

2.4.5 Earthquake Japan - Fukushima

The Great East Japan Earthquake on 11 March 2011 with a magnitude 9 earthquake, generated a series of large tsunami waves that struck the east coast of Japan, the highest being 38.9 m at Aneyoshi, Miyako. The earthquake and tsunami waves caused widespread devastation across a large part of Japan, with 15 391 lives lost. In addition to this, 8 171 people remain missing, with many more being displaced from their homes as towns and villages were destroyed or swept away. Many aspects of Japan‘s infrastructure have been impaired by this devastation and loss. As well as other enterprises, several nuclear power facilities were affected by the severe

ground motions and large multiple tsunami waves: Tokai Dai-ni, Higashi Dori, Onagawa, and TEPCO`s Fukushima Dai-ichi and Dai-ni. The operational units at these facilities were successfully shutdown by the automatic systems installed as part of the design of the nuclear power plants to detect earthquakes. However, the large tsunami waves affected all these facilities to varying degrees, with the most serious consequences occurring at Fukushima Daiichi.

3 COBACORE Analysis

3.1 Motivation

The role of communities in the response to a disaster, the recovery from it and the reconstruction of their community has been recognized by many agencies and organizations as a critical success factor for successful and effective disaster response. In the early stages of the response empirical research has clearly shown that local communities save the most lives (Gilbert, 1998). In fact, "no more than 10% of survival in emergencies can be attributed to external sources of relief aid". (Bankoff, Frerks and Hilhorst, 2004). In addition considering the avail be knowledge capacities and capabilities as the starting point, response and recovery operations can be better tailored to a specific situation. Providing food distributions for example, might not be needed if local (or neighboring) farms are unaffected, even more these operations may even disrupt local economies (Barrett, C. B. 2006). Furthermore, from evaluations of disasters such as New Orleans, Haiti and Fukushima, we learned that recovery often fails if driven only by external organizations (Quarantelli, E. L. (1999). Another arguments for the central role of the local communities are accountability and resilience. By involving them in planning and decision making, community residents are empowered and better prepared for future disasters, and the recovery planning process is legitimized. [FEMA, 2011].

We thus see the community members in or near the affected area as the most important actors in relief and recovery. In its Network Age report, UN OCHA reports a fundamental shift in power from capitals and headquarters to the affected people. New tools to engage broader social networks, communities and individuals are more effectively determining how people can help themselves, and how they want to be helped by others —mobilizing local, national and sometimes global support to meet their needs. [UN OCHA 2013]. Whereas political leaders and aid agencies, often far away from an emergency, once made assumptions about the needs of people in crisis, those people now have the tools to communicate their own expectations.

As illustrated by the case of the flood in Germany introduced above, the response of community members -either affected themselves or external volunteers can have a significant positive- impact on the efficiency and effectiveness of the overall response. Fuelled by modern information and communication technologies, such as social media, people did not only call for help, but also posted offers of help and other important up-to-date information about the on-going situation. As a consequence, high numbers of spontaneous volunteers could become active, within almost real time, at places where assistance was needed. This case underlines the trend that people nowadays have the desire to support aid and relief processes not only financially, but with their time, skills and knowledge as well. They seem to feel, or have the desire, to be more personally attached to the needs of those affected. Another trend that supports the community based approach is the declining trust of citizens in large institutions and governments bodies and, as a reaction, a growing movement of self-organized community initiatives (e.g. Semaan & Mark, 2012). Examples are local energy cooperative's that collectively buy and produce their own renewable energy, and neighborhood watches providing safety in neighborhoods. The trend towards self-organization coincides with the aim of governments throughout Europe currently facing budget cuts, to decrease their role while attempting to improve the resilience of the civil society.

It is evident that governments and professionals in disaster response and recovery will continue to play a crucial role in complementing local capacities and capacities of outside volunteers, when it comes to coordination, allocation of (financial) aid resources, strategic planning, and specialized knowledge and skills for e.g. search and rescue, restoration of vital infrastructure, and urban planning for recovery. This is especially true for larger disasters where local government structures, capacities and infrastructures often cease to work, and for under-developed areas with low levels of resilience. In conclusion, effective disaster relief and recovery starts with improved community resilience and response that is supported and complemented by national governments and outside professionals.

3.2 User Groups

The previous section discussed the community in the role of affected community members and as supporting community members. In addition the role of governments and professionals was acknowledged. In COBACORE, we have defined three main user groups, also shown in the Venn diagram below:

- The *affected community*, defined as all directly (first order effect) and indirectly (second order effect) affected community members. These can be both individuals and groups. Key users for COBACORE are: individual citizens, civil society organizations, and private sector organizations such as local small and medium enterprises. Also important for the recovery process and functioning of a community, but not among COBACORE's first users, are local public services and vital infrastructure providers.

- The *responding community*, defined as all directly and indirectly involved local (affected) or external (non-affected) community members that support relief or recovery efforts by providing e.g. direct help on site, goods, knowledge or funds. These can be both individuals and groups. Key users for COBACORE are again: individual citizens, civil society organizations, and private sector organizations such as local small and medium enterprises. It is important to distinguish two types of volunteers: trained volunteer responders, who are trained and organized like professionals but work on a voluntary basis (cf. full definition on next page), and spontaneous volunteers, who can be assumed not to have relevant basic or specific skills in the field of disaster response [German Red Cross, 2013].

- The *responding professionals*: professionals in the field of crisis response and recovery. These can be both individuals and groups that have pre-organized resources, skills or organizational structures with the purpose of addressing needs that arise in the affected population after a disaster has struck. COBACORE key users are: national and local governments, NGOs, national crisis coordination centers. Noting COBACORE's focus on European municipal or state level disasters, international organizations such a UN-OCHA are considered outside scope.

Evaluation reports from the studied cases regarding the recent disasters, recount the same issues that have hampered the relief and recovery process: disconnects between relief organizations and local communities, a lack of information sharing between organizations, incompatible work practices, misalignment between needs and recovery actions, and short-sighted decisions on funding and courses of action. These issues can be traced back to 'collaboration gaps'. A collaboration gap appears when critical parties in a cooperative effort are not collaborating in the most effective way. In the worst case, there is no collaboration at all, or parties are left out of the main recovery effort [Neef, 2013]. The overlap between the main user groups shown in the Venn diagram represents two additional user groups that we believe are key in bridging these collaboration gaps:

- *Trained volunteer responders*, defined by the characteristics that they are organized and trained in crisis response (like the *responding professionals*) but work on a voluntary basis (like most of the members from the *responding community).* Equipped to quickly source large groups of volunteers with basic training, they are essential in supporting the responding professionals in their relief efforts. Also, they are typically firmly rooted in the community, and thus well positioned to provide guidance to spontaneous volunteers (volunteers without relevant training or organization).
  In COBACORE, key organizations in this group are: National Red Cross and Red Crescent Societies, and Volunteer & Technical Communities (V&TC). Volunteer and technical communities such as the SBTF are part of this category: can be considered as trained volunteers that are part of a pre-setup organizational structure when a disaster occurs.

- The *resilient community*, members (individuals or organizations) of the affected community harnessing local resources and skills to help themselves or other members of the affected community in recovering from an emergency. Key community members for COBACORE are: Citizens, civil society organizations, private sector organizations. They can contribute to awareness in needs and capacities, help to close the disconnection between professionals and affected communities, and steer sustainable recovery planning by speaking and acting on behalf of the community itself.

The overlap in the Venn diagram between the *affected community* and *responding professionals* is not treated as a separate user group in COBACORE, but represent local professionals affected by the disaster themselves. Important COBACORE users here are the municipal authorities that are often responsible for crisis coordination on a community level.

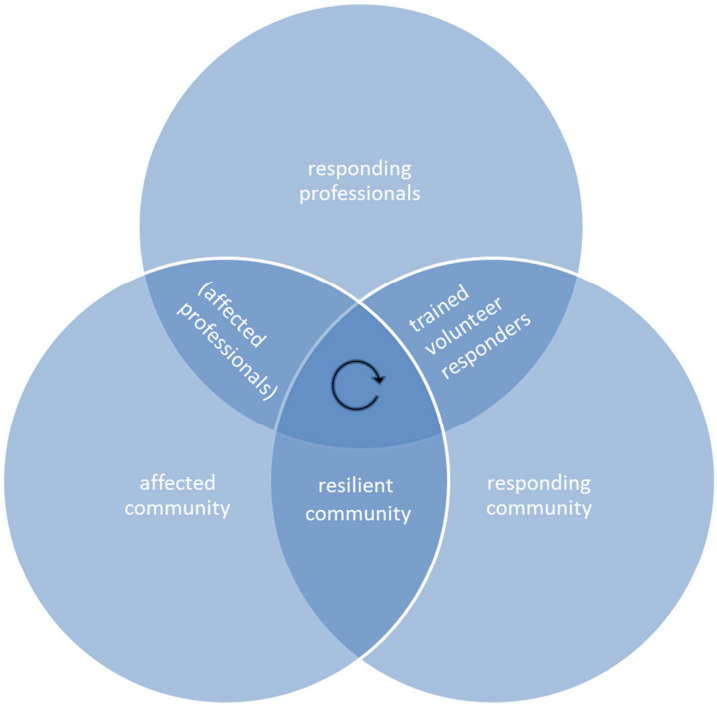


Figure 3 COBACORE user groups shown in a Venn diagram

The five user groups, along with their main characteristics, are also given in the figure below. For each user groups we have defined key COBACORE users; those identified in the cases and present in most of the disaster responses. Furthermore additional users are listed, identified in some cases or suggested by partners or workshop participants based on past experiences.

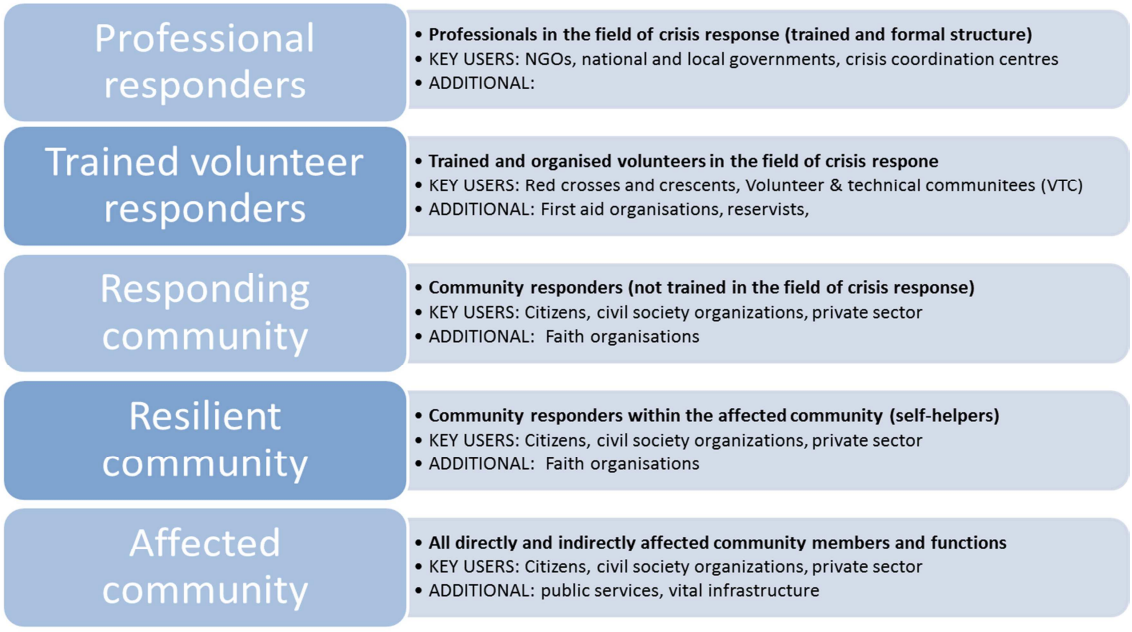


Figure 4 COBACORE users

3.3 High level User Requirements

COBACORE will address the growing challenge that users are expected to quickly react to spontaneously emerging dynamics in expressing and addressing needs between affected and responding community during and after a calamity. One of the goals of the COBACORE consortium is to build a platform that is actually going to be used. It is thus of crucial importance to have a thorough understanding of the key users, their roles in the response and recovery process, and their incentives with respect to using new tools for information and collaboration. While the principal adopters of the solution are considered to be primarily within the professional aid sector, we examine all involved user groups and their high-level requirements in more detail to understand how adoption through added value can be achieved.

3.3.1 Affected community

We define the Affected Community as all directly and indirectly affected community members. Some of them may have the capacity to help themselves (see 3.3.2 resilient community). These affected community members have direct needs as result of an incident and look to have those needs addressed, either through their own (resilient) community, responding professional organizations providing relief or other means, such as external volunteers responding to their needs. In addition to immediate needs following a disastrous event, the affected community has also needs that pertain more to the reconstruction and rebuilding of the affected community. For example, construction workers who help restore houses, or volunteers who help clear the debris and garbage. In general a wide range of needs can be articulated by the affected community, varying in scope and urgency. The affected community looks to have those needs addressed through different channels, depending on what channels are available to them.

Key users for COBACORE are:

- individual citizens
- civil society organizations
- private sector organizations such as local small and medium enterprises

"*W*e don't really have a clear picture of *what is* needed in an affected region. Both the Netherlands and the German Red Cross do not know a standard procedure of identifying and assessing needs in an affected community. In Germany there is a hotline that affected people can call to ask for help – in light of verification of data: all of the calls to this hotline are (like 112 calls) followed up. Based on the type of event community level needs are quite predictable and in small or medium events improvising is still possible. In case of major disasters our volunteers go out and interview community representatives (5%-10% of the community population). The gathered data is *analyzed*, matched with available capacities and help (being sanitary kits or the like) is distributed on community level. With *COBACORE* we will have a much more accurate image of what is needed in each community; and the aggregated picture will be available faster. Answering to it on the same level of detail will be (too) challenging for our logistic procedures." – ***Red Cross organizations***

3.3.2 Resilient community

This community is composed of members of the affected community harnessing local resources and expertise to help themselves in recovering from an emergency. The intersection of the responding and the affected community are those individuals that belong to both; the resilient community. These people are hit by the disaster themselves, but still have the resources and means to help themselves and possibly others. They know and recognize the needs of the affected community and act immediately, for example because of a sense of community, self-preservation or a shared communal goal. Given the limited resources, time, and energy they do not have time to search for the best option and find the most optimal solutions. The resilient community look not only to have their own needs fulfilled but also provide certain resources and skills to rebuild their own life and community and look for aid to support their endeavors.

Key community members for COBACORE are:

- Citizens
- civil society organizations
- private sector organizations

3.3.3 Responding community

We define the Responding Community as local or outside community members that support in relief or recovery by providing e.g. direct help on site, goods, knowledge or funds. The responding community is a valuable asset which presence can make a huge difference. It is also a very unpredictable and self-dynamic asset, since it cannot be mapped at forehand and is difficult to steer during the action. A large group among the responding community consists of spontaneous volunteers who commit themselves depending on the type of disaster and their own circumstances at the time. They react to the needs of their direct environment or to another urgent / strong appeal. (Almost) always their actions are ad hoc and altruistic, but they do like to get recognition for r actions afterwards. To get overview of their actions and being able to guide their efforts to effective response complementing the response of professionals would be an invaluable innovation.

Key users for COBACORE are:

- Individual citizens (spontaneous volunteers)
- civil society organizations
- private sector organizations such as local small and medium enterprises

An important note to consider is that the willingness of spontaneous volunteers to help generally has a very short lifeline. A few days (weeks in case of large event) after the event people will have returned to their daily lives and will not actively be looking for things to do to help anymore. One of the added values of COBACORE might be that the ongoing needs of the affected community are better visible/understandable and will therefore prolong the lifetime of the attention and motivation of the responding public. Raising awareness especially during recovery phase would be a huge asset. Providing a tool with current and valid information on needs during recovery phase could help to prolong the lifeline of (spontaneous) volunteers and would be a big innovation.

The commitment made by a responder (either professional or private) to meet an expressed need (an orange traffic light) should be visible on the map – including the name or logo of the person/organization that has committed to meeting that need. This creates an incentive for 'taking pride in one's achievements' and also system of checks and balances to ensure accountability. Private companies do like to help when they have a specific idea of what they could do to help, for example making use of their unique knowledge or resources. While a motivation for the private sector is visibility of their efforts and yields (potential) media-attention, the private sector also benefits itself for an expected recovery, especially if their production facilities and/or market are located in the disaster stricken area. COBACORE should aim to support and facilitate the private sector so that companies stay engaged longer in the recovery process (Simo, G., & Bies, A. L. 2007).

The Red Cross sees it as their responsibility to provide help and support to the responding community as well – in the form of checklists, like "if you are going to help – do not forget…. (good shoes, gloves etc.)" and with psychological aftercare: "if you experience a traumatic event, please know where to find us".

"*W*e have no way of working together with well-meaning individuals that don't have training but do have a clear (better than our own) image of what is needed. Our registered volunteers have insurance, training, hierarchal guidance, protective gear and can be offered aftercare (psychological) – unbound volunteers do not have that, *might* have out-of-the-box ideas and actions, and therefore do not fit in our systems. With *COBACORE* we will have a better system to guide their offers through, potentially even collaborate with them, and hopefully we can offer them the things we offer to our regular volunteers through the system." – ***Red Cross organizations***

Based on the experiences in the Dresden floods, questions that the responding community has included:

1. Where can I help?
2. What do I need?
3. What kind of skills do I need?
4. Who is the responsible person on site?
5. Where can I give in kind-kind donations?
6. How can I get there?

In general COBACORE aims to support these responding community members, whether they are individual, organized groups or private sector. In order to properly support them COBACORE should facilitate the identification and communication, for example through registration and the management of volunteer resources. By actively participating in the platform responding communities can also express their own needs, such a protective gear, materials but also additional training. If people leave their contact details and interests, capacities – this system might also provide a base of 'potential helpers' for future reference (aka team Austria)

3.3.4 Trained volunteer responders

We define Trained Volunteer Responders by the characteristics that they are organised and trained in crisis response and crisis recovery (like the *responding professionals*) but work on a voluntary basis (like most of the members from the *responding community).* Equipped to quickly source large groups of volunteers with basic training, they are essential in supporting the responding professionals in their relief and recovery efforts. Also, they are typically firmly rooted in the community, and thus well positioned to provide guidance to spontaneous volunteers without relevant training or organization. Trained volunteers may serve as a bridge between the professionals and the responding community. They are community members that are trained to act as a professional; which means that they are responsible, skilled but also acting on grassroots-level, either on- or off-line. They might be better placed to receive information from the community and they know (a part of) what needs to be done. Often they are addressed as being either a community member or a trained responder, while their strength lies in the combination of those two roles. Their interest in innovation would be to have a platform and group context that allows and recognizes them in both roles simultaneously.

In general the trained volunteer responders offer specific expertise, knowledge, skills and/or resource that could either directly benefit the affected community or can support the actions undertaken by the professional organizations (for example by providing mapping support) or can support responding communities (for example by providing training). The trained volunteer responders should be able to articulate their skill set and services they can provide, but also proactively react on identified needs by any of the other user groups.

In COBACORE key users in this group are:

- Volunteers of the National Red Cross and Red Crescent Societies
- Volunteer & Technical Communities.

"We have trained volunteers on the ground in our local branches that are capable to respond in a professional way – their tasks and training are very specific. With COBACORE their tasks might change to more coordinating roles and the local RC branch might function as a hub for knowledge and donations. Also, there used to be a back office for our Command and Control Centers but that is not there anymore – with COBACORE this back office could be reinstated online. The proposed system collects individual needs, current relief operations aim at community level needs. It is an improvement if we have a broader understanding of specific, individual needs in a community. However meeting needs on an individual level will ask a lot of, and might even be impossible, with current logistic processes." **– Red Cross Organizations**

3.3.5 Responding professionals

We define Responding Professionals as professionals working in the field of crisis response and recovery.

One of the things that sets the responding professionals apart from the other two groups in the COBACORE concept is their expertise, which is of a professional level: specialized and high quality. This implies that it is also a 'confined' group with a predetermined workforce and there isn't necessarily an existing relation with the affected (or responding) community. Their interest in innovation is that to be effective they need to know as accurately as possible what is and what will be (most urgently) needed in an affected community. Their services should thus be complementary to the responding communities' efforts and they want to be able to respond to what is already being done or planned.

Key COBACORE users are:

- national and local governments
- NGOs such as National Red Cross or Red Crescent Societies
- Crisis coordination centers.

"NGO's working in collaboration with / commissioned by the government – other aid and relief organizations (like Salvation Army) are known and informal ties exist. Who is responsible for what is often food for discussion. Assessed or identified needs are shared by the government (most of the time) but not between NGO's. With COBACORE it becomes easier to align respective recovery actions by issuing your commitment to certain needs and see the commitment of others in the system." ***– Red Cross Organizations***

The professional organizations have also expressed specific requirements towards the COBACORE platform.

- Registration of beneficiaries is a delicate process with a lot of sensitive data. COBACORE should have a way to deal with that sensitivity
- Registration of private responders / unbound volunteers should align with existing registration processes, for example by employing same fields and collecting the same data.
- Relief organizations should be able to post on COBACORE 'collective needs in a community' that they are not able to address with their own means.
- Similarly they should be able to post their commitment to help on a community level, since their logistic processes are not equipped to respond on an individual base

3.4 COBACORE Issues

As illustrated by the case of the flood in Germany, the response of community members, whether personally affected or unaffected, can have a significant positive impact on the efficiency and effectiveness of the overall response. The response of the affected community itself or external community members is facilitated by increasingly connected online communities. Technology advancements as well as the increased online social cohesion enable an increased ease in the formation and organization of community-based responses. Furthermore, the economic changes and changing political climate encourage communities to be more self-reliant.

These changes provide great opportunities for responding organizations, most notably a more efficient and tailored response. The community response provides professional organizations with additional resources, capacities, local knowledge and direct access to the community. In addition to the in-field response, community responses can also be geo-graphically dispersed, for example when organizing fundraisers or mobilizing volunteers. In short, there are numerous advantages to the community response. However to effectively deploy these capacities in the response, professional organizations need to understand and adapt their methods and tools. Specifically the following considerations have to be taken into account in regard to the alignment with existing processes and structures:

- **Data collection:** in NL and Germany this is primarily done by the government (LCMS in NL) which will then commission the RC branch and/or other organizations to respond. This is because it is too intensive -in time and resources- to gather own data for events that are often quite oversee-able and do not occur on a regular base. Internationally (in more disaster prone areas and weaker states) data collection is considered more a RC task, all other relief organizations invest in it too.
- **Recovery program planning:** In the context of the German and the NL RC, there is little experience with how to plan for recovery. There are guidelines that could be followed but those have a strong international focus with slightly different objectives (poverty reduction etc.) than would be applicable in the 'developed world'. A role for RC branches in NL and Germany in recovery could be that of a logistical 'hub' – where the marketplace with needs and capacities gets a real life counterpart and where a neighborhood can gather to 'find its strength' again.
- **Volunteer management:** working together with, alongside with, supporting or facilitating unbound volunteers or private (individual) responders asks flexibility from our current visions on what is a volunteer, how to deal with untrained helpers, how to manage accountability etc. These procedures are very well developed in NLRC and GRC, and are currently not designed to take the work of unregistered, spontaneous volunteers seriously."

COBACORE aims to become the platform that harnesses the capacities and resources available in the wider community and to provide a gateway for professional organizations to support the community efforts and tap into this resource for the overall response. In general, to reach the goal of community based comprehensive response and recovery, COBACORE needs to address the following issues outlined below.

3.4.1 Unknown needs and capacities

Responding communities can have a significant positive influence on the entirety of the response. As illustrated above, social cohesion has not been the only factor positively affected by the combination of the professional responders, support by spontaneous volunteers and community driven efforts. The impact of individual spontaneous volunteers and the community as a whole is tightly linked to the needs of the affected community on the one hand and the available capacity of the entire response on the other. The ability to identify and map these different needs and capacities is the first step to an integrated approach, in which the availability of resources and the need for specific knowledge is combined.

Limits of autonomous spontaneous assistance lie, for example, in disaster response and recovery measures requiring specific skills, knowledge or materials such as evacuations of hospitals and nursing homes or the provision of support and nursing care to vulnerable groups of the population in emergency shelters – unless the spontaneous volunteer possesses the relevant professional background or education. The same goes for the building up and

maintenance of emergency shelters. These sorts of measures and activities require a specific education and skills that cannot be conveyed to spontaneous volunteers through ad hoc instructions by professional forces responders on site. On the other hand, spontaneous volunteers may be quicker to respond or can provide a large labor force, where professional organizations have limited resources available.

As illustrated in the figure below, currently needs can be addressed by different groups, however there is only limited coordination between these different types of responses and the available capacities, which could lead to needs not being met (shown in the left figure in purple) or being addressed in an inefficient manner (illustrated in the left figure by overlapping capacities/responses). Ultimately COBACORE would facilitate the transition to a more coordinated and balanced response, addressing the whole of needs in an efficient manner, grounded in the efforts provided by the (wider) community. The first step in facilitating this transition is the ability to create the situational awareness and the ability to draft and map the diagrams, identifying gaps and overlaps between needs and (different sources of) capacities.

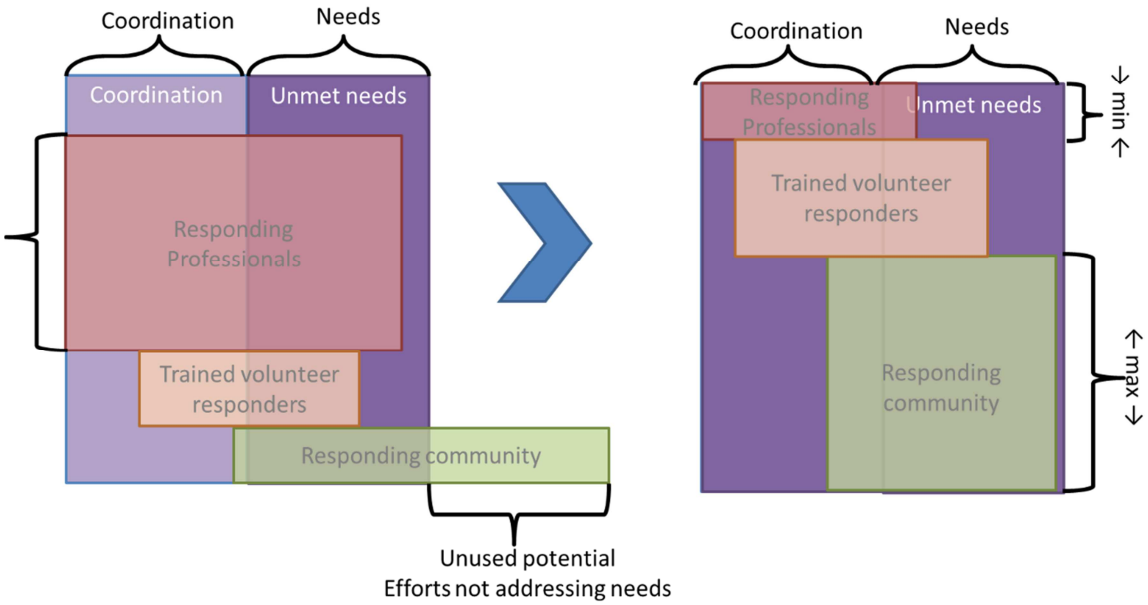


Figure 5: Transforming the response landscape to address unmet needs with community efforts

Currently needs assessment is ad-hoc and improvised (at least in The Netherlands and Germany there are no standing procedures), slow (3 weeks in the Philippines), and inaccurate (input of 5-10% of the affected population). **– Red Cross Organizations**

Added value of COBACORE for professional responders should be:

- Visualization / Overview of needs, offered help and ongoing or planned activities of civil society and of organizations and government as well
- Fast collection of essential information about how people are coping
- Inclusive image (more than 5-10% of affected population) of needs on an individual level
- Tool to ask the community to help professional responders meet those needs that they are unable to meet ourselves

- Make sure that spontaneous, private recovery activities do not make things worse: share the knowledge and expertise of professional responders on how to be safe and effective with private responders.

On the needs identification side, COBACORE should mainly complement existing data collection processes of professional responders (being an extra source for primary data) and provide information for evaluation and monitoring purposes. On the capacities side, it should support the responsiveness of the professional responders to spontaneous volunteers in knowing how to support and work with them.

Professional recovery programmers aim to be (1) Appropriate, (2) Timely, (3) Precise and (4) Inclusive – If the information on COBACORE can help us to improve on those 4 ambitions, this would be an incentive to use the system. **– Red Cross Organizations**

3.4.2 Limited mutual awareness and sharing of informing and coordination

In addition to the identifying the needs and capacities, awareness is needed to increase the alignment between the various response types. A mutual awareness and situational overview is needed and must be communicated. The resulting situational information and overview can aid in creating a situational overview of the current and projected needs and the responses being undertaken, current and planned. This situational awareness helps to inform all involved responders and can be used to redirect the efforts.

In order to achieve this, the resulting situational overview has to be communicated to inform the various responding individuals, initiatives and organizations. Through shared information the transformation depicted above can be established. However, to be able to effectively inform the overview to groups, a thorough understanding of the various groups is needed. This ensures that the resulting information products and tools are integrated in the modus operandi of, and adapted by, the users.

Next, using the information and communication options, the platform enables coordination options between the various groups. Initially this could be passively, by informing groups of what is currently being done and what needs remain unaddressed. When groups are motivated to create an impact, they are more likely to take notice of unaddressed needs. Currently, however, volunteers groups are often 'coordinated' or directed through the media and less through a comprehensive situational overview. These coordination options could be more active and engaging, by facilitating, for example, direct coordination between groups.

3.4.3 Lack of synergy and capacity building

From the mapping of the needs and capacities (i.e. drawing the diagram depicted in Figure 5), through the dissemination and coordination efforts, COBACORE enables a better alignment between the various available resources and needs (i.e. shifting the 'blocks'). In the final step, COBACORE can aid in building capacities in the community, either before, during, or after an incident (i.e. reshaping the 'blocks'). The COBACORE platform can provide various options to build capacity in the community.

First, an important connecting element between the responding professional community and the community are the professional volunteers. There are various existing groups that have some form of training and/or organization prior to an incident. These groups can be embedded within the community or can support spontaneous volunteers in their efforts. Besides knowledge-based groups, other groups can arise from existing community structures. These groups can also be an important connecting element between the community and the

professional responders. These groups and their capacities can be identified prior to an incident. In addition certain key-persons with specific skills, knowledge or resources can also be identified in order to 'shape' the community response.

In addition, COBACORE can facilitate training, knowledge and support for community responses that lack these but may have other resources or added value. For example, volunteers can provide labor but may require materials such as sandbags or shovels. Besides material support, professional organizations, or even other volunteer initiatives can also reshape the community response by providing guidance, information or knowledge. In time, even the responding community itself can provide and require certain capacities, creating (simplified) supply chains, thereby building towards a truly compressive community based response.

3.5 Validation

3.5.1 Introduction

In order to verify the abovementioned user groups, functions and features partial evaluations with the three different user groups were organized. From these partial evaluations, the main assumptions and starting points for the other work packages were confirmed, but also sharpened in some areas. These specific areas of interest resulted in significant discussions during the workshop or which were explicitly altered can be found below.

3.5.2 User groups

The five user groups, their specific roles during a crisis along with their main characteristics, were validated during the partial evaluations by the three user groups themselves. The evaluations showed that the COBACORE system should not be tailored towards a very specific country or region, as local variations in Europe exist on how trained volunteer responders are organized. This is because some countries (former communist in particular) expect a large role for the government after a crisis, while citizens in other countries prefer to take more initiative by themselves.

More specifically, research (Alexander, D. 2002) shows that some countries still have societal structures in place which can be mobilized when a disaster occurs, while others lack this kind of 'sleeping' structures. One example is the large groups of emergency responders that can be part of the military hierarchy. These structures (often referred to as civil defense) can be regarded as a legacy of the Cold War period, for example the over 5,000 soldiers from the Dutch reserve army that have completed (basic) training and can be mobilized on a voluntary basis to aid in emergency responses.

3.5.3 Requirements from an end user perspective

For the platform to be used, the general requirements below have been confirmed. Furthermore, some additional end-user requirements were mentioned in the partial evaluations.

General requirements

For the platform to be used, to following general requirement have been identified from end-user perspective:

A. COBACORE must not repeat (functions in) existing planning- and decision tools
    - This includes tools used at the community level in humanitarian support. If COBACORE can successfully and credibly create a connection with the responding and affected communities in the humanitarian process; it will complement existing systems and not replace or compete with any of them.

B. A self-sustaining operational model is required, to ensure continuity after the end of this project
    - The system should have a maintenance model, for example an identified owner and/or operator. This also implies that the systems have to be embedded in (technical and organizational) structures and platforms. This could for example be realized by connecting to existing platforms and community structures.

C. COBACORE must deliver on its promise: firmly rooted in, and provide value to, affected and responding communities.
    - The adoption of the platform and the added value for the user groups have a strong connection and influence each other. To ensure adoption the platform needs to provide an added value, and in order to provide value the platform depends on its users. Therefore COBACORE should be facilitate a (community-) user dynamic, for example by providing the affected community with valuable information (help/action/what are my options / others doing) and value for effort: get more out the information you put in (interpreted data)

D. The use of COBACORE must add value to all main user groups. This holds for professionals who have to make decisions in a very short time while being overloaded with information. But even more this is crucial for the affected and responding community members, whom participate voluntarily. For them a direct and clearly perceived or visible value is of great important to make sure they continue using the services and invest their time in it. For volunteers the term value must be broadly defined and include immaterial elements like improved social cohesion, doing “something good” for society or social image.

E. The public must be informed on what their handling perspectives are prior to and during crises and recovery

F. Given the wide range of users (the diversity within and between communities) and the importance of adoption the solution must have high usability and low complexity. Related, the solution must be reliable.

G. Privacy must be dealt with carefully: ensure transparency on how collected information is used and who has access to the data. To improve privacy and accountability there should be a Code of Conduct: “If you use COBACORE we expect you to work according to these international standards… ”

H. Added value of COBACORE should be, according to the end users in the partials:
    - Visualization / Overview of needs, offered help and ongoing or planned activities of civil society AND of organizations and government as well
    - Fast collection of essential information about how people are coping (mentioned by professional responders)
    - Make sure that spontaneous, private recovery activities do not make things worse: share our knowledge and expertise on how to be safe and effective with private responders. (mentioned by professional responders)

3.5.4 Suggestions from end users on functions and features

Next to the findings from the German floods, the partial evaluations showed that the responding community has the following additional questions during a crisis. *(Additions in italic)*

Based on the experiences in the Dresden floods, questions that the responding community raised are:

7. Where can I help?
8. What do I need?
9. What kind of skills do I need?
10. Who is the responsible person on site?
11. Where can I give in kind-kind donations?
12. How can I get there?
13. *Who else is supporting (government, neighbors, military, online communities*, etc.)
14. *What should I* not *do when supporting*?

4 COBACORE Concept

In this section the user profiles described above are combined into one system. It describes the interaction between the groups and the role COBACORE plays in this interaction. Based on the issues described above, this section elaborates on the main ambitions/value propositions of our project (functions) as well as the interactions between the 3 main user groups and the COBACORE system (features).

4.1 Functions

Based on an analysis of state of the art COBACORE alike tools, the following recommendations are given with respect to functionality:

- Tailor the platform/app for different user groups: even within the professional responders, affected and supporting communities there are multiple subgroups with different information needs
- Use multiple information sources: apps have low saturation level among the public but high quality, Twitter has wider coverage but lower quality (10% geo-tagged, 2% usable)
- Stimulate people to download and use the app prior to a crisis (by adding pre-crisis features: high water levels, Burgernet[3] information)

4.1.1 Mapping needs, capacities and responses

The different user groups as described in the previous section 3 have different information needs during the early recovery phase of a crisis. This section will focus on identifying what is needed by each user group, what is being done by whom and what needs are not being met. This helps to create an understanding for the functions and the features of the COBACORE system.

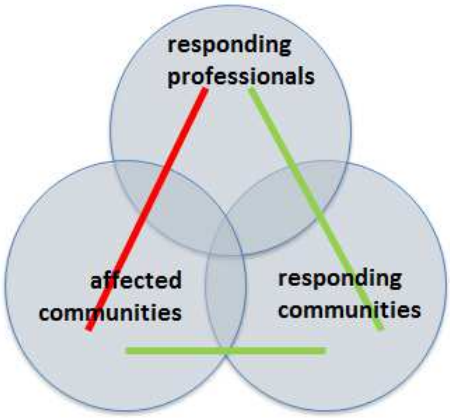


Figure 6: Along the left axis, COBACORE will enhance the quality and scope of needs assessments, which in turn will lead to better informed decision making by professionals *and* the affected communities

[3] Burgernet is a collaboration between citizens and police. In Burgernet, the police shares information concerning an urgent report, with a lot of citizens in the same time.
http://en.wikipedia.org/wiki/Civil_network

First, during a crisis in which the COBACORE system will be deployed, interaction will take place between the responding professionals and the affected communities. The main function of the COBACORE system between these two user groups will be to enhance the quality and scope of needs assessments, which in turn will lead to better informed decision making by professionals *and* the affected communities.

Currently, responding professionals use a wide array of tools and methods to harvest information from an affected crisis area. Responding professionals already monitor social media as an additional source of information to get improved 'situational awareness' of the situation on the ground. Previously this was mainly limited to viewing tweets and possibly pictures that were uploaded onto the web on certain topics relevant for the professionals.

Over the last few years however, an increasing number of tools have become available to analyze information semi-automatically, in order to make the data more relevant for professional responders. It has therefore already been suggested that in the coming years, crowd sourced data will become an increasingly important data source upon which response-critical decisions will be based. That way, the COBACORE system will help to improve shared awareness between communities about unresolved needs, so that professionals are better equipped to deploy their capacities more effectively.

In addition, the COBACORE system will help to inform the affected communities of on-going efforts in line with their information needs. Currently, in the immediate days after a large crisis or disaster, affected and unaffected people are usually dependent on radio and television in order to receive the latest updates on the crisis situation. The COBACORE system will help professional responders to update particular groups from affected communities in line with their particular information need. For example, if a mother has lost her child in the chaos following an earthquake, informing the authorities about her lost child is her primary goal. Once the responding professionals have received this information about the lost child, the professionals are able to instruct the mother on which follow-up actions to pursue. This in turn helps the mother to make better informed decisions by allocating the resources at her disposal more effectively (such as family or friends offering search capacity for searching for the lost child in the neighborhood).

4.1.2 Needs and capacities alignment

Second, during a crisis in which the COBACORE system will be deployed, interaction will take place between the responding communities and the affected communities. The main function of the COBACORE system between these two user groups will be to make better use of available capacities that are present among the affected and responding communities.

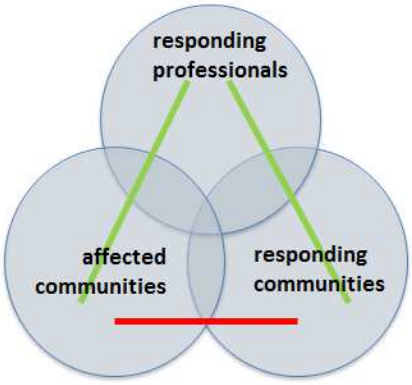


Figure 7: On the bottom axis, COBACORE will identify, map, align, match and broker between needs and capacities that exist between the affected community and the responding communities

As seen in nearly every crisis (that receives a level of media attention), a certain group of people is keen to provide resources, which in turn leads to a surge in resources made available to the affected community. This has led to extreme logistical challenges, such as the case of Port-au-Prince airport after the earthquake in Haiti in 2010 which was congested with flights arriving with non-essential goods. This led to flights that did contain essential goods such as SAR teams returning with their cargo to the United States which in turn led to decreased matching of needs and capacities.

Through the articulation of the needs directly by the affected population, the COBACORE system can also help to make responding communities aware that certain people are in need of particular goods that may be at the disposal of the responding community. Therefore, the function of the COBACORE system is to identify, map, align, match and broker between needs and capacities that exist between the affected community and the responding communities.

4.1.3 Fostering Collaboration

Third, during a crisis in which the COBACORE system will be deployed, interaction will take place between the responding communities and the responding professionals. The main function of the COBACORE system between these two user groups will be to facilitate collaboration and to create awareness of mutual capacities.

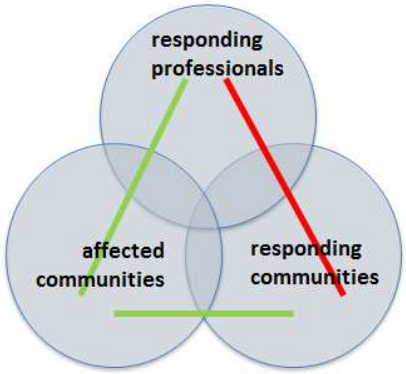


Figure 8: On the right axis, COBACORE will facilitate collaboration to create awareness of mutual capacities

Currently, limited mutual awareness between responding professionals and responding communities is a third key limiting factor in decreased operational effectiveness in crisis response operations. For example, there are substantial capacities usually existent within the (potential) responding community that are not being used in the response. There are a number of reasons for this issue, of which 'unawareness' is usually a general explanation. For example, during the 2009 refugee crisis in Sri Lanka in which 300,000 refugees' required basic aid in a matter of days, UN and INGO staff setting up the aid operation did not consider the option of mobilizing the community living around the refugees' camps to support in provision of basic aid. As a result, aid resources were flown in at a higher cost and arrived comparably late.

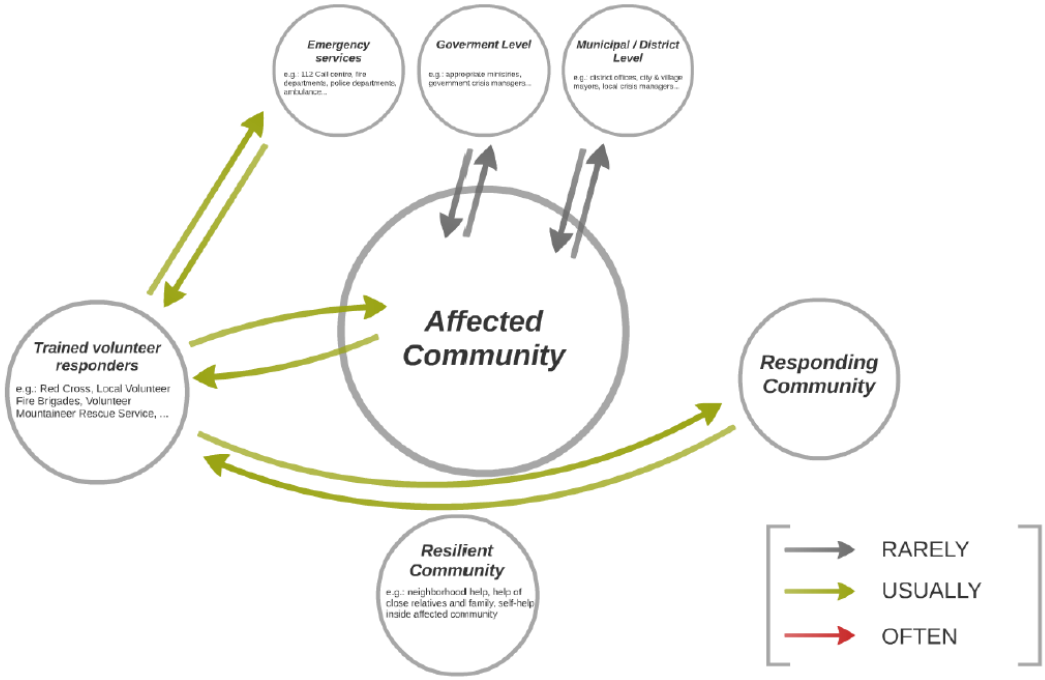
Therefore, a third main function of the COBACORE system will be to facilitate collaboration and to create awareness of mutual capacities. This will help to create a whole-of-community recovery network which can contribute to better operational effectiveness. Furthermore, next to the function of creating awareness, the COBACORE system can also help to extend the size of the responding community by organizing volunteers (such as the Standby Volunteer Task

Force[4] for analyzing crowd-sourced data) more effectively. This can be done by making pre-crisis arrangements such as developing Standard Operating Procedures/Standard Operating Instructions (SOP/SOI) for potential volunteers, but also by providing training and awareness to potential responding communities on how capability gaps can be matched when a crisis strikes.

4.2 Use cases

Based on the cases introduced in the previous section of the document we can distill and identify several generalized workflows or use-cases for the various user groups. These use-cases illustrate the various (general) interactions between the groups and the various actions they undertake. The use-cases help to identify the specific processes COBACORE should support in order to facilitate basic the relief, recover and development efforts of all user-groups. In the next section additional added value for combined efforts and synergy is described in more detail.

4.2.1 Pre-crisis



Responding professionals

Local/Municipal/District government/Responsible authority: In the pre-crisis phase the emphasis is on the preparation of risk analysis documents (for separate areas and disaster types), inhabitant's protection plans and other relevant documents. During this stage information exchange is happening between all levels of governance (both horizontally and vertically). Relevant information from this process for COBACORE is the content of these documents and monitoring of the capacities. This results in a capacities overview which should be accessible to the relevant user groups such as the authorities (number of trained and employed personnel, accessibility, response time overview, material capacities, locations,

[4] The purpose of the Standby Task Force (SBTF) is therefore to provide dedicated crowdsourcing, mapping, data scrambling and technology testing support to such organizations, particularly local organizations. http://blog.standbytaskforce.com/

shelters, etc.). Additionally general or public information about rules and advices in cases of disaster events are published, informative or practical seminars are taking place, and training or demo's days for general public are organized.

Emergency services: During the pre-crisis phase the communication between ("affected") community and emergency services is minimal (and not really necessary because of the purpose of service). Any relevant information originates from government or municipal authorities.

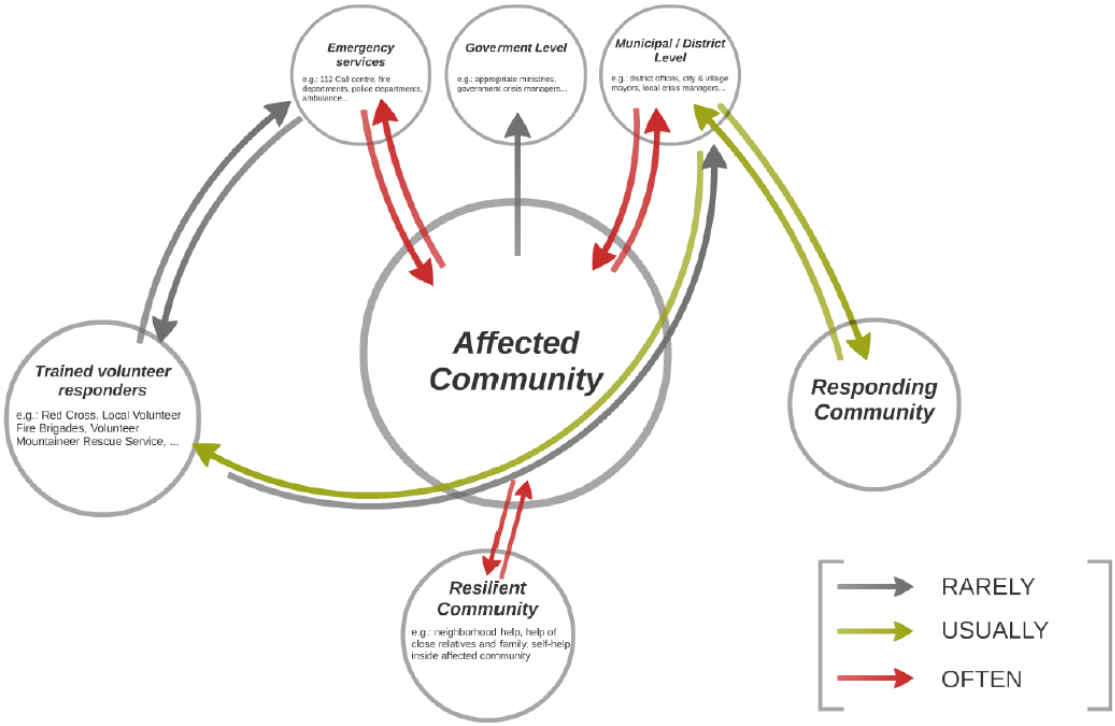
Trained volunteers responders

Depending on the organizational focus (e.g.: humanitarian and health aid, fire prevention and suppression) specialized seminars, practical exercises and information provisioning efforts are taking place for general public (the possible or potential affected community). Furthermore the organizations have systems for "self" education and are performing joined exercises with professional responders or between themselves.

Affected community

For interested or concerned individual several information sources, various seminars, courses and exercises are available in the pre-crisis phase (organized or provided by trained volunteer responders or professional organizations). In the pre-crisis phase we cannot distinguish the difference between affected community, resilient community and/or responding community, although individuals can prepare for a specific role based on their education and interest.

4.2.2 Early – recovery flow



Responding professionals

*Municipal/District/ responsible authority***.** In the early recovery phase citizens articulate their needs towards the municipal/district authority; mainly in case if it is a direct necessity such as food and accommodation (e.g. the mayor has an overview of the capacity of buildings) According to legal standards (based on the emergency situation in a given area) a mayor has

the right to ask the private company for the rent of equipment (such as excavators, transport). The companies can ask for reimbursement of costs for the work that they have done. Similarly, the responsible government official has the option to impose civilian duty to carry out certain tasks associated with coping the effects of a disaster.

Emergency services. They provide capacities and resources for rescue activities in the first stages of recovery. They coordinate rescue activities at the site of the incident.

*Government***.** In case a disaster exceeds a certain territorial scope (e.g. a district) governments can decide to scale up to a higher level of response. This incident classifications systems are tightly coupled with options to respond and the deployable resources. The government agency responsible decides what the appropriate classification for an incident is.

Trained volunteers responders

Help of trained volunteers is requested in the case the capacities of the emergency services are insufficient and/or if the responsible government officials or responding organization asks them for help. In addition trained volunteer responders can be part of the deployment by professional organizations and responders.

Affected community

In a large scale disaster the government establishes additional coordination centers where the affected community can ask for help. In the first phase the community asks for help through emergency services (coordination and operation centers – police, fire brigades) in the corresponding area. Citizens ask for temporary accommodation from local/district authority (e.g. mayor has the documentation/information about capacities and possibilities); food and clothing (responsible government official establish provision of food, water and clothing). On the web sites of village/city/voluntary organizations information about possibilities for volunteers to participate in some relief and response activities is provided – mainly in the case of flood (e.g., building of sand bags dam).

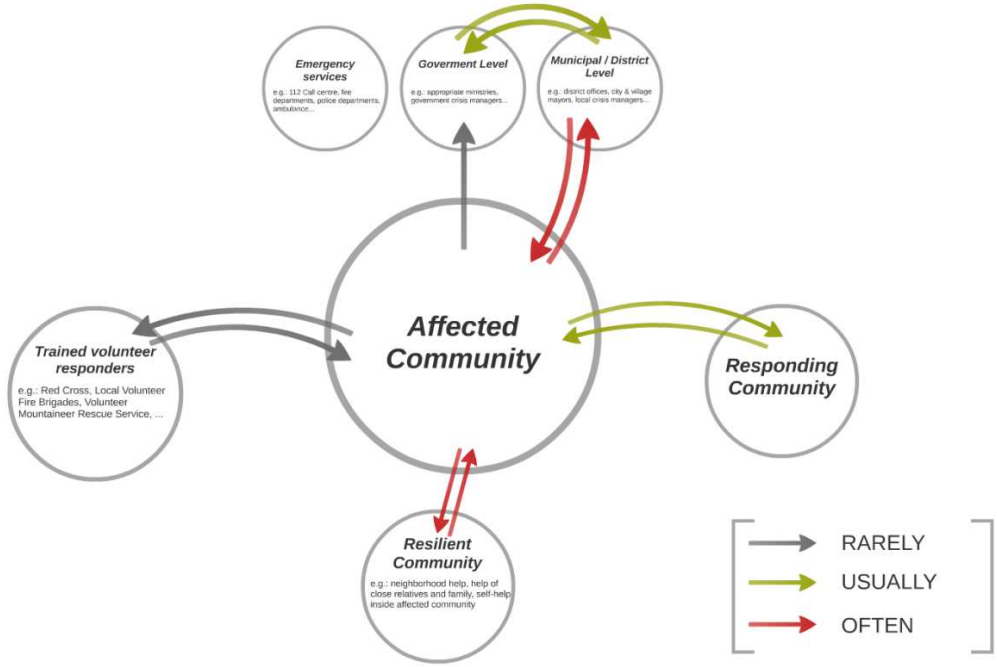
Resilient community

In this phase the neighborhood is engaged with activities they themselves can provide. Members of the community help each other (food, accommodation, first aid) – the affected community becomes a self-aiding organization (resilient community).

Responding community

Based on the focus of the organization / location specific help is provided towards the affected community. Private companies, at the request of municipal / district responsible authorities, can for example provide the necessary material (e.g., vehicles, technology ...).

4.2.3 Late – recovery flow



Responding professionals

Local/District government/Responsible authority. In the late recovery phase the responsibility for reducing the impact is with the local/district authorities (based on the scale of disaster). Likewise they inform the government about the progress and activities; they request additional forces and resources, and in particular ask for reimbursement of costs associated with the disaster recovery efforts if eligible.

Emergency services. They are not involved in the late phase of recovery (only in early recovery phase).

Trained volunteers responders

In case of long term disasters they help the affected community (based on capacities and competitions) and organize financial and material collections.

Affected community

Based on the scale of disaster and consequences the affected community contacts government/district/municipal level mainly in relation of the damages that were caused by disaster. The affected community can also ask the resilient community to assist with aftermath.

Resilient community

In this phase neighborhood help is really necessary within all activities which are resilient community able to provide. Members of community help each other, by reconstruction houses, rebuilding roads and providing services to each other, thus restoring their own community.

Responding community

Mainly in form of neighborhood help (e.g. the drainage of houses and basements).

4.3 Information

There are many guidelines on how to categorize needs in a needs assessment, both for relief as for recovery (7.4). In Western, developed, countries needs might be different than in disaster prone, developing countries where they might need 'everything'.

Needs are context specific and change over time - if we are assessing needs on an individual level, no existing format will exactly fit. The express needs in a categorized manner will be essential, as will be the possibility to enter an own very specific need, for example an excavator needed to remove debris.

In light of the offers that can or will be made, a categorization in 'I need physical help', 'I need logistical or coordinating help' or 'I need material (in-kind) help' would be a useful categorization.

Other issues to consider related to information are:

- Privacy issues – who collects what data about whom; and what is allowed to be stored and analyzed? What is publicly available and what happens to sensitive data??
- A positive match between a need and a capacity is not a guarantee for delivered help. There should be an 'in between' status that expresses that the need has been matched but not been met yet (a little traffic light icon with red, orange and green colors).
- The verification of uploaded data (both needs and capacities) is a very important issue that needs to be addressed. The German hotlines were used intensely to verify information people had read on the internet. To address these issues COBACORE should be able identify credible information and thus establish itself as a credible source for information. For example trained volunteers could get the task of verifying data and issue quality marks: "this information has been verified by your local Red Cross branch".

4.4 Non-functional requirements

In addition to the functional requirements outlined in the previous sections there are several other considerations for the COBACORE platform. Non-functional requirements outline the operational setting in which the platform has to operate. These requirements are certain qualities that the COBACORE system has to possess in order to be useful and provide added value in the specific setting illustrated in the sections above. We divide these non-functional requirements in platform-, data- and security specific categories.

Platform

- *Accessibility*: Given the operational setting and the wide range of users, the COBACORE platform should be able to handle access through different social and traditional media, including non-digital media like radio, TV, paper and word of mouth. Increases robustness and makes the solution inclusive (accessible for all, including e.g. elderly, children, illiterate, deaf or blind people). This includes the option for intermediaries (agents) to act on behalf of others.
- *Localization*: The platform and services need to support different regional formats (e.g. number, date, and currency), character sets and languages, and present locally relevant content. Initially the focus will be on the European context, but system must be prepared to extent and support other regions.
- *Simplicity and user friendliness:* Given the high-levels of stress, the majority of the users in the user group affected community and responding community have to work with an interface that is intuitive and do not require manuals or prior training to use the system.

- *Scalability*: The system should be able to handle large volumes; for example of registered users and simultaneously active users.
- *Average availability*; Since the system is intended to work in post-crisis situations, it should remain available in extreme situations, e.g. in absence of electrical grid power and main communication lines, with flooded communication exchanges and data warehouses, resulting in invalid or incomplete input data, etc. Solutions are to be sought in redundancy, interfaces to different kind of communication systems, automatic re-configurability, etc.
- *Robustness level*; degree to which a service can function correctly even in the present of invalid, incomplete or conflicting input data (e.g. due to bad telecom connectivity).
- *Flexibility / Adaptability*: the capability to adapt the platform and the services to different contexts with different functional and non-functional requirements and over changing requirements over time.
- *Openness*. Given the large number of different organizations interacting in different ways with the system open source is preferred, but the minimum requirement is to use open en standardized interfaces for the main functionality. Furthermore, the software should be written in a common and future proof software language and documented to allow others to modify the software code.

Data

- *Law*: Adherence to specific European laws regarding the collection, storage, processing and dissemination of data, specifically for disaster responses.
- *Data governance*: Track the process for data gathering and processing, to ensure the validation of the data, to complete missing data (such as location or user identification), and accountability.
- *Archived data*: maximum “longevity” of records and amount of detail (spatial and time) archived. Considering the slower dynamics in the recovery phase and depending on the applicable laws on protection of personal data.
- *Privacy:* The system should provide mechanisms to interact with the system without disclosing personal information to other users and/or the public. Privacy in the platform must adhere to applicable laws on protection of personal data.
- *Format*: Data must be stored in open and standardized formats. Import and export of data must be supported. Automatic backup and restore of data must be supported.

Security

- *Authentication*; The platform users should be authenticated to provide interaction and follow-up, to validate data and to ensure the privacy and integrity of the platform.
- *Authorization*; only authorized service consumers should be able to access the service for part of the functionality only, such as functions for professionals. Interfaces to communities should open to anybody.
- *Confidentiality*; Data should be treated properly so that only authorized service consumers can access or modify data, specifically personal data (individual records). While data integrity/quality that originates come from the crowd should be modifiable by a wider range of people while making modifications traceable and transparent (e.g. like Wikipedia, Openstreetmaps)
- *Data encryption*; the communication with the service should be encrypted, mainly for communication and the storage of personal data.
- *Non-repudiation*; whether it is possible to ensure that a service consumer cannot deny requesting the service after the fact.

5 COBACORE use, integration and dissemination

Logically, various systems similar to COBACORE have already been designed and put to use. These have been analyzed to check where the exact added value of the COBACORE platform should be. Some general trends can be identified from this State Of The Art Analysis:

- Trend from large-scale government led crisis systems towards crowdsourcing applications for variety of purposes
- Trend from using people as simple sensor (report incidents, request first aid) to more complex tasks (first aid, send pictures, analyze local situation, interpret crisis intel)
- Trend from top down to bottom up: not only government to citizen, also citizen to citizen and citizen to government
- Growing the number of more advanced apps enable trend towards tailored information exchange on individual level: not only tweets but concrete aid requests for specific situations for specific (groups of) people
- Crisis apps remain too crisis oriented: no apps incorporate reconstruction activities

A key element of COBACORE is therefore the positive impact that volunteers can bring to disaster response and recovery activities. However, working with volunteers involves some special considerations and implications in the particular use of the COBACORE platform. One of the first steps mentioned here, is identification. Not all volunteers can be discreetly identified, as some may either not want to register or not have the ambition to make themselves known. In some situations these may even be a security issue. More generally, a 'volunteer' as such cannot always be clearly identified, some people may contribute to the response in a way not anticipated by the organizations up to this moment. In recent years for example the rise of digital volunteers has taken quite a number of organizations by surprise, some of which only begin to see the potential of these volunteers. On the other hand people themselves may not actually identify themselves as volunteers, for example they may consider this good citizenship. Even more, pre-existing volunteer structures within a community may coordinate themselves. All in all, a key challenge for COBACORE is to construct a comprehensive overview of all community and volunteers efforts undertaken, even if these activities do not identify themselves as such or cannot be recognized by organizations directly.

Added value of COBACORE has not only value in this specific area, but to a larger extent affects all involved stakeholders. A large number of systems, tools, methods, processes are being developed and offered to professional organizations, government agencies and even communities. Since COBACORE premise is to provide a comprehensive overview, adoption is of high importance. A high adoption level will lead to an increase information flow, thus providing more data representing the reality. The aforementioned added value therefore is a key motivator for all stakeholders; it there is a certain gain, users will be more likely to share data. Finding this added value or motivation therefore is important follow-up research question for this project. Finally, in addition to the added value, COBACORE can also ensure a higher adoption through integration with existing systems. For example people expressing their needs on platforms they are already familiar with, such as social media but also emergency contact centers (112 or 911). This alignment is also key for professional and governmental organizations, in which case COBACORE enables better information sharing across all three user groups.

5.1 Prospected use and integration

The target audience and potential users might be the professional aid sector – for them the platform will gain its leverage by how firmly it is rooted in and has access to the community.

Therefore, apart from the technological challenges, an important challenge for the platform will be to effectively link to 'the community' - and thus to create some sort of user-dynamic on it that keeps the platform alive and gives it credibility. Looking at successful examples for this, like Facebook and Spotify; a layered approach seems best suited for that:

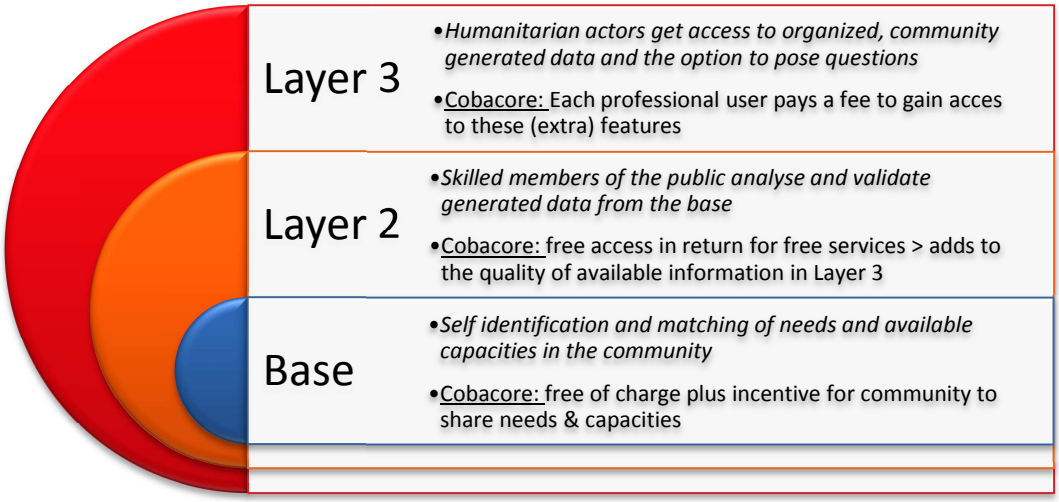


Figure 9: Schematic summary of the proposed layered

Among the objectives of the COBACORE platform are: to **quickly identify needs in an affected community** (1), but also **visualize and mobilize the affected communities' own capacity (and/or that of the supporting communities) to directly meet those needs** (2). A community in crisis might be able to meet some of its own needs, but unable to meet others. External assistance during response, recovery and reconstruction is then needed to address those unmet needs. The platform will **help external actors to target those needs that are not (yet) met** by the direct environment (3).

5.1.1 Layer 1: A community driven view on needs and capacities

Multiple examples show that during and after a disaster a community is often able to provide much of the needed capacity for emergency assistance, recovery and reconstruction by itself. Communities with a certain 'self-reliant starting level' have shown to be:

- able to identify the individual needs of community members affected by the disaster
- able to communicate the needs to other members of that same community and to local organizations
- able to address the needs of members within the community by using the capacity within that same community

Existing web-based communication is already being used for these activities; people use Facebook, Twitter and self-built platforms to find and exchange help. Examples for this behavior were found during Hurricane Sandy when she hit the greater New York area, in Queensland, Australia when the lager part of that state flooded in 2011 and even already in 2005 in New Orleans, where people used Yahoo mailing lists to find their old neighbors and

coordinate rebuilding efforts. These self-assessing and self-supporting abilities are, however not yet used, integrated or taken advantage from by aid and relief organizations.

Output of layer 1: The community driven assessment provides an easy view of needs, capacities and other information that facilitates (personal) in-disaster decision making by the community:

- Geographical view of anonymous needs and capacities (mapping).
- Geographical view of other base information (what was there before)
- Geographical view of disaster related information (what is the situation now and how is it or has it been developing)

Requirements for layer 1: The fundaments of a community based assessment tool obviously need to be firmly rooted in the community. However, for people affected by a disaster it is required that there is some sort of an incentive for them to share their information, either:

- Other members of the public will provide them assistance that they can otherwise not find; or
- Local organizations will provide them with assistance that they can otherwise not find; or
- Humanitarian organizations and NGO's will provide them with this kind of assistance; or
- Local government will provide this assistance, or help them with recovery and reconstruction in the aftermath
- People online might need the assistance they themselves can provide, thus they might be able to contribute to the relief operation

Also, the required tools and services need to be free to use for members of the public, since during a disaster there should be no obstacles for people to address their most basic needs.

Building something new adjacent to existing popular tools and communications routes (e.g. Facebook, Twitter, LinkedIn), would at best reach a sub-selection of the communicating community. Like the features of Google, COBACORE should start with gathering and combining the information that is already shared on other places on the web and mix and merge this data into overarching information. The use of open standards for storage and communication of data is important here. Next to that community members could be trained to help others to assess the prevailing needs and capacities (as a voluntary service) and upload these assessments directly to the COBACORE platform. If the information from these compiled sources is accessible through a portal that is so comprehensive and useful that people consider it a (the) trusted source during a crisis, they will start sharing their updates and adding information on it – instead of somewhere else. When that happens, this would validate the COBACORE platform.

Role of layer 1 in the Business Case: The community uses the platform free of charge. The huge amount of data generated by the community is the basis of a commercial model for organizations and market players.

5.1.2 Layer 2: Technical communities

Technical communities are members of the general public that are willing to participate in the data analysis and reporting. They can be experts from organizations, community representatives, or just people with specific skills (language, analytics, writing, HR, etc.).

Output of layer 2: Technical communities support the COBACORE platform with:

- 'Operating' the system
- Analyzing the community generated data
- Finding additional sources of information and add open-data sources to the platform for enhanced data visualization

- Increasing the reliability of community generated data and turn it into information and knowledge, by
    - Aggregating user reports
    - Proving the reliability of data (triangulation, cross checks, source analysis)
    - Generating high level reports for input to decision makers

Requirements for layer 2: It should be possible to train members of the technical communities on their tasks. Technical community members should have the capacity to:

- See the community generated needs and capacities
- See the geographical views of primary and secondary data sources
- Divide tasks according to work descriptions (coordination?)
- Perform tasks within the platform
- Collaborate among each other

Role of layer 2 in the Business Case: technical communities will provide their services free of charge and are therefore not charged for the use of the platform. They do however add to the quality of the community generated data and provide coordination, or coordination support.

5.1.3 Layer 3: Planning and decision making by professionals

The community generated view on needs and capacities of layer 1, combined with the annotated augmented information of layer 2, can be used by humanitarian actors, local organizations, NGO's and local, regional and national government to work within their mandate on assisting these communities.

Starting point for layer 3: The community generated view on needs and capacities of layer 1, combined with the augmented information of layer 2, can be used by humanitarian actors, local organizations, NGO's and local, regional and national government to work within their mandate on assisting these communities.

Output of layer 3: These actors will have the exclusive access to:

- Community generated needs and capacities that are not framed by a set of assessment questions
- Geographical views of primary and secondary data sources
- The option to disseminate specific needs assessments questions through the COBACORE - platform to:
    - the general public (social media)
    - volunteers and community representatives (mobile technology)
    - organizations that can provide secondary data
- The results of the disseminated and returned answers from the local communities.
- Dashboard and coordination

Out of scope for COBACORE: (provided by other platforms and existing tools)

- Providing information about what needs the organization will address, in what geographical area (who, what, where)
- Combining the community-based data with other sources of data (primary and secondary)
- Analyzing all sources and create a report
- Taking into account the organization's mandate, political and financial constraints.
- Planning the operations
- Executing the operations

Requirements for layer 3: Employees have to be able to analyze the need assessment data and migrate it to proprietary planning systems. There should be training materials/facilities for the organizational employees to train them on their tasks.

Role of layer 3 in the Business Case: Each decision maker will pay an additional fee for using these extra capabilities of the platform. The center of gravity for financially balancing the business model should be on this layer: these are the users that gain the most from the innovations made in the practice of needs assessment and have the largest budgets available for these innovations.

From the partial evaluations it was shown that the layered setup will indeed be a strong point and logically connects the three user groups through a single interface. The exact composition and requirements for different layers needs to be explored in more detail though the intermediate evaluations. This is because the different user groups in one country are not intending to use the COBACORE platform in exactly the one single manner. This is different from country to country in Europe depending on factors such as privacy regulations, governmental policies, level of activity of volunteers, cell/smartphone and internet coverage. For example, the partial evaluations showed that not all professional responders are motivated by exactly the same incentives; paying for certain services can only be planned when the other layers are effectively functioning.

5.2 Position in time

During the different stages of a crisis, the COBACORE system has the most added value between the immediate relief stage to the recovery phase. This implies that the main focus is of the COBACORE system is on the early recovery phase. In the figure below, the early recovery phase where COBACORE has the most value/impact is marked in red.

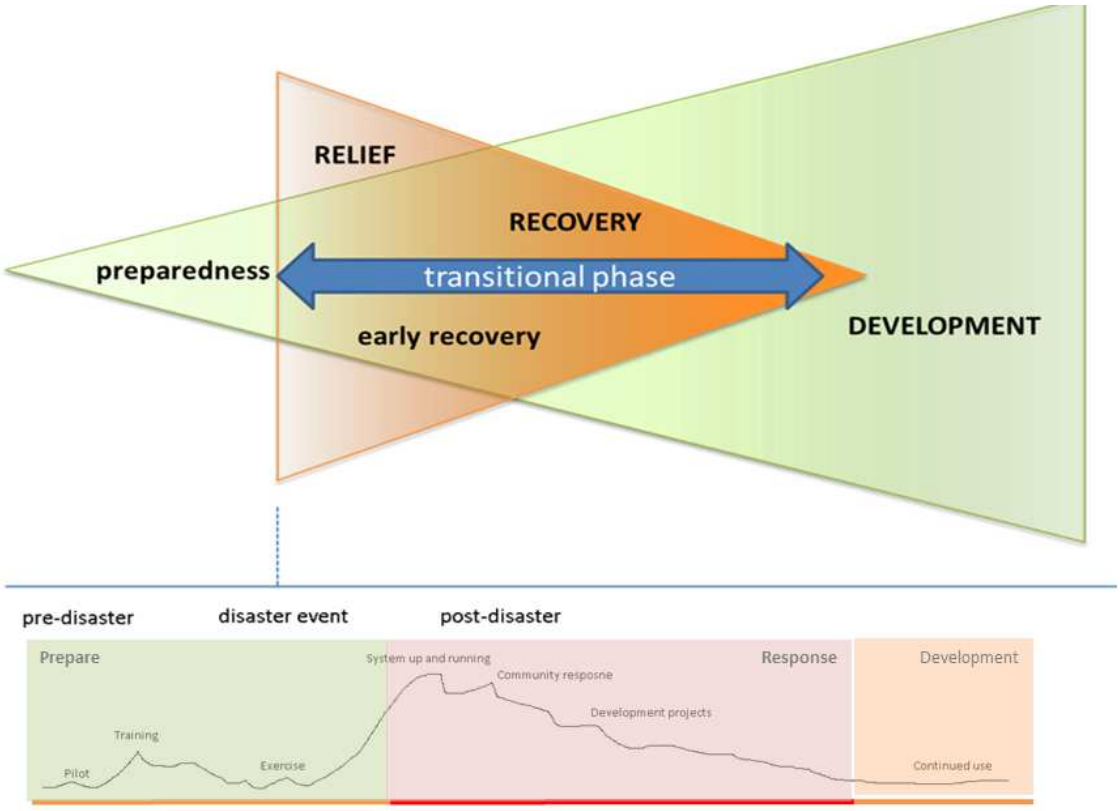


Figure 10: Position of COBACORE in time

Although for a wide variety of crisis scenarios the exact added value will vary, the transitional phase between relief, early recovery and recovery is highly fluent. Literature (Neal, D. M. 1997) and field experiences show that bridging the early recovery gap (or LRRD in humanitarian terminology: Linking Relief, Rehabilitation and Development) is the most urgent need and most practical from a user perspective.

The main reason for the focus on the early recovery gap is that current crowd-enabled information processing tools require time to tailor and cannot be deployed straight into a disaster situation. Setting up context-relevant automated classifiers for short contextual strings, classification and information extraction requires time for translation into the relevant context. Although pre-setup information analysis frameworks can be helpful in limiting response time, it is deemed unrealistic to aim to deploy a COBACORE system in the first 6 hours directly after a disaster occurs.

The main reason for not seeing COBACORE's main application well into the development phase is that in that stage, the information density has already gone down and regular information channels are sufficiently able to ensure that the main issues as identified in chapter 3 are covered.

6 Conclusion

Based on the analyses of the domain using several cases and the outlined scope, deliverable 1.1 provides a definition of the setting on which COBACORE is focusing its efforts. From the analysis of this specific focus area several key-user groups have be identified: the affected community, the professional responses and the responding community. The analysis shows that bringing these groups together provides synergy for all involved, expediting the relief, reconstruction and development processes of the community hit by a disaster. In order to achieve this synergy COBACORE aims to provide the users of the system with information that will allow them to better use and distribute the available resources, leverage the capacities available in their own community and those available in the responding community. By building on these capacities, supported by the professional organizations, the communities become more resilient to disasters, more effective is dealing with the aftermath and more self-organized in deciding the future of their own environment and living conditions.

The domain analysis, concept and requirements presented in this document feed into the work by conducted by other work packages and form the bases for the next stages of the development of the COBACORE project. Work package 1 members will continue not only to help refine the content of this document and help the consortium members to interpret the content for their specific needs, but also answer questions and facilitate discussions to ensure a common understanding of the platform-to-be and continue to act as a sounding board.

6.1 Limitations

Along the development path of COBACORE some questions and discussions regarding the content of this document may require the revision of some specific sections, while other sections may be updated to be more precise, and better specify or even quantify input required for other work packages. Work packages aims to keep track of these requests and update the documents where needed.

Furthermore, the analysis and concept presented in this document is based on research conducted on historical data and verified by partial evaluations, conducted by work package 5. This approach enables work package 1 to clearly identify opportunities for improvement in disaster responses and the identification of trends towards the future of disaster response and recovery efforts. However a key success factor for the concept as it is presented here is the adoption of the platform by the end-user and user-groups. To ensure a high-level of adoption a close collaboration with these user-groups is required, to ensure proper alignment with their expectations and wishes. While WP1 andWP5 have worked together to collect these requirements through interviews, an evaluation in a more realistic setting is needed to verify those findings. Given the volatile post-disaster environment in which COBACORE will be used it is important that the platform will be manageable by the users in such setting. WP1 and WP5 are working together on evaluations that evaluate the presented concept in such settings.

Finally, COBACORE aims to facilitate the work and operations of a great number of organizations, communities, and users. Some of these groups already have certain systems in place to support their operations. COBACORE does not aim to replace these existing systems, but rather augments the existing ecology of systems. To ensure a proper fit, COBACORE needs to have a good understanding of the current state-of-the art. In this analysis, part of the next deliverable, WP1 will identify lessons learned, alignment opportunities and potential collaborations with other systems.

6.2 Future work & State of the art

While the state-of-the art analysis is part of the next deliverable, several key initiatives can already be identified that provide valuable input and inspiration for the COBACORE platform (see also section 7.4). 4 types of platforms/systems have already been analyzed in more detail.

First there are initiatives led by the EU or (national) government. Example of such systems include the Global Disaster Assessment and Coordination System (GDACS)[5], Infrastructure for spatial information in Europe (INSPIRE)[6] or LCMS. These initiatives in general have a clearly established consortium that can be engaged to exchange ideas and foster collaborations with.

Next there are several crowd sourced initiatives. Built on the practice of obtaining needed efforts, services, or content from a large group of people, and especially from an online community, rather than from traditional employees. Examples in the humanitarian aid and disasters response community include Ushahidi and Sahana. Both initiatives developed, supported and driven by (digital) volunteers. These initiatives are open for collaboration but because of their more loosely based coordination structures may be harder to engage.

Other initiatives are the result of research or development efforts conducted by academics. Example of such platforms are twitcident, tweettracker, twitris. These initiatives originate from either identified innovative or technology driven opportunities or a specific need or opportunity identified by research in the field. Engaging these initiatives can be established through existing collaboration with universities and the academics involved in COBACORE.

Finally there are professional responder-developed examples. Fore example crowdsourcing apps for different situations: FEMA, ICRC, Amber Alert, BurgerNet, RAM Risk Alert Manager, SOS4US, BuitenBeterApp, Influenza Monitor App, WISER (Wireless Information System for Emergency Responders), Nextdoor App. There is wide range of these examples and a specific selection has to be made of initiatives relevant for further analysis by Work package 1.

While presented here as clearly distinct groups, most initiatives are the results of collaborations between two or more of these groups (see section 7.4). While the initial origin might be from one specific group the resulting outcome is a joint effort. Especially to ensure adoption by the professional community collaboration with them is important. Considering these groups and the outlined concept of COBACORE, two examples are particularly interesting for inspiration for the COBACORE platform: The FEMA self-reliance app (Figure 11) and the Nextdoor platform (Figure 12). From these two platforms we observe the following trends:

- Trend from large-scale government led crisis systems towards crowdsourcing applications for variety of purposes
- Trend from using people as simple sensor (find bad guy, call police) to more complex tasks (first aid, send pics, analyses local situation, interpret crisis intel)
- Trend from top down to bottom up: not only government to citizen, also citizen to citizen and citizen to government
- Growing number of more advanced apps enable trend towards tailored information exchange on individual level: not only tweets but concrete aid requests for specific situations for specific (groups of) people
- Crisis apps remain too crisis oriented: no apps incorporate reconstruction activities

[5] http://www.gdacs.org
[6] http://inspire.ec.europa.eu/index.cfm

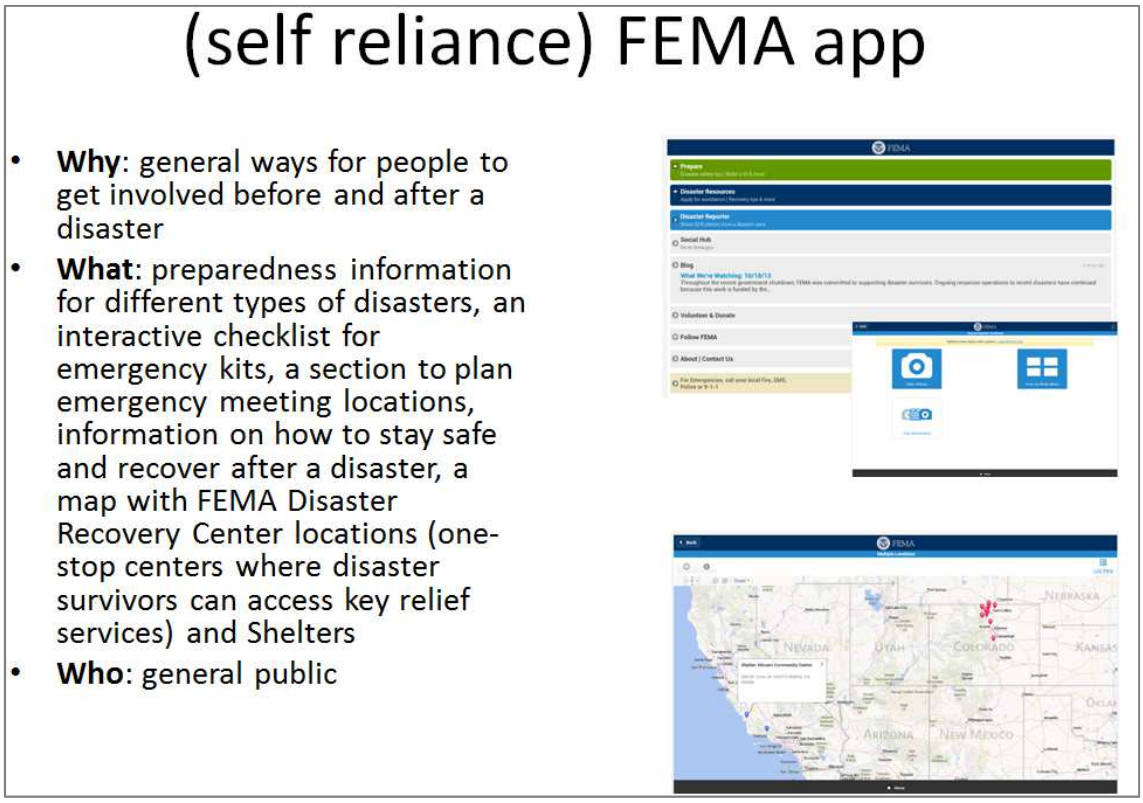


Figure 11: FEMA app http://www.fema.gov/smartphone-app

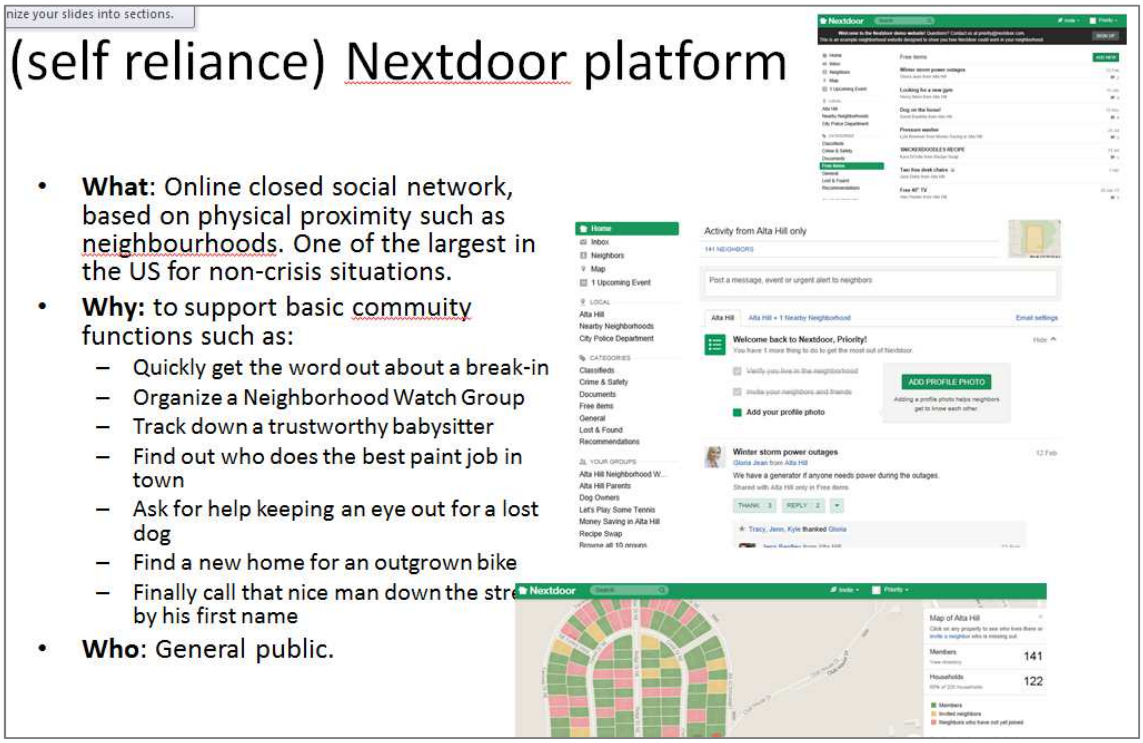


Figure 12: Nextdoor platform https://fondren.nextdoor.com/about_us/

7 Appendix

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- UNISDR, 2009 UNISDR Terminology on Disaster Risk Reduction, 2009, United Nations, Geneva, online: http://www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf , latest access 12.03.2014

7.2 Glossary

For the further development of COBACORE, it is very important that all project partners use the same set of terms and clearly define this terminology. Translation and country-specific vocabulary can lead to misunderstandings and disagreements; in order to avoid this, this glossary shall serve as a basis. Some of the mentioned terms are taken from this Deliverable; others were not mentioned before and are considered to be important in the further process.

The definitions of terms are adopted from the United Nations International Strategy for Disaster Reduction (UNISDR) (UNISDR, 2004, 2009), the World Health Organization (WHO 2013) and the Federal Emergency Management Agency (FEMA 1992) and adapted to the needs of COBACORE.

Term	Definition
Affected community	all directly or indirectly affected community members; key users of COBACORE: individual citizens, civil society organizations, private sector organizations + local public services and vital infrastructure providers.
Affected population	People who are adversely affected by a crisis or a disaster and who are in need of urgent (humanitarian) assistance.
Capacity	Combination of all strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals.
Capacity Development	Process by which people etc. systematically stimulate and develop their capacities over time to achieve their agreed goals.
Collaboration Gap	A collaboration gap appears when critical parties in a cooperative effort are not collaborating in the most effective way; in the context of COBACORE the term refers to a lack of collaboration of the end-user groups
Complexity of response	Level of systematic utilization of instruments to deliver humanitarian assistance in a cohesive and effective manner.
Contingency Planning	A management process that analyses specific potential events or situations that might threaten society or the environment and establishes arrangements to enable timely, effective and appropriate responses to such events and situations.
Coping Capacity	Ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters.
Critical facilities	Primary physical structures, technical facilities and systems which are socially, economically or operationally essential to the functioning of a society or community.
Disaster	A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.
Disaster Risk	Potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community over some specified future time period.
Disaster Risk	Systematic process of using administrative directives,

Management	organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster.
Disaster Risk Reduction	The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters.
Economic Impact	Loss of income due to disaster-caused destruction.
Emergency Services	The set of specialized agencies that have specific responsibilities and objectives in emergency situations.
Environment	The setting or conditions in which a disaster occurs.
Event formation	A specific state of growth or advancement of a crisis.
Impact on beneficiaries	Overall effects of a disaster on the well-being of a population.
Hazard	A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.
Level of preparedness	Activities and measures taken in advance to ensure effective response to the impact of hazards.
Preparedness	The knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions.
Prevention	The outright avoidance of adverse impacts of hazards and related disasters.
Public Awareness	The extent of common knowledge about disaster risks, the factors that lead to disasters and the actions that can be taken individually and collectively to reduce exposure and vulnerability to hazards. Public awareness is a key factor in effective disaster risk reduction. Its development is pursued, for example, through the development and dissemination of information through media and educational channels, the establishment of information centres, networks, and community or participation actions, and advocacy by senior public officials and community leaders.
Recovery	The restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors. The recovery task of rehabilitation and reconstruction begins soon after the emergency phase has ended, and should be based on pre-existing strategies and policies that facilitate clear institutional responsibilities for recovery action and enable public participation.
Resilience	The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

Resilient Community	Members of the affected community, who try to help themselves in recovering from an emergency.
Responding Community	Local or outside community members that support in relief or recovery by providing e.g. direct help on site, goods, knowledge or funds; key users of COBACORE are individual citizens, civil society organizations, private sector organization and spontaneous volunteers.
Responding Professionals	Professionals in the field of crisis response and recovery; COBACORE key users are national and local governments, NGOs, national crisis coordination centers.
Response	Disaster response is predominantly focused on immediate and short-term needs and is sometimes called “disaster relief”. The division between this response stage and the subsequent recovery stage is not clear-cut.
Risk	The combination of the probability of an event and its negative consequences.
Risk assessment	A methodology to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability.
Risk management	The systematic approach and practice of managing uncertainty to minimize potential harm and loss.
Spontaneous volunteers	Are motivated by a sudden desire to help others in times of crisis. They are not officially invited to become involved and are not part of a recognized voluntary agency. Therefore most of the unbound volunteers can be assumed to not dispose of relevant basic or specific skills in the field of disaster response; but due to their personal backgrounds they come with a variety of skills. Their help is common welfare orientated, free of charge and in most cases taking place outside the volunteer’s spatial and social surroundings. Spontaneous Volunteers independently coordinate their help among each other e. g. Using Social Media.
Structural and non-structural measures	Structural measures: Any physical construction to reduce or avoid possible impacts of hazards; Non-structural measures: Any measure not involving physical construction that uses knowledge, practice or agreement to reduce risks and impacts, in particular through policies and laws, public awareness raising, training and education.
Time horizon	Estimated length of time for a recovery plan to complete.
Trained volunteer responders	Are trained and organized like responding professionals but work on a voluntary basis but work on a voluntary basis.
Volunteer	Encompass trained and spontaneous volunteers; contains freely offers to take part in an enterprise or undertake a task.
Vulnerability	The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

7.3 Scope and Focus overview

Factor	Category	Dimension 1	Dimension 2	Dimension 3	Dimension 4	Dimension 5	Dimension 6
Affected population	Impact	International	Nationwide	Province / State	Municipality	Local community	Individual family
Impact on beneficiaries	Impact	Immediate loss of life	Potential loss of life	Major disruption	Service Replacement	Delay/Expedition	Minor Inconvenience
Economic impact	Impact	XXL (10^9 €)	Extra Large (10^7 €)	Large (10^6 €)	Medium (10^5 €)	Small (10^3 €)	None
Recovery rate	Time	Ongoing (long shadow)	Months	Weeks	Multiple days	1 day	Hours (cathartic)
Complexity of response	Scope	Cluster coordination	Multiple organizations	County / Province	Municipality	Emergency services	Citizens
Level of preparedness	Population	Systems-active	Systems-standby	Strategy/plan	Training / preparedness	Basic response	None
Data availability	Population	Extensive, structured and up-to-date	Multiple data-sets	Basic, structured data	Unstructured / Dispersed data	Limited data available	None
Global frequency of event	Time	Once per 50 years	Once per 10 years	Annually	Monthly	Weekly	Daily
Environment	Scope	Western urban	Western suburban	Western rural	Developing urban	Developing rural	Uninhabited
Event formation	Time	Fast-burning	Sudden on-set	Developing situation	Slow-burning	Creeping / Silent	Predictable
		Scope	Focus				

7.4 Existing initiatives, tools and state of the art

7.4.1 Inter-Agency Standing Committee's (IASC) Need Assessment Task Force (NATF)

In the IASC-NATF where the UN and key humanitarian aid organizations work together to harmonize and standardize assessment methodologies. In 2010, the IASC has established the 'Needs Assessment Task Force' (NATF) with an ambition to create a common assessment methodology that yields a 'stronger evidence base for humanitarian action, in particular in sudden-onset natural disasters', and develop tools and guidance based on standardized information. UN-OCHA and the International Federation of the Red Cross/Red Crescent (IFRC) co-chair the NATF.

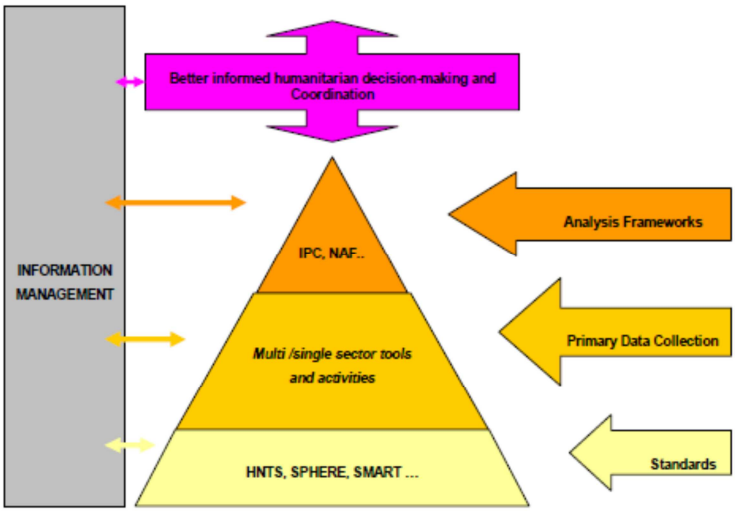
The activities of the NATF have given rise to new initiatives such as the **MIRA (Multi-cluster Initial Rapid Assessment) methodology**, the **Operational Guidance for Coordinated Assessments in Humanitarian Crisis report (#OpGUid)** and **Global mapping review of NGO engagement in coordinated assessments (#GLobMap)**.

The most widely-used common needs assessment framework is the **Post-Disaster Needs Assessment and Recovery Framework (PDNA)**. A PDNA is a national government-led exercise that assesses physical damages and economic losses; and identifies the humanitarian recovery needs for the population in the affected area. A PDNA is initiated by a local government, managed by the World Bank, the EC and the UN, and supported by national and international humanitarian partners.

UN-OCHA has proposed that primary data collection tools have to be based on **standards (e.g. HNTS, SPHERE, SMART**) and provide information for existing **analysis frameworks (e,g. IPC, NAF)**.

7.4.2 UN OCHA ACE Report

OCHA Assessment and Classification of Emergencies (ACE) provides a comprehensive overview of needs assessments methods in use, and their use in different phases after a disaster.



- Standards-related initiatives, which serve as a foundation for assessment tools and data collection;
- Primary data collection, with a distinction between rapid and in-depth assessments; and

- Analysis frameworks, where information and data generated by the two previous levels is integrated into a framework for analysis and in some cases, response planning.

One can think of various types of assessment tools, which all serve different purposes but aim to collect similar data that is currently offered in different formats. For example, the Health and Nutrition Tracking Service (HNTS) and the Standardized Monitoring and Assessment of Relief and Transitions (SMART). Moreover, ACE also classifies analytical frameworks for consolidation of Information, for example Integrated Food Security Phase Classification (IPC), Nutritional Information in Crisis Situations (NICS), Needs Analysis Framework (NAF, 2007 version), Post-Disaster Needs Assessment (PDNA) or Post Conflict Needs Assessments (PCNAS)

OCHA's Online Projects System (OPS), as part of the larger Consolidated Appeals Process (CAP) is a web-based database accessible to registered users (any organization participating in a CAP can register) on which draft CAP projects are peer-reviewed, tabulated, and (after approval) electronically published. Financial Tracking Service (FTS) thereafter shows financial progress of the project.

7.4.3 FEMA

In the USA FEMA published recently a new National Disaster Recovery Framework (NDRF). The NDRF is a guide that enables effective recovery support to disaster-impacted States, Tribes, Territorial and local jurisdictions. It provides a flexible structure that enables disaster recovery managers to operate in a unified and collaborative manner. It also focuses on how best to restore, redevelop and revitalize the health, social, economic, natural and environmental fabric of the community and build a more resilient Nation.

The National Disaster Recovery Framework defines:

- core recovery *principles*,
- *roles* and *responsibilities* of recovery coordinators and other stakeholders,
- a *coordinating structure* that facilitates communication and collaboration among all stakeholders, guidance for pre- and post-disaster recovery *planning* and;
- the overall process by which communities can capitalize on opportunities to rebuild stronger, smarter and safer.

The FEMA Long-Term Community Recovery (LTCR) Self-Help Guide (2005) is intended to provide state, tribal and local governments with a framework for implementing their own long-term community recovery planning process after a significant disaster event.

7.4.4 Technical communities and crowd sourced data

The rise of 'volunteers and technical communities' (V&TC) are open, voluntary communities that are using their skills and capacities to create **ad-hoc communication channels** for individuals to express needs and capabilities in areas of distress. Many recent large disasters have seen the involvement of V&TCs to provide **crowd sourced data** (e.g. Haiti (2010), Japan (2010), Libya (2011), but also in smaller scale crises such as severe weather situations (e.g. Hurricane Irene, 2011) or societal turmoil (London Riots, 2011). Still, these so-called **CrowdMaps** (e.g. **OpenStreetMap, Sahana, and CrisisMappers**) are still very much disconnected from workflow of the larger relief operations. While there are examples of crowd sourced information used by professional organizations, usually crowd sourced information is too unreliable and too prone to misuse to become a primary source of information.

Online disaster-response community (ODRC) that is comprised of formal and informal networks of people acting as sensors collecting, processing, and delivering information where it is needed.

Common Operational Dataset (COD) is an example of an inter-agency data standards for data like baseline population, road data and more. The COD's schema lack specificity about how to characterize individual objects that are important to the response.

The Harvard Humanitarian Relief 2.0 initiative is of particular interest here, as the HHR 2.0 serves as a neutral forum to surface areas of agreement and conflict between international humanitarian system and the V&TCs. It is basically an innovation space where new tools and practices can be explored as experiments, allowing for the failures that are a necessary component of learning new ways of working. The HHR 2.0 deployable field team with a mandate to deploy the best available tools and practices from the V&TCs to the field adds a practical component to the more research-oriented approach.

7.4.5 Guidelines for assessment in Emergencies (Joint initiative of ICRC, IFRC)

These guidelines provide advice on how to carry out an assessment. The international Federation of Red Cross and Red Crescent (IFRC) and the International Committee of the Red Cross (ICRC) Movement (the Movement) is involved in a wide variety of situations. Each assessment is different, reflecting this diversity. These guidelines do not explain every activity for every assessment. They do, however, provide a framework within which an assessment can be organized. By working through the guidelines, you should be able to cover all the main issues required for successful assessment.

Rapid Mobile Phone-based (RAMP) survey: Over the past few years the International Federation of Red Cross and Red Crescent Societies (IFRC) has worked with partners to develop an innovative approach to designing health surveys and improving the timeliness of the entire data collection cycle. This approach has been named Rapid Mobile Phone-based (or RAMP) survey.

7.4.6 ACAPS

The Assessment Capacities Project (ACAPS) is an initiative of a consortium of three NGOs (HelpAge International, Merlin and Norwegian Refugee Council). ACAPS works with a number of humanitarian actors, including the IASC Needs Assessment Task Force and has signed a MoU with the IFRC to collaborate on Emergency Needs Assessment.

ACAPS aims to improve coordinated needs assessments by:

- Developing innovative needs assessments tools and methodology
- Providing specific needs assessments training courses
- Building a roster of deployable assessments experts
- Deploying assessments experts in high disaster-risk countries or crisis-affected contexts

ACAPS has a rigorous operational learning component which serves to identify and apply good practice and innovative approaches, including the use of new technology, to coordinated multi-sector assessments.

ACAPS collaborates with a large network of partners and supports the work of the Inter Agency Standing Committee (IASC) Needs Assessment Task Force (NATF). ACAPS works through the

existing humanitarian architecture and reinforces the structure in place rather than creating new and separate systems (http://geo.acaps.org/#geomap-tab)

7.4.7 Nethope

Nethope has developed two promising initiatives which might be of relevance for the COBACORE project, in particular because of the open source approach these two initiatives have been taken.

- Open Humanitarian Initiative (OHI)
  - Five year initiative focused on bringing the concepts of open data and increased transparency into the humanitarian space
  - Enabling affected communities to be part of the information loop
  - Build a platform for information to flow between existing systems
- Open Humanitarian Alliance (OHA)
  - Bringing together all of the actors needed to make an impact
  - Humanitarian Response Organizations, Academia, Private Sector, and Governments
  - Provides strategic direction for the initiative

7.4.8 Humanitarian Exchange Language (HXL)

Technical broker-solution for creating exchangeable formats for various stakeholders during a crisis response operation. The original idea for HXL was to develop an XML schema that allows humanitarian organization to publish XML adhering to this schema. However, it was found more practical to develop a new format, as the extensibility, a shared syntax and data sharing through a standardized API (Application Programming Interface) appeared to be more practical.