



**Enhancing the Efficiency of Alerting Systems Through
Personalized, Culturally Sensitive Multi-Channel Communication**

**Project No. 261699
Deliverable D2.3**

“Report on individuals previously affected by crises”

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Objectives of Opti-Alert in general and WP 2 in particular

The EU-funded project “Enhancing the Efficiency of Alerting Systems Through Personalized, Culturally Sensitive Multi-Channel Communication” (“Opti-Alert” – EC Grant Agreement No 261699) deals with improved regionalization and personalization of warning messages, as well as a closer cooperation and integration of industry-funded alerting systems and state-funded alerting tools.

The deliverable D.2.3 “Report on individuals previously affected by crises” is the third out of seven deliverables within work package (WP) 2: Socio-cultural factors in risk and crisis communication. WP 2 addresses the fundamental question: How are different types of risks (technological, environmental, social, etc.) perceived in different socio-cultural and regional contexts, and what is the impact of these perceptions on efficient risk communication?

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1 Introduction

This report is based on information from biographical interviews with victims of a previous disaster as well as “survivors” of industrial accidents and severe weather. Included in this study are seven Member States: Austria, France, Germany, Hungary, Italy, the Netherlands and Sweden.

The explorative interviews with those who have personal disaster experience give insights into the personal reflections of such a disastrous experience and the interpretations after that event. This method will allow an understanding of individuals’ perceptions of risk-communication and alerting and it gives some indication of the similarities and differences of risk perception within different cultures and countries.

We have chosen for our study an innovative methodological approach that combines the information and the knowledge gathered by expert interviews and the research of official publications, websites, literature, etc. with the information, impressions, knowledge, (information) behaviour and information expectations reported by individuals who were actually personally affected by a previous disaster. The major advantage of this approach is that we will not only (re-)produce an official perspective regarding the supply of crisis management and crisis communication strategies and methods - of which officials might potentially think, and take for granted, that the supply will be used by the target groups as intended by the sender - but we will also gather the perspectives of those who did use the official offers - or rather not - and how they actually did and why they did as they did. The analysis of the explorative interviews conducted with disaster survivors will illuminate strong and weak points of current alerting systems. We assume that the comparison of the two perspectives - expert view and aggrieved parties - will lead to a better understanding of and improvements in regard to more effective alerting systems. Results of both studies will lead to the construction of the socio-cultural clusters of the focus groups.

This innovative qualitative approach combined with a variety of different disasters ranging from natural disasters (hail, flood, storm) to industrial disasters (chemical fire, explosion etc.) to hybrids of both (such as red sludge) cannot and will not pretend to be representative. But by covering these diverse disasters and using these explorative methods we will be able to address issues on a meta-level, such as trust in official bodies, credibility of media, trustworthiness of provided information etc. The analysis will show similarities and differences between the examined countries and how cultural and national contexts will influence actual dealing with such disasters.

1.1 Interviews and interviewees

We have conducted 31 interviews in seven countries with 36 interviewees in total. Interviewees were selected according to their personal involvement in specific disaster. The disastrous experience should not have been too long ago, that is generally not longer than 5-8 years ago (the Dutch Enschede disaster was an exception). The actual disaster people suffered varied. The partners of the Opti-Alert consortium have decided about relevant and suitable disasters in their respective country. The following table 1 gives a short overview of the interviews conducted and the disaster interviewees involved.

	Kind of Disaster
Austria	Storm & hail (5), flood (1)
France	Industrial explosion (2) storm and flood (3)
Germany	Storm & hail (3), flood (2)
Hungary	Red sludge (2), mud slide (1), flood (3)
Italy	Mudslide and flood (4), earthquake (1)
Netherlands	Health (1), chemical fire (1), bush fire (1), chemical explosion (1)
Sweden	Industrial accident (2), storm (1), nuclear (1), epidemic (1)

Table 1: Kinds of disasters involved in our study within the examined countries. In brackets are the number of the conducted interviews.

The following table 2 describes briefly the disasters which are integrated into the analysis.

	Kind of Disaster
Austria	
Heavy Hailstorm 2009	On the 23th of July 2009 there was a heavy hailstorm in Lamprechtshausen. Many buildings in the city were damaged by this hail storm.
Storm Kyrill 2007	The interviewed person was affected by the storm Kyrill 2007. There was a heavy hailstorm in Tenneck in the night from the 18 th of January to the 19 th
High-water 2002	There was a flood in summer 2002 after heavy rainfalls lasting more than two weeks. In this case there was a holiday house concerned, which was

	<p>flooded in two waves, first on the 7th and second on the 13th of August. Normally the river Kamp runs 15 meters away from the house, in this case the river flowed over the ground floor.</p>
<p>France</p>	
<p>Storm Xynthia 2010</p>	<p>Xynthia was a heavy cyclone which crossed France and parts of middle Europe from the 26th to the 28th of February 2010. About 60 people died because of the thunderstorm, mostly in Western parts of France. Interviews were conducted with people from the West coast of France. The Atlantic coast was one of the most heavily affected areas. Here the hurricane produced waves more than eight meters high whereby many dams were damaged. Many people died or lost houses.</p>
<p>Toulouse - Industrial fire 2002</p>	<p>On the 21st of September, a big explosion happened at AZF, a chemical plant close to city center of Toulouse. Three hundred tonnes of ammonium nitrate were stored there, even though only two hundred tonnes were officially admitted. The explosion destroyed the entire plant and left a crater up to a depth of 30 meters and a diameter of 200 meters. Altogether 29 people were killed, 2500 badly injured and 8000 people suffered minor injuries.</p>
<p>Germany</p>	
<p>Mering – Storm 2009</p>	<p>On the 26th of May in 2009 there was a heavy thunderstorm in Mering, Bavaria with rough hail (tennis ball-sized hailstones), heavy rainfall and high wind. Damage through landslide, abrasion of hail and flooded streets occurred.</p>
<p>Wertheim – Flood 2011</p>	<p>Wertheim is situated between the rivers Main and Tauber and parts of the inner city are frequently flooded. The flood in Winter 2011 was from the 9th till the 20th of January and was a disaster for people and buildings of Wertheim. The flood came in two waves and parts of the inner city were flooded for more than ten days. Average water-line of the river Main lies approximately 1,30 meters and floods up to 5,20 meters can be dealt with by special water pumps. However, in January the 5,20-limit was overrun two times – on Wednesday the 12th of January the waterline was by 5,79 meters at noon and on Monday the 17th of January waterline was at 5,95 meters at night.</p>
<p>Hungary</p>	
<p>Devecser - Red mud disaster 2010</p>	<p>After an accident on the 4th of October 2010 at the plant Stade Aluminium Oxid in Ajka there was a huge mud current. Between 700,000 and 1 million cubic meters of toxic mud escaped from a defective depository basin, mixed with flood water, which was there because of heavy rainfalls, and contaminated an area over 40 sqkm. Due to toxic chemicals in the mud like antimony, nickel and cadmium there was long-range environmental pollution, which is still problematic for nature and human beings.</p>
<p>Felsőzsolca, Mórágý - Flood</p>	<p>The otherwise marginal Sajó, a river in the northeast of Hungary,</p>

2010	overflowed the small towns Felsozsolca. In 2010 heavy rain caused in Mórágý a mudslide that damaged several buildings.
Italy	
Mesina – flash flood 2010	Heavy rains caused extreme flash floods and landslides in Messina on the 1th of October 2009. 20 people died in the floods, many people were severely injured others were trapped by bodies of water or mudflow. Buildings were destroyed and the infrastructure of the area around Messina was closed down for a while, so that only helicopters and boats could reach the victims to rescue them from the floods and the mud.
L'Aquila – Earthquake 2009	The Earthquake l'Aquila occurred on the 6 th April 2009 at 3:30 a.m. local time. There have been several thousand foreshocks and aftershocks since December 2008, more than thirty of which had a Richter magnitude greater than 3.5. The quake was rated 5.8 on the Richter scale. Epicenter was near L'Aquila, in the center of the Apennines, which together with surrounding villages were seriously affected. Overall 308 people died, 1,500 were injured, many buildings were damaged and altogether 40,000 people were made homeless through the earthquake.
Netherlands	
Moerdijk - industrial fire 2011	There was an industrial fire in Moredijk at the Chemie-Pack company on the 4 th of January 2011, at which there were several explosions. The company packs, among other things toxic and caustic chemicals, indeed there were no release of these dangerous substances. People of surrounding towns complain about black and stinking clouds of smoke.
Bouwens Nijmegen Vierdaagse – hot weather 2007	Nijmegen Vierdaagse is an annual four day walking event in summer. The interviewees were talking about their experiences in 2007, where people had to fight against a great heatwave.
Bergen aan Zee – dune fire 2010	Near Bergen aan Zee there was a dune fire the 14 th of April 2010. A pyromaniac set numerous fires in the area of which this one was extreme due to a high North-East wind. The fire located in the North-East of Bergen aan Zee and approached the town quickly. When the fire was just one km away, the 400 residents of the village had to be evacuated and people could return after the firefighters cleared an area of land of vegetation to stop the spreading and the fire was under control. The fire threatened many homes and holiday houses in the dune village, persons did not suffer.
Enschede fireworks disaster – May 2000	The Enschede fireworks disaster was a catastrophic fireworks explosion occurring at the SE Fireworks depot on 13 May 2000, in the Eastern Dutch city of Enschede. It happened in storage where about 900 kg of fireworks were stored. After this, fire spread out of two containers which were stored illegally outside the building. The fire led to a huge explosion, whereby 23 people were killed and 947 injured. Additionally, about a 40 hectare area around the store was damaged including 400 buildings, 15 streets and 1,500 homes – so that 1,250 people became homeless.

Sweden	
Helsingborg accident 2005 – industry	Early in the morning on the 4th of February 2005, a large cistern containing sulfuric acid broke and 11 000 tones of sulfuric acid leaked out at Kemira chemicals in Helsingborg, a town with 100,000 inhabitants. When the sulfuric acid reached the ocean a huge cloud of hydrogen chloride was formed. The wind direction was favourable and carried the gas cloud out to sea. It took almost two hours before the city alarms sounded and alerted the public. By that time the gas cloud had dissolved. Eight workers at Kemira were taken to the hospital but no one was seriously hurt. Under less favorable conditions the accident could have had much more serious consequences. Despite there being no injuries this is considered to be the biggest industrial accident that has happened in Sweden in recent years.
South Sweden – Storm Gudrun 2005	On Saturday the 8th of January 2005 Southern Sweden got hit by the storm Gudrun, the Deutscher Wetterdienst (DWD) named it Erwin. It is the biggest reported storm to ever hit Sweden. Some of the strongest winds, with hurricane strength, were measured on the island where the interviewees endured the storm. They lived on the island Bolmsö on Lake Bolmen, which is located between Halmstad and Ljungby. The couple live at the end of a road on one of the islands most isolated corners.

Table 2: Description of disasters reported by the interviewees in the examined countries.

In our study we have tried to cover different age groups, different marital status, different occupations, etc. – factors known to have an influence of the risk perception of individuals. The interviewees therefore form a heterogeneous group:

- they are between 23 and 75 years old
- they have all kind of degrees
- they are still working in a lot of different jobs such as a craftsman, office worker, nurse or are retired persons or students
- they are singly and married, with children and without them
- they are from different parts of the countries

The following table 3 gives an overview about the “survivors”:

Country	Sex	Age	Marital status	Educational status	Job qualification	Comments
A	m	39	cohabitation, 2 children (3+7)	secondary school	trading assistant, logistician	raised in this region and stayed here, modern
A	m	42	married, 2 children (13+17)	grammar school	engineer	suburbia, family-orientated
A	m	54	married, 4 children	secondary school	self-employed locksmith	raised here, strong dialect, wife owns farm
A	f	63	married	vocational diploma	pensioner	travelling a lot (RV), sportive, convivial
A	m	65	married	vocational diploma	pensioner	travelling a lot (RV), sportive, convivial
A	m	36	married, 3 children	secondary school	wholesaler + insurance broker	raised in this region and stayed here
F	m	46	married, 2 children (23+16)	secondary school	informatics engineer	communicator for victims association
F	m	43	married, 2 children (14+17)	secondary school	teacher (first degree)	
F	f	42	married, 2 children (14+17)	grammar school	nurse	
F	f	58	divorced, 1 child (32)	grammar school	housewife	president neighbourhood association
F	m	68	married	secondary school	pensioner	president neighborhood association, spokesman of CLIC
D	m	44	divorced, 2 children	vocational diploma	metal worker	born in Saxony
D	m	75	married, 2 children		pensioner	
D	m	42	married	vocational diploma	IT admin and agricultural engineer	motorcycle club, manually talented, pragmatic

D	m	63	married	secondary school	hairdresser	founder of citizens' group, active
D	m	39	married	grammar school	nurse	voluntary helper
HU	f	40	married, 2 children	secondary school	librarian assistant	
HU	m	62	married, 1 child	university diploma	pensioner (real estate agent)	
HU	m	63	married, 1 child	university diploma	pensioner (agrarian entrepreneur)	till 2010 mayor of the settlement
HU	m	52	married, 1 child	secondary school	electronical technician	
HU	m	41	married, 1 child	university diploma	architect, entrepreneur in construction	
HU	f	28	married, 1 child	secondary school	maternity leave	
I	f	28	unmarried	high school	office worker	
I	f	41	married	high school	retailer	still shocked (brother still missing)
I	m	61	married	junior high school	civil servant and retailer	not always clear, strong dialect
I	m	23	unmarried	high school	student	
I	f	27	unmarried	university diploma (MBA)	project manager	
NL	f	34	married, 1 child (2 months)	university diploma	pharmaceutical manager	husband attended interview and answered some questions
NL	f	52	widowed	vocational training school	financial administrative employee	
NL	m	50	married, 4 children	vocational school	self-employed in health care industry	
NL	m	53	relationship,	university	self-employed	

			unmarried	diploma	(game clocks)	
S	f	53	married, 2 grown-up children	high school	economic assistant	modern
S	f	65	married, 2 grown-up children	secondary school	pensioner (shop assistant)	rural
S	m	67	married, 2 grown-up children	secondary school	pensioner (factory worker)	rural
S	m	64	unmarried, no children	secondary school	cultural worker	modern
S	m	72	married, 2 grown-up children	secondary school	pensioner (driver)	modern
S	M	38	unmarried, no children	high school	control room technician	modern

Table 3: Short description of interviewees

1.2 Conducting and preparing interviews

The biographical interviews were based upon interview guidelines (see D 2.1). The duration of an interview was between 30 minutes and nearly three hours (10 up to 79 pages). All interviews were done by native speakers. People were interviewed at home or at the work place. All interviews were digitally recorded and all interviews were transcribed verbatim and translated where applicable and analysed thereof.

Please note: Methodologically biographical interviews will always be analysed verbatim in order to keep authenticity. Verbatim means, not just word by word, but that we have literally transcribed all expressions by the interviewees (breaks, expressions of feelings, etc.) This means that all quotes given in this report are according to the actual speech of people, we did not smooth any language.

We ended up with a wide sample of interviews. 32 translated transcripts are present for the analysis. In the analysis there are finally 30 suitable interviews. By now we were still missing one translated transcript from Italy (see table 4):

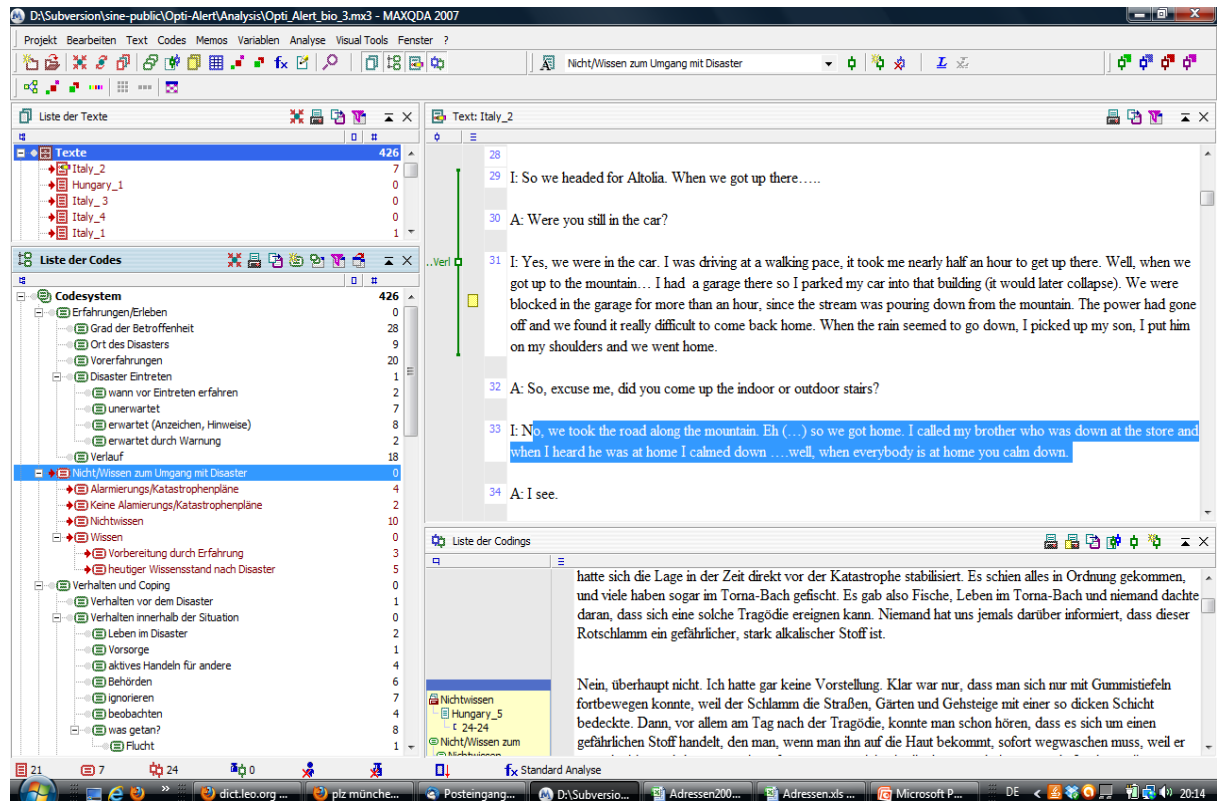
	Conducted interviews	number of interviewees	present transcripts	analyzed interviews
Austria	5	6	5	5
France	3	5	3	3
Germany	5	5	5	5
Hungary	6	6	6	6
Italy	5	5	4	4
Netherlands	5	5	5	4
Sweden	5	5	5	3

Table 4: Interviews conducted in the countries and analysis status¹

¹ In those cases when more interviews were conducted than analysed, this means that not all interviews were considered as relevant for the analysis.

1.3 Analysis of the biographical interviews

We are working according to the Grounded Theory (Strauss and Corbin 1996). All interviews were read and encoded with a data-based program (MaxQDA), paraphrased and analyzed in detail. The following screenshot displays a MaxQDA sheet which has been used for analysis of the biographical interviews.



Screenshot 1: Displaying a MaxQDA sheet used for the analysis of the explorative interviews with disaster survivors.

The analysis and the results of the report are based on the analytical framework (see D 2.1). The main topics of the questions are:

- Knowledge about alerting & crisis communication
- Risk Perception
- Actual and assumed behaviour in case of a crisis
- Information behaviour & information expectations

2 Results

Communication is an art. Make sure to provide information that uh, uh, is difficult to interpret incorrectly, those people who were sent the right way, uh, I do marketing for uh, my, uh, to earn a crust, uh, the, the, the provision of information in a way that gets people to react the right way, uh, yeah, that's an art .. it's an art all unto itself (laugh). (Netherlands_4)

2.1 Knowledge about alerting & crisis communication

2.1.1 What does the individual citizen know about alerting systems in their country?

The knowledge about alerting systems in one's own country varies, but in most cases the people don't know a lot about alerting systems in their country or in their communities. Everyone takes sirens as an alert, but the people often don't know the meaning of different siren signals (like in Germany). In case of emergency they then don't recognise what the signals mean – or think it is (once again) only an exercise alarm.

And then the big alarm that was on for two hours, there were probably discussions amongst the emergency crew and the municipality's crisis group that were called in. There were discussions amongst them if they were going to start the big alarm, and so they did, at seven a clock in the morning, two hours after the accident. So Sonya my spouse, we used to live over there (points to nearby house), she was awake so she heard the alarm. She thought that it was a drill alarm as usual. It sounds every Monday. (...) So actually it is dangerous to have exercise alarms because you get used to it. If it sounds at any other time than ten in the morning you just think that it is a drill. It wasn't a drill this time. (...) Spouse(S) replies: Yes this is what I thought, when this is what you are used to, I'm born out here, so one is, I didn't reflect over this. (Sweden_2)

I heard the alarm go off and I thought hey, it's not Monday! So, uh, I looked out the window and then I saw that black cloud. And uh, then I called the city council and they told me that, uh, that there was a fire - and that I should turn on the radio, you know, the Disaster Channel. (...) And uh, yeah, and to close the doors and windows. (Netherlands_2)

Nowadays there is SMS-alert available in many countries; however, the people aren't always informed automatically and straight forward, but are warned due to e.g. being a customer of an insurance company's SMS-service (like Austria or Hungary). Due to the warnings not being sent out automatically but having to be ordered actively, this limits the number of people being warned this way. This despite the fact that people do regard SMS-service as useful.

A: As a matter of fact we have an alarm system which was set up after the 1st October. Yet it has proved to be absolutely ineffective up to now. – I: Why? A: The alarm sets off through SMS text messages; yet, you have to take into account that (...) mobile phones often don't work properly in this area. This is a big problem. (...) Another problem is that the alarm often gets tripped. In fact sometimes it goes off for no logical reason. Other times, even when mudslides occurred, it didn't go off at all. (Italy_4)

In the Netherlands the radio is known for and used to get information ('Disaster Channel'). It was reported that the disaster channels work very well, but they have a

problem: They have regional responsibilities, but in some cases people near the regional border listen to other regional radio stations – without disaster information:

And then at the hospital they said yeah, we haven't had any information from the Area Health Authority, because we're not in their region. (Netherlands_2)

The interviewees do not have further knowledge about warnings or risk communications in their own countries they didn't talk about it at any point.

2.1.2 Do people know who is responsible for disaster management and mitigation?

In most cases people know who to turn to. That are specifically civil action forces like Civil Defence, catastrophe protection services, fire brigades and paramedics, as well as the police.

Even when some weather condition warning was given in the past and nothing happened, even in that case this office was used by the people in charge as Civil Defence officers and firefighters, who were responsible for security in this area. (Italy_4)

And also that it happened on a provincial level and not from the overarching government because its not like the Netherlands is huge (...) you would think that the central government would take this, this over. (Netherlands_2). This is a problem in small communities. The mayor is almighty and decides everything so that everybody is waiting for his instructions. Consequently, no one knows what to do in case of emergency. No one takes responsibility by saying „well the mayor is not here and cannot be reached. We have to do this and that.“ No one does it. (France_3)

In that context, the centralisation of the alarm system's triggering in France is criticised:

Coming to the local government's defence, one has to mention that recently the sirens are supposed to be activated by order from Paris. It has been centralised. Which is total rubbish. (France_2)

2.1.3 Do people know how and where to get information in a disastrous situation?

Normally people first gather information about all information channels available to them, such as mass media, Internet and private contacts (see chapter 2.4), but aren't sure where to get the „right“ information. It differs how and where people get informed. But in most cases they know that they can turn to the people responsible.

In some places there are direct contact points for the citizens, although those are mostly local arrangements (like Wertheim, Germany), not national ones. Here one can see the experience of places that have had to deal with disasters repeatedly, and who have integrated such contact points into their disaster concepts. The contact points are a big help to the citizens as they provide direct contact persons.

I would phone them. I would phone them immediately. The Internet website... the Internet website..... it's one thing if you see something with your own eyes, if you are on the spot and ask people directly. We have been doing it since 1st October 2009. After that date there were other events (different from the ones which had occurred on 1st October 2009 and in 2007), with heavy rain during - which even caused some mudslides (...), therefore we called the local authorities and they offered their help. I must admit that there may have been some lack of coordination sometimes, (...) but such problems were then worked out. Now we have someone we report to, given the extraordinary situation in which we are today. We know exactly who we have to contact in case of emergency, the Civil Defence or the Civil Engineers or whoever. (Italy_4)

Generally the people concerned turn to the local authorities and institutions.

I: But did you know, did you know immediately what you had to do? A: No uh, the city council told me. (...) There was a number you could call that - no, you know, no, I simply looked up that number myself on the Internet. (Netherlands_2)

It is not sure, if everybody knew where to turn to in order to get help, but everyone's first thought automatically is the municipal office. The civil servants were hardly available at the phone because everyone called them primarily. (Hungary_1)

A central aspect that can be seen in all the interviews is that people would like to get informed, they would like to have access to important information in an easy way and not have to gather it all. They would like to be able to contact someone and ask questions as well as getting answers that they can rely on.

Official websites and information provided by higher authorities or specific institutions are not an issue for the interviewees; neither do they know that they exist nor do they use them. I.e. even if current information and warnings are provided there, people did not use it.

Um, well, there is, and uh, uh, the municipality has as far as that's concerned, especially after the fire of April 2010, they've improved a lot in terms of communication. The press prints a lot more information, there is a lot of information on the website, and um, so in that sense, uh, they keep people up-to-date properly. To uh, compare with the fire in April of this year, we weren't home at the time. It was approximately in the same area, only a little further away, and that started too with a North-East wind, that later turned to the East, meaning the threat to Bergen aan Zee, so uh, the evacuation, went away. But once again it was much further away, so that it wasn't so, that, that, that, that fast, or, or quick to threaten, but we weren't home, we followed what was happening on our mobile phones and the Internet. And then you can see on the municipality's website, they had really accurate information listed, information was posted on the council's website as was, as per, uh, yeah, necessary. But when we started twittering, then you actually see a parallel to the actual council's account, when you see what's being twittered. People start twittering about messages they don't know everything about. Because they obviously hadn't followed the council's website. (Netherlands_3)

Hungarian but also Italian interviewees inform themselves mostly through private channels before turning to official bodies (see chapter 2.4).

Thus we learned those things primarily from the family, for at night it is hardly possible to call the municipal office, although I know that they had installed a stand-by duty during the night. But so early in the morning one only dares to call family but not people outside the family (Hungary_1)

2.1.4 Do people know how to behave in particular disasters?

It varies greatly whether people know how to behave. If they have previous experience with the disaster, it is easier for them to react appropriately. This applies to the catastrophe of Messina (Italy) as well as the people affected by the flooding in Wertheim (Germany) or people affected by hail.

The memory and the fear of what happened make you more careful. Concerning that some lessons on safety regulations have been given. I'm therefore sure that people are now more prepared about it. In fact I think that experiences can teach more than theory. (Italy_1)

However we knew what we had to do, we have to clear things away, we have to take things up to the first floor, we also made sure that – as I said – things, such as the cars which normally may be parked in front of the door, find another parking position, (Germany_3)

This however doesn't have to be the case:

I: When the disaster occurred who did you enquire about what was happening and what could be done, who did you ask to know what the safer places were, whether it was better to stay in or not....? - A: At that time I didn't know what to do, I didn't know who I had to enquire in order to have more information about what was happening. (Italy_4)

In case of a future raging storm (which I certainly do not wish to happen) the consequences would be the same, for we still do not know what to do. (France_2)

In case of industrial accidents there is usually no previous experience, the catastrophe happens suddenly and the people concerned are confronted with the situation for the first time. The information and instructions on how to behave given out by the authorities are marginal, too late or non-existent. Accordingly, the people don't know what to do.

It was very plain to see that uh, that at every level, uh, um, people were not prepared for this kind of disaster. What I mentioned, like uh yeah, there needs to be a, a, an information centre for those affected, an action centre where they ... there doesn't need to be another struggle when it comes to competencies. Uh, a system to determine how you uh ... and that is then communication chiefly from those affected to a central point, uh, about uh, missing people and uh, how you filter that in such a way that you release realistic figures. Yeah, that wasn't available at that time. So it's a question of giving it proper and fundamental thought, uh, and, and making sure that the expertise is uh, uh present there. (Netherlands_4)

A: No, the only thing you found out through the radio was that you were not allowed to go outside, stay indoors. And those who were going to their houses they were not let in. They were closed out. There were people who sneaked, the police can't see everything, they sneaked home anyway. They had dogs, and old people that needed caring, they couldn't get by without help. And children, children that were home alone, so people sneaked anyway, through the barriers. I: So there was no information from anybody? A: No..... (Sweden_4)

We did not know, we were not prepared. No one attached importance to giving us the needed instructions. One is acting instinctively in order to protect one's kids, and I did not allow my mother to return to her place that evening because we did not know what was going on there. But I was bedridden and could not do anything. (Hungary_1)

It becomes clear that mostly there aren't any alarm concepts in the affected communities or regions or they aren't accessible for the public. This especially applies to industrial enterprises and goes hand in hand with the fact that most people don't even know about the danger coming from the enterprises in their neighbourhoods. If there are any concepts at all, as it is the case in Hungary, people practically don't know about it:

A: Yes, according to the commitment to civil defence the municipality had, such an alarm plan containing the episodes caused by water, too. This plan exists now at our municipality, too (...) - I: Did people know that such a plan existed at the time and that it had to be enacted according to that plan? - A: No, it had not been necessary of late and it had never been necessary to carry out that plan in practice and execute the whole alarm process according to directions. Thanks God there has never been a situation in which that would have been necessary. In previous years there had been exercises, but even then it was rather theoretical, a concrete execution of the plan has not been essential until now. (Hungary_4)

Everyone of course knew that there was an industrial area there ... And we also knew too that Shell is there, we knew that (...) And we're given a newspaper from the ATM, that's what it's called, they're also a storage company, they give us a newspaper. (...) But as for this company [name of company], we have no clue. (...) no, no, we knew ... no one knew what was there, actually (...). I had never heard of it. (Netherlands_2)

Improvements in crisis communication often happen due to experience. The people are prepared, know what to do, the authorities responsible organize the alert earlier and more effectively:

There is a so-called citizen telephone, which is manned by three people for 24 hours, everyone can call there, can get rid of his problems. (Germany_2)

2.2 Risk Perception and risk awareness

2.2.1 Perception of the disasters

The interviewees perceive the experienced disaster in manifold ways:

Disaster as a once-in-a-hundred-years-event: people describe the disaster as a single extreme weather condition.

However that is a millenium or a 1500 years old flood now. (Austria_1)

According to the interviewees most of the disasters experienced could not be foreseen.

We knew something could happen in the future, but nobody would expect such a disaster. Nobody would expect such a torrential rain could sweep away houses and a whole road. We would never have thought of something like that. (Italy_3)

Saturday morning we were quite calm and with an easy mind at home, we did not anticipate anything (...) My mom said that we could be totally assured that the water would not come to our place anyway because the house is situated comfortably, even during the flood of 74 there was no problem here (Hungary_6)

You are not able to see the sea in La Faute. The danger is completely hidden. The sea is concealed by the bank and the river. The danger is completely hidden. We were not aware of the risk. Therefore we were all taken by surprise. All of us. (France_3)

Often the disaster is perceived as an expression of nature's power or even as nature's striking back.

I am afraid that something, there is something here, if it is the way we live or what it is that is affecting nature because nature says no. Not only here but around the world. With earthquakes, floods, it is not small things that happen because it is big things that happen. And I think that mother earth is protesting against something. And we have to accept the consequences. (Sweden_3)

Often the interviewees describe a (positive) fatalistic attitude regarding the scope of action provided by nature's power.

*Anyway the fury of nature can'tI mean you can't stop and hold it back (...) (Italy_1)
I cannot imagine that one is able to protect oneself somehow in a special way eh against eh the force of nature, whatever it might be. (Austria_3)*

But that attitude does not only apply for natural disasters but also for experienced industrial disasters.

I know that there are things there, I know that uh, uh, yeah, that Akzo is producing chlorine in Hengelo pff, it's a life-threatening process there. If it goes wrong, it will go hugely wrong. Should the wind come this way and bring the chlorine cloud with it, damn it - we're in trouble. Uh, you know that. But yeah, what can you do about it? (Netherlands_4)

I: How would it be for you if the same accident would happen again? A: (Small laughter) How would it be? If the wind blew in this direction I wouldn't be able to tell you, I would be dead....(laughter) No but if it would happen again and some people pass away, then they would have to shut down the plant. No discussion. (Sweden_2)

In the case of the flood and mudslide in the Messina region the disaster is partly perceived as God's punishment by some persons concerned.

Some people thought that...(she smiles) "since the devil had come to Scaletta, a sort of divine punishment had befallen it,in early 2012" (...) I remember there were people in church who were praying because a devil had befallen them... (Italy_1)

You must be angry with God only. He wanted all that, who should we be angry with, otherwise? (Italy_3)

2.2.2 Risk awareness of individuals living in an at-risk area²

Most interviewees having experienced a disaster show a distinct risk awareness: they know about dangers connected with storm or flood and assess them in a realistic way. Earlier experiences with disasters are central in that context, in many cases preventive measures had already been installed. Besides in many cases again a certain fatalistic attitude towards future disasters, a 'living along with nature' is prominent.

There have been some tornadoes and thunderstorms, but Gudrun is the biggest thing that has happened, it is (...) Because there is almost always a wind here. More or less. And you have to think about this in the summer time, on the lake, there are a lot of accidents because people don't understand, because in five minutes the lake can go completely white with high waves, and no one understands this, because it is a deep lake, down to 30 meters. Which means that you can be bathing and you don't even have time to change clothes before it is half a storm, it happens so quick. But you have learned to live with it. (Sweden_3)

But I cannot act otherwise, it is not possible to put something on top of the buildings and put down, well, that is- yes, all existing preventive measures, but besides that anyway one is helpless in fact, well. (Austria_5)

In the cases of the experienced industrial disasters in Sweden, Hungary and the Netherlands people seemed not to be aware that there could be any risk connected with the industrial plant situated in the neighbourhood. The lack of risk awareness in those cases is ascribed to the non-existing or irritating risk communication on-site.

We had no information in this regard and did not recognize that there are problems or could be problems. In fact it was calming that even in previous cases when the creek did colour we had

² Risky area means here: Close to a potentially risky industrial site, or close to a volcano or living in an area with frequent floods, wild fire, avalanches, storms, etc.

been told that we should not to be afraid, that there would be no danger, because it would have been only a harmless colorant due to the ferric oxide. No one felt at risk. (Hungary_5)

I: Was there no communication beforehand or no information before you came to live here or from the municipality? A: No, no, yes, everyone of course knew that there was an industrial area there - and we also knew too that, Shell is there, we knew that. And we're given a newspaper from the ATM, that's what it's called, they're also a storage company, they give us a newspaper. But as for this company, Chemie-Pack, we have no clue (...) no one knew what was there, actually (...) I had never heard of it (Netherlands_2)

I: What did you know about the chemical plant and Kemira before the accident? – A: Like everyone else that has moved here they didn't have a clue about how dangerous the activity they do in there is. (Sweden_2)

Apart from not being informed about risks, the interviewees note that some residents were generally not interested in what was going on:

I: During the building phase were there any informations about what was to be stored there and which consequences that could have for the environment and the people living nearby? – No. The ones who worked there knew about it or guessed it in some way but it was not a topic for the general public, there was no one who concerned himself with it in a special way. (Hungary_5)

But I think that many people don't want to know many things. Uh and uh, the uh, there's a kind of duality in that, ... I think like yeah, the general public imagine there's more or less a risk in the neighbourhood - people would prefer you didn't talk about it, remain silent, I simply want to live and stay here nice and quietly. I mean, do you really want to know, uh, that if you live in Hengelo, what can go wrong with the chlorine production at, uh, at Akzo if it gets out of hand? (Netherlands_4)

The situation is quite different in the case of the chemical disaster in France – here people seemed to be conscious of the risk all the time.

I have always lived here. People always said: „The chemical plant will blow up some time.“ For we always saw lorries and trains going in and out while people were working like mad. It was evident that it would blow up some time. And there were times when it was smelling bad. Well... (France_1)

Looking at the Italian interviews even in the case of given warnings they were either ignored by the residents or not taken seriously. The interviewees do not want to think about risks, they tune out dangers even if they are announced.

A: Because in the morning it was sunny, we had been to the sea, we never expected something like that could ever happen. There had been some weather alarms, but (...) nobody (...) I: How did you know about it? A: We knew it from television. I: Did you watch it on TV? A: Yes, we did. (Italy_3)

A similar phenomena can be analysed in France. Despite the existence of serious warnings, people played down risks and consequently behaved like every day without installing any preventive measures:

A: We were just watching the weather forecast on TV. Never before had we experienced a „red“ warning for the Vendée. Yellow yes, but never red. I thought: „This cannot be. The weather is quite calm. They are wrong“. So we went to bed as usual. One week before there had been a „yellow“ storm warning, the wind blowing moderately. Yello, yes. Then no storm at all. Storms are nothing unusual for us over here. I thought: “they are exaggerating. Nothing compared to 1999. They have to be mistaken. We all thought nothing exceptional would happen . We all just went to bed. I: But you thought about the

storm damaging your car; didn't you? A: Yes. We thought of roof tiles hurtling. But we did not think about flooding. (France_3)

2.2.3 Risk awareness after the disaster experience

In most cases a high risk awareness is developed after having experienced a disaster – whether man-made or natural. The interviewees across all countries in that context described extreme changes in their personal feelings as well as in their every-day behaviour and their sensitivity regarding perceived “signs” (like rain, sirens etc.) for a disaster.

As soon as the wind started one was standing outside all the time, whether there is something happening well, and all the time, gell, on the rope, one hammer in readiness, nails and eh (laughter) the first aid kit (Austria_3)

Now, when it starts raining you phone anyone, even if it isn't raining hard people phone just to ask: “What's the weather like in Giampilieri? How are you getting on? How is everything? I mean, now everybody is more concerned. (Italy_4)

I only have to hear a siren and I go outside to check to see if there's smoke. (Netherlands_3)

It was an unnecessary... it was strange... it was unpleasant and you did not know how serious it was. That caused serious worry. And then there has been a constant worry about, when can it happen again? One thinks about this all the time, every time you look at that chimney..... How dangerous is it really to live here? (Sweden_4)

2.2.4 The subjective feeling of insecurity regarding future risks

The risk perception is strongly connected to the evaluation of the risk of being threatened by a disaster once more. Evaluating the disaster as a single extreme event implies in most cases a minimal fear of being struck again.

I don't think it can happen again. At least in I don't think it can happen again (Italy_1)

*I: Have you changed your concept of disasters generally or regarding the concrete case of water
A: No, for in my opinion, in any case, one is never immune against those disasters. (Hungary_2)*

Individual characteristics and attitudes influence the feeling of being safe:

I have never been scared of it and I have tried to pass on to my children such confidence. So when they are in they feel safe although at the back of my house all hell broke loose. Yet I feel safe anyway. (...). Well I was born here, I live here and I don't want to go away. The mountain has always been there. Some rocks may have tumbled over but the mountain has been cleaned out. I'm sure neither debris nor mud will come down from it any longer. (Italy_3)

When I look to the future I feel a kind of um, fatalism wash over me, like if it happens it happens, you know, then we'll see where we go from there. And then, yeah, at a certain point in time I leave it over to, yeah, if the wind won't die down then we'll just have to see how far it gets. But it is not the case that it unsettles me. (Netherlands_3)

What can I do? If I was afraid of everything I would have to lock up at once. However I do not mourn the past, that would not be professional, so what? I mean to live in the future. What has happened is over. I do not waste any thoughts on this. I try to learn from it and prevent according to my sort of admitting chains of thoughts, then let's see what is next, what comes next. (Germany_4)

But there are a lot of interviewees who express severe feelings of fear that a disaster could strike them another time:

In the future it will be even worse, I think. Because the area has been badly damaged, therefore safety measures are extremely important. However, who can say something like that won't happen again by 2012? (Italy_2)

Then I found out how dangerous it was and this; they have 20 mil (200 kilometers) of pipes that run through the area, above and beneath the surface so it's just a matter of time before another pipe goes. (Sweden_2)

Certainly there will be a new flood. I might be not there by then but it will happen again, definitely. Maybe in a hundred years. Or in two or three years. We do not know when. But there is one difference: We know now that it can happen. (France_3)

Socio-cultural aspects like age and professional background and previous disaster experience influence individual risk perception:

It seems easier for younger people to solve a critical situation.

We are young people who are able to climb across it or run against the current if necessary, well I say for us it was not that dramatic. (Germany_3)

A professional background influences the attitude towards risk situations.

When I started working as a mask maker I started to see all this with the chemicals and the dangerous stuff, in the sixties. (...) So I have a relatively good knowledge about toxins and toxicity, how bad it is. (...) I: Does this make you more worried or less worried about what is going on at Kemira? A: Less worried I think. I have a more sane relationship to toxins. (...) But it is much more dangerous to smoke a cigarette than to live here. I think emissions from Kemira are less dangerous than to be a smoker. (Sweden_4)

People who are familiar with risks show less difficulties in handling risk situations.

*No, it was because I had already suffered three or four floods since 1984 (Italy_3)
And then experienced both the storm 1969 and 1970, so you had a little of that in the back of one's head. (Sweden_3)*

2.2.5 Who is held responsible for the disaster's occurrence?

Being asked who is being held responsible for the disaster, in some cases institutions can be clearly named.

I: But does Kemira have the main responsibility? – A: Well Kemira has the responsibility for their activities. And then there are others who share this responsibility if there is an accident. But it is Kemira that is running the plant. (Sweden_4)

Well, first of all the mayor and those people who decided upon the flood area's backfilling (...) (Hungary_3)

For it is sure that, indeed, 10% here in the village could not have been saved, the Kassai Street but, if we would have built an embankment there reverting the water in the Sajó channel, 90% of the village could have been saved. Thus we have named the culprit already. It would be the civil protection because, in my opinion, it should have been its duty to know these high points. (Hungary_2)

I believe there were at least two, perhaps three, permit expansions in between knowing what had happened at Culemborg. And uh, in Enschede that bomb expl-, ...well if the knowledge would have

been there, knowledge has to lead to changes and needs to lead to uh, uh actions, uh so, yeah somewhere on a theoretical-academic level there had been an risk analysis made, but it did not lead to policy changes. Then they never would have uh, allowed 120 tons of fireworks in a, uh, residential environment. (Netherlands_4)

If they had told us the day before... We know that [the mayor] had been informed about flooding of one meter. If that information had been passed to the community members, we would have been sensitive regarding the words "flooding of one meter". Everyone would have asked: „what does flooding mean?“ (France_3)

All those are responsible who received information and did not pass it on: Mayor, prefect and fire brigade. (France_2)

But not only the persons and institutions who failed to deal properly with the fatal disaster are held responsible, a lack of responsibility is also ascribed generally to the local coping strategies with risks on site: e.g. building permits issued in a high risk area or the structure of the alarm system focusing on the mayor, who is solely responsible for alerting the emergency services and the population:

But he is not the only one we should focus on... In my opinion, he is not the only one who is responsible. A complete chain. He is not the only one who is responsible. I do not accuse him personally. But he does take everything personally. (France_3).

Among those who perceive the disaster as a single extreme event which could not be foreseen in its full consequence, hardly any blame authorities or anyone else:

I don't believe that there is anyone who could be blamed for it. It was just a miserable coincidence or I don't know, I only can put the blame on the weather, that an extreme weather condition is able to cause something like that. (Hungary_4)

I don't blame anyone for it. I think it was just misfortune: it rained too hard. It is believed that nine inches of rain fell in a space of three hours. It was a huge amount of water. The torrent was a flood. It had never happened before. (Italy_3)

I don't blame anyone for it. Absolutely not. Who can I blame when the mountain came down? Should I blame us for being unlawful as Bertolaso, the Head of Civil Defence in 2009, said? The point is that it rained so hard and the ground got so soaked that it couldn't contain water any longer. (Italy_2)

A: Nobody. Nobody was responsible. There was no one. – I: Was what happened probably the consequence of a wrong decision? - A: No, that, if – in fact we screamed that the mayor is to blame, we screamed that the head of the municipality is to blame. But who to blame for? (...). I do not see anybody here to blame, and not even regarding, that we were not able to protect ourselves, nor to blame that it happened. (Hungary_2)

2.2.6 Trust and credibility in authorities

Having taken precautions minimizes the subjective feeling of insecurity. Trust regarding authorities in the context of feeling safe is rather important. Looking at the experienced disasters in Hungary there are two opinions. On the one hand, there is a strong safe feeling regarding future risks that is influenced by trusting in the precautions carried out.

No, this, this – but this is over now. Now we have got that embankment system and this system is developed by bright and rational people. In my opinion it is well planned and it is even protecting

us against accumulated groundwater and rain water not running off. (...) In my opinion something like that will not happen here anymore. (Hungary_2)

On the other hand, if there is no trust in those precautions there is fear of future incidents.

Yes we are in great fear. We are afraid somehow that it might happen again anytime. They have built those embankments round the basins, yet they do not seem to be very calming. In case the mud is coming along at 30 to 40 km/h – however I am not sure whether these small hills can stop it. (Hungary_1)

On the whole trust in authorities is low.

I don't trust the authorities. (...) At the beginning I was more full of hope, maybe because I expected things would change... people would change... I hoped for some change....I thought: we fell down, we fell in the mud, but we can rise up and get from 0 to 100. Yet I must observe that nothing has changed, on the contrary, the situation is even worse because the whole area is like dead. (Italy_1)

I just don't trust that the authorities of the municipality or the Area Health Authority or whatever, cares about the safety of it's citizens. (Netherlands_2)

The only reasonable answer is to move the plant. But the politicians do not want it. Though there is no more business tax, there is still something similar. Thus the plant will stay, for there are eighty jobs there. Eighty people endangering 50.000 residents. (France_1)

But there are also voices that trust in the preventive activities of the authorities.

That safety, I think it is there. (...) Especially during Gudrun, everybody had to help out. It was very well organized even though we ourselves didn't need, but there was always in the back of one's head, that if it was anything we can get help. And this is why you never were scared. You took one day at a time and it all worked out. (Sweden_3)

2.2.7 Lack of trust in authorities' information policy

The lack of trust could be ascribed to the authorities' absent or irritating risk communication and covering up of facts in line with the disaster.

No. There was a positive attitude but all French people – I mean all people around here – said: "One day it will crack". But the plant provided new jobs and people were not paid badly, thus there was no antagonism. There were no objections at the time. Talking about trust, it was the employee's trust in the employer: „He thought of everything, thus it will work out" But now and then there were conflicts. People got home tired and asked themselves questions about the consideration for safety measures. And the voice of the people said: "One day it will crack." And it cracked. Now there is no trust left any more. Everything crashed. They could say whatever they wanted: people do not believe anything anymore. (France_1)

I: Did you think of asking for help to rescue squads? To authorities? A: How? I didn't know how to do it. I didn't have an- I: You didn't know how to get in touch with them, did you? A: No, we didn't. There was no.... you are like a rat in a trap, you are with no way out, you don't know how to ask for help (...) (Italy_2)

There was not information that it would be dangerous. But there were signs that something was not okay. I have been living in Devecser for a long time, for more than 40 years, and due to my experience from 40 years, if I look back, I can say that there were flood waves every once in a while colorating the Torna creek's water red. Many people then turned to the authorities in order to ask why the creek's water had been polluted. But everyone was calmed down by saying it was nothing dangerous, that it actually was just ferric oxid colour, a colorant ending up in the

depository basin as a aluminium production's by-product and drained off with the water, but that there was no danger (...) Everything seemed to look good and many people even went fishing in the Torna creek. Thus there were fish, there was life in the Torna creek and nobody ever imagined that such a tragedy could happen. Nobody has ever informed us that this red mud is a dangerous and heavy basic substance. (Hungary_5)

A: Well, I have to say that I've lost my trust yes, yeah, my trust in such people as the National Institute for Public Health and the Environment and uh .. mm .. yes they came out later with a report .. (...) and they then said in their report that: No, no, there's absolutely nothing wrong (..) .And uh, when you read that for your yourself, uh, I used to work for the RIVM, so I uh, if you read a report like that, you know .. I: *You are, you're originally a biologist, so you understand quite well what's going on* .. A: Yes, yes, that's why, so when you read a report like that yourself, then and you suddenly arrive at, at the lead concentrations .. Yes .. that, uh, that are elevated and, and also so are all the other materials, you know .. because the calibration value is set at 60 kilos (..) . They assume a healthy adult weighs a minimum of 60 kilos .. Mm .. To, the, to determine the toxicity .. to measure it. But a little one, for example .. Mm .. an unborn child. Yes, you ask yourself what, what, what, what, could happen you know. .. Mm .. . And that, they didn't (Netherlands_2)

That disaster had its uh, mechanism thoroughly analysed. That resulted in good recommendations, that was put on the uh, uh, minister's desk in 1992, uh saying dude, these are the risks associated with fireworks and uh, these are the kinds of problems you can get. That was subsequently never properly communicated and they did not make decisions uh, uh, based on knowledge. In the same period that, that it was released up until the year 2000, there was permit expansion after permit expansion ...I believe there were at least two, perhaps three permit expansions in between knowing what had happened at Culemborg (Netherlands_4)

We had a meeting with the rescue service as well and they don't think there is any danger at all, they have everything under control. So one can't really speak to them. At their statement for the environmental court it was clear that they agreed with Kemira. It is so weird, Kemira buys consulting services from the rescue service and this makes them economically dependent. And it is the same thing with the city of Helsingborg, they are also economically dependent on Kemira because they provide heated water, the surplus goes to district heating. Kemira is like a spider, everyone is economically dependent of them. (Sweden_2)

In many cases, respondents felt insufficiently informed by the competent authorities or, worse, misinformed. In some cases, information was retained and not made available to the public. This approach means that citizens lose confidence in the authorities and subsequently (no longer) trust them, their warnings and information:

Each time we got information we had the feeling that it came too late. (Hungary_5)

We did not get any information, we were left to our own devices. (Hungary_6)

With the local government Civil Defence (...) I remember when (...) sirens went off, in October 2010 another (..) storm broke (...) on 13 October (...) we rushed to pick up our children from school (...) I remember sirens went off in Altolia and maybe in all the other villages nearby when the storm ended. So we asked engineer [name of the engineer] why it had happened. He said it wasn't true that sirens hadn't gone off and he said that in public. There are some witnesses who could testify that it was true..... (Italy_2)

First they said: there's absolutely nothing wrong, it is not, uh, there are no damaging materials in the air. And later they were talking about a low concentration of damaging materials .. (...) .. so you first have a story where they say there's nothing in the air and it's immediately busted and then .. (...) .. then yeah, then your trust just starts uh .. (...) to fade.(...) Yes, and when, and when you as an authority start to contradict yourself then yeah, you lose your credibility as far as I'm concerned (Netherlands_2)

Also we had the mayor who said that evening in a press conference that he was sure that everything was in order with the permits. (Netherlands_4)

The municipality doesn't do anything. This thing called ipos, the industrial park, they are expanding with a wide range of strange companies. Sita. Who clean tanks, this is also something that causes pollution, they just moved in. Tons of companies, they are expanding their area without the municipality saying a word. They are happy because it renders taxes. But that Kemira can act this way without the municipality saying a word... (Sweden_2)

Yeah very, and the way the police acted was like something out of a Chaplin movie. I don't have a problem with authorities, but the police have an authority that you have to watch out for sometimes. But this was just silly. (Sweden_4)

People often say that the inconsistent information by experts and authorities is not reliable:

I would like to refer to a concrete case which brought about much disgust and shock. Dr. [name], a prominent toxicologist had explained that life is over at this place here, that everyone should move away from here and no one is to stay here even a minute longer because the danger is so high that one should not even approach within 20km of the area. When this was announced everybody was distressed, that there would be no more life after the red mud. People tried to escape in panic (...) One week later Dr. [name], having talked about the apocalypse, came and explained that he had looked at the results once more and that the situation had dramatically improved. Within one week! How can that be figured out? (Hungary_5)

2.3 Actual behaviour in case of a crisis³

2.3.1 Coping strategies within the disaster situation

Regarding unexpected disasters like storms, most interviewees ascribe themselves no wide scope of action. Acting is hardly possible.

It is a thunderstorm, so in that case I was not able to do anything. (Germany_5)

I couldn't get in because there was water in the hall, so I couldn't get through. I was also afraid that mud could break down the door. There was nothing else I could do so I stayed there and it saved my life. (Italy_3)

I didn't do anything, I stayed inside, could hardly walk the dog, one had to sneak out. It was all I did. Because one had no information about how dangerous it was. (Sweden_2)

*So we took my father's fishing ropes...and we tried to fasten the car to the gate through the wheels. (...) well we were trying to do that when suddenly we were struck by the first wave which got over the wall. It got over the wall and came into the garden. The wave just threw us off balance (...), or rather, stability (...) Then the second wave arrived and that was the end, because, hem, we were actually unprotected as well as the car. That was the wave which swept us away (...) and dragged us down. I: *Did you manage to keep your head out of the water?* Yes, because (...) I don't know (...) how, probably my time hadn't come. (Italy_1)*

³ Behaviour includes an analysis of the reported actual behaviour of those individuals who experienced a disaster as well as their perception of the behavior of authorities and rescue services which had to deal with the respective disaster.

In those cases people have to wait and rather apply psychological coping strategies like trying to stay calm or calming other people.

I hoped nothing big would happen. I couldn't do anything but lie to the girl who was at my house - I just put her to bed. I could do nothing else. I mean, keeping calm also means that you must be aware of the gravity of the situation (Italy_4)

At four in the afternoon it started to blow And then.... the last time I talked to my daughter, or our daughter, she lives 50 km from here. And we said, we rounded up by saying, we stay indoors and take care of ourselves. You had a feeling that something was going on, and then it picked up more and more. (...) It was just like, we had to be ready, anything can happen, but then it was, just like Inger said before, stay indoors, stay calm, and take care of each other. (Sweden_3)

If possible, people tried to get away from the location of the disaster and seek shelter.

Luckily that situation lasted just a few seconds, (...) when we heard that the roar was waning, we ran away and went to my mother's. (Italy_2)

I: Where did you get your information about where you had to go or what you had to do or how everything worked? A: Yeah, it wasn't actually so, not so clear, uh, we were uh, we went and looked on the website. And um, uh, yeah, we ourselves didn't, uh, we didn't think for a second of going to the creek, or to, or of doing other things. Because it is, we know a place we can go, uh, where a garden is where we could park the camper van, where our children's friends are, so actually it was an easy answer. (Netherlands_3)

It had been raining in front of it, there was plenty of water in front of it, from 4.30 p.m. to 6.45 p.m. At about 6.45 I said to my employees and to my children: "things are taking a turn for the worse, let's close the shop and leave". And they said "what are you saying? Do we have to quit?" and I "Yes, let's close and leave quickly. " (Italy_3)

The roof was slippery and there was a strong wind. We wanted to latch on to each other to keep warm. But then we removed a few roof tiles and thus got access to the attic. There we found some old blankets and clothes. By chance I found two thick hand-knitted sweaters for the girls, an old Halloween-outfit for myself, for you I found an old surfing-overall. That's it. There were some old carpets as well, totally dusty, but so what? We tucked ourselves in and waited on the roof for eight hours. (France_3)

2.3.2 Coping with the disaster's consequences

Right after the disaster people started coping with the situation. What is and can be done varies according to the dimension of suffering from the disaster. Thus the coping strategies are quite heterogenous. First of all people try to fix those things which have been damaged by the disaster.

The night was only the short moment that you experienced, then it was months. You had to get the forest together, the roof on the barn had to be fixed, it snowed in and there was no electricity, no telephone, food and everything. The job was afterwards, the practical. (Sweden_3)

Besides clarifying the damages and arranging i.e. the rebuilding measures, people have to cope with the factors directly and indirectly connected with the experienced disaster. The Hungarian interviewees affected by flood for example had to protect themselves against looters.

But we did not dare to leave our houses because of the gypsies instantly trying to plunder the empty houses, for the gates were open. My husband and me went to bed by turns, one time he was guarding, the other time it was my turn. That lasted for nearly two weeks until the water went back. (Hungary_6)

In the case of the industrial disaster in Sweden, soon after the disaster everything went back to normal – according to the interviewee due to the fact of not having been properly informed what had happened.

We stated that after three days everything was back to normal. Nothing happened, it's like Kemira says; nothing happened (...) People didn't understand, not even then, how dangerous it was. It was first when Christian Åkerlund wrote his articles, then people woke up, and then we woke up and started this campaign for safe living (...) It just disappeared, everything, three days later everything was normal again and people around had no idea how dangerous it was. (Sweden_2)

For those struck by the flood disaster in France, survival ranked first. People were not able to move back into their houses and some people lost family members and all their belongings.

We had not yet realized that we had lost everything. Not yet. We had been rescued. Full stop. All four of us had been rescued and I was not yet thinking about the next day. Where we should stay for the night. Not really. Only afterwards. Then our best friends took us with them to their home. Four days long. They catered to us, they bought tooth brushes for us, for we were brushing our teeth with our fingers. Yes. Otherwise we would have stood there wearing panties. No shoes. That was terrible. After that we experienced so much solidarity. That is true. That was great... friends, family — everyone was great. That was a great help. We were supported a lot. (France_3)

In that context several interviewees referred to the support and help received from friends and other persons concerned. At the same time they expressed disappointment regarding the delayed reactions of the ones responsible on site.

In the beginning people helped themselves and saved lives. Only after that did the fire brigade march up. First the people, then the state. The state joins in time-delayed. In the first moments, the people concerned helped each other. (France_3)

2.3.3 The role of rescue services and authorities

Generally the quick help and commitment of the rescue services on site (fire brigade, disaster relief organisation, etc.) is rated positively.

Regarding the organisation, in Mering, as things stand it seems that we have the fire brigade on site and for sure they did their best, everything was running very well. (Germany_5)

We got a lot of help – from the Red Cross, from the Malteser emergency service, from the Caritas – that was really a lot of help indeed. (Hungary_1)

Well everyone who needed help could get help, as well in the case of renovation as in the case of building material. So the ones who made efforts to get help and the ones who helped themselves were helped by the Hungarian State, by the Red Cross or by other organizations. (Hungary_2)

I have to say too, uh, the people, uh, the first-aiders that where there should be complimented for their .. Mm .. good work .. mm mm .. And and and the the good help they offered. (Netherlands_1)

On the one hand, several interviewees rated the work of the authorities positively:

I: What was the reaction of local authorities on that occasion and immediately after the disaster? A: I think they did a good job, since everybody offered assistance to the people. They did what they could, of course, because it was a disaster all around. No means of transport could get through until the following day. (Italy_3)

It did not take long and the municipality repaired the alley in front and behind the bridge, filling it up with sand and affixing it, so in fact we were able to pass over it at, at, after the weekend. (Austria_1)

Well the civil protection had ensconced in the municipality. There was a permanent operative board looking after everything. Therefore one had to go to the municipality in order to get help or information. There were also the different consultations, the analysis and the total organization on the whole, while outside the assistants divided the volunteers into groups, who should go where to. One could get shovels, tool kits and gumboots from them and even information and every sort of help. (Hungary_5)

In case of a disaster, means are provided either by the army or by the Sécurité Civile [relief organization of the Department of the Interior], situated as close as possible on site, and from there things are distributed to the several hospitals. That was working well. The sick bay generally is set up at a communications junction. We participated. I knew some things. That was working well. No question... (France_1)

Whereas, on the other hand, the role of authorities regarding organisation and support during the disaster phase was sometimes harshly criticised:

I: How did you feel about the way the municipalities and the rescue services acted? (...) A: The way they reacted during the accident 2005, it was catastrophic, people could have died, left and right and the municipalities didn't do anything (Sweden_2)

No, we didn't get help from anybody. In fact there were donations, we could watch that on TV but I don't know where they were going to for we didn't get much of them. We knew that food parcels were distributed because we saw the gypsies – if I may say so – coming cup in hand in droves with their bikes. Then we knew that there was something dealt out and went there. The Hungarian inhabitants did not know anything (...) We only knew from hearsay and lined up for food but even when the water had already drained off the distribution of food donations worked that way that there were three distributed parcels. Those who were really injured by the flood did get a small card and we lined up until noon in the blazing sun for 1 kg meal, sugar and oil, we had to line up in order to get this parcel three to four hours and there were some who fainted, thus the whole thing was organised that well. (Hungary_6)

Three/ four days afterwards we wanted to fetch some goods from the centre. He [a politician] and his whole team were there. They were eating their sandwiches calmly. He did not even approach us. (France_3)

2.3.4 Living with future risks

Besides applying direct coping strategies in order to handle the disaster's consequences individuals reflect about the meaning of the disaster experience for their own future.

Asked if they are considering to move away after having experienced the disaster almost all of the interviewees answered the question by clearly stating "no!" In that context neither the kind of disaster (natural or man made disasters), nor the dimension of being affected by it are important but – transnational – factors like having grown up at the place, a feeling of solidarity and local identity influencing the fact of not wanting to leave the place.

Well I was born here, I live here and I don't want to go away. The mountain has always been there. Some rocks may have tumbled over but the mountain has been cleaned out. I'm sure neither debris nor mud will come down from it any longer. (Italy_3)

We are all attached to our land, we have our origins here, a particular lifestyle, we perceive human relationships in a different way. Therefore, (...) no.... we never thought we would move. Instead we all rolled up our sleeves and said: "We must stay here" (Italy_4)

I: But will you keep living here? – A: Yeah. One has to keep doing that, my spouse doesn't want to move from the southern part of town....(laughter) Spouse replies: No way, I was raised here and I have lived here since I was born. (Sweden_2)

I: I'm curious about, it sounds like you have been through something very dramatic. But if it happened again, would you still stay here? A (Both): Absolutely. - There is no reason to leave. (Sweden_3)

In a few cases moving to a safer place is taken into account – people who think about that are young and single.

As far as I'm concerned I'd like to go away.... as a matter of fact I have gone away, I've moved... (Italy_1)

The French persons affected by the flood disaster in that context represent an exception. They left their homes and were able to sell their houses to the administration. Moving seems to be the only solution in order to go on after having experienced the catastrophe:

Right when I was on the roof I thought to myself... I did not know what the future would bring, but I instantly said to my husband: "I don't want to live in that house any longer". Although we still had to repay the loan, for me it was unthinkable to go back in that bedroom. Even the girls did not want to go back. (France_3)

Having experienced the disaster there are preventive measures installed by the individuals in order to cope with a forthcoming disaster.

It is inherent in our thoughts that when they predict a lot of snow or strong winds, then you have to have water indoors, we have a well on the yard and as long as the water supply system worked you put water in a number of buckets so you are able to flush the toilet, wash yourself, do the dishes, heat water and such. (Sweden_3)

And also be aware that you can lose things in life, so there are things, that you can't keep everything. And take a look at the most necessary things that you will take with you. And uh, draw up a priority list if needed. Right, and make sure at any rate that you can do three of the ten things listed if you don't have any time. (Netherlands_3)

The interviewees reported positive changes on the local level which are linked to the common experience of the disaster, for example the intensifying of the local social networks.

We can say that, from various points of view, here in the village human relationships have grown stronger, people talk to each other much more. It sounds strange that such a disaster managed to bring people closer together. Now people understand each other much more but they also have more arguments than in the past. (Italy_4)

In the beginning the organisation was disastrous. Then it worked out better. The commentatorship was not ideal either. In retrospect I think I should have spoken more severely: But in the beginning

I did not know much. Afterwards, the solidarity worked. When we walked through the streets and saw people cleaning up or moving, we assisted. (France_2)

In that context in many places local committees have been founded in order to cope with future disasters as well as with the authorities.

I: Has the perception of living so close to a factory changed since the accident occurred? A: Yes, absolutely. We walked around with a petition and collected 2000 names, we walked around by foot, not through the Internet. Hell of a lot of work. 2000 signed and we sent these lists to the environmental court so they have them as documents...so.. many missed these lists... there are 7200 people living here and we collected 2000 names, that is pretty good I think. Then there were even names up from town. Nurses from the hospital signed, they had copied this list and we got two list from up there. If something happens down there, we will get a hell of a lot of work they said. (Sweden_2)

Local people are not used to logging on to the Civil Defence website. I: How do you explain that? A: I said people weren't used to it, now they are. I can also tell you why. Everybody knows what happened in 2007. The point is that the disaster was underestimated at that time (...) by the same local people. A group of them decided then to form a committee and by doing so they worked at some plans, therefore some works of maintenance were done (...) and where there was the mudslide in 2007, while along via Punta Ala – where nothing had happened in 2007 – no works were done. Unfortunately it was there that a lot of people died. Let's say that the local authorities didn't take great care over the matter at that time. (Italy_4)

This time it was different. (...) The real strength comes from the bottom, I mean, there is a great force coming from the local committees that didn't exist in the past. People feel more concerned than in the past. (Italy_4)

2.4 Information behaviour & information expectations

And yeah, one person does something with the information, and the other doesn't know. Look at me, the information that came my way came through other people. (Netherlands_1)

2.4.1 No alarm

The biggest problem was that people didn't get any or not enough information before and at the beginning of the disaster. Of course there are disasters like industrial accidents where people couldn't be alarmed beforehand, but they sometimes even didn't get any information once the disaster began. They had no idea what to do and were left alone by the authorities. Information was not of an official nature, the only information people received was the information by word-of-mouth:

I: And was there any warning or alarm concerning this matter? – A: No, there was absolutely nothing. (Hungary_3)

Not at all. At the most from word-of-mouth. Everyone came and left, everyone had heard something, it worked that way. The people here absolutely did not get any information, neither in advance nor in between nor afterwards. (Hungary_6)

So that guy, he, uh, came home and he let his children play outside and in the playground and I don't know where else (...) because how was he to know? It wasn't until that evening on the news that he heard, uh, that the air-raid siren went off. (Netherlands_2)

After the disaster the siren was tested: It worked. Yet during the storm it was not activated. It would have been sufficient to let the siren howl ten minutes. Maybe we would have been able to do something. (France_2)

While there are general, but not very precise, warnings about severe weather conditions in the cases of natural disasters such as hail, predictions about floods or extreme heat (Netherlands) are mostly better and more precise. Poor information and alerting policy is evident in the cases of different man-made disasters, for example the red sludge disaster in Hungary, the chemical explosion in a chemical factory in the Netherlands or the case of Swedish and French industrial disasters. They have inadequate disaster plans (see above) and no comprehensive risk communication in the field took place. The people were left to themselves. Once again, this situation was different from the mudslide in Messina (Italy). There, the danger was known, the people were informed - but none of the habitants had taken the information seriously.

2.4.2 How did people, who had been affected by a previous disaster, inform themselves before the disaster?

There are obviously differences between a surprising disaster and an announced disaster. The information or alerting in case of announced disasters was regarded in most cases as good. In case of weather-related disasters, the interviewees indicated that they had been informed, whether through traditional media like TV or radio, new media (SMS services, Internet services, e-mail) or, as in the case of the flood in Wertheim, through verbal communication on-site. It is different for industrial accidents. Even if, as in the case of red flood, it was known that accidents could happen, there is no possibility of informing the public beforehand. Generally it can be concluded that early warnings and informing of the public – even beyond country specific alerting systems- are a challenge, because of access to and use of different information channels in different ways.

Traditional mass media like TV or radio are widely used; for many people they are the main source of information. In many households television or radio constantly run in the background, so warnings will be received fast. The elderly usually rely on this source of information.

There is also, of course, radio or North Holland Television. Yes uh, you had to watch the TV for the latest news. And that went quite well. So then, everyone had the television on in the background. (Netherlands_3)

Radio, TV - Kyrill has already been announced (Austria_5)

In all municipalities with previous experience with disasters, risk and crisis communication and information exchange has significantly improved, as disasters often lead to more information and use of this information by the public:

Um, well, there is, and uh, uh, the municipality has as far as that's concerned, especially after the fire of April 2010, they've improved a lot in terms of communication. The press prints a lot more

information, there is a lot of information on the website, and um, so in that sense, uh, they keep people up-to-date properly. (...) We followed what was happening on our mobile phones and the Internet. And then you can see on the municipality's website, they had really accurate information listed, information was posted on the council's website as was, as per, uh, yeah, necessary. But when we started twittering, then you actually see a parallel to the actual council's account, when you see what's being twittered. People started twittering about messages they don't know everything about. Because they obviously hadn't followed the council's website. (Netherlands_3)

A way of warning that is widely accepted across all countries and which the public considers a good way to be informed, is the use of sirens – even if parts of the population does not know the exact meaning of the signal - or loudspeaker announcement.

Sirens and radio, first sirens had been announcing the disaster. (Austria_5)

Soon after the mud had emerged a loud speaker or an alarm system was installed, but they did not dare to apply it in order not to frighten the public. When the mud had emerged for the first time the mayor had promised to activate all the city rescue service sirens, civil protection and so forth in case of a new disaster situation. That did not happen. But they really don't dare to apply those big sirens in order to avoid panic. (Hungary_1)

Because of this we were closed in for three days. And then the alarm sounded, after many discussions the alarm sounded two hours after the accident, that big VA alarm that sounds. And then they closed off the area, not even the employees that were supposed to work the next shift could come in. (Sweden_2)

Another form of alerting in advance is direct information. In some municipalities, such as Wertheim (Germany), this form of alerting is integrated into the warning alarm system. A citizens' initiative warns the affected population.

There is one, for each alley there is one flood convenor or a woman, all together there are 20 alleys, streets concerned in the old town and for each alley there is one person living on that street. These 20 were informed and they went through town already on Saturday and told each shop, take care on Sunday the water will reach the town, we don't know how high it will be yet, probably eh, it will get in, one can hardly predict the height three days in advance but it will probably get into your shop, please count on that.' (Germany_2)

2.4.3 How did people actually inform themselves at the time of the disaster?

At the time of the disaster people try to get any information possible. They wanted to know what is going on, what they should do and how big the risk is for them. In most countries mass media information is a central source of information.

The radio then was very good, because we had batteries and there were many broadcasts on the local radio where you found out about which areas are without electricity and now the next one is expected to get power. Yeah they updated it all the time, on the local radio. So this was good. You were always up-to-date and knew approximately how fast it was progressing. (Sweden_2)

What I know is that you close the doors and shut off the ventilation and then listen to the local radio. That would be the first. And there will be a lot of noise here, so you would know that something is going on. So the first thing you do would be to listen to the local radio. (...)I think that the radio was the best. The local radio and then local TV. HD they painted a quite frightening picture. (Sweden_4)

We watched the media reports constantly. Referring to that Saturday – there on Devecser-TV it was reported already in the morning that we were in an episode here, too, that we should prepare our documents and toys for the children, non-perishables, towels and so on. There were several pages

listed with things we should take with us. Everyone was to prepare parcels for each family member. Meanwhile a local radio station was set up. Some young students have created a radio station named „common wavelength” that was heard loudly at the church square. That went well for those living nearby but it was not received well by everybody. The ones who did not know about the radio did not search for the station. We from the library tried to find the station but it didn't work. Thus the radio station was not that good but we constantly watched Devecser-TV for there are teletext news all the time in between broadcasting. That was the only option and the Internet, we constantly got our information from there. (Hungary_1)

In fact we noticed that... During the storm there was only one information source left: the car radio. However it only worked when not covered by water... Thus I was able to get preliminary information. (France_2)

There are different opinions about the credibility of mass media messages. Whereas the credibility and reliability of mass media is basically assumed in Sweden, the Netherlands, Austria and Germany, victims coming from the other examined countries (Hungary and Italy) tend to be more critical. As a result, information from the media provided after an event will find limited acceptance among the population in the latter cases, because the sincerity of the information is put into question. The alert itself diffused by the media is considered not always precise enough, but even in those countries, the alert itself is taken seriously.

Maybe some alert from a neighbour. Not from the mass media. In fact I don't think they may have been informed of what was happening. (Italy_1)

Well, the media were put on. Alas, the reports there had nothing at all to do with the truth or just minimal. (Hungary_6)

An intelligent human being is not watching the news, because it is of no interest. (Hungary_2)
I: Wouldn't you surf a newspaper website or the one of the Civil Defence? A: I don't think so. (Italy_2)

Journalists....they reported news according to their political points of view. Those who had left-wing views said the local administration hadn't done a good job since here we have a right-wing government. I: Therefore they blamed the local administration, didn't they? A: Yes, they did. Those who had right-wing views (...)They said it was anatural disaster. (Italy_3)

Previously concerned people appreciate Internet access for themselves as an important source of information. In particular, specific weather pages (in case of weather related disaster) or any other websites that provide collected information about the current event are appreciated.

I simply looked up that number myself on the Internet. (...) .. Yes, yes, for (...). the city council. And I put on the, uh, disaster broadcaster; here that's Radio Rijnmond.(...) so, and uh, yeah then, uh, then I got more information from them, so to speak, and I looked stuff up on the, uh, Internet. Yes. So uh, yeah, then, uh, then I actually, uh, looked up some more information myself from the Internet. (Netherlands_2)

In this area there is a guy who is responsible for the website called 'Zanle.it', who has always given the latest news in real time. Indeed, there was also Facebook, I remember well about what had come out on Facebook; someone had immediately spread a rumour about the number of victims. Indeed I remember that I had received some messages that night like: How are you? What's up?" I also remember a scene: there was a boy who said as soon as he saw me: "Noemi,

you don't know how much I (...) because I was sure you had died". Well, in that case, Internet could be more useful than television (Italy_2)

Today we are used to surfing the Internet, we often log on to the official weather forecast website of the village of Scaletta which is very close to our village, just to see what the weather is going to be like. We also log on to the Civil Defence website. Today we have more possibilities to be informed about something. (Italy_4)

Yet the day before, the 27th of February, a storm alarm was activated around 4 pm for four departments – and also for our department. Though it was only a warning of heavy storm but not of flooding. We were to stay at home. Around midnight however I watched Météo France's weather forecast on the Internet which was much more precise: There was a flood warning for several areas including our area. The water was to rise one meter over the ordinary level; thus the Internet warning for our area was clear. (France_2)

Communication with local people through social media such as Facebook can be seen as an equivalent to the telephone or direct communication. Some respondents consider this as more effective than relying on official information:

I was connected to the Internet via Facebook, via other websites... by getting in touch with other people in the village (...) hem (...) some news started to circulate rapidly.... they said a body had been found, then, indeed, the first "Ansa" started to circulate. (interviewer's comment: Ansa is the most important news agency in Italy, the name refers to its official news) They were also published on TempoStretto website. (Italy_4)

I: You think it is better to ask the local people first, don't you? A: Yes, for sure. The first who could give immediate information were the local people, the people living in the village, since rescue teams arrived the following day. I: How did you contact them? Did you phone them or what? A: Yes, we phoned them, then we communicated through the Internet, through the chat-line. Especially through the chat-line because the telephone lines were jammed. Even the telephone line for help was jammed. Hundreds of calls arrived but most of them couldn't get through because the line was jammed. (Italy_4).

Contact persons on-site were important for the exchange of information: Members of the fire brigade, public authorities, civil protection and police. In Austria, for example, the fire brigade was the first to contact, in Wertheim (Germany) they set up a civil phone service which was manned continuously. This has proven very helpful, because the public administration was accessible around the clock.

There were so many people from civil protection, firemen and policemen, you met one of them on every street practically. And when we were able to return to the streets again, they communicated the fundamental information to the people. (Hungary_2)

Well the people were updated by us and eh, it is possible at any time, there is a so-called citizen telephone, which is manned by three people for 24 hours, everyone can call there, can get rid of his problems. (Germany_2)

Loudspeaker announcements are important, too:

Even the catholic priest went through the alleys with a loudspeaker announcing to all that they could get various important protective clothing in the parish. (Hungary_5)

It actually got to here, and (...) I heard from other people that one of those cars came along here to say close your doors and windows, you know, with one of those uh .. okay .. with one of those, uh, yeah, what're they called, one of those loudspeaker things .. (...). Yes. But, it drove so quickly (Netherlands_2).

2.4.4 Difficulties with alerting systems

We have identified many problems concerning alerting; some of them are of a technical nature, but not all. A lot of people are using mobile phones, text messages and the Internet. However, there is a part of the population, especially elderly people, who do not have permanent access to these kinds of media. Here, other alerts and information channels are necessary.

Mobile phones:

A: Nobody had a mobile in Altolia. I: Weren't they working? A: No, it's not that they weren't working, people simply didn't have any, we didn't have any mobile connection there. Indeed we just had it after the flood...No, We simply had no mobile connection, we just had the phone line installed. (...) which wasn't operating either. (Italy_2)

The alarm sets off through SMS text messages; yet, you have to take into account that (...) mobile phones often don't work properly in this area. This is a big problem. (...) Another problem is that the alarm often gets tripped. In fact sometimes it goes off for no logical reason, other times even when mudslides occurred, it didn't go off at all. (Italy_4)

In fact, the use of SMS and phone notification in emergency situations could be very limited. Respondents frequently told us that in crisis situations mobile networks collapsed, telephone lines did not work and individual numbers were inaccessible.

I also think that, that one of the points to think about too is the accessibility of the mobile phone network. For instance, there's a huge part of the Zeeweg that our provider doesn't cover, but there are also loads of places in the dunes with no reception, and then you think, yes I get it, that, that, it's a low area that you don't really have to pay any attention to, but in cases like this, then you really miss out on information. (Netherlands_3)

For the telephone was not working. When there was a specific episode the telephone was not working properly. (Hungary_1)

I also sent text messages, it turned out later that a few of them did get through, the entire network was, uh, overloaded, severely overloaded at that time (..), after a while, late in the evening, it turned out you could use your phones again for contact. (Netherlands_4)

I called nobody mainly because the line was cut off. Nothing was working. Therefore I couldn't ask anyone for help. Everything was cut off. (Italy_3)

Then, after half past four, the mobile phone network was totally overloaded. Nothing was working anymore. (France_3)

If power cuts out, access to information is restricted considerably. Without power people cannot listen to the radio, watch TV or charge their mobile phones.

Well the mobiles in fact were working but no one was prepared that there would be such a flood and that there would be no electricity, there were problems with charging. And therefore we were receiving calls only – although friends called all the time wanting to know what was happening – but we did not answer in order to be able to talk to the most important people and to be sure that the mobile was charged as long as possible. (Hungary_6)

As far as means of communication, it was a bit hard because the electricity had been cut off. I: Do you check email there constantly? A: Not constantly. If it is a normal day I do not check it. Then I delete it and over. (Austria_5)

She didn't realize what was happening, she thought it was an exercise alarm that went off. (Sweden_2)

No electric devices like telephones or televisions were working. We couldn't see anything because we were without electricity... in fact we had lit candles. (...) And then the lack of electricity had cut us off for three days, because in Scaletta there was neither water nor electricity. We were totally isolated. (Italy_1)

Another important point is that warnings, although be given, are ignored by the population. The reasons for this are complex, there is simply a lack of risk awareness (see chapter 2.2.2), an incorrect estimation of actual risk and miscalculations - and in some countries also the consequence of a lack of trust in media and politics. Where false assessments of risk are made and warnings are not taken seriously, the existing risk communication structures must be rethought. Text messages or e-mails containing weather warnings will be ignored if they are not very targeted and specific and sent out only in small numbers. Sirens also may be interpreted as an exercise, there is a lack of knowledge about how warnings might sound.

You should have an alarm that is, if you now should have an alarm.... two different types of alarm. One that was a test alarm and then you have a alarm that is real. Where there is no doubt which alarm it is. So you test the test alarm but then you have a real alarm, and everyone should have this information. When it sounds that way it is time to close the door and listen to the radio. I think this could be one way. (Sweden_4)

2.4.5 Lack of information

Survivors of unannounced disasters have often received little or no information. They had obtained most of the information themselves; they felt left alone with how to handle the situation. There was also confusion about how to behave in the respective situation the respondents were missing clear instructions for action rather than indifferent statements:

Besides that, we tried to get in touch with lots of people that night; we phoned the firefighters, the Red Cross , etc. Yet, nobody put us on alert; nobody said: " that area is dangerous, don't go there". Nobody told us anything on that day. (Italy_3)

My mother in-law therefore could not get back into her flat that easy. She had to wade back to the flat in the mud breast-deep and there was even no water anymore. And thankfully she didn't wash herself with water, for the water would have caused a chemical reaction. My mother in-law washed herself with apple-juice which she found at home. She threw her clothes into the tub and washed herself with apple-juice. And thus she didn't suffer from skin burns but many had bad luck and are still under medical treatment. (Hungary_1)

And uh they once said the water used to put out the fire is pink. Uh but we didn't see anything after that. .. no ... nor did we hear anything else either .. Mm...that was actually the only information that we heard that day. Apart from close your doors and windows. (Netherlands_2)

I didn't do anything, I stayed inside, could hardly walk the dog, one had to sneak out. It was all I did. Because one had no information about how dangerous it was. (Sweden_2)

Some kind of relation between shutting of the area and that you were allowed to stay in the area. I did not understand this (...) if it is dangerous, it is dangerous. And then people shouldn't be there, then you evacuate. And then you have to make sure you have somewhere you can stay, a hotel or

hostel or whatever it might be. But not both. And this gives it all an air of ridiculousness. And we did not take it seriously. (Sweden_2)

2.4.6 How do people want to be informed in case of disaster?

Interviewees had expected to obtain concrete and punctual information as well as behavioural information in the disaster situation. They also mentioned the problem of failing mobile networks and power cuts, as was the case in the disaster at Messina (Italy). Generally, however, it is clear that the alert needs to take place through multiple channels to reach the population reliably. A systematic alerting in a crisis, by sirens or public address systems like loudspeakers, is designed to raise awareness among people to check the media and wait for information. The media should supply plenty of information – what happened/ can happen- and give simple, clear instructions. In addition, alerts should be sent via text messages – but always taking into account that text messages are not a safe and reliable medium. Face-to-face warning is very effective as people will be addressed personally.

➤ **Direct alarm through loudspeakers and sirens:**

Such a storm warning from the municipality with a siren or something like that, that would not be bad indeed. (Austria_3)

You know some people don't turn on the radio or, or, or how, how, how will you rapidly reach the people? In my opinion that's the biggest problem. In former times there was the sound truck driving through the streets giving the information to the people. I still think that is the most reasonable thing. Yet who wants to do that, in fact? (Germany_4)

We would have expected a sound truck coming and saying: stay here or wait, we will inform you later. One is the middle of a situation not being able to stir from the spot, and nothing is said then. (Hungary_6)

They could set up a siren, as they actually did, so that when the flood level goes up, it could ring to warn people who could then be alerted. Well, that could be a good way. They obviously can't use a megaphone. (Italy_3)

I think that if the, you know, the, the ala-, the air-raid siren had gone off here and they had a car drive around that you could actually hear. (Netherlands_2)

You know... The radio is not something that everyone turns on right away, and one should really do this. But... through loudspeakers they should communicate what has happened, drive around on the streets, if the ones doing the driving can do this without risk. But they should definitely spread information through loudspeakers. (Sweden_2)

A siren would be better. Everyone is able to hear it. However, the problem regarding the handicapped people would still not be solved. There are not so many residents around here. But if there would be many... (France_3)

The bells should ring one more hour that would be the best. Yes. Although half an hour would have been enough. (France_3)

➤ **Mobile phone:**

Well for sure via mobile it would be more reasonable. I haven't got a mobile with Internet access and such gadgetry, that, I have no sense for that either, and I need a mobile for calling, but probably such a warning via text message wouldn't be that bad. For it is always with me, it is always turned on and thus I would be able to realize it and probably I would be able to react, depending where I am at that moment. (Germany_4)

Or perhaps a different, uh, alert system, but I think that was there for most people at that time, so you, uh, so all the connected mobile telephone numbers were available at the push of a button. Well anyway, you might want to think about expanding that with another network, so that someone who is in the citizen's network can disseminate that to the neighbourhood association or whatever. But so the first thing, uh, is my mobile, then the Internet, which these days is available through iPhones and other PDAs, uh and then television. That's actually three... and look, television is simply a big image that you can sit quietly and watch, instead of following everything on such a tiny little screen. And it's nice to have on in the background. But it goes in that order. (Netherlands_3)

➤ **Telephone:**

Eh, from the text message, that I receive the SMS via the fixed network (...) No, I, I, I am quasi called on the phone, so not every telephone is able to do that, my phone is able to do this. Like on the mobile I receive it on the display and can read it. (Germany_5)

➤ **Internet and social networks:**

I think we should attract more people to the website, or via the citizen's network, do you know what was started up here, or, or via, well yeah, or perhaps via the neighbourhood association too, that there, that you can use the neighbourhood association to, send a, a, a, mobile message by text message or whatever saying 'guys this is what's going on, make sure to follow what's being posted on the council's website'. (Netherlands_3)

➤ **Mass media (TV / radio)**

Radio, the media are sure too, for everyone has radio, everyone has got TV as well. Radio, TV, that for sure and the Internet, that is, if you have a blackberry and are able to receive emails an Internet warning does not help you, however. My wife for example, she surfs the web once in the evening, so it does not help any more if there is a storm warning from the previous day, well. (Austria_5)

It would be the radio and then television of course (Sweden_2)

The radio is perfect (Sweden_4)

Of course there are also specific suggestions:

That would help for sure but I think one would not need millions or billions in order to change that, because as I said: each church bell is connected with a satellite, we get the signal by the satellite, one central push of a button suffices in order to mobilize six bells within the village, we let them ring loudly and thus everybody knows that there is a problem. (Hungary_2)

2.4.7 What kind of information do people need?

There are three primary focus points of information people would have liked to know: What is going on? What kind of risk is there? What shall I do? Those who were already affected by a disaster stress that extensive information and behavioural instructions would have been especially important.

➤ **What is going on?**

Well, one has to be more alert, if you live this close. And then I think the municipality has been so bad about information about how dangerous it really is if something happens. They are supposed to provide information at Rå vallar about how to react if something happens, they haven't done this either. (Sweden_2)

➤ **What kind of risk is there?**

Each person living next to such a dangerous plant has to be informed about what could happen, how to behave, which materials you contact, how one is able to seek shelter quickly. By all means there must be an escape plan. (Hungary_1)

Well, I would have liked to have known .. yeah, what kind of company it was, uh, is it dangerous or not? (Netherlands_2)

➤ **What shall I do?**

What does it mean? Can I let the cat out? Can I go out? What happen if I go out? Is it dangerous to be out ten minutes? An hour? What shall you do? The degree of poison that spread in the air (Sweden_4)

And, yeah, what uh what should you do? (Netherlands_2)

Supposing they give you some useful information by text message, well, I'm not an expert on the matter, but let's suppose they write you a message: "Watch out, weather conditions are expected to worsen, there may be a storm by 8.00 in the evening, therefore, from 7 to 10 don't go out and stay upstairs". (Italy_2)

3. Summary

Overview of similarities and country specific differences

3.1 Similarities

- Knowledge about alert systems seems generally low, but almost all interviewees of all countries recognise sirens or loudspeakers as a preferred method of alert (even if sometimes interpreted as exercises (NL)) and wish for alert by sirens or loudspeakers first. After sirens more information should follow.
- Text message-alert is regarded positively. However, interviewees across all countries name its flaws: Availability, general usage of mobile phone, alarm applies to a certain place where one is not at, mobile networks collapse, not precise enough, too many warnings, needs active sign-up, not automatically. Here a GPS/location-related system could be of interest, which would warn automatically when a person passes through or lives in a certain area (such as NL Alert – see expert report from the Netherlands).
- Strong wish for behavioral instructions
- Local contact persons are very important for alerting and compliance
- Simple ways of getting information across should be favoured, e.g. on the community's website
- The people affected should have easy access to information
- Information should be easily available for the people affected, where they can look for and find the information, and this should be communicated in advance.

3.2 Differences

- Italy: refusal of communal civil defense pages/information
- In Italy social networks are well used for information as the trust in media is generally low
- Hungary: private networking and exchange, no real trust in the media, which is considered to just reproduce the statements made by authorities
- Dutch people definitely use the TV/radio ('Disaster Channel'), know that the radio is a source of information in case of disasters, catastrophes. There are, however, problems related with local allocation/ information, in border areas people often listen to other district's stations
- In Austria, Germany, the Netherlands and Sweden interviewees have shown trust in media reports, with the exception of one survivor of the catastrophe in Kemira (Sweden)
- Hungary: There should be existing alert plans which would have to be updated on a regular basis, the locals however doubt they would be able to do so

- France: Trust in authorities is low, the local authorities are held responsible for the disaster, the almighty position of the mayors regarding decision making in case of a disaster is criticised; generally people did not receive enough support.

To sum up, there are clear cultural differences as to trust in the media. But there are also similarities, such as the wish to be informed with straight forward instruction about how to behave in case of crisis as well as a loss of trust in media and authorities due to their nonspecific behaviour and bad risk communication in the cases of man-made disasters.