

The Social Dimensions of Disasters: Understanding the Enschede Fireworks Disaster

Bachelor Thesis – Human Geography and Planning



Figure 1: Unnamed painting by J. Martinus; The two lightning strikes resemble the two big explosions of the Enschede fireworks disaster.

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Abstract

On 13 May 2000, two disastrous explosions in a firework depot destroyed a large part of Roombeek, Enschede, the Netherlands. A total of 23 people were killed and over 900 were injured. Using the Enschede fireworks disaster as a case study, this paper aimed to investigate the social dimensions of disasters, including the social preconditions, the negative social impacts and to what extent community resilience contributes to deal with these impacts. The main research question was: *How did the social dimensions, including the social preconditions and the community resilience influence the negative social impacts of the Enschede fireworks disaster?* The report of Commission Oosting (2001), the legal proceedings and the socio-economic status of Roombeek showed that the community was already vulnerable for a hazard to turn into a disaster. These preconditions also exacerbated the negative social impacts. The community resilience was shown through various ways, and it was found that they did somewhat reduce the negative social impacts. Due to limitations with regards to the interviewees, further research is required to understand how community resilience can be enhanced after a disaster.

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1. Introduction

1.1 Background

On 13 May 2000, two disastrous explosions at a firework depot destroyed a large part of the Roombeek neighbourhood in the city of Enschede, the Netherlands. The explosions killed 23 people and over 900 people were injured. Additionally, more than 1200 people lost their home, and many companies were forced to relocate (Roorda et al., 2004; Denters & Klok, 2010). Using the Enschede fireworks disaster as a case study, this research paper investigates the social dimensions of disasters, including the social pre-conditions, the negative social impacts of disasters, to what extent community resilience contributes to cope with these impacts in the short-, mid- and long term, and how post disaster interventions can help build back better. Naturally, the initial questions regarding this disaster concerned the cause of the explosion, how it could have been prevented, and the question of responsibility. While these questions have gone through the legal system, other matters have been investigated concerning the health impacts in the aftermath of the disaster. Through monitoring the local general practitioners in Enschede after the fireworks disaster, it was made clear the disaster caused a lot of mental and physical health issues to the victims (Ijzermans et al., 2006). Quickly after the disaster, a clear consensus emerged in Enschede, that the victims should be allowed “maximum feasible participation” in the planning process concerning the rebuilding of Roombeek, and that their views should be guiding the planning decisions (Denters & Klok, 2010). In their article, Denters and Klok (2010) showed how this participatory planning process had been rather successful. Other literature on the firework disaster in Enschede is often related to the social change process (e.g. changes in the population), but not to the social impacts created by the Enschede fireworks disaster on people’s wellbeing at various levels (likely caused by social change processes). Also, little has been said about the social pre-conditions of the disaster, the community resilience that came into action immediately after the disaster, and about the mid- and longer term post-disaster recovery processes.

1.2 Research problem and research aim

Considering the previously mentioned gaps in the literature, the aim of this research is to investigate the social dimensions of the Enschede disaster, and especially the social pre-conditions and the social impacts of the disaster, as well as how, and as to what extent, community resilience could have been (and could be) enhanced in the post-disaster interventions carried out. Using a document and media analysis and in-depth interviews, this research aims to answer the question:

How did the social dimensions, including the social pre-conditions and the community resilience, of the Enschede disaster influence the negative social impacts of the Enschede fireworks disaster?

In order to gain answers on the central question, this paper contains a total of six sub-questions that logically arise from this research question. First, this paper will delve into the concepts surrounding the social dimensions of disasters using a theoretical framework in order to find answers on the following theoretical questions:

- *What are the social impacts of a disaster?*
- *What is community resilience and what are the social pre-conditions of a disaster?*

Following the theoretical framework and a subsequent conceptual model, the paper continues with the focus on the Enschede firework disaster. Using document and media analysis and the in-depth interviews, this research aims to find answers to the following questions:

- *What were the social pre-conditions of the Enschede firework disaster?*
- *What were the main social impacts of the Enschede firework disaster as perceived and experienced by the local community?*
- *To what extent did community resilience come into action after the Enschede disaster?*
- *How did the short-, mid- and long term recovery and reconstruction activities mitigate social impacts and vulnerabilities after the disaster?*
- *How did the recovery and reconstruction activities enhance the community resilience after the disaster?*

1.3 Structure

This research paper is structured in the following order. First, a theoretical framework is presented in which the key concepts are discussed regarding the social dimensions of disasters. A conceptual model then illustrates the interconnectedness of the social dimensions of disasters. Next, the methodology is discussed, including the primary and secondary data collection, the data analysis, and a brief reflection on the methodology. After the methodology, the findings of both the document and media analysis, and the in-depth interviews are presented. This is followed by the conclusion which aims to answer the previously presented research questions.

2. Theoretical Framework

In order to adequately analyse the findings and discuss the research questions, it is necessary to gain a clear understanding of the key concepts and theories that relate to the social dimensions of disasters. Understanding these key concepts and theories helps clarify the conceptual model presented further on in the research, which acts as a basis for the analysis of the findings.

2.1 Hazards and disasters

Hazards are ongoing conditions that carry the potentials to cause a disaster (Tierney, 2019). Hazards can be classified as natural (e.g., earthquakes, floods, typhoons), medical/health (e.g., epidemics), industrial (e.g., explosions, collisions, leakages), infrastructural (e.g., collapse of buildings or bridges, power outages, building fires), technological (e.g., war, terrorism, ethnic conflict) (Imperiale & Vanclay, 2021). Disasters are by definition social events and not merely physical in nature. For example, a substantial landslide could result in social and economic impacts on a community. However, when this landslide occurs in an area without human settlements, or without causing damage to them, it will not be considered a disaster. The vulnerabilities and exposure of a community exacerbate the risk of a hazard to turn into a disaster, whereas their resilient or absorptive capacities reduce this risk.

2.2 Social impacts of disasters

Social impacts are changes in people's wellbeing, perceived and experienced by people at various levels (Vanclay, 2002). Vanclay (2002) argues social impacts exist in various dimensions, namely the individual, the family, the community and the societal. Imperiale and Vanclay (2021) note that the social impacts of disasters can be categorized by affecting people's *health, community, culture, livelihoods, infrastructure, housing, environment and land*. More specifically, disasters lead to the breakup of neighbourhoods and in the loss of major social support for disaster survivors. Some people may never be able to return to their homes after a disaster, and some may never recover from what they experienced (Tierney, 2019). The social impacts vary between disasters and they are unequally distributed at both a global scale, as well as between local communities (Imperiale & Vanclay, 2021).

2.3 Community resilience and community vulnerability

Community resilience is a broadly defined concept (Tierney, 2019). It involves the social survival processes that are initiated by the affected communities to address the negative social and economic impacts perceived and experienced as common problems during crises (Imperiale & Vanclay, 2016). More specifically, community resilience conveys two central ideas according to Tierney (2019), namely the resistance or absorptive capacity and the ability to cope and adapt after a disaster, to recover and build back better. The local people then collectively learn and transform with regards to enhancing community wellbeing and addressing the shared negative social impacts they perceive and experience in times of crises or disasters. This shared intentionality feeds and is fed by *shared needs, desires and vision, individual and collective capacities, sense of place/community/risk, togetherness and brotherhood, local knowledge and beliefs, empathy, caring, social responsibility, mutual aid and cooperation* (Imperiale & Vanclay, 2021). Community resilience is very much linked with the concept of community vulnerability, as the vulnerability involves the (lack of) capacity (of a person or group) to anticipate, cope with, resist, and recover from a disaster (Blaikie et al.,

1994). The difference between community resilience and community vulnerability is that the vulnerabilities can be considered as ‘weaknesses’ characterising the multiple dimensions of community wellbeing, whereas resilience can be considered as the processes that enable people to enact and strengthen their capacities to reduce the risks and impacts of a disaster. People can learn from crises through community resilience as well, in order to reduce the risk of a hazard and pre-disaster vulnerability. Blaikie, Cannon, Davis and Wisner mention that vulnerability involves a ‘combination of factors that determine the degree to which someone’s life and livelihood is put at risk by a discrete and identifiable event in nature or in society’ (Blaikie et al., 1994, p. 9). Community vulnerabilities regard matters such as *political-institutional vulnerabilities*, *biophysical vulnerabilities*, *economic vulnerabilities*, *psychological vulnerabilities* and *cultural vulnerabilities* (Imperiale & Vanclay, 2021).

2.4 Conceptual Model

In order to have a clear overview of the previously described social dimensions of disasters and the interconnectedness of the key concepts that come in to play, a conceptual model was designed (Figure 2). For clarifying purposes, it is to be noted that the **green** arrows refer to a reducing development, whereas the **orange** arrows refer to an exacerbating development.

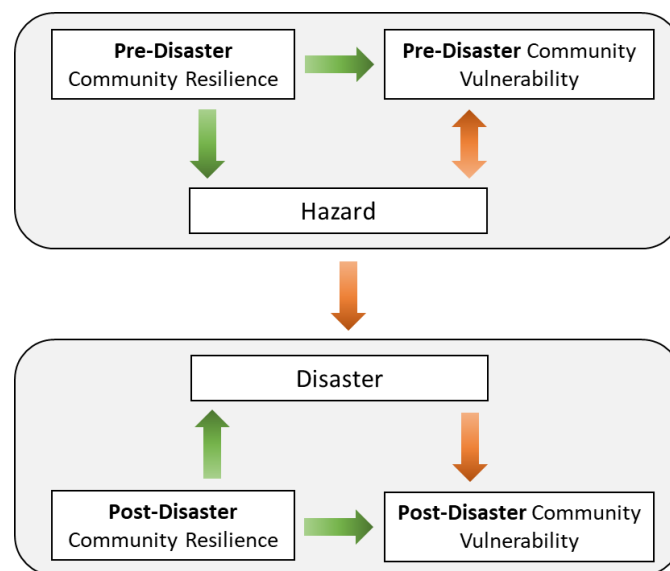


Figure 2 Conceptual Model of the Social Dimensions of a Disaster, made by the author (2021)

Figure 2 depicts the conceptual model that would serve to gather data and analyse findings of this research. More precisely, it is used to explore the social pre-conditions and the pre-disaster community vulnerability that exacerbated the disaster risk in the Roombeek neighbourhood and on the other hand, the pre-disaster community resilience of the neighbourhood that would reduce both the risk of disaster impact and the vulnerabilities of the community. Additionally, the conceptual model is used to analyze the hazard that exacerbated the risk of disaster impact, as well as the post-disaster community resilience of Roombeek, which would reduce the disaster impacts and the post-disaster vulnerabilities.

3. Methodology

This research was built upon primary data collection in the form of in-depth, retrospective interviews. Additionally, secondary data collection was conducted in the form of a document and media analysis, in order to further explore and triangulate the data that came from the in-depth interviews.

3.1 Primary data collection

With the conceptual model as a theoretical basis for the in-depth, retrospective interview questions, the goal of the primary data collection was to investigate the social impacts as perceived and experienced by the inhabitants of the Roombeek neighbourhood; the cognitive and interactional dimensions of the local community that emerged after the disaster; how the recovery and reconstruction activities mitigated the social impacts and vulnerabilities and enhanced local community resilience in the Roombeek neighbourhood. The in-depth interviews were conducted in a semi-structured way, combining a number of main interview questions with probing questions. This way, there is a certain degree of freedom, in order to keep conversation flowing, and have specific follow-up questions emerge as the interview unfolds. The full list of interview questions can be found in *Appendix 6.1*. Quotes coming from the in-depth interviews were also used to back up and strengthen the data coming from the document and media analysis.

3.2 Ethical considerations

The interview questions had to be accessible for everyone, so the questions were made in a straightforward way, naturally keeping in mind ethical considerations. Here it was important to not focus too much on the disaster itself, as this could cause discomfort or unease. It might happen that insensitive questions were asked with no intention. Therefore, it is crucial to really consider the wording of any questions that could lead to sensitive topics. When an interviewee drifts off to an unrelated (but sensitive) topic they should of course be able to tell their story. The interviewees are also asked to sign a consent form. This consent form involves that the interviewee is:

- Informed about the research that is being conducted;
- Able to ask questions before, during, and after the interview;
- Given sufficient time to decide whether or not to participate;
- Able to withdraw from the interview at any given time.

Lastly, the consent form also involves that the interviewer confirms that they:

- Informed the participant about the research;
- Informed the participant about the matters that could influence their participation.

3.3 Participants

For the primary data collection, participants were recruited through Facebook groups related to the Enschede firework disaster, and through contact with *'Huis van Verhalen'* (House of Stories). Huis van Verhalen is a foundation that was set up after the disaster and serves as a place for people to meet and talk with each other. The municipality of Enschede was also contacted. However they mentioned they could not provide any interviewees or other information due to privacy reasons. Through general request messages in the Facebook groups, three participants reached out and accepted to be interviewed on their experiences. First, Fehmi Karasoylu was – and still is – an inhabitant of Roombeek. At the time of the disaster, he lived

with his wife and children opposite to the fireworks depot. He was home at the time of the disaster, belonged to one of the many severely injured people, and their house was declared uninhabitable. Second, Erwin Metselaar lived about 200 meters from the Roombeek neighbourhood with his parents, but he was at location when the explosions happened. At the time he was 13 years old. Erwin Metselaar got slightly injured in the explosion. Third, Johan Metselaar worked at a housing corporation in Enschede and helped with repairs of houses in the surrounding neighbourhoods during the immediate aftermath (the hours and days after the disaster). At the time of the explosion, he was at home in Almelo. Fourth, Berry van den Berg is a volunteer at House of Stories, and does guided tours in Roombeek. He lived about 500m from the depot, together with his pregnant wife and one child. Their house was declared uninhabitable. Lastly, Boetie Bijlsma works at the Huis van Verhalen as a hostess. She lived in Roombeek and was home when the disaster happened, and returned when Roombeek was being rebuild. Bijlsma's house was also declared uninhabitable.

3.4 Secondary data collection

The goal of the document and media analysis was to gain knowledge on three matters regarding the disaster. (1) Understanding the Enschede disaster itself: where, when, and how it happened precisely; which were the physical components of the hazard; and which were the social pre-conditions that contributed to make the disaster happen and the main social impacts; (2) gaining a chronological understanding of the specific emergency, recovery, and reconstruction operations that were implemented after the Enschede disaster; (3) gaining further insights on the vulnerabilities that led the disaster happen, the solidarity actions that emerged on various spatial scales in the immediate aftermath, and the engagement processes implemented during the emergency, recovery, and reconstruction activities. Various sources were used for the document and media analysis, such as Final Report Commission Oosting (2001), legal trial documents, as well as local and national newspapers.

3.5 Data analysis

Before and during the analysis of the data coming from the interviews, it was important to reflect on the data collection. This means that reliability, validity, and trustworthiness of the process was taken under consideration throughout the research. Reliability indicates the quality of the measurement. This means that the data that is collected and used, has to be accurate, coherent, and most importantly, consistent. Validity of the data refers to the extent to which the instrument used measures what it is claimed to measure. The trustworthiness refers to the sampling strategy that is used, and ethics regarding the primary data collection (Punch, 2014). A deductive code tree is used to help analyse the raw data, as these codes can filter out patterns and exceptions within the answers that are given by the interviewees. These codes have to do with the possible social impacts, concepts concerning community resilience, as well as links with the community vulnerability. Although as these codes were mere expectations, the analysis is conducted flexibly as such, that newly introduced activities/social impacts/vulnerabilities by the interviewees were easy to be incorporated. The deductive code tree can be found in Appendix 6.2. The codes were based upon the conceptualization of social impacts, community resilience and social vulnerabilities by Imperiale & Vanclay (2021) as previously mentioned in the theoretical framework.

4. Findings

4.1 What happened, where, when and why?

At about 15:03 on Saturday 13 May, the first fire report came in at the emergency centre of the regional fire department. The fire brigade was at location at 15:08 and took note that there was fire at various places on and around the firework storage site from *Smallenbroek Enschede Fireworks (SE Fireworks)*, located in the neighbourhood of Roombeek, Enschede. Situated on this site, was a bunker containing 17 firework compartments, 2 warehouses, 16 sea containers and 7 mavo garage boxes. At about 15:15, the fire seemed to be under control. However, a couple minutes later, a firefighter took note of a fire in another compartment at the storage site of *SE Fireworks*. This led to further firework explosions, causing new fires in other compartments and containers as well. At about 15:34, one of the containers blew up and threw out a lot of firework bombs. The mavo-boxes exploded about 42 seconds after, mavo-box M7 had been the one explosion with the most impact. About a minute later, the central storage and the remaining containers explode (Commission Oosting, 2001).

Immediately after the disaster, the municipality of Enschede, the province of Overijssel and the central Dutch government decided that the disaster needs to be investigated by an independent commission: Commission Oosting. On 28 February 2001, this commission came with Final Report Commission Oosting (2001). First, this report and other media sources (such as newspaper articles and reports) are used in order to draw out the main chronicle of what happened, where and when, and see what vulnerabilities were present. Second, the implemented emergency, recovery, and reconstruction operations are discussed as investigated by the Commission and reported by various media sources.

Today – more than twenty years later – there has not been found a clear cause for the initial fire that started it all. Nevertheless, a number of preconditions that exacerbated the risk for the hazard turning into a disaster became evident throughout this research.

[A fireworks storage next to a residential area](#)

In 1890, a railway was opened between Enschede and Oldenzaal. This made Roombeek an attractive business location for a number of textile factories, as well as the Grolsch Brewery. In its prime, Enschede was the second textile city of the world, after Manchester. This industrialisation led to an increasing labour demand, in turn resulting in the development of the working class neighbourhoods around the area. The textile industry stopped in the late sixties, and many artists and small industrial businesses started to settle in the old factories (Roombeek, n.d). One of these businesses was *Smallenbroek Fireworks (SE Fireworks)*. SE Fireworks was developed in 1976 in a former machinery factory. They produced and sold fireworks. The production moved to China in 1985, but the storage and dealership stayed. During the 1980's the realization arose within the municipality of Enschede that the industrial businesses that were present, did not have a future in Roombeek, so in the development plans of 1986 and 1995 it was made sure companies with category 3 or higher could not expand. SE Fireworks was a category 4 company. According to Commission Oosting (2001), SE Fireworks stayed and even expanded without the necessary building and environmental permits. Second, Commission Oosting (2001) noted that there were two problems with the fireworks that were stored at SE Fireworks. Not only were there more fireworks stored than allowed, the fireworks

were also way heavier than permitted. This caused the fire to spread more easily and exacerbate the impacts of the disaster, in combination with inadequate safety measures that were present at the site. Lastly, Commission Oosting (2001) stated that SE Fireworks had been insufficiently inspected, both in quantity and quality. The duty of sufficient inspection was on the municipality of Enschede and the Dutch Ministry of Defence (Rechtbank Almelo, 2002a; 2002b).

Legal proceedings

On 19 May 2000, an arrest warrant was issued by the Dutch authorities for the two chairmen of SE Fireworks at the time, R. Bakker and W. Pater. W. Pater turned himself in that same day, R. Bakker a day later (BBC News, 2000). Initially, they were accused of involuntary manslaughter, involuntary arson, violation of environmental and safety regulations, and dealing in illegal fireworks. At request of their lawyers, R. Bakker and W. Pater were released from remand 19 August 2000 on strict terms (Ritsema, 2000). On 2 April 2002, R. Bakker and W. Pater were convicted of violation of environmental and safety regulations as well as dealing in illegal fireworks. The two chairmen were acquitted from the charge of involuntary manslaughter and involuntary arson. They were initially sentenced to six months in prison, of which 3 months on probation, and they both received a 2250 euro fine (Rechtbank Almelo 2002a; 2002b). As they already spent 3 months in remand, they were freed after the decision (BBC News, 2002). Upon appeal on 12 May 2002, the chairmen were convicted of violation of environmental and safety regulations, dealing in illegal fireworks, as well as involuntary detonation leading to death. R. Bakker and W. Pater were sentenced to 12 months in prison. A few matters were taken into consideration. First, the safety regulations were partially intentionally violated, though the chairmen were barely conscious of the contents of these regulations. Despite the serious culpability here, the absence of malicious intent was taken into consideration. Second, the act of storing too many and too heavy fireworks was considered culpable, but the intentionality was not proven. Third, it was taken into consideration that there were more factors regarding that led to the disaster, some of which others were to blame for (who remained unpunished), and some of which were coincidentally (Gerechtshof Arnhem, 2003).

Socio-economic position of Roombeek

Before the fireworks disaster, the Roombeek neighbourhood was a disadvantaged, lower working-class neighbourhood (Hakkert, 2020). There was deprivation, anti-social behaviour, and many families living in the neighbourhood were dealing with socio-economic problems (high unemployment rates, low-income households) (Denters & Klok, 2010; Hermans, 2020). The neighbourhood also had troubles regarding petty crime: destructions, burglary, and cars were put on fire every once in a while (van Haastrecht, 2007). This weak socio-economic position of Roombeek is emphasized by one of the interviewees:

“The small part where I lived used to belong to the church. (...) A little further down the road it was different at the Kroedthofteplein. Those people were, let’s say, kind of the ones that would be affiliated with the trailer parks. They would always be tinkering with their car around the back of their house as well. That is also where many more people lived who were unemployed.” (Boetie Bijlsma, 2021)

Roombeek is not just characterized as a bad, deprived neighbourhood. Roombeek was also known for its multicultural character (Gerson, 2007). The inhabitants partially consisted out of (former) guest workers (and their descendants), who moved to Roombeek in order to work at the textile factories. About 69% of the inhabitants were of Dutch origin, 8% were of Turkish origin, 5% came from former Dutch colonies (Surinam, the Antilles, Indonesia), and 2% were of Turkish origin. The remaining 17% were from a wide range of other countries across the globe (Denters & Klok, 2010). The inhabitants would often know each other well, and they would sit outside in the garden with together. The close nit, multi-cultural community that characterized Roombeek is further affirmed by one of the interviewees:

“Yes it really was a close community. Sitting outside in the garden with a barbeque with a big group. Our neighbours, Dutch, migrants, Italians, Turkish, Arabs, a whole group in the back garden with good weather. There was no discrimination. Not in our community, because we were living here now.” (Fehmi Karasoylu, 2021)

4.2 The social impacts of the Enschede fireworks disaster

The disaster took the life of 23 people and about 950 people were injured. More than half of the surface of Roombeek (about 40 hectares) was completely destroyed, including over 200 houses. Additionally, another 300 houses were deemed uninhabitable due to heavy damage. About 50 corporate buildings were irreparably damaged and almost 60 artists lost their studios. The total damages were estimated at 1 billion guilders (~450 million euros) (Commsion Oosting, 2001). Furthermore, the disaster caused a number of other negative social impacts that can be differentiated between short term impacts and long term impacts.

Short term social impacts

With regards to housing, many people living in and around Roombeek lost their home due to heavy damages. Others could not access their home in the first few hours, days or weeks after the disaster, because the area was restricted for civilians. This was the same for the people whose houses were not, or only slightly damaged. Some still managed to find a way to access their homes through back alleys, others were provided with temporary housing. Fehmi Karasoylu was one of the people who got offered temporary housing. In an unformal setting, whilst walking through the Roombeek neighbourhood, he told about a small apartment he temporarily stayed at. Johan Martinus spoke about the sorts of damages he came across in the neighbourhoods surrounding Roombeek. Many houses and companies had broken windows due to the extreme air pressure that arose from the explosion. These were smaller damages people could deal with rather quickly, mostly within the first week after the disaster.

Long term social impacts

With regards to people’s health and livelihoods, the disaster led to a lot of physical and psychological impacts throughout the years after the disaster, that still last for some. Van den Berg’s son, whose wife was pregnant with at the time, was still dealing with anxiety disorder ten years after the disaster, as stated in the interview:

“He did not experience the disaster, but because of what happened in the womb, a chemical is released and that is how he developed an anxiety disorder. That is what the experts say at least.” (Berry van den Berg, 2021)

These psychological and physical issues have also led to people not being able to work anymore, and further financial problems. Fehmi Karasoylu had one of his kidneys removed after the disaster, because a piece of glass had damaged it in the explosion. He became unfit for work as he explained in the interview:

“I was simply declared unfit for work. I cannot continue. I have one kidney. I also became a heart patient because of it you see. (...) We do not have a life anymore, it has changed. We cannot recover.” (Fehmi Karasoylu, 2021)

The community as a whole was negatively impacted through the fact that lots of social connections between the inhabitants were lost as many of them moved away to either another neighbourhood within Enschede, or a different city. Along with the community and the social connections, the culture of Roombeek also changed according to the interviewees. As previously mentioned, Roombeek was a typical *[volkswijk]* which was characterized by a lot of social interaction with people sitting outside. One of the interviewees emphasized how this has changed:

“You see the whole neighbourhood has changed a lot. In the past it was a real [volkswijk]. People were sitting outside, in front of their door. (...) That is completely different now, you could not tell anymore. Yes, they rebuilt some things back in new condition, but really the social neighbourhood is not like it used to be.” (Erwin Metselaar, 2021)

4.3 Emergency, recovery, and reconstruction operations

The emergency, recovery, and reconstruction operations after the Enschede fireworks disaster consisted of multiple interventions implemented throughout time.

Short term operations

During the first few hours after the last explosion, at least twelve emergency shelters were set up at local foundations, community centres and at Twente Airport. These emergency shelters were mostly realized by police, emergency personnel, and employees of the municipality. Relative to the chaos that was present, the initial reception of victims went well. Other victims quickly received shelter from family and friends (Commission Oosting, 2001). The final report by Commission Oosting (2001) states that the contingency plan of Enschede was only put into operation from 16:50, due to slow, incoherent and intransparent communication between the responsible authorities. At 17:00, the Diekmanhall (big sports hall) was designated and set up as the central emergency shelter, in order to properly register victims, and report missing people. The first people arrive at the Diekmanhall at 20:00, and at 20:20 it was announced that people who were sheltered at the other emergency locations had to be moved to the Diekmanhall. Meanwhile, nearly 950 people were quickly treated for injuries and over 500 of them were taken to various hospitals in the region (Commission Oosting, 2001). Commission Oosting (2001) also notes that the first aid at location was organized rather well, despite the chaos. Furthermore, psychosocial care was also offered to the people in need through psychologists and medicine (Commission Oosting, 2001).

Mid term operations

Over the mid term period after the disaster, the people that lost their homes, or could not access it due to the area being restricted, had to be provided with temporary housing. Tens of

households whom were immediately sheltered at the Diekmanhall after the disaster already got a temporary home at 14 May. Through joint efforts between housing cooperations and the Social Development Service (SDS) of Enschede all people sheltered at the Diekmanhall got a temporary house within the first three days of the disaster. The people not sheltered at the Diekmanhall also got a temporary house relatively quick, within six weeks after the disaster 560 households were helped with temporary housing (Commission Oosting, 2001). Though Commission Oosting (2001) also found two problems that occurred due to the fast provision of temporary housing. First, not everybody was satisfied with the house they got offered. This is also found in an article from 15 May 2000 in the NRC newspaper (2000), as someone explains they got offered a house outside the Enschede ringroad, rather far away from Roombeek. Second, during the first week after the disaster the registration of data relevant with regards to the housing process did not go well. Result was that it was somewhat unclear how many, and of what kind of houses were required.

Long term operations

The long term operations are concerned with the reconstruction of the Roombeek neighbourhood. In the introduction of this paper it was already mentioned that there was a clear consensus in Enschede that the victims should be allowed “maximum feasible participation” in the planning process, and that this participatory planning process had been rather successful (Denters & Klok, 2010). This is also emphasized by an interviewee:

“(The process) took place in a very diligent manner. Children could play with LEGO while the adults could participate and think along. (...) There was a newspaper that kept the people up to date about the progress every week or two weeks, a full bulletin. That was organised very well.” (Berry van den Berg, 2021)

Although in theory this process may have been successful, interviewees mention how they – along with others – are not satisfied with the way Roombeek lost the feeling and social interaction of a typical [*volkswijk*]. Possibly, the social interaction of the neighbourhood decreased due to the spatial planning of the neighbourhood, with regards to where people have their cars parked. This was explained in one of the interviews:

“What the municipality has done differently, they wanted everybody to have their cars on their own property, so all these streets were narrowed. That is also something I have missed. In the past you would see someone come home if you sat by the window, or when they would go to work, because their car would be in the street. That is not the case anymore, as the cars are all parked around the back of the house in little areas where all cars are parked together. (...) Now you need to rely on good weather, when we are all in the garden at the same time.” (Boetie Bijlsma, 2021)

Before the disaster, the vast majority of Roombeek consisted of social housing. In the reconstruction of Roombeek, the amount of social housing has been drastically reduced (RTV Oost, 2015).

4.4 Community resilience

Immediately after the disaster, people helped each other or provided support both in the short term after the disaster, and over the longer term with the emergence of social media. Locals helped each other evacuate the area as quick as possible, as reported by an interviewee:

“... the togetherness and help was there from the beginning. Everyone fled not only for themselves, but also for the other. I think that is normal, the human instinct is to help yourselves first, but also see if you can help someone else in any way possible.” (Erwin Metselaar, 2021)

Many people – mostly from other parts of Enschede – came to Roombeek to offer things to the victims that lost their possessions out of empathy, as one of the interviewees notes:

“On the social side, a lot of materials, things, furniture, bikes, all sorts of things were collected at the Twente Complex.” (Johan Martinus, 2021)

This solidarity and empathy of the people from Enschede still showed weeks after the disaster, especially for people that had lost their home and possessions, as described by an interviewee:

“We arrived there (at the temporary home) and after only five minutes the doorbell rang, and people from the neighbourhood were there asking us whether we need anything. ‘Garden furniture? Do you need a couch?’ We got offered all sorts of things.” (Berry van den Berg, 2021)

Years later, people still came with stories about the disaster, and spoke to each other about this. House of Stories serves as a location for people to tell these stories and store them. At the time people could move (back) in to their new house in Roombeek, people would also speak with each other. Their sense of togetherness, brotherhood and cooperation somewhat reduced the impacts, as explained by one of the interviewees:

“Together we would make the gardens look pretty again, so that is when you would see each other. That was nice, because you get to know each other. There were people from before the disaster, but also new people. (...) You talk to each other and together you create something beautiful again, that is what it comes down to. Yes, that does help.” (Boetie Bijlsma, 2021)

Social media also contributed on this matter, as people started sharing their stories on media such as Facebook. These people apparently have a shared desire and need to share their stories, and a certain degree of togetherness and brotherhood, as they get together in Facebook groups for example. The emergence of social media has a direct link with another development found with regards to the longer term. This has to do with how people started gathering on social media in order to uncover the truth of the disaster, understanding the pre-conditions and vulnerabilities. People cannot recover until they really know what happened, and that they demand more transparency from both the municipality and the state. A lot of distrust towards these authorities grew over the years after the disaster, as the root causes and pre-conditions remain unclear to this day. These people feel left out by the authorities and they want to know the truth in order to properly recover, as explained by an interviewee:

“... if the municipality came clean from the beginning about how this could have happened, it would have been easier for people to rebuild their lives. (...) The fact that it is still unknown today, and that it will stay pretty much covered up, puts the municipality of Enschede – from the inhabitants’ perspective – in a bad light you know.” (Erwin Metselaar, 2021)

5. Discussion

Through qualitative data collection and a document and media analysis, this research aimed to investigate the social dimensions of the Enschede disaster, and especially the social pre-conditions and the social impacts of the disaster, as well as how, and as to what extent, community resilience could have been (and could be) enhanced in handling the social impacts after the disaster.

Considering the research of Commission Oosting (2001) and the legal proceedings (Rechtbank Almelo, 2002a; 2002b; Gerechtshof Arnhem, 2003), the Roombeek neighbourhood was already vulnerable due to illegal storage of dangerous substances, violation of environmental and safety regulations, and weak governance. Therefore, the municipality of Enschede and the Dutch Ministry of Defence were, and still are, also accountable. These pre-conditions exacerbated the risk of a hazard, and relate to the political/institutional vulnerabilities as introduced by Imperiale and Vanclay (2021).

These findings show how the socio-economic position of the people living in Roombeek was rather bad. Their low socio-economic position can be considered as an important social vulnerability which exacerbated the negative social impacts of the firework disaster. These vulnerabilities are economic and cultural of nature. On the other hand, the strong connections between the people living in Roombeek, show a sense of community, as well as togetherness and brotherhood, therefore showing signs of pre-disaster community resilience that could have reduced the negative social impacts to a certain degree (Imperiale & Vanclay, 2021).

The main negative social impacts people perceived and experienced after the Enschede fireworks disaster were related to people's health, livelihoods, housing, infrastructure, their community and culture. The disaster led to psychological issues, loss of social contacts and many people lost their home and possessions. The culture and community were impacted due to gentrification of the Roombeek neighbourhood.

The community resilience shown after the Enschede fireworks disaster can be explained through different dimensions and motives. First, in order to try reduce the direct negative social impacts (with regards to health and livelihoods), people helped each other flee the area showing the togetherness, brotherhood, mutual aid and cooperation (Imperiale & Vanclay, 2021). In the hours and first few days after the disaster, people and companies from Enschede showed signs of individual and collective capacities, empathy, caring and social responsibility, as well as mutual aid and cooperation through the provision of goods such as furniture and food. Over the longer term, the people supported each other through talking with each other, which was reinforced with the emergence of social media. This also contributed to the social bond between people who experienced the disaster, and how they all got through it together. Social media also led to people gathering to uncover the truth about the disaster, showing resilience through a shared vision and goal amongst the people of Roombeek and Enschede, some level of mutual cooperation, as well as local knowledge and beliefs (Imperiale & Vanclay, 2021).

6. Conclusion

This research investigated how, and as to what degree, the social dimensions – the social preconditions and the community resilience – of the Enschede fireworks disaster influenced the negative social impacts people perceived and experienced, caused by said disaster. Through qualitative data collection and a document and media analysis, different ways the Roombeek neighbourhood was negatively impacted by the disaster were illustrated, how these impacts were exacerbated through the vulnerabilities that were already present, and how community resilience emerged in order to and reduce the social impacts. The research was limited in its interviewees due to the sensitive topic, so people were hesitant to partake. The municipality of Enschede could not provide further information either. It came forward that the community resilience emerged in the immediate aftermath with people understanding and recognizing those most vulnerable and most affected, and helping them cope better. Throughout the years, the understanding of the root causes and pre-conditions is still unclear and people still claim truth. This proves that people show their resilience even on the long term enacting a process of learning that seeks understanding of the vulnerabilities and pre-conditions of disasters, while at the governance level too often this capacity is neglected. It is recommended to consider the social climate of a community during the reconstruction after a disaster. To achieve true understanding how community resilience can be enhanced after a disaster, more research is desired. This should include easier participation and transparency from authorities and other people involved in the disaster.

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8. Appendices

8.1 Interview Guide

Question	Subquestion	Answer	Code
Were you present during the explosion? If so, could you tell us what happened?			
	What were the main impacts you, your family, and your neighbours experienced ...		
	... during the immediate aftermath?		
	... during the time the emergency operations were implemented?		
	... during the time the recovery and reconstruction operations were implemented?		
Could you tell me about possible vulnerabilities within the local community?			
	Do you think certain groups within the community were more vulnerable to the social impacts of the disaster? (why?)		
Did the local people living in the neighbourhood (and the neighbourhoods close by) undertake individual or collective action to help and cope with the negative impacts of the explosion, in the immediate aftermath of the disaster?			
	Which were the triggers / drivers that led (you and) these people to undertaking these actions?		
	How did you / these people collectively organize these actions?		
	Were these actions undertaken in the aftermath of the disaster oriented towards helping the people most affected by the disaster?		
	Did these community actions, specifically		

	addressed towards the most vulnerable, last beyond the emergency- and beyond the recovery and reconstruction activities?		
What were the emergency, recovery and reconstruction interventions that were implemented to let the neighbourhood recover from the disaster?			
	Did these interventions mitigate the social impacts (you experienced) and if so, in which way?		
	Did these interventions engage with the neighbourhood and if so, in which way?		
	Did these interventions address the vulnerabilities that contributed to make the disaster happen and if so, in which way?		
	Did these interventions strengthen the feelings, attitudes, and organizational capacities showed by the local neighbourhood during the emergency and recovery operations and if so, in which way?		

8.2 Deductive Coding Tree

