From Data To Action

Enabling in-field decision makers with IATI data

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EXECUTIVE SUMMARY

From November 2017 to April 2018, HumTech Lab at TU Delft partnered with Cordaid to work on an applied research project and address data and analysis challenges in humanitarian resilience and response activities. Central to the project were the questions: what information challenges do humanitarian field workers face? How can communities be empowered through data and information? And how can novel data initiatives like IATI create direct practical value for communities and humanitarian field workers?

The project was started by HumTech Lab with a review of the state of research and practice around information needs in humanitarian contexts. A major source were the findings of the 2013 report on humanitarian decision makers information needs[1]. Existing data sets and software platforms, incl. those dealing with IATI, were examined with respect to their ability to address those information needs. The matching process between information needs and available data and tools uncovered gaps where data and tools do not meet information needs and formed the first set of requirements for a novel software prototype that would select and combine certain data for a more tailored information supply.

HumTech Lab initiated the development of the software prototype that combined IATI and HXL data to answer important questions during humanitarian interventions, for example: how many female fatalities were recorded in a certain country district? What organizations are active in shelter item distribution?

After the initial phase of research and prototyping, from January 2018 onwards, HumTech Lab and Cordaid discussed possible case areas to 1) collect concrete data requirements of a specific humanitarian case, 2) refine the initial prototype based on these requirements and 3) evaluate the prototype with local communities, disaster management officials and international humanitarian staff.

[1] Gralla, E., Goentzel, J., Van de Walle, B. (2013). “Field-Based Decision Makers’ Information Needs." Digital Humanitarian Network, Geneva (2013).

The Cordaid programme in the Philippines was selected as the concrete project case, as Cordaid humanitarian staff in the Philippines and local stakeholder groups faced urgent data and analysis challenges, strongly related the project's objectives.

Cordaid Philippines and HumTech Lab began collecting concrete requirements and exchanged data. In parallel, HumTech Lab refined the initial prototype further. During a first field visit of HumTech Lab to the Cordaid Philippine case area in Cebu Province in March 2018, Cordaid organized workshops and stakeholder meetings where local communities, iNGOs, local governments and disaster risk management officials discussed local capacities as well as information and analysis challenges, specifically for disaster resilience and response.

A core group was formed consisting of HumTech Lab, Cordaid, Cebu Disaster Risk Management Office and the Arch Diocese of Cebu. Over March and April 2018, HumTech Lab incorporated important features and data, identified by the core group, into the software prototype, extending its IATI and HXL data backend with data from the core group. A close communication loop within the core group and Cebu citizens was established to collect feedback, as well as additional data and requirements for further implementation.

During the closing of the project at the end of April 2018, HumTech Lab went on the second field visit to Cebu and discussed the current state of the prototype with the core group. During these meetings, all participants articulated the value of the prototype for their work in strengthening resilience and improving humanitarian response action. A strong need for a follow up project was expressed by each stakeholder group.

OBJECTIVES AND PLANNED OUTCOMES

The goal of the Data To Action project was to serve as a pilot that produces tangible results to demonstrate the potential of data, incl. IATI, to improve the effectiveness of humanitarian aid as well as to uncover specific challenges, requirements and opportunities in that field. We looked at *data* from two perspectives: 1) data as information and knowledge from local communities and 2) data from large-scale international initiatives like IATI.

The expected outcomes of the project were three-fold. First, a state of the art analysis would identify requirements and opportunities for improving quality, use and impact of data in humanitarian operations. The strong focus on field operations ensured that the results would have a direct real-world implication and provide a clear path for both quick-wins and long term solutions for leveraging data-driven innovation in the humanitarian field. Second, the project would provide a clear demonstration of the importance of network platforms like HumanityX, that bring together different expertise and knowledge to find new solutions and opportunities to further improve the effectiveness of humanitarian aid. Finally, the project would provide a direct added value for in-field humanitarian coordination. At the same time it provides a starting point to include other technologies and extend IATI's value beyond the current reporting and accountability application.

The combination of these outcomes would fuel future projects by providing specific requirements and directions for future research and development, but also by articulating specific short-term opportunities and questions from the field. The project itself also aligns with other current initiatives such as the Humanitarian Data Center, DCHI and the Partos Data group. Through collaboration with various stakeholders, the project would connect local communities with partners iNGOs, government agencies and research institutes.

PROJECT APPROACH

The project approach was to focus on a specific limited case, to examine local capacities, knowledge and the usefulness of data like IATI in humanitarian contexts. In order to ensure tangible and actionable results, we took a narrow focus of the project by looking at one small-scale humanitarian case in a region often affected by natural disasters. Focusing on one specific field mission enabled a more thorough examination of cross-cutting issues, while ensuring a direct added value to the stakeholders within the case. The following activities were undertaken:

Understanding basic information needs

Initially, basic information needs and requirements were determined. Through literature review, interviews and documentation analysis (project documents, guidelines, reporting, etc.), basic information needs for in-field humanitarian response activities were determined. It was investigated what information is needed when and by whom to make certain decisions. In addition, requirements for in-field adoption of data support processes were examined.

Review of available solutions

The next stage was to identify the availability of information and data. This included a review of available data sets, information management practices and coordination tools. This review also focused on the current use of IATI data and the related processes to generate and share that data. This helped to understand what data is already available, accessible and used, what data options are possible but not yet adopted and where current solutions fall short.

Gaps & requirements

The comparison between the two previous steps helped to illustrate the gaps, between the current needs in the field and the available data sets and practices. The result illustrated the various requirements (technical, organizational, social, etc.) for the adoption of new systems and practices, along with cross-cutting issues related to data use in the humanitarian sector (e.g. data policy, governance, and literacy).

Prototype development

The technical requirements were combined into a prototype. Although the application and use of the prototype would be (initially) limited to the examined case, it would serve several purposes. First and foremost, it would provide a direct added value to the field. Second, it would help verify the findings of the review, and underlying assumptions. And third, It would also serve to determine and demonstrate the impact of data-use in the field.

Future research

The developed prototype would serve as case to closer examine several important aspects about the use of data in the humanitarian sector, such as cross-cutting issues like data privacy and data literacy. Furthermore, the approach could also be applied to other aspects of humanitarian aid. Such examples include logistics, needs-assessment or (impact) monitoring and evaluation. Finally, the case itself could be expanded to a wider scope and include other parties, or areas/missions to validate the results. The many aspects of this project, from identifying existing data sets and linking them to in-field information needs, the cross-cutting issues, development and implementation of the prototype provide a comprehensive view on the prospects and challenges of data-driven decision making.

The data gathered and lessons learned from this project will be further analyzed, reported and actively shared with the wider humanitarian and scientific community through various channels. Among others in policy briefs, academic channels, white papers and presentations at networking events.

IMPLEMENTATION PROCESS

Initial rapid prototyping

Protoype development started in November 2017, parallel to the information needs, data and tools review. HumTech Lab developed the first version of the prototype's backend, the Application Programming Interface (API) until December 2017. The API uses IATI and HXL programming libraries to collect and process IATI and HXL data from the IATI datastore and the Humanitarian Data Exchange (HDX). The model of the API remains flexible and can be extended with additional data sources. The API delivers its collected content via the light-weight and commonly used data standard JSON. Thereby, the functionality and content of the API is accessible to different clients like websites, desktop applications and mobile apps. From December 2018 on, the first developed clients could send requests to the API web service to answer questions like:

- How many female fatalities were recorded in a disaster affected country district? (HXL data)
- How many shelter items were distributed to which country districts? (HXL data)
- What organizations were active in which humanitarian sectors and where? (HXL and IATI data)

These were some of the information needs that were regarded as important throughout humanitarian disaster responses. In the next phase, further concrete requirements would be gathered from a selected concrete case area. Based on the discussions between HumTech Lab and Cordaid, the case of Jagobiao community in Cebu province in the Philippines was selected.

Protoype refinement – More data & new requirements

In the discussions that followed between HumTech Lab and Cordaid, two issues became apparent. First, that the prototype's data backend needed to include highly localized data to be of support for the Cordaid humanitarian staff, Jagobiao community and local stakeholders like church groups and disaster management officials. And second, that the frontend needed to show the combined data sets in a user-friendly dashboard and mapping design to enable easier analysis by the stakeholders in the Philippines.

The development of the main frontend that combined dashboard and mapping functionality while being connected to the data backend, started in February 2018. HumTech Lab extended a dashboard previously developed by UN OCHA for the 2015 Nepal earthquake response for that purpose.

Cordaid provided baseline data used for resilience planning and analysis that HumTech Lab translated into the prototype. The prototype successively developed into a tool that visualized capacities in the Jagobiao community along with vulnerabilities and risks the community faces. The very localized data provided by Cordaid extended the protoype's data backend that until then was focused on IATI and HXL data.

The combination of IATI and HXL data with the localized data on capacities, risks and vulnerabilities, transferred the prototype into a tool that was able to answer important humanitarian pre- and post-disaster questions in addition to the ones above:

- Where do the most vulnerable people in the community live?
- Why are they vulnerable? Why are others less vulnerable?
- What local capacities exist and which are lacking?
- What effects would certain hazard scenarios have on the community?
- What could be estimated needs by the community in case of a disaster?

This information is not only important in resilience but also in response activities to understand where the most affected people live and what their estimated needs are.

Usefulness of IATI - Matching humanitarian information needs with the right data

Table 1 outlines information needs described by the 2013 report on humanitarian decision makers information needs. In blue are information needs that can be addressed through the combination of IATI, HDX and the current Cordaid and partner data from community assessments and household surveys. In purple are information needs that currently can only be addressed by HDX and IATI. White are information needs that currently can't be addressed by neither of the data sets.

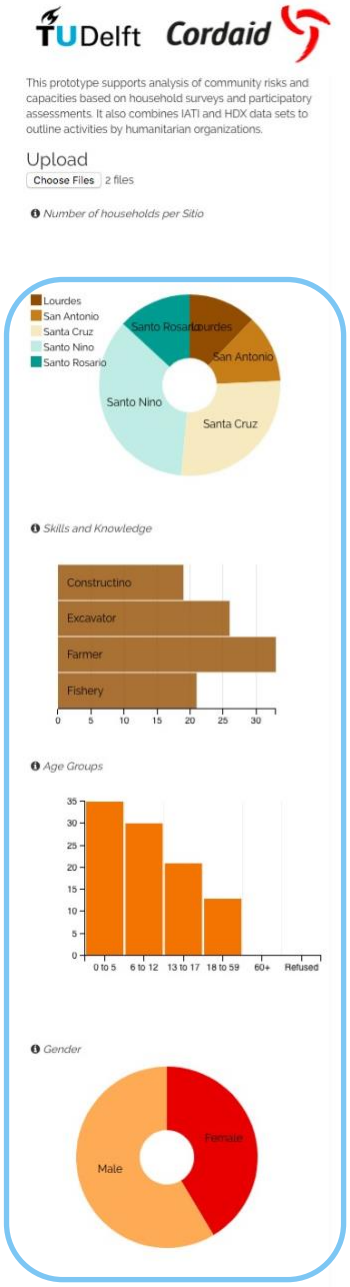
First days			First weeks			First months		
Context and scope	Scope of emergency situation	Impact: damage to infrastructure, livelihoods, etc.	**Capacity and response planning**	Other actors' capacity and response (incl. government, military, local community, commercial aid agencies)	Response of actors (who, what, where, etc.)	**Looking forward**	Recovery and reconstruction	National development strategies
		Geographic areas affected			Capacity of other actors (skills, equipment, scale, etc.)			Needs and plans for recovery
		Assistance requirements		Internal capacity and response	Internal response plan		Preparedness	Information to collect before crisis
	Affected population	Number of affected, locations			Internal capacities, structure			
		Status of affected: displaced, vulnerable, etc.		Available resources: financial, personnel, stocks, technical				
		Local socio-economic, political context						
	Context	Local environmental, weather, livlihoods	**Operational situation**	Security	Current threats			
		Local community capacity, coping mechanisms			Future threats and risks			
	Public and media perception	Public perception, awareness, attention		Access	Limit to access			
		Media perception			Logistics capacity and structure			
		Political will, donor will		Monitoring	Issues			
Humanitarian needs	Needs	Number in need			Trends			
		Types of needs (health, shelter, water, etc.)			Accomplishments			
		Locations of needs		Measuring and outputs	Measurable indicators for output			
		Needs of sub-groups: displaced, vulnerable			Standards			
	Priorities	Geographic priorities	**Coordination and institutional structures**	Coordination of the response	External coordination (with other actors, various levels)			
		Priorities accross sector			Internal coordination (with other parts of the org.)			
		Within-sector priorities		Relevant laws and policies	External coordination (with other actors, various levels)			
					Internal coordination (with other parts of the org.)			

EVALUATION

During the second field visit, the core group evaluated the current version of the prototype. Evaluations took place in a per organization and a focus group discussion format. Participants were humanitarian staff from Cordaid, representatives from Jagobiao community, local church groups and local disaster management authorities. The group unanimously acknowledged the value of the prototype, its data and functionalities, for the resilience and response work of each of the involved stakeholder group. Jointly, a set of important issues for short-term and long-term development follow-ups were agreed and divided into quick-wins until the end of the Data To Action project and a Phase Two that would require additional funding for a project extension, outlined in table 2.

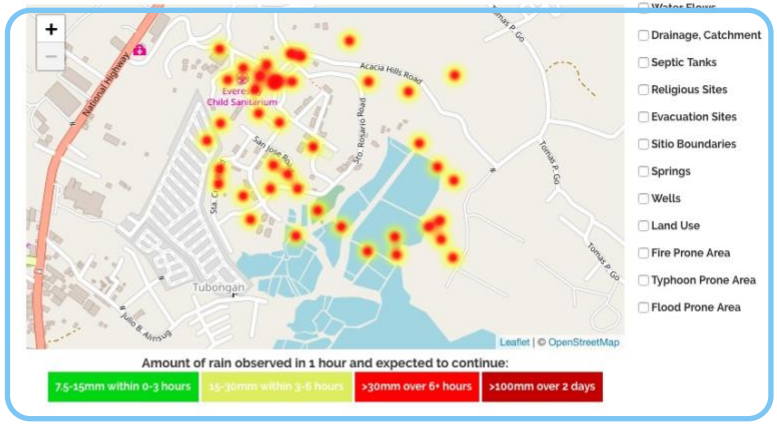
Quick Wins	Phase Two
Review survey structure for collecting data Wednesday	Outline cost analysis Element at Risk Livelihoods – costs to rebuild after disaster – costs to adapt or diversify
Outline Cost analysis for Element at Risk shelter – costs to rebuild after disaster – costs to improve and resulting impact of reducing high risk group	All Indicators to be further checked/expanded, all categories, capacities and hazard behavior
Additional indicators / Hazards: a) Earthquake b) Heat/Drought, c) ensure extreme events for climate scenarios added (to all hazards)	Elaboration of environmental capacities / resources
Add evacuation facilities and infrastructure facilities (schools, hospital, religious building, markets) into layered tab on the right of dashboard to ensure evident in baseline information shown	Currently all hazard data is static, need to configure hazard variables – frequency, duration, intensity, also check all associated indicators as experienced by communities
Adjust stakeholders mapping to outline government agencies, local and Philippines stakeholder groups and international groups	Enhanced system should be able to support analysis of change over time, providing M&E and decision making tool (for disaster and development)
Outline stakeholders services delivered (under ideal scenario) with example data to be included in pilot prototype	Enhanced analysis of capacities for infrastructure/communities facilities to deliver services able to contain multimedia materials to illustrate hazard/impact/Element at Risk
Outline Element at Risk Human / who are they: data per household that requires analysis between variables: age, gender, income, work within the high-risk household group.	Strengthen analysis at household level to be able to outline special groups and work situation (as an element of capacity analysis)
	Illustration of IATI data systems for monitoring and reporting
	Align with government systems such as CBMS

PROTOTYPE OVERVIEW



Community Demographics

Selection of hazard

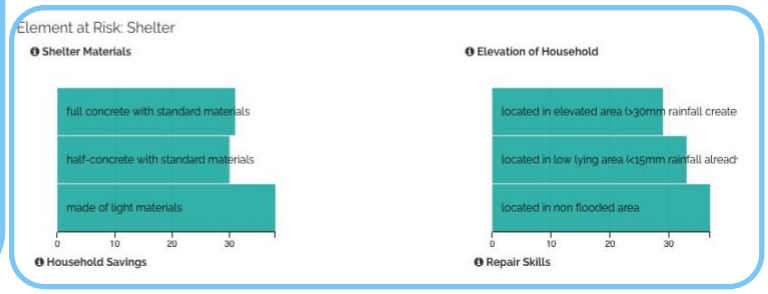


Mapping of priority areas

Number of households in selection: 52

Shelter upgrade vs. rebuild costs

Numbers of Households at different levels of risk



Community Capacities

LESSONS LEARNED

First and foremost, including local citizens and governmental bodies as well as local social and religious groups in all phases of the project was the most valuable, insightful and important influence to the project. Existing social and political networks and initiatives were much stronger in the Jagobiao, Cebu case than we expected in the project beginning. We recognized a strong will on joint disaster resilience and response actions on all sides and the unanimously acknowledgement of the importance of information. At the same time all actors were aware of the difficult questions on information ownership, privacy, governance and literacy. Our most important lesson learned therefore was to work as close with communities, local governments, local social and church groups as possible. Even if that meant investing more time in discussions and reducing time for project outcome development. We understood the local context better, local actors were more aware of potentials the project could offer and were more committed to invest own capacities and resources to sustain the project beyond its scope in the future.

A second lesson learned concerns IATI data as a source for *who-is-doing-what-where* information during humanitarian operations. While IATI was originally designed to make funding streams in international development more transparent, it was not designed to be an up-to-date source of data on ongoing humanitarian emergencies. A couple of limitations of IATI data for humanitarian information activities arise from that fact. IATI data does not include information on e.g. numbers of people in need, numbers of displaced people, types of needs, extent of humanitarian emergencies like geographic areas affected and infrastructure damaged. These are some of the operational data that can better be answered through HXL. Therefore, the combination of IATI and HXL becomes important. Still, potential actors for collaboration based on their areas of action and expertise, can be extracted from IATI data and be made available to emergency responders.

Our third lesson learned emphasizes the value of participatory development processes of humanitarian information products. Only through frequent feedback loops that include local representatives and thereby the future target group, concrete data and functional requirements

can be identified. Rather than the thinking “what can we do with a particular tool” we followed these six points to understand what is actually needed:

1. Determine desired outcomes for the responders and actors involved in the humanitarian information activity
2. From these outcomes, determine the data needs i.e. what data is needed to create the outcomes
3. Examine what data already exists, and in what format, quality, granularity etc.
4. Find the gaps between the existing and the needed data
5. Then find the best way to collect that missing data
6. Then find the tool to do it, depending on the local circumstances, capacities etc.

Focusing the reciprocity of information constitutes the fourth lessons learned. Today, humanitarian information activities mostly generate data in the field and transport it to field offices, headquarters and further to large international data hubs. IATI is one example, HDX another. Reversing this flow of data, so affected populations and local responders are the recipients of important information, is still underrepresented.

In light of the recent debate around human rights to data and information in humanitarian settings, we recognized the difficulty for small-scale projects to fully respect disaster affected communities’ information rights, as outlined in the SignalCode[2]. ICTs can only play a valid and significant role in humanitarian activities if they can be adopted by the local actors, do not add additional exposure to populations, support their capacities and respect their rights.

[2] Greenwood, F., et al. "The Signal Code: A Human Rights Approach to Information During Crisis." (2016).

RECOMMENDATIONS

The importance of follow-up activities was stressed by all actors involved, to move the project from a prototypical approach to a comprehensive process and full-featured system. Repeatedly, locals raised concerns over data privacy, data ownership and ICT capacities regarding the implementation and adoption of humanitarian information products in general and the project's prototype in specific. It is recommended that potential future follow-up activities focus these issues together with data governance and data literacy questions. In broader terms, future humanitarian information activities should center around the populations of disaster affected areas and local responders. The Cebu Provincial Disaster Risk Management Office expressed strong interest in supporting the rolling out of a future full-featured system to 52 municipalities, covering more than 3 million People.

In depth research on communities' and responders' information needs, available data and capacities as well as information rights is required to evolve the prototype into a full-featured system. Communities need to be further involved and trained in data collection and data analysis through the system, so they can also utilize it as further evidence in discussions with local authorities.

The project generated insightful outcomes on how community empowerment towards disaster resilience can be matched with data collection and analysis support. Further data sources should be integrated into the system, including hazard data from (inter)national, regional and local authorities as well as international initiatives like the OCHA Financial Tracking Service.

The potential of international initiatives like IATI for humanitarian information activities should be further investigated and exploited though discussions between data standardization groups, researchers and development and humanitarian workers, to achieve mutual benefits and better resilience and response efforts.

CONCLUDING REMARKS

The Data to Action project aimed at connecting local communities' capacities and needs with emerging international trends in humanitarian data management. Empowering local communities to make use of data, using it as evidence to guide preparation efforts for example, is crucial for disaster preparedness and response. Local people represent the majority of first responders, know the local circumstances best, speak the language and are familiar with the prevalent political and cultural settings. That is why humanitarians need to respect their rights, capacities and needs in all steps of humanitarian information activities: collection, storage, processing, analysis, use, transmission, and release of data. When these activities are supported - and more important: driven - by local communities, there is a greater chance of sustaining them, keeping data up-to-date and systems secure. In the discussions we had, community members repeated their need for evidence on how exposed they were, why some houses were more at risk than others, and what they could do about it. Not only to better understand their own situations, but also to include that evidence in their further discussions with local governments, NGOs and the private sector. The implemented feedback loop between project stakeholders during requirements collection, development and evaluation, ensured that all voices could be heard, future users got more familiar over time with the system's functionality and even less-tech people could understand to what result data about them could be processed and used.

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PROJECT IMPLEMENTATION PARTNERS

HumTech Lab at Delft University of Technology

The Humanitarian Technology (or "HumTech") Lab at TU Delft brings together students, researchers, and faculty members who contribute their expertise to design, develop, implement, and evaluate new technologies for humanitarian aid. Through this initiative, we aim to bring technology-driven, evidence-based solutions to humanitarian aid and disaster relief operations. As a cross-faculty initiative at the Delft University of Technology, we are using our experience in policy analysis, multi-actor systems, information management, resilience, logistics, and other domains, to improve preparedness for and response to natural and complex disasters. The Lab leads a variety of national and international projects focusing on the role of technology in disasters. HumTech actively works with students from the various master's programmes at the TU Delft to address research challenges within the humanitarian-technology nexus. The HumTech Lab team is led by Prof. Dr. Bartel Van de Walle and consists of staff and researchers with extensive experience in the practice of humanitarian response.

Cordaid

Cordaid is the Dutch Catholic Organization for Relief and Development Aid. Their fields of focus are fragile contexts and (post-) conflict areas. As one of the largest NGOs in the Netherlands, Cordaid raises and receives funds from both governmental and other institutional donors, companies and private and family contributors to finance its international development and cooperation activities. Among others, Cordaid works in humanitarian Aid. Cordaid has been working together with local communities to reduce the risk of disasters. In their approach they follow-up rapid emergency aid during the occurrence of a disaster with sustainable development afterwards. Cordaid aims to be recognized as one of the most transparent NGOs in terms of openness on program and project outcomes and impacts. Since 2013, Cordaid publishes comprehensive data according to International Aid Transparency Initiative (IATI) standards on all projects on their website.