

# Value of Case Studies in Disaster Assessment?

Delphine Grynszpan, MFPH;<sup>1</sup> Virginia Murray, FRCP;<sup>1</sup> Silvia Llosa<sup>2</sup>

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1. Centre for Radiation, Chemicals and Environmental Hazards, London, Health Protection Agency London, UK
  2. UN International Strategy for Disaster Reduction

## Correspondence:

Dr, Delphine Grynszpan  
Centre for Radiation, Chemicals and Environmental Hazards, London  
Health Protection Agency  
7th Floor Holborn Gate  
330 High Holborn  
London WC1V 7PP  
United Kingdom  
E-mail: delphine.grynszpan@hpa.org.uk

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UNISDR = United Nation's International Strategy for Disaster Reduction

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## Abstract

Case studies can be useful in assessing and learning lessons from emergency situations. In this paper, different uses for disaster case studies, are explored with identification of potential pitfalls that should be avoided. In addition, ways to improve the rigor and significance of case studies are suggested. Case studies can be used as examples or as a research tool. If conducted properly, they can provide robust and compelling results. It is argued that sharing a common guide to conducting and writing case studies among all disaster risk reduction professionals could improve the quality of case study reports and thereby strengthen their value in advancing the prevention, preparedness, and management of disasters and emergencies.

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## Introduction

Reports of a crisis often are used in the field of disaster risk reduction. Usually, they are presented as a narrative description of the impact of an event on the local population and resources and, of the relief and recovery phases that followed. The term “case study” commonly is applied to these narratives, although a definition of what is meant and expected by a case study is used rarely. For example, the United Nation's International Strategy for Disaster Reduction (UNISDR)'s terminology lexicon does not provide a definition for case study; it does include methodological terms such as “risk assessment” and “forecast”.<sup>1</sup> Usually, publications use the label “case study” because it seems to carry a “common sense” meaning, and the need is felt rarely to refer readers to a specific definition or method statement. Contrast, in the social sciences, where case studies also are used, the term has been much debated.

This paper is based on a review of the literature. An answer to the question “Why are case studies useful in disaster research and prevention?”. This review explores uses for case studies and how they can be relevant to disaster reduction, potential pitfalls ways to improve disaster case studies will be discussed.

### *What Is a Case Study?*

The common sense understanding of the term ‘case study’ implies a focus on a single case that the authors explore in depth. A number of definitions have been put forward, such as:

*“The basic idea is that one case (or perhaps a small number of cases) will be studied in detail, using whatever methods seem appropriate. While there may be a variety of specific purposes and research questions, the general objective is to develop as full an understanding of that case as possible”.*<sup>2</sup>

*“Case study is the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances”.*<sup>3</sup>

Case studies have been described as signifying a range of closely related but scientifically distinct endeavors. These include: (1) a narrative written to provide an example of an event, practice, or organization; (2) a method for teaching using a particular situation to discuss what might be done about it; and (3) a particular means of performing social research.<sup>4</sup> Stake categorized three types of case studies: (1) *intrinsic*, in which “one wants better understanding of this particular case”; (2) *instrumental*, “if a particular case is

examined mainly to provide insight into an issue or to redraw a generalization”; and (3) *multiple or collective*, when several different cases are “studied jointly in order to investigate a phenomenon, population or general condition”.<sup>5</sup> Similarly, Bassey proposed three types of educational case studies: (1) *theory-seeking* or testing; (2) *picture-drawing* (which mirror stake’s first two categories); and (3) *evaluative*.<sup>6</sup> Disaster reduction can draw information from each of these related but different categories of case studies to improve the understanding of events, vulnerability, and effective preventative and mitigating measures.

#### *Why Use Case Studies in Disaster Reduction?*

There are three main reasons that case studies are particularly well-suited to the analysis of disasters:

1. *Case Studies Help Capture the Complexity of Disaster Situations*—disasters, whether caused by natural or human-made hazards, intrinsically, are complex phenomena. Whether a hazard becomes an incident or a disaster is a consequence of the interaction between the nature of the hazard, the vulnerability of the population, the aptness of response, and the resilience of structures and systems. When analyzing disasters, it is important to combine a range of physical, probabilistic, behavioral, and socio-political factors. The UNISDR’s definition of *disaster risk reduction* highlights the multi-factoral and multi-professional nature of the task: “the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.”<sup>1</sup>

Few research methods or strategies allow the investigator to capture the overall picture of multi-factoral situations akin to disasters, where interdependent variables of a different nature, such as the geographical, social, economic, and structural components of vulnerability, are the key to understanding the case. Case studies are a common-sense approach to real-life phenomena, and also a rational choice for “research situations where the number of variables of interest far outstrips the number of data points”.<sup>7</sup> They allow the investigator and reader to study situations in their real-life context, with an emphasis on the role of context.

2. *Case Studies Appeal to a Broad Audience*—The importance of multidisciplinary collaborations and sharing information between scientists and decision-makers has repeatedly been put forward as a key element of more effective approaches to disaster risk reduction. The Hyogo Framework for Action calls for overall risk assessments and a multi-hazard approach.<sup>8</sup> More recently, the International Council for Science has highlighted the added benefits of integrated, multi-disciplinary, and international research,<sup>9</sup> and the UNISDR Scientific and Technical Committee has recommended using a “holistic, all hazards, risk-based, problem-solving approach”<sup>10</sup> to address the multifaceted nature of emergency response and of disaster reduction.

A case study can be useful for sharing information across disciplinary boundaries. Its format is familiar to many professionals involved in preparing for and responding to emergencies. Learning by example is a common method used for education and training, particularly for practice-based professions such as medicine (and other clinical occupations), law, and public policy. This method is popular and effective because professional

operate on the basis of knowledge of numerous concrete cases in their field of expertise, and analytical learning based solely on theory and rules is inadequate.<sup>11</sup>

Also, the narrative nature of case studies tends to make them easier to communicate, even among people from different cultural backgrounds. The draw upon shared familiarity with storytelling, a traditional tool for sharing memories and information in many cultures. Case studies are effective communication tools because they are easily accessible and interesting to read.<sup>12</sup> Therefore, they can a valuable conduit for a more integrated, inclusive approach to disaster risk reduction.

3. *Disaster Reduction Requires an Approach that Can Make the Most of Each Single Case*—Disasters that take many lives and devastate economies are uncommon events. Smaller-scale emergencies that undermine vulnerability and keep communities in poverty occur more frequently, but have not been well reported.<sup>13</sup> The comparative rarity of well-reported disasters and comparative lack of available data are important factors in deciding on an appropriate strategy for studying these events. Most methods require a comparison between a number of events in order to achieve valid results, a sufficient sample size to produce statistically significant results in quantitative research,<sup>14</sup> or enough data points to achieve saturation in most qualitative methods.<sup>15</sup> Case studies offer an alternative research approach that is, by nature, well-suited to gaining an in-depth understanding of a single situation.

Moreover, in disaster risk reduction, having an effective tool to draw public attention to an event that is relatively rare is crucial. Communities and decision-makers are unlikely to take action to prevent an event that they do not perceive as likely to affect them. Even within communities that have been affected directly, memories of the disaster and best practices to reduce vulnerability tends to disappear over time and across generations.<sup>10</sup> Reports of “real-life” cases present the situation in a way that aggregated data do not.<sup>16</sup> Case studies can be a powerful means to bring the reality of disaster risks and the value of prevention and preparedness to an audience that may not relate to theoretical or statistical statements.

#### *How Can Case Studies Contribute to Disaster Reduction?*

Disaster case studies have been published in many forms, under different labels, and with varying levels of detail and rigor. Nevertheless, drawing on a distinction often made in social science,<sup>4,7</sup> their use can be narrowed to two broad categories: (1) case studies used to illustrate an argument, which, for the purpose of this article, will be called “*illustrative case studies*”; and (2) those that present the results of a research process, which will be called “*investigative case studies*”. This dichotomy provides a good basis for discussion, although like many attempts at categorization, it is imperfect. In practice, there can be some degree of overlap between these two types of disaster reports.

#### *Illustrative Case Studies*

Illustrative case studies probably are the most common type used in the field of disaster risk studies. They are used widely both in the professional literature and in policy documents. Some are event-focused and either simply describe the event and its impact, or put it in context by highlighting certain characteristics of preparedness or relief, recovery, and response phases. Others focus on practice, detailing how disaster preparation,

prevention, and management can reduce the impact of a hazard. Illustrative case studies answer questions such as, “What can the impact of a given hazard be?” or “Can better prevention and preparedness reduce the impact of the hazard?”. They are useful examples to illustrate an argument, and as educational tools to encourage best practices and raise awareness about disaster risk reduction.

#### *Investigative Case Studies*

*Investigative case studies* refer to a study in which the author sets out to answer a clearly defined research question before piecing together the various elements of the case. Investigative case studies can answer questions such as “Why did the event have the impact it did?”, “Why did people respond in the way they did?”, or “How did event x develop into situation y?”. This approach was developed primarily by social scientists, particularly in organizational sociology and management research, and gained fame with landmark studies such as the analysis of the Cuban missile crisis.<sup>17</sup> Social scientists use case studies to explore or test explanatory theories by analyzing how well they can explain a succession of events. There is a growing interest in this social-scientific approach to understanding “what makes” a disaster, drawing on an increasing knowledge base of the factors and sociological relationships that can explain technological accidents.<sup>18</sup> For example, a sociological study of the Chicago heatwave in 1995 demonstrated the role of social structure and social capital in vulnerability to extreme heat.<sup>19</sup>

However, the investigative case study approach also is valuable outside of the social sciences. Disaster professionals and inquiry commissions have used this approach to analyze the causes of and protective factors for a disaster through a narrative overview of available data.<sup>20,21</sup> Such investigative case studies can provide valuable analyses of processes and practices. They offer an important opportunity to learn from experience and identify actions that can be recommended as evidenced-based good practice.

#### **Toward Improving the Quality of Case Studies for Disaster Reduction**

Like other qualitative methods, case studies carry inherent weaknesses.<sup>22,23</sup> The purpose of this short paper is not to examine the methodological characteristics of case studies. Others, particularly Robert Yin, have explored these issues in depth. There are a few issues that are important when using case studies to improve disaster risk reduction.

First, although the main attraction of case studies is that they facilitate the development of an overview of complex situations, it is important to remain cautious about their ability to be comprehensive. Whether illustrative or investigative, a case study always will be limited by the amount and quality of the data available for analysis, and by the perspective taken to explore the case. It may not be possible to explore all aspects of a complex phenomenon in one study. Indeed, case studies can focus on specific aspects of a disaster, such as the impact on a precise vulnerable group.

Case studies have long been criticized as a soft option, as opposed to the harder science of surveys and the “gold-standard” of randomized controlled trials. Now they are accepted as a justified and valid approach, as long as they are based on robust methods and data.<sup>24,25</sup> This statement, generally made about research case studies, equally can hold true for illustrative cases. The main criticisms of case studies as a research method focus

on the risk of subjective bias, lack of construct validity, and problems with internal and external validities and reliability. Although they mainly have been refuted as misunderstandings of the method and criticism that can apply to poor qualitative research in general,<sup>7,24,25</sup> they remain constructive lessons of what to avoid when conducting a case study.

1. *Subjective or observer bias* refers to a tendency to confirm the investigators’ preconceived ideas about the subject matter. As Flyvbjerg writes, the case study “tests views directly in relation to phenomena as they unfold in practice” and reality cannot be underestimated as a powerful, critical force. To avoid subjective bias, researchers must ensure that their study has good construct validity, i.e., their study actually investigates what it claims to investigate.<sup>26</sup>
2. Case study researchers can enhance the *internal validity* of their work (how strongly can the study establish an association between variables and results?) by formulating a clear research framework, comparing observed patterns with predicted ones, and by triangulating the theoretical perspectives used.<sup>26</sup>
3. Although it is important to recognize the limitation of case studies in time and place, it can be argued that they are not devoid of *external validity*. Rather, they can be a source of generalizations from empirical observations to theory.<sup>27</sup>
4. To ensure adequate *reliability*, Yin recommends conducting and documenting the case study “so that an auditor could in principle repeat the procedures and arrive at the same results”.<sup>7</sup>

Case studies can produce robust and relevant results.<sup>28</sup> However, unlike other scientific methods and strategies, study routinely are not expected to present a methods statement. One way to improving the robustness of our understanding of disaster risk would be to encourage authors of case studies to describe their methods, including the perspective and context of their research, the data collection methods, and data processing procedures. Although this process appears more obvious for investigative case studies, it can be valuable for illustrative studies as well. Clarifying how and why the case was chosen, how the information was sourced, and identifying possible gaps in knowledge about the case can improve the study’s worth even when case studies are used simply to illustrate or teach.

Similarly, the *readability* and *comparability* of case studies could be improved by systematically including a description of important factors, such as the baseline situation and the main vulnerability (or protective) factors, as well as the event or new practice, their impact, and the lessons learned. There are good examples of case studies in which the important aspects of the case are presented clearly. For example, the UNISDR report on disaster risk reduction and education<sup>29</sup> uses a common template for each case that is included, clearly highlighting important aspects of good practice and lessons learned. Clearly explaining the important factors that have contributed to the development of a disaster and of its management could facilitate comparisons between different events. It would help bring to common factors to light and could contribute to the development of potentially generalizable evidence and advice.

One potential way forward in the area of disaster studies could be to design and implement a basic, common template for reporting case studies. A common format, the Utstein style, has been proposed for reports of incidents in disaster medicine in

an attempt to drive the quality of crisis reporting forward.<sup>30,31</sup> Without necessarily being overly rigid or cumbersome, a “guide to good disaster risk reduction case study writing” could provide a common basis for authors and readers, and improve researchers’ and policy-makers’ ability to compare different cases.

### Conclusions

The purpose of this paper was to provide an overview of how and why case studies can be used to improve disaster risk reduction. It is a summary overview, which, by nature, cannot shed light on all relevant aspects of case studies. It is acknowledged that, although this paper has borrowed extensively from the social science literature, disaster risk reduction professionals come from varied backgrounds, and will have different methodological reference frameworks.

Overall, it is hoped that this review has demonstrated the particular value and fit of case studies to the field of disasters and emergencies. Case studies can be used to illustrate an argument or research the causal factors of an event. Although the method has been criticized as a soft option, in reality, it can provide robust and compelling results. A better-shared understanding of the methods to conduct and write case studies among disaster professionals could improve the quality of case study reports, and thereby, strengthen their value in advancing disaster preparedness and reducing vulnerability to extreme events.

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### References

- UNISDR Terminology. Available at <http://www.preventionweb.net/english/professional/terminology/v.php?id=477>. Accessed 12 May 2010.
- Punch K: *Introduction to Social Research: Quantitative and Qualitative Approaches*. 2d Ed. London: Sage, 2005.
- Stake R: *The Art of Case Study Research*. Thousand Oaks, USA: Sage, 1995. p xi.
- Tight M: The curious case of case study: A viewpoint. *International Journal of Social Research Methodology* 2009;1(11):iFirst article.
- Stake R: Qualitative Case Studies. In Denzin & Lincoln (eds), *The Sage Handbook of Qualitative Research* (3d Ed, pp 443–466). Thousand Oaks, USA: Sage, 2005.
- Bassey M: *Case Study Research in Educational Settings*. Buckingham, UK: Open University Press, 1999.
- Yin R: *Case Study Research. Design and Methods*. Fourth Edition. Los Angeles, USA: Sage, 2009.
- UNISDR: *Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters*. World Conference on Disaster Reduction, 18–22 January 2005, Kobe, Hyogo, Japan.
- International Council for Science (ICSU): *A Science Plan for Integrated Research on Disaster Risk: Addressing the Challenge of Natural and Human-Induced Environmental Hazards*. Paris: ICSU, 2008.
- UNISDR: *Reducing Disaster Risks through Science: Issues and Actions. The Full Report of the ISDR Scientific and Technical Committee*. Geneva: UNISDR, 2009.
- Flyvbjerg B: Five Misunderstandings about Case-Study Research. In: Seale C, Gobo G, Gubrium JF, Silverman D (eds). *Qualitative Research Practice*. London and Thousand Oaks, CA: Sage, 2004.
- Eisenhardt KM, Graebner ME: Theory building from cases: Opportunities and challenges. *Academy of Management Journal* 2007;50(1):25–32.
- ISDR: *Global Assessment Report on Disaster Risk Reduction*. Geneva: UNISDR, 2009.
- Kirkwood B, Sterne J: *Essential Medical Statistics*. Second edition. Oxford: Blackwell Publishing, 2003.
- Bauer W, Gaskell G: *Qualitative Researching with Text, Image and Sound*. London: Sage, 2000.
- Whinney IR: The value of case studies. Editorial. *Eur J Gen Pract* 2001;7:88–89.
- Allison GT: *Essence of Decision: Explaining the Cuban Missile Crisis*. Boston: Little, Brown, 1971.
- Perrow C: *Normal Accidents. Living with High Risk Technologies*. New Jersey: Princeton University Press, 1999. p 353–387.
- Klinenberg E: *Heat Wave: A Social Autopsy of Disaster in Chicago*. Chicago: Chicago University Press, 2002.
- 2009 Victorian Bushfires Royal Commission: *Interim Report 2—Priorities for Building in Bushfire Prone Areas*. Victorian Bushfires Royal Commission, November 2009.
- Dutch Safety Board. Available at <http://www.onderzoeksraad.nl/en/index.php/onderzoeken/afgerond/sector/luchtvaart/> Accessed 16 June 2010.
- Yin RKL: Enhancing the quality of case studies in health services research. *Health Services Research* 1999;34(5 Pt 2):1209–1224.
- Sofaer S: Qualitative Methods: What Are They and Why Use Them? *Health Services Research* 1999;34(5II):1101–1118.
- Robson C: *Real World Research*. Second Edition. Oxford: Blackwell, 2002. pp 177–185.
- Flyvbjerg B: Five misunderstandings about case-study research. In: Seale C, Gobo G, Gubrium JF, Silverman D (eds): *Qualitative Research Practice*. London and Thousand Oaks, CA: Sage, 2004.
- Gibbert M, Ruigrok W, Wicki B: What passes as a rigorous case study? *Strategic Management Journal* 2008;29:1465–1474.
- Eisenhardt KM: Building theories from case study research. *Academy of Management Review* 1989;17(4):532–550.
- Keen J, Packwood T: Qualitative research: Case study evaluation. *BMJ* 1995;311:444.
- UNISDR. *Towards a Culture of Prevention: Disaster Risk Reduction Begins at School*. Geneva: UNISDR, 2007.
- Kulling P, Andersson H, Gell T, Nordensten C, Sigurdsson S: Use of a common, inter-sectorial template for observer reports of crisis. *Prehosp Disaster Med* 2009;24(2):s146.
- Kulling P, Birbaum M, Murray V, Rockenschaub G: Guidelines for reports on health crises and critical health events. *Prehosp Disaster Med* 2010;25(4):377–383.