Disaster risk management (DRM) as a global challenge for geographic data

No matter how complex the situation is, there is always an anchor of clarity: its geographic component.

Tom De Groeve

Seventh Plenary Meeting of UN-GGIM: Europe, 22 June 2020 via webinar
DRM has become an (even more!) global challenge in the Anthropocene era

The potential consequences of cross-scale systemic environmental risks with global effects are increasing.
The “knowability” of the new threats (and their interlinkages) ranges widely.

No matter the level of complexity of the situation, when a disaster strikes, questions are recurrent, simple…

...and urgent!
Difficult answers to simple questions

- Timely
- Global coverage
- Right format, clear content
- Historical & updated
- Reliable upon need
- Properly detailed
- Verified/validated

Data, information & analysis

Components of Geospatial Technology

- GIS/Spatial Analytics
- GNSS & Positioning
- Earth Observation
- Scanning

- Desktop
- Web/Cloud
- Mobile
- Navigation
- Indoor Positioning
- Surveying
- Satellite Remote Sensing
- Aerial Mapping
- UAVs/Drone
- LOAR
- Laser Scanning
- Radar

Our MISSION is to strengthen the EU’s resilience to crises and disasters and the EU’s aim to promote stability and peace through better management of risk.

Our RESEARCH covers earth observation, modelling, artificial intelligence and crisis management technologies and analysis.
JRC Disaster Risk Management Unit
we work for all phases of the DRM cycle & we inform all phases of the policy cycle

- **all natural and man-made hazards**
- **Integrated research** and **knowledge management** in climate, natural, technological, health and conflict risk **globally**.
- **Integrated systems** for risk analysis, situational awareness, early warning and collaborative decision-making.
- Monitoring, evaluation, **anticipation and communication of the impacts** of weather extremes and future climate change.
- **Evaluation of the effectiveness of policies** and measures for DRR and sustainable development.
JRC Disaster Risk Management Unit

The Unit is organized in 5 projects

- Copernicus Emergency Management Service
- Disaster Risk Management Knowledge Centre
- Global Human Settlement Layer
- Crisis Management
- External Security and Stability
Our lessons learnt from 20 years of science advice…

...for upcoming/ongoing emergencies

- As local as possible
- As global as necessary
- Speed, predictability, reliability
- Trust
- Clarity
- Uncertainty
- Visual
Global Disaster Alert and Coordinatin System

Right Information, Right Time, Right Format, Right Place

- Automated GIS-based impact analysis of earthquakes, cyclones, tsunamis, droughts, floods and volcanoes.
- Actionable information with Green-Orange-Red alert scores for humanitarian impact.
- A long-term partnership among EU and UN based on science
Copernicus Emergency Mapping Rapid Mapping Service

Right Information, Right Time, Right Format, Right Place

• All phases of disasters, combining EO, in-situ data and modelling
• Having access to science advice under predictable service level agreements is important.
• A major success story of the trilateral partnership among scientists, practitioners, private sector in the EU

Example of a wildfire monitoring over 1 year's time, from CEMS Global Wildfire Information System
Epidemics Intelligence from Open Sources

Right Information, Right Time, Right Format, Right Place

- **Media monitoring** of news on diseases and symptoms.

- **Spatio-temporal mapping for risk analysis** with back. Detection of COVID in December.

A long-term **partnership** between EU and WHO based on science

One of tools for COVID-19 monitoring

Example of EIOS screen showing news volume on COVID-19 filtered for imported cases in Europe
Our lessons learnt from 20 years of science advice…
...for DRM & DRR policies

Transparency

Openness

Uncertainty

Co-design

Flexibility

Non-emergency science work
Risk Data Hub

Quality data are built on long term efforts

Loss data is the empirical basis for risk analysis

- **Guidelines** for recording, storing and sharing loss data
- **Tools** for Member States and Institutions
- **Data curation** in the DRM Knowledge Centre
- **Support** for building common evidence base in EU policy
Global Human Settlement Layer

Globally agreed definition of cities – from Space

Almost half of the world lives in cities

The population living in cities, high density places of at least 50,000 inhabitants, has more than doubled over the last 60 years, going from 1.5 billion in 1975 to 3.5 billion in 2015. Almost half the world’s population (48%) lives in cities, a quarter in rural areas (24%) and the remaining people live in towns & semi-dense areas (28%).

While the proportion of city dwellers has consistently grown, it remains lowest in low-income countries. In these countries, the population share of rural areas is still highest, representing 58% of the population, but it is shrinking faster than elsewhere. Globally, urbanisation is spreading. Towns are increasingly growing into cities and suburbs are being absorbed by expanding cities.

Population by degree of urbanisation, 2015

- Rural areas: 24%
- Towns and semi-dense areas: 28%
- Cities: 48%
Climate change threatens Europe’s coasts

**NO-ACTION SCENARIO**

Global warming is driving sea-level rise and intensifies coastal storms, resulting in more frequent flooding. If no action is taken, coastal flood impacts will be severe.

- 130 Gt of CO₂eq emissions
- 25 Gt of CO₂eq emissions

**MITIGATION AND ADAPTATION SCENARIO**

Mitigation means limiting sea level rise by reducing emissions. Adaptation includes all measures to protect coastal communities through nature-based and engineered physical measures.

- Year 2100: With Mitigation
  - Sea level: +85 cm (47 cm – 188 cm)
  - 2.2 million people exposed per year
  - 239 billion € economic losses per year
  - 552 thousand people exposed per year
  - 12 billion € economic losses per year

- Year 2100: Without Mitigation
  - Sea level: +51 cm (21 cm – 84 cm)
  - 100 thousand people exposed per year
  - 1.4 billion € economic losses per year

**170-fold increase in economic losses**

**22-fold increase in exposed population**

95% reduction of economic losses
73% fewer people exposed
Conclusions – DRM & Global Geospatial Information Management

Fast, reliable (difficult) answers/evidences for (simple) questions in **RESPONSE** times

Flexibility is built on **SOLID FOUNDATIONS** of basic research and trustworthiness.

Provide **EVIDENCE** to gain the essential political support also in ordinary time
Keep in touch

**EU Science Hub:** ec.europa.eu/jrc

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EU Science, Research and Innovation

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Thank you

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