



- Definition of vulnerability
- Vulnerability:
 - Factors
 - Examples
 - Parameters
 - Root causes
- Definition of exposure
- Exposure and vulnerability
- Main points

A Resilient Future: Science and Technology for Disaster Risk Reduction

In this video, I will define vulnerability in relation to disaster risk reduction. I will present vulnerability of communities and assets, and through examples, the general vulnerability factors. Later, I will talk about vulnerability and hazard parameters and the root causes of, and progression towards, vulnerability. Lastly, I will present a definition of exposure and how exposure relates to vulnerability.

Notes

Summary



0m 03s

Factors of vulnerability



Vulnerability results from many factors:

- Physical
- Socio-Cultural
- Institutional
- Political
- Economic
- Environmental

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What is vulnerability? *Vulnerability* can be defined as the characteristics and circumstances of a community, system, or asset that make it susceptible to the damaging effects of a hazard. This definition identifies vulnerability as a characteristic of the element of interest, a community, a system or asset, which is independent of its exposure. However, the word "vulnerability" is often used more broadly to include the element's exposure. Currently, a new version of the UNISDR definition is being discussed. Draft documents include the following definition quoted in the Sendai Framework adopted in Japan in 2015: "Vulnerability is the conditions determined by physical, social, economic, and environmental factors or processes which increase the susceptibility of a community to the impact of hazards." Let's now look at the different factors of vulnerability. Vulnerability is not natural. It is the human dimension of disasters, and the entire range of physical, social, cultural, institutional, political, economic, psychological, and environmental factors that shape people's lives and create the environment they live in.

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0m 31s

Vulnerability and hazards: Parameters



- Hazard-independent vulnerability parameters
- Hazard-dependent vulnerability parameters

(Vulnerability parameters: Birkmann, 2007)

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Vulnerability is usually associated with poverty. However, it can also arise when people are isolated, defenseless, or facing stress. Examples of physical vulnerability may include poor design and weak construction of buildings, unstable locations, close proximity to hazards, and fragile, unprotected houses. Social and institutional vulnerability may include lack of public awareness and information, inadequate preparedness measures, low status in society, unequal gender relations, fewer decision-making possibilities, oppressive formal and informal institutional structures, and political, economic, and social hierarchies. When we talk about economic vulnerability, we mean, for instance, the absence of productive assets, limited income-earning opportunities, poor pay, single-income revenue, no savings, and insurance. And, as you can see on these images, vulnerability can also increase through the disregard for adequate environmental management. So, what are the parameters that influence vulnerability? Vulnerability varies significantly within the community, country, or region, and over time, so there are many vulnerability parameters. Some are hazard-independent and should be considered in relation to any natural hazards.

Notes

Summary



1m 50s

Vulnerability and hazards: Parameters



- Hazard-independent vulnerability parameters
- Hazard-dependent vulnerability parameters

(Vulnerability parameters: Birkmann, 2007)

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Others, are hazard-dependent and should be considered for a single natural hazard, or several hazards. Moreover, those parameters are not the same if we consider individuals and households, administrative communities, countries, regions, or cultural communities. All these parameters help us to determine vulnerability.

Notes

Summary



3m 13s

Hazard-independent vulnerability parameters

Individual and household level

- Age
- Income
- Health
- Disability
- Education
- Subsistence economy in primary sector
- Savings
- Individual and family related insurance
- Neighborhood network
- Access to information



(Vulnerability parameters: Birkmann, 2007)

Let's look at some of the individual and household-level parameters. For instance, age. Older people might have difficulty running down the stairs in case of disaster. Or, let's think about neighborhood networks. Neighbors can help you before, during, and after disaster. And lastly, and very importantly, access to information.

Notes

Summary



Hazard-independent vulnerability parameters



Region

- Climate
- Regional political stability

Cultural community

- Status of communities
- Gender inequality
- Risk perception and approach to emergencies
- Coping strategies

(Vulnerability parameters: Birkmann, 2007)

At the administrative community level, some of the parameters include infrastructure and accessibility. For instance, the lack of shelters makes people more vulnerable as they have less choices to protect themselves. The presence and quality of civil protection. For instance, the lack of fire departments and civil protection agencies that could help before, during, and after an event. Disaster preparedness, the degree of autonomy, participation in decision-making, and finally, access to resources. There is a significant number of hazard-independent parameters. At the country level, these include, among others, the regulatory environment or armed conflicts. For instance, the number and intensity of conflicts, the population structure, looking at the number of internally-displaced people or refugees. But also, the level of national disaster planning. For instance, the lack of a plan or inappropriate guidelines that, instead of decreasing the vulnerability, may actually increase it. At the regional level, hazard-independent vulnerability parameters include the climate and the regional political stability. At the level of the cultural community, parameters include the status of communities, gender inequality, risk perception and approach towards emergencies, and coping strategies.

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3m 57s

Hazard-dependent vulnerability parameters



Individual and household level

- Quality and age of building
- Size and height of building
- Location of dwelling

Administrative community

- Protection measures and preparedness
- Legal regulations
- Constraints on agricultural use

(Vulnerability parameters: Birkmann, 2007)

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Now, we're coming to the hazard-dependent vulnerability parameters. For example, at the individual and household level, the quality and age of a building are important parameters. For example, if the materials used in the building are of good quality, the building can, therefore, better support movement during an earthquake. Or, the location of a dwelling is also key. For example, if a house is close to a mountain with high landslide risk or in a flooding zone, these are important vulnerability parameters. And at the administrative community level, legal regulations are important parameters because in the context of a disaster risk reduction, we need to know whether building codes exist and whether they are applied and monitored.

Notes

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5m 16s

Hazard-dependent vulnerability parameters

Country

- Environmental degradation

Region

- Sufferance from climate change
- Land use
- Relief (slope/elevation)

Cultural community

- Preparedness

(Vulnerability parameters: Birkmann, 2007)



At the level of a country, environmental degradation can result from cutting down trees, which leads to soil erosion and potential landslides. At the level of a region, land use and the slope elevation-- the so-called relief-- can be a hazard-dependent parameter. And when we look at cultural communities, the level of preparedness will be an important hazard-dependent parameter.

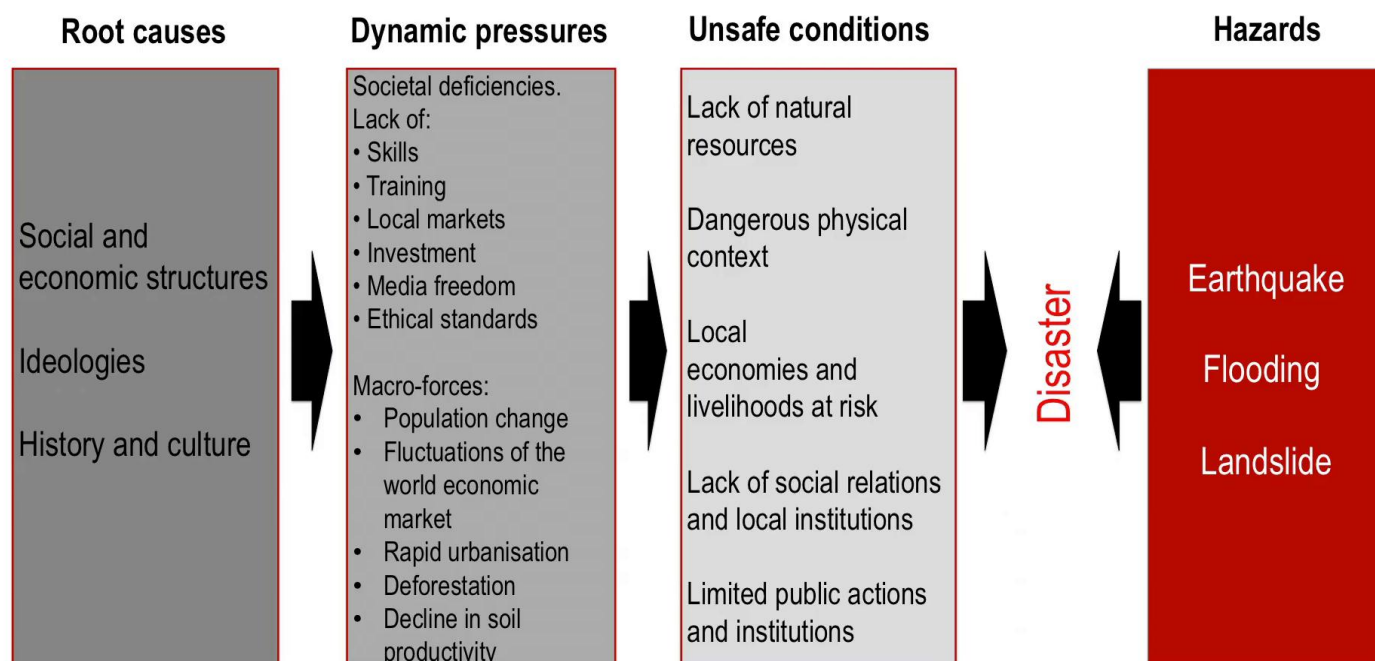
Notes

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5m 59s

Root causes and progression of vulnerability



Let's now look at the root causes and progression of vulnerability. This model explains the causal chain, which is the progression of vulnerability developed by B. Wisner in 2003. The diagram shows how unsafe conditions, for example dangerous physical environments, are created by dynamic pressures, for instance by rapid urbanization that stem from root causes of vulnerability, such as poverty, discrimination, poor governance, and inadequate access to resources. Let's now look at the specific example: how vulnerability can progress. Limited access to resources to invest in training leads to a lack of skilled and trained people on building back better techniques. This contributes to unstable houses and unsafe living conditions, putting local livelihoods at risk. Tackling those root causes and dynamic pressures is imperative in order to create safer conditions and reduce vulnerability.

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Definition of exposure



Exposure refers to “people, property, systems, or other elements present in hazard zones that are thereby subject to potential losses”

(UNISDR, 2009)

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Now, I will define the term *exposure* and explain how exposure and vulnerability are connected. The term *exposure* refers to people, property, systems, or other elements present in hazard zones that are thereby subject to potential losses.

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7m 27s



What do you think? Are all exposed elements equally vulnerable? No. Because it is possible to be exposed, but not vulnerable. For example, by living in a flood plain, but having sufficient means to modify the building structure of the house to mitigate potential loss. However, to be vulnerable to an extreme event, it is necessary to also be exposed. For example, both houses in the picture may be exposed to storm surge and strong winds. However, the vulnerability of each house, and each household, may be different. One house looks sturdier and is built with high-quality materials, and may, therefore, be less vulnerable. I invite you to look at the additional materials for this video where you will find the link to an article presenting exposure variations to earthquake between day and night in Lisbon, Portugal. In the aftermath of a disaster, many people may suffer a downward spiral of vulnerabilities where new vulnerabilities add to previous ones. As you can see in this video of a Nepalese village in the aftermath of the 2015 earthquake, the main house was destroyed and a shelter is being built. This shelter may be of lower quality than the house, or repairs to the shelter may be inadequate, making the family more vulnerable to other events.

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7m 46s



Main points



- Vulnerability is the human dimension of disasters
- Vulnerability varies significantly over time and within a community/ country/ region
- Many factors influence vulnerability
- Vulnerability can be hazard – dependent or independent
- Not all exposed elements are equally vulnerable

In this video, we have defined vulnerability and exposure. Let me recall the main points. We learned that vulnerability is the human dimension of disasters, that vulnerability varies significantly over time and within a community, country, or region. We also learned that a number of different factors influence vulnerability, and that vulnerability can be hazard-dependent or independent. And, very importantly, not all exposed elements are equally vulnerable.

Notes

Summary



9m 05s

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