Informatics for Equitable Recovery — Lessons Learned

Aug 2018 — Feb 2020

Regarding what worked and did not work with regard to the technical aspects, organizational experience (including collaborations) and the potential for replicability and scalability.

Technical aspects

The multiple backgrounds, disciplines, and perspectives from each of our team members were both exciting and challenging to work with. For example, the language of technical analysis can be highly discipline-specific, with data science, engineering, and the social sciences all using different terms to describe related concepts. We found that even while team members were thinking about the same type of analysis, individuals would refer to these methods in different ways. We addressed these challenges by creating space for explanations on regular conversations and in workshops.

One very important aspect of what worked well in our technical workflow was the importance of capitalizing on local datasets to calibrate and use as inputs in our models. While aiming to develop *generalizable* frameworks, models should be made using data *specific* to each region. We found our models to be greatly improved by the local knowledge and the provision of local data from groups based in Nepal, including the National Reconstruction Agency, The Asia Foundation, Housing Recovery and Reconstruction Platform, and the managers of Geonode Nepal.

Finally, the survey that we carried out served two purposes: to 1) understand the interlinking between impacts, vulnerability, and recovery and 2) to develop a model for post-disaster persistent need. We collected this survey with both items in mind — however, as is often the case, our eventual analysis prompted us to consider how we could have asked different questions to capture new variables. This tension between analysis needs and survey design is common in such projects, and we feel we ultimately struck a balance between getting the survey as comprehensive and implementable as possible while capturing the variables we wanted.

We also were committed to an approach of “prototyping everything”. This ended up being extremely helpful throughout our project. With our survey, for example, we went through multiple stages of experimentation with pre-tests, pilot tests, exploratory interviews, and the eventual full-scale survey rollout for 815 households.

The decision to use open-source platforms, such as the R statistical programming language, also contributed greatly to our project's documentation and enabled us to share and collaborate on outputs very easily.

Organisational experience (including collaboration)

Our project team benefited enormously from the diversity of its members. With team members based in Kathmandu, Singapore, Zurich, San Francisco, and Bali, we collectively represented and leveraged a wide array of experiences in disaster risk reduction, mapping, post-disaster fieldwork, technical analysis, and much more. Beyond disciplines and geographies, the team was also diverse in terms of gender, seniority levels, culture, and perspectives.

To honour such diversity, it was critical that our project team facilitated conversations and made commitments from the very early stages of the project regarding what sort of values, group dynamics and managerial styles we would adopt. We kept spaces open throughout the project for team members to give and receive feedback on power dynamics, project management, workflows and general satisfaction. This included a structured reflection process, often through 1-on-1 confidential interviews with the Project Officer.

In this vein, our project team invested substantially and very early on in project management, research tracking, and facilitation resources. We hired a Project Officer in Singapore and worked with a Research Assistant in Kathmandu to facilitate group meetings, plan workshops, and speak across disciplines to enable dialogue between different team members. Given the scale of our project, these investments proved to be very worthwhile, with support staff contributing both to the management of project tasks and the intellectual development of project ideas.

The most crucial lesson learned organisationally is the importance of investing in personal and professional relationships in serious, structured ways. Our project benefited from dedicating considerable time, funds and other resources to in-person meetings, group calls every week, team-building and bonding activities, and building networks with local and international collaborators. These enabled us to manage a productive collaboration despite a globally distributed team, ensure a successful field survey with an over 90% response rate, meet with high-level local officials, and share our research at numerous platforms to get feedback, ideas, and share our findings.

Replicability & scalability

One important lesson learned here is the distinction between perspectives, frameworks, and models. In the disaster risk reduction field, scalability has always been a core challenge — each disaster is unique. Extreme events happen with specific characteristics, in specific exposure contexts, and generalisable models are difficult to develop. In order to address this challenge, we saw a need to pivot from models to frameworks — in other words, to go from making event-specific data products to generalisable frameworks (tools, code, and statistical methods) that can be applied across multiple events with flexible data inputs. Given the vast increase in the availability of input data (remote sensing maps, engineering predictions, hazard datasets like shaking intensity, etc) after disasters, we felt it was much more useful to develop a nimble set of frameworks for combining, calibrating and validating damage data rather than simply develop a single model for the 2015 Gorkha earthquake. This was part of our approach from the get-go, and motivated our decision to focus so heavily on local calibration and ground truth data.

Even broader than the shift from models to frameworks is the importance of emphasising a new perspective on post-disaster information. Cutting across all of our frameworks and tools is one core understanding: **post-disaster needs are not the same thing as disaster damage or impacts**. This is the beating heart of 'informatics for equitable recovery' — drawing attention to the fact that the way we measure and count impact of disaster can conceal, reproduce or exacerbate inequities, and finding ways to count needs in more sensitive, thoughtful ways. We created frameworks to measure this — the Post-Disaster Persistent Need (PDPN) metric — but fundamentally, we think any tools that measure how recovery outcomes diverge so significantly for communities with similar impacts will be helpful.

These frameworks and perspectives can be scaled and replicated across many different contexts. In fact, because of how G-DIF and PDPN are calibrated, we expect that applying them multiple times across multiple contexts will improve their outputs. One way to facilitate this could be to embed an 'IER (Informatics for Equitable Recovery)-trained analyst/modeler' within a post-disaster needs assessment process in a subsequent disaster.

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Monitoring questions & responses

Risk mitigation:

Did you need to address any risks? If yes, what were the risks and how were they managed or mitigated?

We conducted an 815-household field survey in rural Nepal. As stated previously, field survey risks were assessed and steps were taken to mitigate them. For example, field surveyors sent to the districts in our sample were briefed on appropriate measures for dealing with transportation in rural areas, personal safety, health issues, and other related risks. All surveyors were sent in pairs as part of this risk assessment. On the conclusion of the field survey, no injuries or risk-related incidents were reported.

Other than the field survey of earthquake-affected households, no research or project activities involved any significant risks.

Output indicators:

Have there been any final results or outcomes in which data or methods have allowed data to be produced: faster; more cheaply; at a higher resolution or granularity, or where there was no data before? If yes, please describe.

Yes.

- **Faster**: G-DIF allows for rapid estimation of regional physical damage by integrating multiple sources of pre-earthquake and rapid post-earthquake damage data sources.
- **Higher resolution**: Our geospatial data integration framework (G-DIF) allows data on earthquake physical damage (e.g. engineering predictions, remote sensing) to be integrated at higher spatial resolution and to be locally calibrated with limited field surveys.
- **Where there was no data before**: we conducted a field survey of 815 earthquake-affected households in rural Nepal to understand recovery holistically.

Has the project contributed to the production and/or use of data disaggregated by a) sex b) disability c) age, d) geography (or other)? If yes, please summarize the of types of disaggregations and the context.

Yes. Our field survey has produced disaggregated data by different metrics. Some of these include:

- Gender (of head of household, the main respondent in our questionnaire)
- Age
- Geography (remoteness, access to infrastructure, ongoing hazard exposure, damage maps)
- Income & economic resources, savings, debt
- Ethnicity/Caste

Has the project contributed to the use and/or production of gender statistics? If yes, please describe.

Yes. Gender data was collected during the field survey, in order to better understand if the disaster had differential impact by gender, or how gender influenced post-disaster needs.