Georeferencing EM-DAT: current situation and objectives

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February 25-26, 2010 - Munich

Introduction

- EM-DAT:

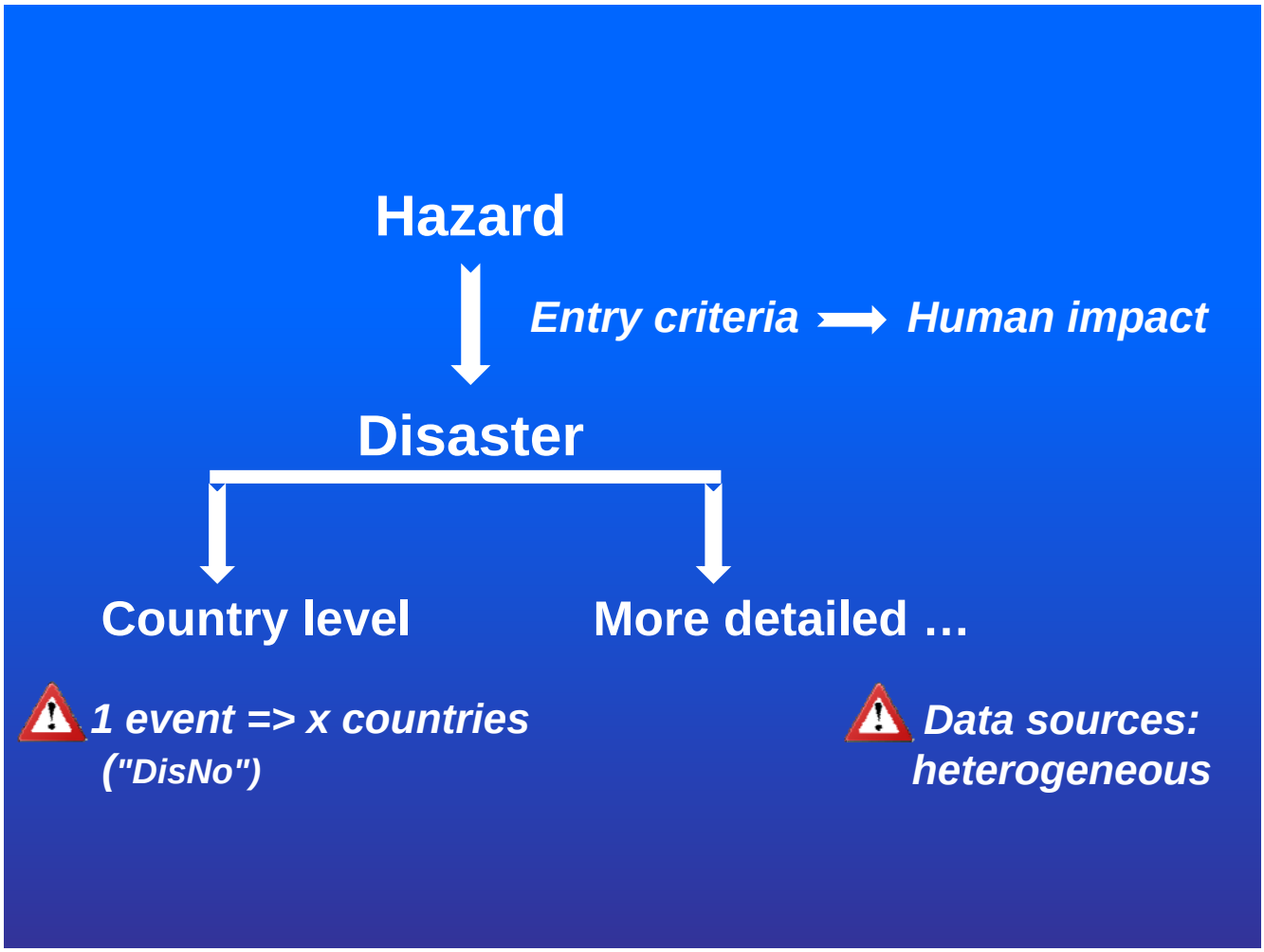
  "reduce mortality, disease and suffering due to disasters through the provision of historical disaster occurrence and impact data for vulnerability and risk analysis and rational evidence-based decision-making"

- Goal of presentation:

  contextualization of georeferencing natural disasters in EM-DAT

Understanding disaster data in EM-DAT

- Entry criteria: disaster occurrence is based on its human impact
- Country-level disaster and impact data
- One event can affect several countries
- More detailed geographical information stored as text strings
- Information from data sources is heterogeneous



Trials in geocoding

- **Hazard epicenter coordinates**
  Earthquakes worldwide 1900-2008

- **Disaster located in center point of GAUL Admin1**
  Natural disasters in African continent 1980-2008
  (Univ. Hawaii)

- **GAUL Admin2**
  Natural disasters worldwide 2008
  + 3 countries 1900-2008

Georeferencing EM-DAT

- Aim=
  store geographical information on natural disasters with higher granularity than current national resolution

- Georeferencing protocol:
  - Technical infrastructure
  - Geocoding procedures
    - historical data
    - future data (2010 – onwards)
  - Analysis and outputs
  - Common Protocol for Georeferencing of Global Disaster Databases

Georeferencing EM-DAT

- Protocol future data (2010 onwards):
  - Typology of reported locations
  - Standardize geographical information across database
  - Linking to dataset of subnational administrative boundaries (i.e. GAUL)

Current data sources provide:

1. Name of precise location
   Village, City, Town
2. Name of administrative unit
   Province, District, Governorate,…
3. Cardinal area
   South-West, North,…
4. Country name
5. Unrecognized name/ geographical zone

Example: Floods in Egypt, 18 Jan. 2010

12 deaths, 3500 evacuated

Sinai Peninsula, the Red Sea port of Hurghada and Aswan governorate

4 regions: North Sinai, South Sinai, Red Sea, Aswan

Source: International Federation of Red Cross And Red Crescent Societies (IFRC)

CHF 257,914 (USD 246,525 or EUR 175,360) has been allocated from the Federation's Disaster Relief Emergency Fund (DREF) to support the Egyptian Red Crescent Society (Egyptian RC) in delivering immediate assistance to some 3,500 beneficiaries. Unearmarked funds to repay DREF are encouraged.

Heavy rainfall has caused floods across Egypt including Al Arish, the area close to the border with Gaza. Photo: Egyptian RC

Summary:
Heavy wind and rains affected parts of Egypt, the Gaza Strip, Israel and Jordan since 18 January, sweeping away homes, knocking out power lines and cutting roads. Torrential rains in Egypt have claimed the lives of 12 people, left many injured and hundreds displaced by rain-induced flooding in the Sinai Peninsula, the Red Sea port of Hurghada and Aswan Governorate in southern Egypt. A great number of houses in four regions in Egypt (North Sinai, South Sinai, Red Sea and Aswan) have been severely hit by these flash floods. Some 3,500 persons (500 households) have been evacuated. The heavy rains are expected to continue in the next few days with storms moving north and west towards Cairo and the Mediterranean coast. Access to the flooded areas remains a challenge for emergency workers due to roads being submerged.

The Egyptian RC established national and local emergency cells, and immediately mobilized its intervention teams and volunteers to support the affected families through the provision of relief assistance (first aid, psycho-social support, and distribution of relief items the National Society's pre-positioned emergency stocks). The DREF allocation will be mainly used to replenish the stocks of the Egyptian RC as well as to ensure appropriate preparedness and response capacity for the concerned branches in order to secure an efficient service delivery to the affected communities.

This operation is expected to be implemented over three months, and will therefore be completed by the end of April 2010; a Final Report will be made available three months after the end of the operation (by the end of July, 2010).

North Sinai: 6 deaths, hundreds injured

South Sinai: 2 deaths, 10 injured

Red Sea area: 1 death, few injured

Aswan: 3 deaths, 14 injured

The situation

The heavy rainfall across Egypt has caused floods affecting most of the country. Houses have been swept away and 57 electrical towers have collapsed in cities and villages. Main roads were closed throughout the country and telephone and power lines were cut.

Heavy flooding has seriously affected several communities from the Sinai Peninsula and in Aswan. The resorts of Taba, Nuweiba and Sharm El Sheikh on the Red Sea had temporary blackouts. The Sharm El Sheikh airport was closed for several hours after rains destroyed part of its ceiling, and the city's main telephone communications centre was severely damaged.

The general authority for Red Sea ports said that the ports of Ain Sokhna, Al Adbeya, El Ataka, El Zayteyat and Port Tawfik are all closed because of the bad weather. In Aswan, power outages put the entire city in darkness. Nearby villages were hit as the mud-brick houses of peasants were swept away by flood waters and hundreds had to evacuate.

According to the assessment of the Egyptian RC volunteers at branch level:

- In **North Sinai**, Arish suburbs have been severely damaged. Six people have lost their lives and hundreds are injured. The central governmental hospital in Arish was flooded and patients were partially evacuated to nearby hospitals.
- In **South Sinai**, heavy rains interrupted the main roads. Two people have lost their lives and 10 are injured. Mild damage has occurred to some Sharm El Sheikh buildings and several areas around Ras Cedr City were isolated.
- In **Red Sea area**, roads were interrupted by heavy rains. One person is killed and few mild injuries occurred. Mild damage has been recorded in suburbs of Hurghada.
- In **Aswan,** three people have lost their lives and 14 are injured. Damage to several villages has been reported.

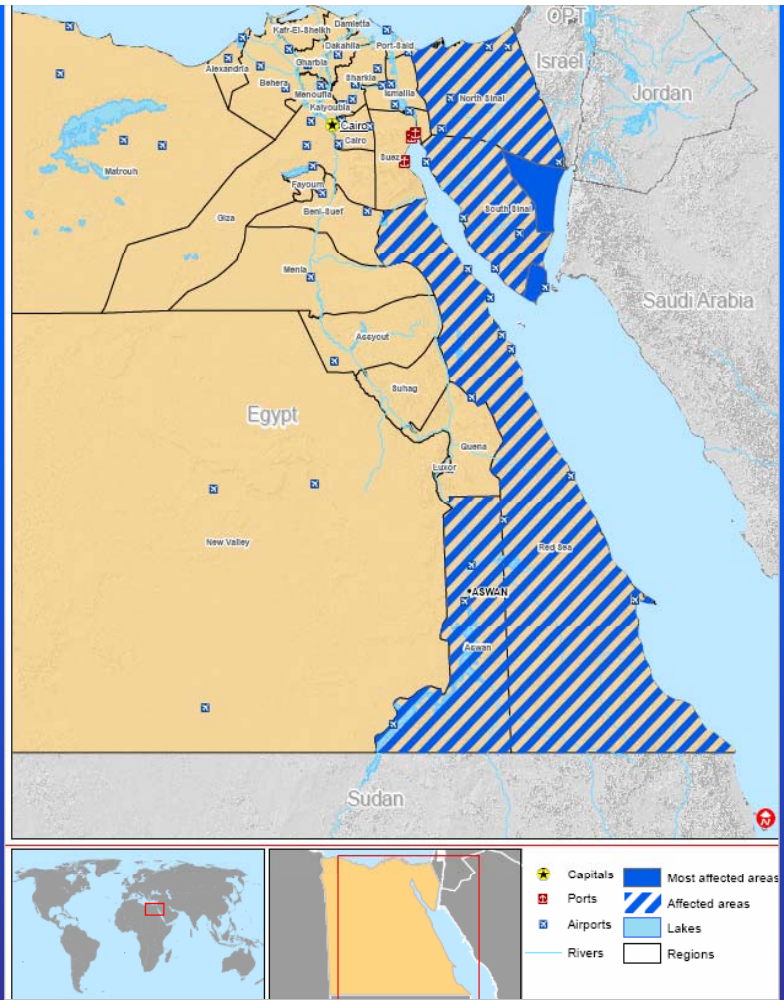
At least, 3,500 people (500 families) have been affected or are homeless.

Coordination and partnerships

The government of Egypt and the civil protection, through its emergency mechanisms for disaster response

Total:
12 deaths, *hundreds* injured, 3500 affected
in North Sinai, South Sinai, Red Sea and Aswan = **'Names of administrative unit'**

Location map



Geocoder

CRED's Geocoding System

Query: north sinai

Choose a provider: All Search

Provider	Name	Accuracy	Details	Latitude	Longitude
gaul	admin1: Shamal Sina (north Sinai); admin0: Egypt	level1	continent: Africa; region: Northern Africa	31.100499661722	32.8821495789998
gaul	admin1: Shamal Sina (north Sinai); admin0: Egypt	level1	continent: Africa; region: Northern Africa	31.1007997252304	33.2967540350673
gaul	admin1: Shamal Sina (north Sinai); admin0: Egypt	level1	continent: Africa; region: Northern Africa	31.0992662683731	33.3842835523344
gaul	admin1: Shamal Sina (north Sinai); admin0: Egypt	level1	continent: Africa; region: Northern Africa	31.0942043099727	33.3766029843684
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google	Sinaí, Tehuacán, PUE, Mexico	Street	AddressDetails: {Country: {CountryNameCode: MX,	18.4535097	-97.4293062
google	Sinai, Safaga, Al - Bahr El_ahmar, Egypt	Street	AddressDetails: {Country: {CountryNameCode: EG,	26.7233002	33.9335417
google	Sinai, Philippines	Street	AddressDetails: {Country:	14.7419813	121.0420488

Print

You selected 'admin1: Shamal Sina (north Sinai); admin0: Egypt' (level1) provided by gaul; lat and lon values: 31.2022211762787, 33.0845771320309

Floods in Egypt

Typology: "Administrative unit"
12 deaths, hundreds injured, 3500 affected
North Sinai, South Sinai, Red Sea and Aswan

QUESTIONS:

1. Reported administrative units present in GAUL?
2. Info with higher resolution available?
3. If no additional geographical info available?
4. Allocating impact figures will be difficult…

Conclusions (1)

Challenges are:

- Unidentifiable locations and geographical zones
  - Names refer to village, town, city or a larger administrative unit?
  - Presence in GAUL?
  - What is the most applicable gazetteer?
- Additional data sources
  - Where to find?

Conclusions (2)

- Data analysis

  - Distinguish disasters affecting entire country and those reported at country-level: include/exclude Admins?

  => *Bad reporting?*

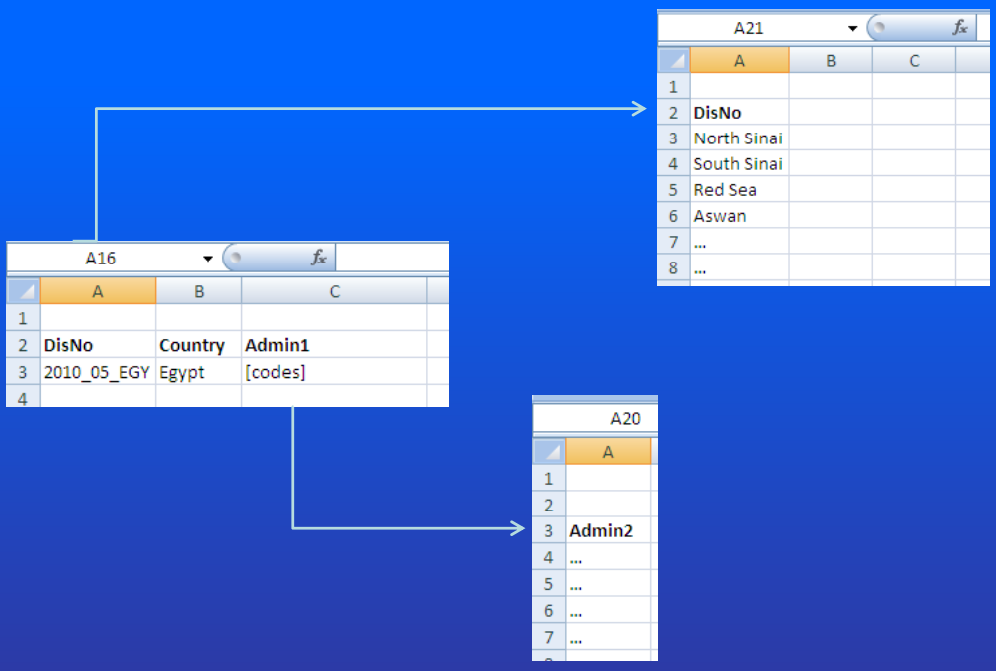
- Looking at possibilities for attributing impact figures to locations on the longer term

  Impact figures generally not reported per administrative unit

Perspectives

- More complete and precise information on disaster locations by using additional data sources
- Disaster statistics with higher granularity
- Enhanced outputs and visualization products
- Standardization throughout dataset
- Linking to other (global) datasets
- "Common protocol" for georeferencing global disaster databases (interoperability)

QUESTIONS?



Attributing impact figures

- Impact figures reported on GAUL Admin1 or Admin2 level will be available in approximately 50%
- Also varies per indicator (killed, affected, evacuated,...)
- Longer term goal?
- Use of sub-national databases
- List of countries with good sub-national human impact data (pilot test)
- Disaster footprints?

Key challenges

- It is not clear to what type of location the reported name refers to (village, town, city or a larger administrative unit?)
- The location cannot be found

  => Typing error, not present in location databases, …

  => What is the most applicable location finder ?
- Geocoding of natural disasters (GAUL Admin2) allows higher granularity in terms of disaster occurrence, but not of impact figures

  => impact figures not reported per administrative unit or location, mainly by event
- Data analysis

  e.g. distinguish disaster events completely affecting the country and events only reported at country-level

  => reporting issue?

  => flagging option to include/exclude in analysis on Admin2 level