Resilience is for losers

[This was first published as "Risk and Reslience" in the Risky Ground Newsletter, September 2017, Simon Fraser University, Centre for Natural Hazard Research].

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Introduction

Risk and resilience are prominent concepts in how we think and communicate about managing disasters. In this essay I suggest that we use risk and resilience more like non-specialists in order to make it easier for everyone to understand one another. The premise is that we unnecessarily complicate communication about disaster management by rigorously defining risk and resilience for clarity, but we use the terms differently than they are used in the common vernacular, and also differently in different disciplines. To complicate the matter further, we then distort those definitions incrementally in our zeal to use the concepts in our work: a 'definition creep'. For risk and resilience, the following analysis highlights differences between common and scientific usage, and suggests what they would mean if we used the terms, for the most part, as non-specialists would.

Risk

'Risk' is commonly understood by the average person as the chance that something bad will happen[1]. It has two uses: The first is the potential of an event happening that may be harmful, illustrated when we say: "There's a risk of falling" or "What's the risk of slipping in the bathtub?" These imply the potential for harm, though they do not describe or ask how much harm. The second use is to describe the potential for harm, illustrated by saying: "You could break a hip if you fall" or "There's a risk of killing yourself if you slip in the bathtub".

In disaster risk reduction, these two uses of risk are separated from one another. The first use is now captured in geology by the concept of 'hazard', and the second by 'risk'. Such usage presents a substantive communication problem between those in the field of hazards and risk, and those who aren't. The result is that hazard is the probability of a potentially disruptive event, and risk is the probability of harm or loss. Illustrated with the sample phrases above, the probability of falling or of slipping in the bathtub are hazards, whereas the probability of injury by falling or slipping are risks. Each conveys probability. The clarity provided by the scientific definitions of hazard and risk are useful, but non-professionals see risk differently. As a result, there is a communication disconnect between those 'in the know' and those who aren't.

Risk involves another consideration, which is not always voiced but is generally understood. Risk exists only for what you care about. If you do not care about the object being damaged or the life being harmed, then from your perspective there is no risk. For example a meteorite crashing into Earth and destroying farm fields poses a risk. The farm fields are important. But what about meteorites that crash into distant planets in other solar systems? Are they a risk? Not as currently understood. Whether you care about it or not does not determine the amount of risk. It determines if there is a risk or not: it is an on-off switch.

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1 Common usage is from English dictionaries, which reflect common usage.

For communal risk, what we care about is determined by community values. The degree to which the community cares about something is a key factor in determining how much risk it will tolerate. Risk tolerance, therefore, is a value judgment based on how much you care to prevent something from being harmed. It is not a factor in determining the amount of risk, but rather is used to evaluate if the amount of risk exceeds a threshold of acceptability: I can live with it or not. If I cannot live with the risk, then how much do I have to reduce it to a level that I can live with?

So the closest definition of risk in common parlance is: the probability of a negative consequence to something you care about. The caring component of this definition is important in making risk management decisions. Even though the scientific definition of the term may make sense, it differs from that in common usage and rarely will anyone understand you when you use the term 'risk'.

Scientific articles and discourse introduce further concepts – coping capacity, hazard, threat, exposure, vulnerability, and impact – in attempting to conceptualize and 'clearly' define risk. Accordingly, risk is considered to be the probability of consequence and coping capacity, or risk is the hazard potential and the consequence, or risk is threat times the vulnerability times the impact. Each of these definitions of risk creates problems for the average person…and in cases even between risk specialists from differing fields. Coping capacity is discussed below in the section on resilience. It is not a risk factor. Threat is hazard. Impact is consequence. Hazard, exposure, and vulnerability are already embedded in the definition of risk because they are the elements that determine consequence.

To better understand risk in the context of disaster management, let's examine how consequences are measured.

A negative consequence is the personal injury and damage to assets caused by a disruptive event[2]. For injury or damage to occur, three things must coexist: the event, exposure to the event, and vulnerability to the event. If any one of these things is missing, there will be no injury or damage. The event can be measured by its intensity. The stronger the event, all else being equal, the greater the damage. Exposure can be measured by the amount of an asset or persons that can be affected by the event, and vulnerability by the degree to which those assets and people are susceptible to damage or harm from the event.

I use a flood as the disruptive event to illustrate these elements: The flood intensity can be measured by height of the floodwater, flow velocity, and the amount of debris carried by the water. The exposure of a house to the flood is the position of the house relative to the flood height. The exposure of a person would be whether the person is at home at the time or is otherwise in the flood zone. Exposure, therefore, is unique to the hazard. The vulnerability of a house to the flood is the degree to which it is susceptible to damage from water and debris in the water. It makes no difference if the house is exposed or not exposed to the hazard; if it has the same physical properties, it has the same vulnerability. Like exposure, vulnerability is unique to the hazard event.

Changing any one of these factors will change the magnitude of the consequences from a flood. Lower the flood water height and less of the house would be exposed and the consequence would be less. If

2 'Disruptive event' substitutes for 'hazard event', because, as described earlier in the essay, hazard is a probability and, therefore, cannot be an event. Hazard is both a probability and an event in common usage. So many communication pitfalls.

the house was on higher ground and therefore less exposed to the flood water, then the consequence would be less. If the water height did not exceed that of an empty concrete room forming the house foundation (low vulnerability to water) then the consequence would be less.

Consequence is thus a measure of the intensity of the disruptive event, the exposure of an asset or person, and vulnerability of that asset or person. As such, hazard, exposure, and vulnerability need not be explicitly added to the risk equation; they are already included in consequence.

Vulnerability is used differently in different disciplines. In addition to susceptibility to damage or harm, it is sometimes used as a synonym for exposure or coping capacity, or as a substitute for risk and resilience. It has been used loosely in the social context of poverty, insecurity, defenselessness, ignorance, and poor physical and mental health. Whereas geological engineers would assign a unique vulnerability to each hazard, social scientists appear to seek a universal measure of vulnerability.

As example, in the field of health, a person's vulnerability to a disease is their susceptibility to acquiring the disease. This might depend, for example, on their immune response to the disease pathogens. Whether the pathogens are actually present is not a factor of vulnerability, but rather exposure. The elderly are generally more vulnerable to a disease because they have weaker immune systems. Being in confined quarters in an extended care facility or hospital does not make them more vulnerable, but rather increases their exposure. Carefully differentiating between hazard, exposure, and vulnerability in discourse about risk can clarify how risk can be reduced.

Resilience

'Resilience' commonly expresses the ability to recover from some type of change, or to cope successfully with adversity or complications (Oxford Dictionary 2016; Webster Dictionary 2016). Resilience and recovery are neither positive nor negative terms, although recovery in these definitions often proceeds from an unwanted state such as being ill or damaged. Some descriptions of resilience include the degree of ease or rapidity of recovery. For example, after being pressed, a young person's skin recovers its form quickly, whereas my old skin will retain the indent longer. In each case, the skin recovers its form, so both are resilient, although the young skin is more resilient than the old. In the case of disasters, resilience can be thought of as a measure of recovery from the losses of a disaster or the speed of re-establishing a 'normal' state.

The ability to recover (resilience) always exists, but recovery itself can only exist after a disaster. When a disaster happens, the risk of it happening is over. Soon thereafter, recovery begins as resilience manifests itself.

Whatever is done to reduce risk does not change resilience, because resilience is about recovering from a disaster and, therefore, it does not prevent or reduce the magnitude of the disaster. So mitigating a potential hazard or reducing exposure or vulnerability to the hazard does not increase resilience. However, mitigation reduces the damage, and therefore the recovery needed to repair the damage would be less. The ability and ease of recovery depend on accessible resources and the capability to use them.

Comparing humans and their assets to the human skin used in the example above highlights challenges to understanding resilience as the term is commonly used. Harmed humans and damaged structures are,

like the indented skin, a consequence. Without a human response, many hurt persons would not survive or fully recover, and damaged structures would not be repaired. In contrast, the indented skin will rebound on its own. So in a disaster, human response is the driver of recovery. Faster recovery does not happen because the damage is less. Resilience does not rely on the pre-existing state. It relies entirely on the capability to recover. Faster recovery from the same amount of deformation is entirely due to a more efficient recovery system.

Resilience is coping with a disaster. Insurance is an example of a coping strategy and therefore can change resilience. With insurance, once the disaster has happened, resources become available to recover. Insurance does nothing to prevent the disaster, but is an important coping mechanism.

Some agencies and practitioners of disaster risk management see resilience as including anything that will reduce risk and enhance recovery. Such a broad interpretation makes conversations between disciplines and non-specialists difficult, confuses the understanding of risk, and reduces the efficacy of risk reduction. Saying that all you need to deal with a disaster is to be resilient seems like saying, “let any disaster happen, because we have the resources and the ability to recover from it”; it accepts any degree of loss.

And that is why I am confused when told that disaster reduction is all about resilience. Disaster reduction is all about risk reduction, and recovering from the disaster is all about resilience. Reducing risk and enhancing resilience both have important roles in decreasing the strain of natural and anthropogenic disruptions.

Acknowledgements

Thank you to Nick Roberts and John Clague for their constructive suggestions, questions and edits.