

The use of data for cost-effectively improving humanitarian outcomes

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Question

What evidence is there that use of data in humanitarian work is cost-effectively improving humanitarian outcomes across DFID humanitarian policy priorities?

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The K4D helpdesk service provides brief summaries of current research, evidence, and lessons learned. Helpdesk reports are not rigorous or systematic reviews; they are intended to provide an introduction to the most important evidence related to a research question. They draw on a rapid desk-based review of published literature and consultation with subject specialists.

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1. Summary

This rapid review was not able to find cost-effectiveness analysis of data use for humanitarian outcomes. Search methods were somewhat limited because it was not possible to search using discrete terms. Search terms for the query were inherently ambiguous and it was difficult to disentangle from general cost-efficiency data, which is published somewhat more widely. Searching tended to find examples of where data had been used to improve cost-effectiveness of an intervention rather than assessing the use of data as the factor that improves that cost-effectiveness. The cost input of gathering and analysing data is not recorded so it is then not possible to look at cost-effectiveness, or how the data process is impacting outcomes.

Resources included in the annotated bibliography have background information related to the topic in question.

A number of examples in the annotated bibliography described the use of data for humanitarian outcomes as effective without formal analysis. Anecdotal examples are included. The sense is that the use of data is believed to have promising potential but there is not yet evidence on real impact. There is also some caution given over the accuracy of big data initiatives which might limit effectiveness of interventions. Cost-effectiveness analysis in general in the sector is strongly recommended but thought to be poorly understood and scarcely applied.¹

The annotated bibliography includes two articles discussing the process of costing data. The cost and impact of data is thought to be difficult to empirically measure.

The definition of data for this report provided by a DFID adviser was: information collected, analysed and used to inform humanitarian communications, policy, programmes and services.

2. Methodology

Within the rapid-review framework it is more productive to trial a number of search strings and check top results to gather as much information as possible whilst exploring different avenues. A number of searches were conducted and the initial most relevant screened. This case in particular did not lend itself to screening vast numbers of results from one or two search strings as there were no discrete search strings and the ambiguity of the query was difficult to work around. Searches were refined as the process evolved. The dearth of relevant results in academic databases was supplemented by grey literature particularly from the Centre for Humanitarian Data.

Criteria for inclusion, primary relevance to cost effectiveness of using data for humanitarian emergency. Since there were no results matching the primary inclusion criteria three secondary criteria were used: 1) relevance to cost effectiveness and humanitarian programming, or 2) relevance to data and humanitarian programming, or 3) big data and cost-effectiveness. Thirteen

¹ Puett, C. (2019). Assessing the cost-effectiveness of interventions within a humanitarian organisation. *Disasters*, 43(3), 575-590.

<https://onlinelibrary.wiley.com/doi/full/10.1111/disa.12344>

papers were deemed to have secondary relevance and included in the annotated bibliography table in Section 3.

Searches conducted:

- Google Scholar: 'data', 'cost-effective' and 'humanitarian'. 45,500 results. Sorted by relevance. Screened first 200. One relevant.
- Google Scholar: 'data', 'cost-effective' and 'humanitarian'. 20,400,000 results. Sorted by relevance. Screened first 200 results. One website identified with three relevant articles. Another website identified one article.
- ALNAP data base: "big data". All 207 results screened. Four relevant articles.
- ALNAP: 'cost-effective' and 'data'. 2894 results. Screened first 100. No new results.
- ALNAP also tried: 'cost-effective' and "data collection"; 'cost-effective' and statistics; and "cost-effective" "response data". One evaluation paper explored from these searches made a reference which was included.
- Google scholar: data system humanitarian cost-eff*. 139 results. None relevant.
- Google scholar: routine data humanitarian cost-eff*. 64 results. None relevant.
- Google: cost of gathering needs data in humanitarian
- Google: UNHCR cost effectiveness data. Two articles included.
- Google: UNFPA cost effectiveness data. One paper included.

3. Annotated Bibliography

Title	Link	Date	Document Type	Organisation/author	Extract
Advancing big data for humanitarian needs	https://www.sciencedirect.com/science/article/pii/S1877705814010303	2014	Journal Article	<i>Procedia Engineering</i> Fadiya, S. O., Saydam, S., & Zira, V. V.	This article proposes a big data platform for large-scale data analysis to improve humanitarian services.
Fighting Rumours To Fight Ebola	https://centre.humdata.org/fighting-rumors-to-fight-ebola/	2019	Impact story	Centre for Humdata Written by Centre team	A dashboard that brought together data on community perception of Ebola helped global and local responders to strengthen partnerships and develop tools. No information on the cost of the initiative. No formal evaluation.
Providing Insight into Cash-Based Assistance In Somalia	https://centre.humdata.org/providing-insight-into-cash-based-assistance-in-somalia/	2019	Impact story	Centre for Humdata Written by Humdata	A data visualisation dashboard showing an overview of cash-based assistance made it easier for field teams to provide quick updates to senior managers on how cash is being used in Somalia.
Big Data for Resilience Storybook: Experiences Integrating	https://www.iisd.org/sites/default/files/publications/big-data-	2018	Case Studies	IISD Ospina, A.V.	Anecdotal evidence of improved cost-effectiveness in Tanzania where a platform enabled community volunteers to collect data to improve flood resilience. No formal cost-effectiveness analysis. Free and open software allowed students to collect on their own mobile

Big Data into Resilience Programming	resilience-storybook.pdf				phones. No need to import equipment or software subscriptions.
Open Data in Developing Economies Toward Building an Evidence Base on What Works and How	http://www.africanminds.co.za/wp-content/uploads/2017/10/AM-OD-in-Developing-Economies-COMLETE-R-WEB-10Nov2017.pdf	2017	Book	African Minds Verhulst, S.G. and Young, A.	The direct impact of open data (crowdsourced mapping tool) in the Ebola response was difficult to empirically measure. Ground workers expressed the importance of the data in fighting the epidemic and coordinating relief efforts. Though important in recognising the risks of responding to data of poor quality. The book also discusses positive outcomes from using data in earthquake response in Nepal. As data projects in Nepal emerged from crisis, site metrics were not tracked or analysed. Qualitative indicators of impact are incomplete and conjectural but qualitative reports are that the use of data saved lives and helped relief workers. Respondents were unable to quantify.
Guidance for incorporating big data into humanitarian operations	https://www.slideshare.net/KatieWhipkey/guidance-for-incorporating-big-data-into-humanitarian-operations-2015-web-version	2015	Guidance document	UNOCHA & Digital Humanitarian Network Whipkey, K. & Verity, A.	For applying big data into humanitarian organisational operations this report suggests a combination of trained staff and volunteers for data management to maximise impact and minimise cost. Cost-benefit of using big data is recommended.
The limits of crisis data: analytical and ethical	https://link.springer.com/article/10.1007/s10708-014-9597-z	2015	Journal Article	<i>GeoJournal</i>	Although social and mobile data can yield insights there may also be limitations leading to oversights made by response teams. It is not possible to track who are using phones and social media to gather the data. Ethical

challenges of using social and mobile data to understand disasters				Crawford, K. & Finn, M.	concerns are highlighted. Those without access to technology are excluded from contributing.
Improving disaster response efforts through data	https://expectexceptional.economist.com/improving-disaster-response-efforts-through-data.html	2017	Magazine	The Economist	One third of data scientists and humanitarian workers surveyed assess data analytics as very effective in advancing disaster management. The scientific lead for the Netherlands' Red Cross Society 510 Data Team advises public agencies and NGOs to increase data literacy within their organisation and invest in using data and analytics tools for disaster preparation and response.
Technical Report on Statistics of Internally Displaced Persons	https://ec.europa.eu/eurostat/documents/3859598/9316015/KS-GQ-18-003-EN-N.pdf/2f5996ce-c15f-42a2-b659-ed1b843a596e	2018	Technical report	European Union and UN Authors: Expert Group on Refugee and Internally Displaced Persons Statistics (EGRIS)	This report recommends good coordination of data collection for cost-efficient production of statistics. To effectively pool resources on internally-displaced persons there needs to be one authoritative source of statistics. There must be reliable consensus to facilitate policy coordination.
Evidence-based decision-making in	https://odihpn.org/resources/evidence-based-decision-making-in-	2010	NGO paper	Humanitarian Practice Network	The World Bank considers two types of evaluation study as rigorous and able to estimate the magnitude of an intervention impact. These are quasi-experimental designs with before and after comparison; and randomised pre- and post-intervention evaluation. Rigorous studies are expensive (typically between US\$

humanitarian assistance	humanitarian-assistance/				200,000 to 900,000 per study). Within the World Bank Operations Evaluation Department budget they can undertake one per year.
Data Transformation Strategy 2020-2025 Supporting protection and solutions	https://www.unhcr.org/5dc2e4734.pdf	2019	UN strategy document	UNHCR	Data and information activities must be grounded in core principles. One of these is that the purpose of data collection must be clearly defined and proportional to the expected benefits, risks and costs associated with protection and solutions.
Evaluation of UNHCR's data use and information management approaches	https://www.unhcr.org/5dd4f7d24.pdf	2019	Evaluation report	IOD PARC and IMC Worldwide Ladek, S., Zamora, N.A., Cameron, S., Green, S. and Procter, C.	Evaluation of UNHCRs data use and management approach concludes a long-term vision for data to become a strategic asset. And that this needs to be supported by the development of a costed, sequenced and thoughtful roadmap and strategy. It cautions against 'Rushing into expensive systems solutions without a roadmap will lose time and money in the long run.' (p8).
Revised Cost Estimates for the Implementation of the Programme of Action of the International Conference on Population	https://www.unfpa.org/sites/default/files/resource-pdf/Revised_Costing_ICPD.pdf	2009	A methodological report	UNFPA Technical Division	The report notes that estimating national census cost is difficult and not many developing countries report total census cost. To illustrate an idea of the cost of data collection, estimated costs for census data in developing countries range from US\$ 0.52 per unit in Eastern Asia to US\$1.50 in Middle Africa.

and Development: A Methodologic al Report					
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4. Useful websites and wider reading

Digital humanitarian network

<https://www.digitalhumanitarians.com/>

Humanitarian Outcomes

<https://www.humanitarianoutcomes.org/>

The GovLab Selected Readings on Data and Humanitarian Response

<http://thegovlab.org/data-and-humanitarian-response/>

New Technology and the Prevention of Violence and Conflict

<https://reliefweb.int/sites/reliefweb.int/files/resources/ipi-e-pub-nw-technology-conflict-prevention-advance.pdf> Five case studies look at how ICTs can be used for prevention of conflict.

Evidence-Based Vehicle Planning for Humanitarian Field Operations

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3039320

Models for the Economics of Resilience

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5267494/>

How big data assists in disaster relief and preparedness

<https://dataconomy.com/2018/12/how-big-data-assists-in-disaster-relief-and-preparedness/>

Zoraster, R. (2012). **Cost Utility Analyses in International Disaster Responses—Where Are They?** *Prehospital and disaster medicine*, 27(2), 198-203.

<https://www.cambridge.org/core/journals/prehospital-and-disaster-medicine/article/cost-utility-analyses-in-international-disaster-responseswhere-are-they/7FA75E59D9CA93D798EDB6C5D55E983E>

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About this report

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