FIGURE 25: ARRIVAL HALL TACLOBAN AIRPORT - WHAT DO YOU NEED TO KNOW?

PART III:
IMPACT EVALUATION

6. EVALUATING THE IMPACT OF INFORMATION PRODUCTS

The information explosion described earlier in this report goes along with an explosion of information products. In the sea of maps, situation reports, humanitarian needs assessments, infographics, appeals, surveys, blogs, and more, practitioners, affected communities, policy makers, donors and researchers may seek filters to identify what they believe are good products. What a "good" or adequate information product is depends on their varied goals and the processes they all use to work with information. The information age has lead to the re-envisioning of the power of information and the rights-based approach to humanitarian action. It is not only the extension of the belief that information is a right – such as health, protection, education –, but the information quality, accessibility, and timeliness are key factors.

> *"Timely information can save lives…Aid organizations must recognize that accurate, timely information is a form of disaster response in its own right."*
>
> *M. Niskala, Secretary-General of the IFRC, World Disasters Report 2005*

Understanding how information products influence humanitarian actors in the early phases of a large scale natural disaster is still a work in progress. Evaluative frameworks and metrics that address not

only the process in which information products are developed, but also accessed and shared appear to be early in development, except for counting the number of reports, maps or downloads of documents from online repositories on sites such as humanitarianresponse.info or reliefweb.int. Efforts continue to advance evaluation frameworks and the related metrics to be able to measure the influence and eventual impact of information products on humanitarian operations. Members of our team have been exploring various approached to evaluating information products.

6.1 The right product for whom?

The discussion on how to measure and evaluate the impact of information products is lively, as the blog posts by Andrej Verity on cue-based decision making and Jennifer Chan's reply show. To create better information products, we need to understand *what* information is required; *when*; by *whom*; and in *what format*. This understanding can only be achieved if we know how the current products are used – and what is missing. The route of information products to users becomes paramount when we think about "timely" information products that are being produced 50-100+/day or more in this age of disasters.

Figure illustrates our experiences in the Philippines: in the field, the most commonly used information products are maps, paper-based lists, or whiteboards. These products are hard to update, monitor, change, or compare systematically – but they are stable and can be used, even in low-tech environments. Yet, processing of information and improving information products, suffers from the divide between the field and the headquarter level – where information is processed and information products, such as the infographic shown below, are created.

FIGURE 16: INFOGRAPHIC ON HAIYAN - MADE FOR...?

To understand how far into the field the information products reached, we used the *map books* for selected interviews. These books comprised various maps and other information products split into different categories. The categories related to the coordination levels such as headquarters vs field operations and areas of application (clusters) such as health, shelter, logistics. The map books contained information products from a wide range of sources (unaware to those who reviewed to books) such as the Digital Humanitarian Network, the UN or government agencies and NGOs. In addition to the map books, we pointed to maps and products that were present where the interviews were conducted. Overall eight map-books were produced, containing over 85 information products.

In the interviews we asked decision makers and staff members to flip through the relevant books and identify which information products were familiar and used. Specifically, we were asking what information products they remembered; how they qualified usefulness and reliability; and what was missing. The answers mirrored the dichotomy between operational work and headquarters.

- **Trust and reliability** are of paramount importance in the field. Hence, a natural filter is referring to few trusted sources – which can be organizational or based on personal relations. Only these sources will be used as a basis for decision-making.
- **Operational information products,** such as the maps produced by the MapAction team were qualified as "*useful*" by decision makers – if they had access (see below). Interviewees added regularly "*although the maps are not pretty*" pre-empting an expected criticism from the level of headquarters or donors.
- **Access** remains an issue. Deep in the field, it was impossible to access Internet platforms, and download information products, or maps. In these cases, word of mouth, radio, or products that were printed and circulated by the organizations present in the area were the only ways to distribute information - leading to very different information dispersion patterns than at headquarter levels.

  In a second phase of the interview, we discussed information products that allegedly were designed for the specific context of the interview. In this part we discussed if the information product *would have been useful* had it been known, and how they would have been able to learn about and access it. On several occasions interviewees indicated that a made would have been useful, but it never reached the decision maker. The match between an information product and the needs of a decision maker, in addition to the list above, therefore also include:

- **Awareness**: decision makers often rely on products directly at their disposal, the more effort required finding an information product, the less likely it will be used. We observed atendency to complement missing information through informal enquiries and rough triangulation rather than actively searching for additional products. Awareness and information about which products are available via which channel are equally an enabler or barrier to the use of information products as access.
- **Fit to need**: the use of a product depends on the (initially) perceived match between the individual information need and the information on the product. While this seems obvious, in our interviews with those who designed products, there was a clear data-driven trend: since information was available, a product was created without a specific use in mind. This is another example of the trade-off between automation vs tailor-made products that we have already discussed in Part II of this report (Information Management).

6.2 Findings from the Map Survey

As described in the Methods section, we combined our field work with a remote review of information that could be accessed remotely and online to have a baseline for comparison about where data could (potentially) be retrieved.
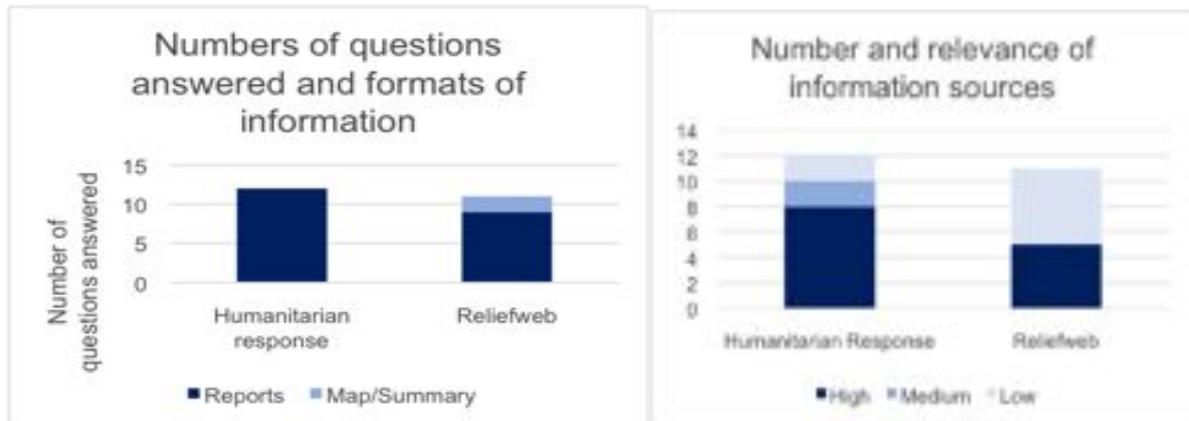
Figure shows that HumanitarianResponse.info provided access to information for answering 12 questions (all in the format of reports), and Reliefweb provided access to information for answering 11 questions (9 reports and 2 Map/Summaries). Concerning the relevance dimension, 8 (66 %) of the information sources from humanitarian response were of high relevance to answering the questions whilst only 5 (45%) from reliefweb.

Not all questions could be easily answered given the information provided. Table 1 provides an excerpt of typical reasons, why a required piece of information could not be extracted from a product. It is remarkable that this difficulty does not only reflect a simple lack of the information, but also an inadequate representation that does not enable to isolate baseline information from information about impact, or damage from deterioration. Similarly, the issue of granularity is an issue – both referring to lack of detail (1di), but also to a lack of overview (1diii).

TABLE 1: EXCERPT - PROBLEMS RETRIEVING INFORMATION FROM PRODUCTS

No.	Qu.	Comments
1di	What has been damaged and what is the degree of damage: - To Transport Infrastructure	Information available is not very **detailed**
1diii	What has been damaged and what is the degree of damage: - To Communication Infrastructure	ETC cluster sitreps **do not provide** summaries of damage to comms infrastructure
1ei	What was the baseline situation before the response?	Some references to baseline data, but few significant summaries of **baseline information** were presented (with the exception of malnutrition), although clearly many of the statistics presented in these reports are using such baseline information - it's just that this information is rarely directly presented
1eii	What has changed (worsened) since the disaster, and where? - Housing	For physical infrastructure like this, there is virtually no **meaningful distinction between damage and deterioration** of the resource

Nationally, NDRRMC provided access to information for answering 17 questions, which was way beyond any other national sites that were assessed. The Department of Public Works and Highways, and Disaster Response Operations Monitoring and Information Center (Dromic) sites respectively were the next highest in providing information to help answer questions.
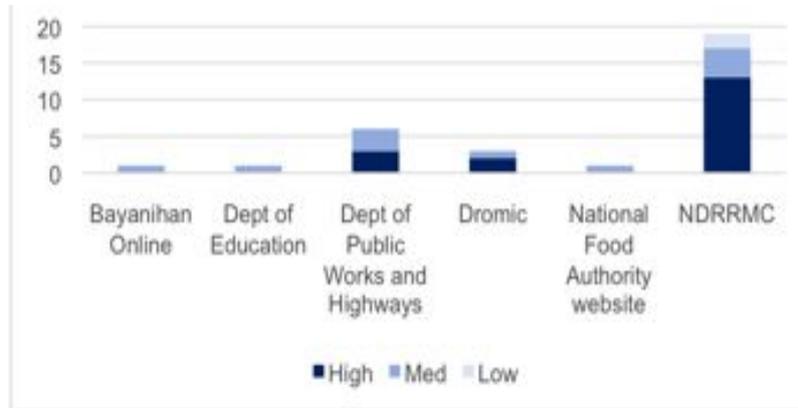

FIGURE 28: NUMBER OF QUESTIONS ANSWERED AND RELEVANCE OF INFORMATION SOURCE: NATIONAL WEBSITES

Figure shows that the largest number of questions were answered through information sources accessed from the NDRRMC site. Information sources accessed through NDRRMC, Dromic and the Department of Public Works and Highways were generally of high or medium relevance to answering the questions.
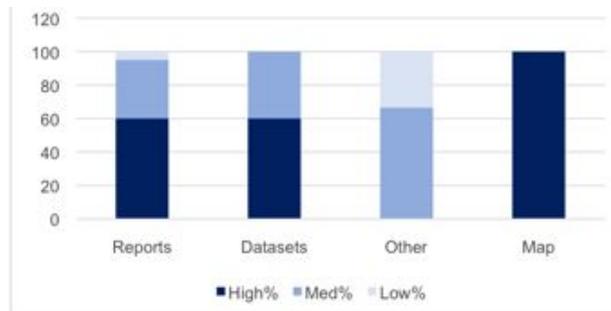

FIGURE 29: FORMAT OF INFORMATION SOURCES AND RELEVANCE TO THE QUESTION

We also asked the volunteers to distinguish between formats and relevance. Figure shows different formats of information and the percentage of them that were of high, medium or low relevance to answering the question. It shows that all maps were judged to be of high relevance to answering the question, so were the majority of reports and datasets were also of high relevance to answering the question. Note that the volunteers here were not asked to *process* the data in any way; this may bias the replies.

This work fed into the **MapReview** for the Philippines that is a joint effort by SIIEM, MapAction, OCHA and DRL, aiming at identifying the major challenges encountered by the governmental entities and the international community involved in the response and recovery to typhoon Yolanda/Haiyan when it comes to availability, accessibility and standardization of geospatial data and population statistics.

6.3 Information is a Mess!

In the past, it was considered as the main challenge to overcome the lack, uncertainty or vagueness of information. As Figure 30 below shows, the core assumption used to be that more information and a complete overview of the situation enable decision-makers to make better decisions. As time passes, it is assumed that not only more information is available, but also that the uncertainty and vagueness inherent in the information can be reduced to make well informed, analysed and justified decisions a few weeks into the disaster.
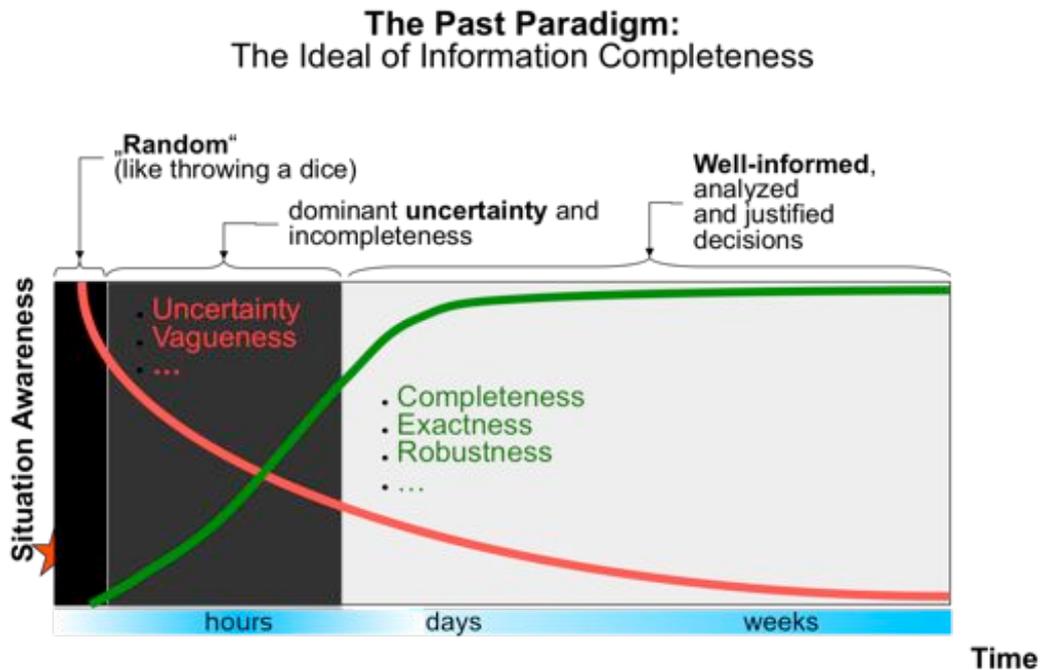

FIGURE 30: MORE INFORMATION - BETTER DECISIONS?!

Today, however, the information landscape is more volatile and more dynamically evolving than ever before, and we have described the explosion of information in part II of this report.

How we handle the emergence of an era of **big and messy data** that is hard to understand, classify and interpret data is critical. With the increased automation of data collection and analysis – as well as algorithms that can extract and illustrate large-scale patterns in human behaviour – it is necessary to ask how we would like the information to influence human sensemaking? What is required for better, objective and impartial decision support?

We propose a **decision-centric paradigm** for information collection, processing and visualisation. Decisions differ in terms of information required, time scales, geographical scope and involved actors. Yet, the purpose, for which infographics and maps actually designed, remains often hidden and implicit; some of the information providers we interviewed gave generic purposes of their products, such as a 3W map shall be used for coordination. Addressing specific decision-makers or problems was, however, not commonplace. The question, for instance, where to set up a hospital has very different characteristics from funding decisions. Both decisions are important, but have very different requirements in terms of information granularity, timeliness, and updates.

FIGURE 31: CHANGE OF PERSPECTIVES REQUIRED

Today we face a situation where decision problems and the information that is required to address them evolve highly dynamically. On an operational level it is important to understand which information decision-makers use, and even search for. A taxonomy of decision-makers is provided in the Decision-Makers' Needs Report (Gralla, Goentzel, & Van De Walle, 2013). We propose going even beyond this work - focusing on key decisions, embedded in a personal and organizational network.

Initially, we just need maps with initial hubs, basic logs info; population data. That does not need to be accurate, and then we need a categorisation of what we put out in terms of maps, e.g. restricted to specific areas or specific groups.

Excerpt from an Interview with an UNDAC member, Manila

This quote shows the dependence of relevant information on the time into the emergency, and the decisions that need to be made. In the field, limited bandwidth and time pressure serve as natural filters. **Queries from the field** are therefore indicators for information that is actually vital, but not provided - at least not in a form that is easy to find or retrieve.

In many interviews, we heard that queries most often are made directly: instead of searching online, trying to understand maps, graphics, sitreps, decision-makers reach out directly. Via sat phone or radio, they would ask a person they trusted for the information they needed. Communication is hence

highly efficient - no searching for the right keywords, platforms, or granularity; no need for interpreting or processing information; no redundancies or time lags. Yet, efficiency comes at a cost: despite its (potential) relevance this **information is not available and lost** for others.

How can information products be as efficient and reliable as a phone call? The answer in this new paradigm: by providing tailored information products, created and designed in near-real time for a purposeful decision in a given context using a wide range of sources, such as local knowledge from the affected communities, structured and verified assessment by formal organizations and the manpower and wisdom from the digital volunteers. For us, the greatest potential for innovation and improvements lies in understanding decisions such that we can **generate fewer information products to make better decisions.**

FIGURE 33: UN OCHA IN MANILA - BETWEEN HEADQUARTERS AND THE FIELD (WITH A. VERITY AND D. LUIZ)

REFERENCES

Boyd, D., & Crawford, K. (2012). Critical Questions For Big Data. *Information, Communication & Society*, *15*(5), 662–679. doi:10.1080/1369118X.2012.678878

Bruns, A., & Liang, Y. E. (2012). Tools and methods for capturing Twitter data during natural disasters. *First Monday*, *17*(4). doi:10.5210/fm.v17i4.3937

Fielding, R. T., Whitehead, E. J., Anderson, K. M., Bolcer, G. A., Oreizy, P., & Taylor, R. N. (1998). Web-based development of complex information products. *Communications of the ACM*, *41*(8), 84–92. doi:10.1145/280324.280337

Gralla, E., Goentzel, J., & Van De Walle, B. (2013). *Field-Based Decision Makers' Information Needs*. Geneva, Switzerland.

Monaghan, A., & Lycett, M. (2013). Big data and humanitarian supply networks: Can Big Data give voice to the voiceless? In *2013 IEEE Global Humanitarian Technology Conference (GHTC)* (pp. 432–437). IEEE. doi:10.1109/GHTC.2013.6713725

Palen, L., Anderson, K. M., Mark, G., Martin, J., Sicker, D., Palmer, M., & Grunwald, D. (2010). A vision for technology-mediated support for public participation & assistance in mass emergencies & disasters, 8.

Tiwana, A., & Ramesh, B. (2001). A design knowledge management system to support collaborative information product evolution. *Decision Support Systems*, *31*(2), 241–262. doi:10.1016/S0167-9236(00)00134-2