End-to-end scientific support for Disaster Risk Reduction

Professor Paul Bates

THE ROYAL SOCIETY

The Royal Society (1660 – 2015)

The Royal Society is a Fellowship of the world's most distinguished scientists, which promotes the advancement of science and its use for the benefit of humanity and the good of the planet

- Est. 1660
- Excellent Fellows
- Publishing
- Grants
- **Science Policy**

THE ROYAL SOCIETY

Science and DRR

The importance of DRR is recognised internationally, however:

- There is a growing challenge from climate change, biodiversity loss, growth in population and consumption, and increasing inequality is putting our future wellbeing at risk

- Whilst the 2015 International agreements are welcome, the purpose, design and implementation of these are not currently aligned. Science has a critical (and urgent) role to play in this

Science and DRR:

Resilience to extreme weather

1. **Evidence** needs to be at heart of both the DRR process and the international frameworks.
2. Scientists should provide evidence that is **suitable for users' needs**.
3. New **technology and methods** for DRR available to **everyone**.
4. Involve those who make and implement **policy in research.**
5. Research funders should **encourage collaborations** between **producers and users** of knowledge.
6. Companies should **report their disaster risk** (at 1% annual probability level) on their balance sheets

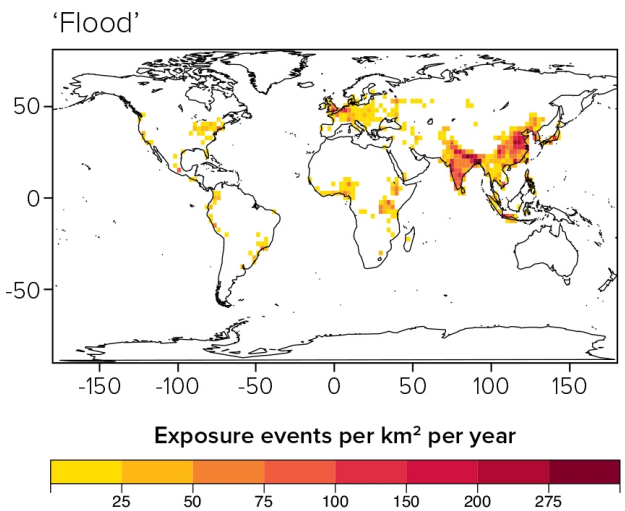
1. Evidence for DRR process and international frameworks

- Scientific evidence should always be used to inform decisions, nationally and internationally
- Evidence-based policy, not policy-based evidence
- Need forensic analysis of past events to learn the lessons of these
- In this field we often needs to link science and social science

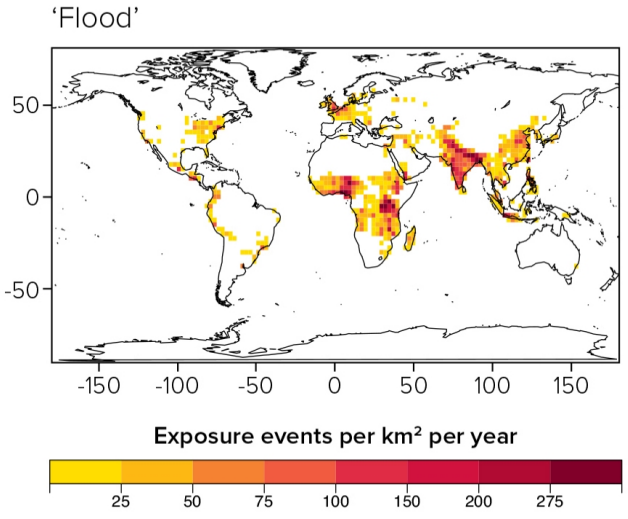
Example

Climate and demographic projections

(a) Change in exposure (2010 population)



(b) Change in exposure (2090 population)



THE ROYAL SOCIETY

2. Evidence is **suitable** for **users' needs**

- Scientific evidence is not useful if it is:
  - Not easily **available**
  - Not **understandable**
  - On a **larger scale** than is relevant

…to users

- Modelling studies often on global scale, due to time and computational limitations and need to be downscaled

Example

RESIN project - Manchester

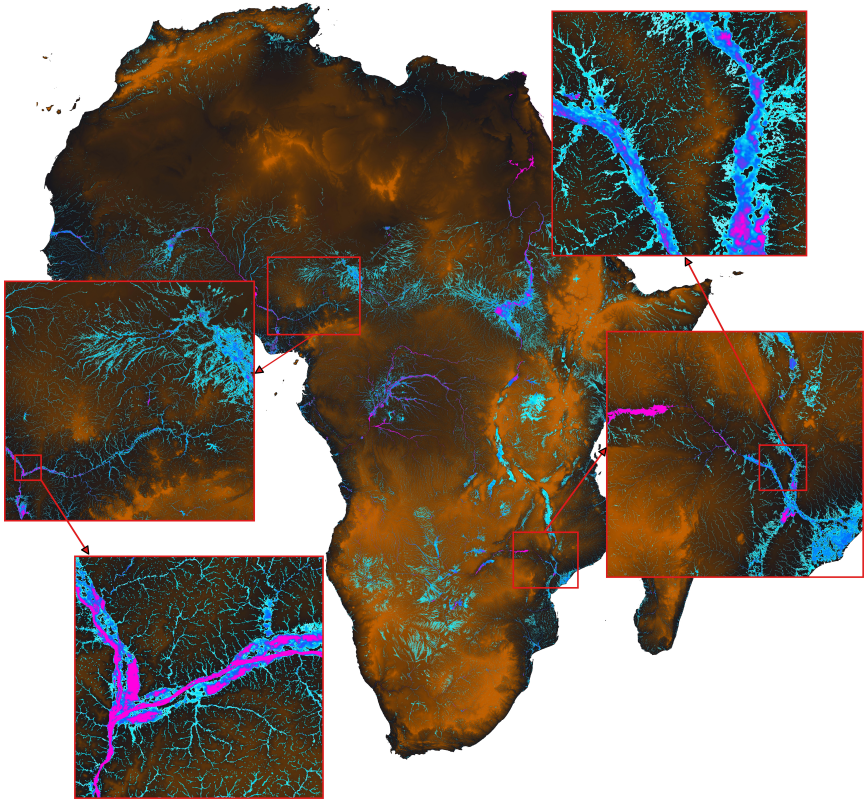
- Enhance the resilience of Europe's cities to extreme weather and climate change
- Bilbao, Bratislava, Paris and Manchester
- **Researchers and city councils** involved in same project, funded by Horizon 2020

3. **Technology and methods** available for everyone

- All countries should have access to knowledge and technology for best practices of DRR
- However there are often multiple barriers to access

Example:

Global flood hazard on Google Earth



~90m resolution global map of flood risk areas

Created using complex modelling and high performance computing

Funded commercially via a University of Bristol start up company

Beyond the capability of many countries

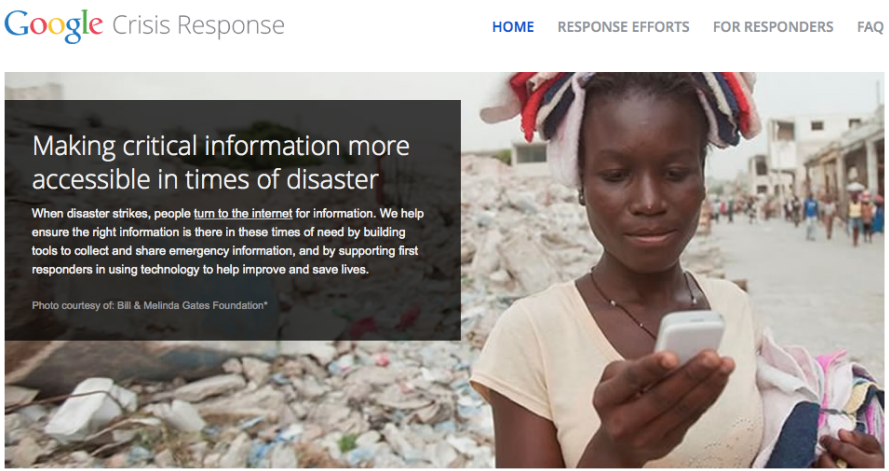
But working with Google to make the results available to all

3. **Technology and methods** available for everyone

- All countries should have access to knowledge and technology for best practices of DRR
- However there are often multiple barriers to access

Example:

Global flood hazard on Google Earth



~90m resolution global map of flood risk areas

Created using complex modelling and high performance computing

Funded commercially via a University of Bristol start up company

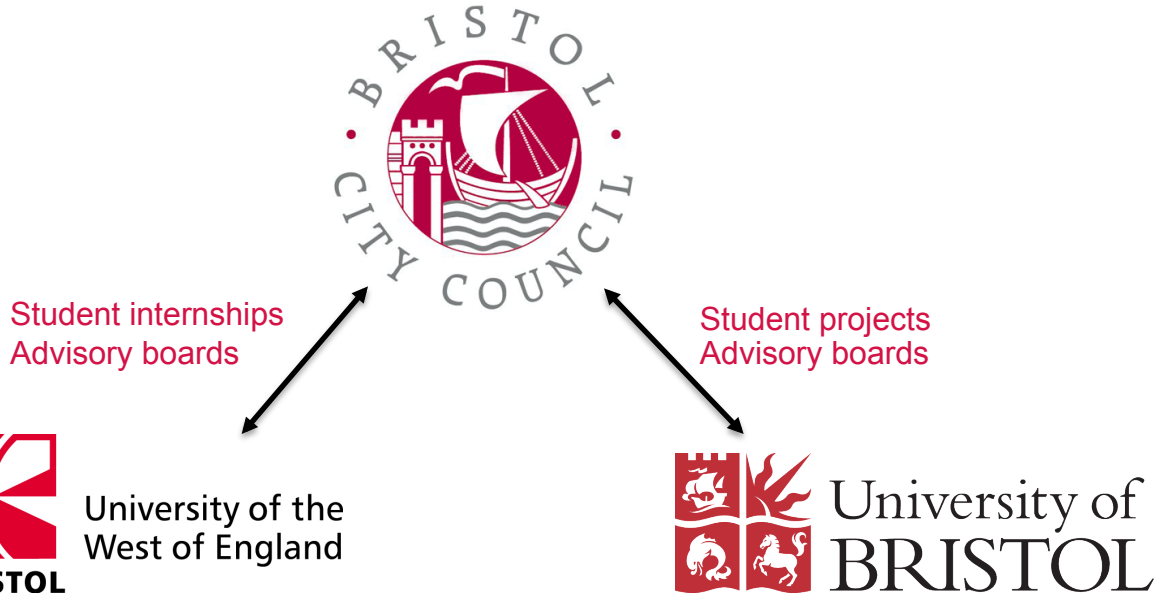
Beyond the capability of many countries

But working with Google to make the results available to all

4. Involve those who make and **implement policy** in **research**

- Users of knowledge should be involved in research:
  - When identifying specific areas to study
  - Throughout the project
- Make the research more useful to the user

Example



THE ROYAL SOCIETY

5. **Research funders** should encourage **collaborations** between producers and users of knowledge

- Funding is one of the biggest problem that prevents collaborative research
- Research metrics and ‘double jeopardy’ reviewing of inter- and multi-disciplinary proposals can discourage collaboration with knowledge users

Example

River flooding – Pickering UK

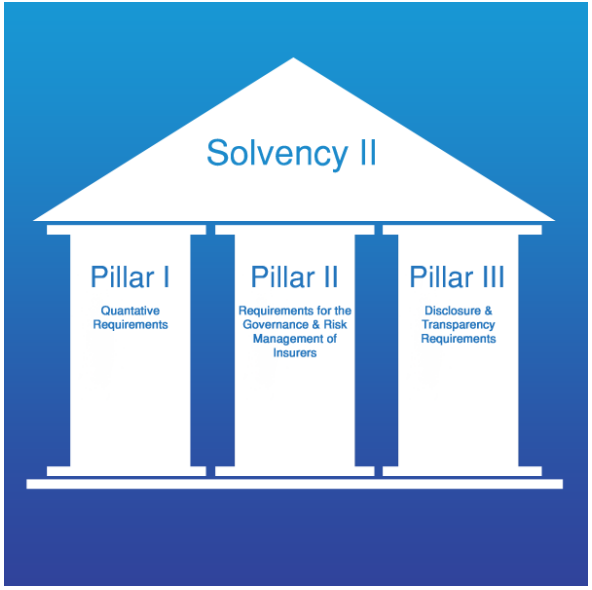
Slowing the flow

- Researchers from multiple universities and local people
- Part of project funded by 3 UK research councils
- Identified best locations for defences to reduce risk from 25 % chance of flood per year to 4 %

6. **Company balance sheets should report their disaster risk**

- Fusing science and capital has the potential to lead to rapid change
- Currently disaster risk is not reflected in company share values
- A requirement to report would allow risk to be reflected in company values

Example **Solvency II**



- Comprehensive EU programme of regulatory requirements for insurers,
- Covers quantification of risk, corporate governance, and transparent reporting
- Insurance firms required to report their resilience to ‘stress tests’ e.g. 1 in 200 year annual loss due to flooding
- Has driven significant change

Sendai and beyond…

World Conference on Disaster Risk Reduction
March 2015

The Sendai Framework for Disaster Risk Reduction: the challenge for science

Conclusions and recommendations of a meeting at the Royal Society on 24 – 25 June 2015

Royal Society meeting and PolicyLab
June 2015

UNISDR science and technology conference
January 2016

THE ROYAL SOCIETY

Conclusions: Science and DRR

- Our work on resilience to extreme weather shows **science has a fundamental role to play in DRR**, by informing policymakers and providing information on the most suitable defences
- We still need to get better at **learning from past mistakes** and **successes**
- **Funders** should assess how they can incentivise **collaboration** between **researchers and local** decision-makers

Find out more

web: royalsociety.org/resilience

blog: http://blogs.royalsociety.org/in-verba

Twitter: #RSresilience