Toolkit for analysing hazards, vulnerabilities and risks, and for developing resilience

Risk reduction comes from the management of the hazards, the reduction of vulnerabilities, and the development of capacities to increase resilience. In order to fully analyse the risks from hazards and to consider developing resilience, a series of analyses are needed:

1. A **hazard profile** to analyse how the hazard will impact upon a particular area or locality.
2. A **vulnerability analysis** to consider all the elements that will be affected, allowing a fuller understanding of risks.
3. A **capacity analysis** to consider the assets available to manage the hazards, improve preparedness and response, and thereby reduce risks and increase resilience.

1. Hazard profile: the characterisation of the hazard in the context of that locality.	
Hazard identification	• A description of the hazard in its local context • Causes
Spatial patterns	• Location and spatial extent of the hazard event • Spatial differences in the hazard and causes • Spatial differences in impacts
Temporal patterns	• Historical background • Frequency and magnitude • Seasonal patterns • Duration and speed of onset • Warning systems available • Likelihood/probability* - probabilistic, based on quantifying past events and/or - deterministic, based on forecasts or modelling

*Critically consider data (accuracy, completeness, resolution and availability) and/or model quality.

Risk = **Hazard** interacting with **Vulnerability** less **Capacity** for **Resilience**
(qualitative measure)
Risk = Probability x Loss (quantitative measure)

Hazard: a potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

Risk: the combination of the probability of a hazardous event and its consequences, which result from interactions between natural or man-made hazards, vulnerability, exposure and capacity.

Risk assessment: an approach to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environment on which they depend.

Facets of vulnerability	**2. Vulnerability analysis**: aspects of the areas, individuals, facilities, property and environment that may be affected. Vulnerability comes from elements that are poor, weak, limited or exposed.
Physical	• Physical location of community • Type of location • Altitude, drainage, land cover
Environment/ ecological	• Natural environmental protection removed • Unsustainable use of environment • Environmental degradation • Potential pollution sources • Inadequate land, forest, water, soil management
Building	• Housing location, quality, construction, types • Limited protection in building design
Economic	• Robustness and diversity of economy • Employment types and levels • Income sources, levels, diversity • Education, training and skills • Market availability • Food supply and production • Property exposure and value • Jobs and businesses location
Political	• Political background • Access to power and resources • Organisations working in the community • Welfare and healthcare programmes • Effectiveness of governance
Social	• Isolation or lack of social networks • Numbers and density of population • Demographic patterns, age, gender, disabilities • Education, poverty and health levels • Ethnic/language diversity • Population change • Neighbourhood characteristics
Infrastructure and services	• Health services availability • Communications networks • Water sources and quality, sanitation • Infrastructure and transport linkages • Power supplies, network, location
Planning/ preparedness	• Lack of knowledge/poor perception of risks • Availability of emergency plans • Response resources and locations • Early warning availability • Evacuation procedures • Emergency shelter availability and location

Vulnerability: the conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards.

Exposure: people, property, other assets or systems exposed to hazards.

Capacities	**3. Capacity analysis:** the assets available or to be developed, to manage the hazard. Resilience comes from elements that are strong, well-developed, resourced and protected.
Physical	• Land use planning systems • Land zoning and regulations • Engineered protective structures and defences
Environment/ ecological	• Natural protection or barriers • Pollution prevention plans • Sustainable use of environment • Environmental planning, control and protection • Effective land, forest, water and soil management
Building	• Housing location and area protection • Insurance • Housing quality, construction, internal protection
Economic	• Robustness and diversity of economy • Employment diversity and levels • Income sources, levels and diversity • Education, training and skills • Market availability • Food supply and production • Business continuity planning • Insurance
Political	• Political background • Access to power and resources • Organisations working in the community • Welfare and healthcare programmes • Effectiveness of governance and scales of relief operation
Social	• Strength and diversity of social networks • Vulnerable population planning • Population change • Education and disaster education • Community-based response teams • Community resilience: consultation, engagement, use of local knowledge • Ethnic/language diversity
Infrastructure and services	• Health services availability • Communications networks • Water sources and quality, sanitation • Infrastructure and transport linkages • Power supplies, network, location
Planning/ preparedness	• Availability of emergency and contingency plans • Organisation of relief and rescue services: planned, trained and exercised • Evacuation procedures known • Early warning signs and systems known, used, practised • Recovery, restoration and rebuilding planning

Capacity: the combination of all the strengths, attributes and resources available within a community, society or organisation to manage and reduce the risks and strengthen resilience.

Resilience: the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

Study MSci Hazard and Disaster Management**

Environmental hazards are increasingly impacting on our societies. The importance of emergency, hazard and disaster risk management has continued to grow within government organisations (GOs) and non-governmental organisations (NGOs) in the UK and overseas. This unique degree will equip you for a wide range of careers related to environmental hazard management, emergency planning or disaster risk management.

This four-year integrated Masters course will develop your knowledge, technical, interpersonal and management skills, and experience beyond a traditional three-year degree.

Key features of the course

- Experience developed on real and live projects
- Extended work placements available in the UK or overseas
- Applied and externally-linked research projects
- Simulation learning and training
- Field trips during each year of the degree course, in the UK and overseas***
- Tutors with experience of working in a range of GOs and NGOs
- Key topics include flooding, coastal and atmospheric hazards, climate change, volcanology and volcanic hazards, seismic and slope hazards, pollution hazards, terrorism threats, environmental analysis, emergency planning, business continuity planning, resilience development, community engagement and disaster management.

Varied career opportunities

The skills you will develop will prepare you to enter a variety of careers. This will include training in civil contingency planning, multi-agency response co-ordination, personal safety and preparedness, leadership and crisis management, simulation development and emergency plan testing, and geographical information systems (GIS).

Find out more

Come to one of our Open Days to meet our tutors and discover more about the course. Book your place at: **www.southwales.ac.uk/geography**

**This course is subject to validation.

***Additional costs apply for optional overseas fieldwork – visit our website for full details. Please also see our website for information about the physical demands of fieldwork elements of the course.

Career pathways in the UK and overseas

The University of South Wales has many years' experience of delivering disaster management and geography courses at various study levels. Here is a selection of the careers our graduates have entered:

- **Ceri Jones**, Assistant Emergency Planner, Environmental Consultancy, Newport
- **Joe Pugsley**, Flood and Coastal Risk Management Officer, Environment Agency, Cambridgeshire
- **Carys Ford**, Technical Asset Officer, Bristol City Council
- **Chris Manuel**, Local Authority Civil Contingencies Officer, Somerset
- **Naomi Davies**, Register and Rosters Co-ordinator, British Red Cross, London
- **Owen Griffiths**, Senior Engineer (Flood Risk Management), Rhondda Cynon Taf Council
- **Emma John**, Flood Incident Management Officer, Natural Resources Wales, Cardiff
- **Aaron Watts-Jones**, Disaster Risk Reduction Officer, Papua New Guinea Co-ordinator, International Organisation for Migration

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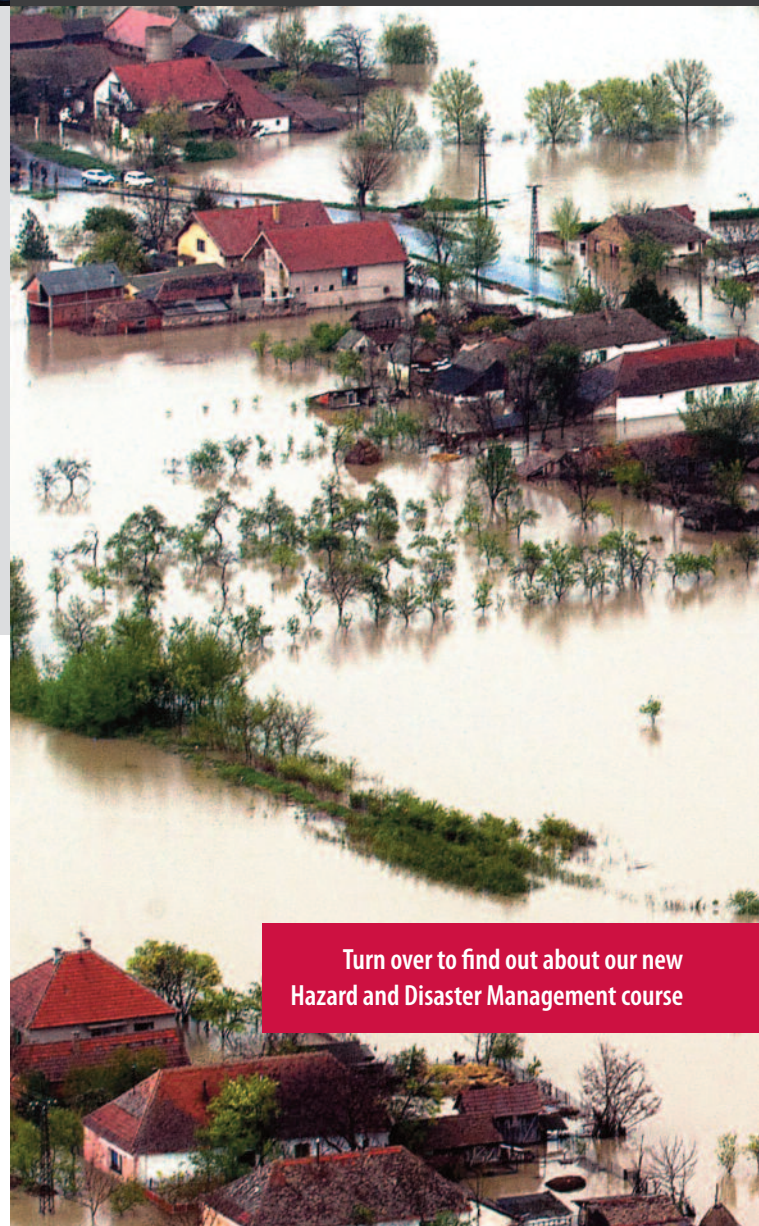
University of South Wales
Prifysgol De Cymru

Hazard management toolkit for A-level Geography students



Turn over to find out about our new Hazard and Disaster Management course