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Disaster Management – Staying Ahead of the Game

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1 Setting the scene

Each year, there are about 400 natural disasters affecting nearly 200 million people and killing tens of thousands people, mostly in the developing countries. In 2005 alone, there were 249 conflicts in the world: 74 of them classified as crises and 24 of them with a higher intensity. Around 95% of all conflicts are termed as violent conflicts within states and tend to take place within developing countries and relatively poor countries. Moreover with more than half of the world’s population estimated to live in urban areas and circa 1.4 million of these predicted to live in poor slums of urban cities mostly in Africa and Asia, the risk to disaster and also crises will only increase further. In the European consensus on humanitarian Aid, it is anticipated that the need for humanitarian assistance will only increase in the short to medium term as a result of demographic, political/security and environmental factors, including climate change. It is also believed that climate change will have an impact on occurrence and severity of natural disasters. These impacts are envisaged to increase human vulnerability to natural disasters emphasising the need for improved disaster preparedness and response.

But no matter what the origin of disasters or crises, and their geographical context, there is a common need by all actors involved in all the phases (from prevention and preparedness to early warning, response and recovery/reconstruction) of crisis management for timely, relevant and reliable information to make decisions, very often within stringent time scales and under extreme duress.

In their report on World Disasters published in 2006, the Red Cross Red Crescent stated:

Information is as valuable as
food, water and shelter for communities affected by disasters.
The right type of information can save lives, livelihoods and resources. It can also reduce suffering in the aftermath of a disaster or crisis.

2 The role of technology in disaster management

If we look around us, for example at GE, Relief web, online newspapers, we'll note that Technology such as EO is playing an increasingly visible role to produce information that should contribute towards providing support to disaster management. But are we hitting the target as far as the type of information on the basis of analysis of EO is concerned with regard to adding value to disaster management?

- **Decision-makers, such as those in the EC** with responsibilities in crisis response, need "big picture" information in order to consult with other decision-makers in the EU and MSs, negotiate with their partners including the UN, and to inform the media and the public. They need information that allows them to understand the key issues related to the crisis or the disaster, be aware of assistance and interventions being provided and be alerted of any emerging problems.

- **Decision makers, such as the EC services and their international partners, also need more detailed information** in order to understand the needs for post-disaster/crisis reconstruction and stabilisation. Quite often, especially in the case of complex emergencies, they are faced with conflicting information and confusion of facts. They need a coherent picture of the situation, delivered to them in a timely manner, in order to understand and address the humanitarian issues and needs for reconstruction.

- **On the other hand the humanitarian community** in the field need timely and relevant information and relevant technologies to support their operational efforts. They need:

    - information that can define the extent of the crisis or disaster, damage and people affected

They need this information to be able to:

- plan and carry out Delivery of humanitarian assistance
- Plan of evacuation routes, localisation of temporary shelters and refugee camps
- Prioritise where HA should be focused.

3 Essential technologies in crises/disaster management

If we look around us, for example at Reliefweb and online newspapers, we'll note today numerous maps produced for each disaster/crises on the basis of analysis of EO data: varying from the course and medium resolution to VH and VHR satellite data. From this observation alone, we could conclude that Earth observation technology is playing an increasingly important role within the international disaster/crisis community as one of the sources of information that can support decision making and operations.

The contribution of EO in damage and situation assessment has been demonstrated in well known humanitarian disasters such as the Indian Ocean tsunami in 2004, the Pakistan earthquake in 2005, and only recently the Nargis Cyclone in Myanmar and Wenshuan Earthquake in China, but also in numerous other disasters that don't make the front news headlines.

A number of players have played an important role in increasing the confidence of the humanitarian community, of decision-makers in the donor communities and even in the affected countries of the added value that earth observation based information products can contribute towards to timely and effective disaster response. These players include the Joint Research Centre, EUSC, UNOSAT, DLR, and consortia funded under the GMES initiative such as RESPOND.

Similarly Google earth is demonstrating very well to the wider public and the media around the world the visualisation power of high and very high resolution satellite imagery in disaster affected areas.

4 Are we hitting the target?

- ARE WE HITTING THE TARGET?
  - **Satellite data acquisition - bottlenecks?**
  - **Getting satellite data to the right actors?**
  - **Getting disaster information products to the right actors**
  - **Useful / relevant data and information products**
  - **Enough of it or too much of it?**

- **Satellite data acquisition - bottlenecks?**
- **Getting satellite data to the right actors?**

  - Most VHR satellite sensors still have a repeat interval of 3 or so days – but with the additions of VHR optical and radar satellites the repeat interval is notably improving
  - But Optical data is heavily dependent on weather – cloud coverage
  - information in Radar and optical data differ – requiring different analysis techniques
  - Data tasking and ordering in the case of emergencies during a disaster is still a complex process:
    - The Disaster Charter data - is reserved to a select set of actors and players in the disaster community: civil protection and specific value adders
    - Conflicting tasking requests: HR vs. VHR sensors (give example of cosmoskymed)
    - Could we envisage one day to have access to one number only through which we could in any kind of emergency (i.e. not only natural disasters but also complex emergencies such as conflict) task and order data for any sensor around the world? Today data tasking and ordering is a hair raising issue with the plethora of available sensors that are relevant to disaster management

- **Getting disaster information products to the right actors**
- **Useful / relevant data and information products**
- **Enough of it or too much of it?**

  - In all major hum. disasters there has been increasing availability of different sorts of information from different actors within the first few days and up to 2-3 weeks after a disaster. Actors contributing to info production include UN related agencies such as UNOSAT and OTHER organisations providing information support to them, national space organisations, and even consortia funded under the GMES programme.
  - SO there is no shortage of information map based products for disaster these days. One need only examine the information products for the Myanmar disaster to realise the number of products quite often providing similar information but based on analysis of different sensors. On the contrary, today we should be asking ourselves, is the disaster, donor and humanitarian community over-flooded with perhaps confusing or conflicting information that is not validated or meeting their needs? The Myanmar disaster confirms the overwhelming amount of information products based on EO and made available over the 3 weeks after the event. There were numerous flood detection/extent maps produced by at least 3 different entities over the same regions initially starting with MODIS, then moving onto Terrasar X and Cosmoskymed. The most useful detailed damage assessment maps based on analysis of VHR optical data were not available until 18 days after the event – why? IS information production today data driven or purpose/user drive?
  - Were the products available at the right time? Did the products meet the reality on the ground? Were the products useful for emergency response and humanitarian relief? What about the duplication in products? Can anybody today answer these questions with reliability and certainty?

- Are those actors engaged today in producing information to support disaster response equipped with robust and validated damage assessment methodologies that can handle both VHR optical and radar data for all types of natural disasters?

5 Concluding words

At the core of any disaster or crisis is information.

But information is only valuable if the relevant data can be collected, analysed and distributed at the right time to the right actors

and if the relevant information can be produced and delivered to the right players at the right time

Today EO infra-structure is no longer the only consideration to guarantee the above. We need to also facilitate the tasking/ordering of EO data and we also need to ensure that the community engaged in information production today has access to robust science and research results, as well as best practise for damage assessment and mapping for all types of natural and other types of disasters.