The Role of Crowdsourcing for Better Governance in International Development

Maja Bott and Gregor Young

Abstract

This paper, originally produced in longer format for the World Bank Group, is meant to be a primer on crowdsourcing as an informational resource for development, crisis response, and post-conflict recovery. Inherent in the theoretical approach is that broader, unencumbered participation in governance is an objectively positive and democratic aim, and that governments' accountability can be increased and poor performance corrected through openness and empowerment of citizens. Whether used for tracking flows of aid, reporting on poor government performance, or helping to organize grassroots movements, crowdsourcing has potential to change the reality of civic participation in many developing countries. The objective of this paper is to outline the theoretical justifications, key features, and governance structures of crowdsourcing systems, and to examine several cases in which crowdsourcing has been applied to complex issues in the developing world.

Crowdsourcing—A New Panacea for Social Accountability and Governance?

Crowdsourcing has become a mega trend in recent years, fueling innovation and collaboration in research, business, society, and government alike. The power of crowdsourcing was first demonstrated by the ability of the open-source movement to successfully compete with proprietary software solutions, as volunteer programmers

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who had never met or worked together mobilized to create the open source-based operating system Linux.[1] Wikipedia showed that collaborative content creation can dwarf the quantity and quality of traditional encyclopedia and other closed expert group efforts. Other kinds of content aggregators—from Flickr and YouTube, to LinkedIn and Twitter—use the crowd to prioritize content for their individual users. Finally, the next generation of Web 2.0 applications, such as search engine advertising, use massive databases to harness the collective intelligence of their users through algorithms that detect patterns and hidden meanings in everyday user activity.[2] Computing systems have become ever more connected, data-rich, and increasingly adaptive.

But crowdsourced volunteering activities are going far beyond coding or simple information sharing. Today, crowdsourcing is used to create and increase collective knowledge, community building, collective creativity and innovation, crowdfunding, and civic engagement.[3] Powered by widespread and increasing access to the Internet, mobile phones, and related communication technologies, the use of crowdsourcing for policy advocacy, e-government,[4] and e-democracy[5] has grown exponentially during the past decade.[6] These tools have dramatically reduced the transaction costs of information exchange, group forming, and coordination. It has become much more difficult for governments to block information and stifle collaboration, and political opposition can now manifest itself without the formation of traditional institutions. The right combination of social networking tools and an active audience allows any individual to inspire and coordinate collective action outside of a formal hierarchy.

The driving vision behind these phenomena is the philosophy of open-source governance, which advocates an intellectual link between the principles of the open-source and open-content movements and basic democratic principles. With its objective of enabling ordinary citizens to contribute directly to the formation of policy, open-source governance theoretically provides a more direct means to affect change than do periodic elections. [7]

Crowdsourcing is not only limited to industrialized countries, where it is often characterized by high-tech data solutions and business applications. In developing countries, it is applicable in the frameworks of popular consultations, election monitoring, constitution drafting processes, or anywhere where it ensures that voices of diverse ethnic, political, and minority groups are heard. Crowdsourcing is already having a strong impact in developing countries, whether applied to crisis and tactical mapping;[8] tracking, reporting on, or coordinating relief efforts in the contexts of natural disasters (e.g., Haiti, Pakistan) and civil wars (e.g., Libya); or tracking human rights abuses and violence (e.g., Kenya). By providing visualizations and monitoring implementation of relief and recovery efforts,[9] allowing for wide dissemination of weather and crop market price information (e.g., Mali, Uganda), crowdfunding microcredit (e.g., Kiva.org), and so on, crowdsourcing is being applied in multiple ways within the context of international development. When used to collect information, it can be seen as a methodology for non-probability sampling.[10] Crowdsourcing can thus serve as a participatory monitoring and evaluation tool for development and

humanitarian programs, eliciting feedback directly from program beneficiaries.

Crowdsourcing's potential cannot be overestimated, especially in Africa where mobile networks have grown exponentially during the last ten years, bypassing all other infrastructure development on the continent in terms of speed and widespread usage. Crowdsourcing is increasingly viewed as a core mechanism of new systemic approaches to governance addressing the highly complex, global, and dynamic challenges of climate change, poverty, armed conflict, and other crises.

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How is Crowdsourcing Expected to Improve Governance?

The availability and interoperability of communication tools makes it increasingly harder to keep information secret. Information security has become a critical issue for governments, due to increased access to professional tools and highly skilled amateur activists. The Wikileaks case and other global hacking operations have revealed the general vulnerability of governments' data protection systems, in contrast to the power of non-state actors to act collectively without need for individual, and thus assailable, leadership. This has created a general power shift: governments are more vulnerable to attack, either technological or political, while citizen groups can become less vulnerable and more effective due to their increased ability to organize. In general, "transparency breeds self-correcting behavior" among all types of actors, since neither governments nor businesses or individuals want to be caught doing something embarrassing or illegal.[11] In the case of government wanting to improve its performance, the effectiveness of governance systems can also be substantially increased by social media applications, which facilitate real-time data collection, categorization, and redistribution from crowds to crowds, e.g., in the cases of tactical mapping and reporting in emergencies, market information sharing, or community planning.

The greater the numbers and the stronger the group's identification with objectives and within campaigning crowds, the harder it becomes for governments to ignore them. However, there are strong cognitive limits to interactivity: causes must be very strong and directly touch the emotions and creativity of people in order to draw their attention and keep them involved long enough to make an impact. With a growing number of national and international causes competing for attention, rallying crowds around a specific cause is becoming ever more difficult. The continuous rise of social media—especially among youth—and its increasing use to consolidate support of common interests and advocacy suggests that the importance of crowdsourcing will continue

to grow, especially if coupled with the real-life interests, needs, and commitment of its users.

Critical Success Factors of Crowdsourcing Systems

Crowdsourcing entails empowering a disparate group of people with the tools to contribute to a larger effort. Incentives to contribute should be tailored to attract the most effective collaborators,[12] and the crowd's motivation must align with the long-term objective of the crowdsourcing initiative[13] to ensure consistent, good quality participation.[14] In Ankit Sharma's model of critical crowdsourcing success factors, summarized below, motive alignment of the crowd is the central idea, whereas the vision and strategy of the crowdsourcing initiative, linkages and trust, external environment, infrastructure, and human capital are peripheral factors.[15]

Infrastructure: A necessary prerequisite for crowdsourcing is the availability, acceptance, and use of crowdsourcing technologies by its users. The ease of accessibility, reliability, and quality of communication technologies and infrastructure is therefore imperative for crowd participation. The global spread of mobile phones has achieved the basic condition for the use of crowdsourcing in many developing country contexts.

Vision: The crowdsourcing initiative must present a vision with a well-defined set of ideals, goals, and objectives that is sensitive to the dynamics of its environment so that the crowd can perceive the initiative as valuable and well-intentioned. While government participation can add an additional trust factor to the initiative, this is not always the case in a fragile or predatory state context.

Human Capital: Another key determinant of success in crowdsourcing is human capital, both at the level of the initiators and the crowd joining the initiative. This includes language skills, managerial skills, national orientation, traditions, and level of education.[16] Basic mobile phone skills are an entry qualification for the crowd. In an ideal scenario, the crowd can engage the crowdsourcing initiative without prior training and with minimal interventions.[17]

Financial Capital: The inherent nature of crowdsourcing initiatives does not make them very capital intensive, especially if based on existing telecommunications infrastructure such as mobile phones and networks. Additional investments to improve infrastructure can enhance crowd participation substantially. Also, in low-income countries, performance-based donor-funding of local community development could be used to create a positive incentive for governments to allow for greater citizen scrutiny and participation, e.g., through crowdsourced monitoring and reporting platforms.

Linkages and Trust: Geographic, cultural, linguistic, or ethnic linkages between individuals, work groups, or organizations can be used to minimize costs of doing business. Robust linkages make knowledge transfer and sharing of best practices and innovative business models easier, and they help pool resources to develop the initiative.[18] Sufficient time must be allocated in order to foster the necessary trust among the crowd, and robust linkages might also add a substantial trust aspect to the

crowdsourcing initiative.[19] Linkages to a diaspora or earlier successful ventures add to legitimacy and trust.[20] If government support is not a trust-building factor, external support through donors and well-reputed international organizations can help and provide global visibility to the initiative.

External Environment: The macroeconomic environment, comprised of the political governance structure, economic and business climate, general attitudes toward entrepreneurship, general living conditions, and profiles of risk, are also important determinants of success.[21] A favorable regulatory environment and ease of doing business can encourage crowdsourcing initiatives. The tasks associated with crowdsourcing must be compatible with prevailing practices and cultural norms, and the crowd must also be able to relate the goal of the crowdsourcing initiative to their living environment. Security and regulatory risks can play an important role in affecting the motive alignment of the crowd toward the long-term objective of the crowdsourcing initiative.[22] The lack of a favorable policy environment may also create a strong motivation for crowds to engage in collective action to challenge the status quo.

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Motivation: Performance expectancy (i.e., the extent to which an individual believes that using the system will help him attain gains in job performance), effort expectancy (i.e., the degree of ease associated with the use of the crowdsourcing system), social influence (i.e., the degree to which an individual perceives that others believe he or she should use the new system), and facilitating conditions (i.e., the extent to which an individual believes that organizational and technical infrastructure exists to support use of the system) are the direct determinants of the crowd's motivation.[23] Five of the above described peripheral factors affect one or more of these determinants. For example, human capital affects the performance expectancy and the effort expectancy. As a result, the peripheral factors affect the overall motive alignment of the crowd toward the crowdsourcing initiative in different manners.

Criteria of Governance: Governance criteria for crowdsourcing include the possibility of anonymous participation via a central registrar, public key infrastructure, and a trusted central authority; decentralization of authority, thus minimizing the principal-agent problem; centralization of information via one platform and interoperability of interfaces and applications with this platform; open and equal opportunity of participation in deliberations or peer reviews, thus enabling self-selection of those most affected and/or best qualified to participate in an issue; and encouragement of diversity of thought. In addition, safe operational procedures must

be ensured: all actions are transparent; all contributions are recorded and preserved; all content and deliberation is structured through content management systems, fora, and moderators and re-factored by participants via software versioning and revision control systems; and access must be inclusive of remote and disadvantaged people via mobile devices and specialized interfaces.

The Potential Role of Crowdsourcing and Interactive Mapping in Improving Aid Transparency, Effectiveness, and Social Accountability

Crowdsourcing supports empowerment based on the principle of universal participation. In either a pure democracy or a state of anarchy or civil war (e.g., Haiti after the earthquake, or Libya post-February 2011), there are few external limitations to its use, which explains why most salient examples come from democracies and situations of crisis.

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In a fragile state, the situation is quite different. The World Bank defines a "fragile state" as a country "facing a combination of particularly severe development challenges: weak institutional capacity; poor governance; and political instability. Often these countries experience ongoing violence as the residue of past severe conflict."[24] An authoritarian or embattled regime may tend to oppose and interfere with crowdsourcing, perceiving broad-based participation and citizen empowerment as threats to its very existence.

Digital mapping platforms—tools that combine electronic networks, maps and/or satellite imagery, and tracking—are currently emerging as a key instrument for improving governance in fragile state environments.[25] Crowdsourcing has become a dominant method for live mapping initiatives in the area of governance due to its potential to integrate all types of information and communication channels. Real-time data can be aggregated, categorized, layered, and visualized in ways that can be understood even by non-experts with relative ease. Geospatial data can thus be linked with non-geospatial data for various purposes, such as in its established uses for disaster risk management or urban planning.[26]

There are two basic types of interactive mapping initiatives: initiatives that take a top-down approach and coordinate with (or are agreed to by) national governments, and initiatives that develop independently with a bottom-up perspective. Both serve to democratize information flows and access. The determinants of these two types differ fundamentally; although with expansion, both can move toward the respective other direction, ideally resulting in a comprehensive, hybrid structure that integrates government, international, non-governmental, and locally crowdsourced data. The distinction between these two perspectives is crucial in a fragile state context, where governments are naturally suspicious of undesired grassroots movements.

The top down approach usually requires buy-in from the national government,

which may provide for certain advantages, such as accessing critical government data and using a wider variety of communication channels, as well as engaging the government and all other local stakeholders in a practical dialogue and even collaboration on political governance issues. However, every new service offered under a mapping initiative requires negotiating with and persuading government counterparts, and thus involves the risk of slow progress. In general, the greater the level of government interest in the initiative, the easier it will be to receive the necessary approvals for rapid project setup. This explains the relatively clearer success of crowdsourced emergency services in the aftermath of natural disasters, compared to other recent initiatives in non-emergency contexts. For a recipient government, the risk of abusing the system for rebellion is very low, while the benefits of coordinating disaster response are enormous. Likewise, there is strong interest in e-government services that facilitate trade, tax collection, and private sector development.

Challenges and Risks of Applying Crowdsourcing and Interactive Mapping

The fundamental challenges of crowdsourcing are to identify the tasks for which crowdsourcing is an appropriate solution: defining, operating, supporting, and ending a crowdsourcing activity; identifying and creating technical means of participation that minimize barriers to use; establishing and maintaining participation through appropriate incentives; ensuring appropriate privacy and safety for the contributors (e.g., when individual contributors might be identifiable and/or locatable); and maximizing the quality and benefit of the outcome (e.g., through filtering, rating, cross-checking, or peer/expert moderation).

The following issues usually pertain to crowdsourcing in general and crowdsourced geo-spatial data sharing in particular. In most cases, these challenges are more critical in fragile state environments than under stable-government conditions.

1. *There is no active crowd.* In various cases, top-down platforms offered by government or donors do not manage to attract the attention of crowds because they seem too static or centrally controlled, and they do not offer any direct benefits, reputational gains, or other incentives to potential contributors. The biggest issue with government-controlled platforms seems to be that individuals do not trust that their information will be used responsibly. The more authoritarian a government's behavior, the less trust it will inspire from its citizens. Under authoritarian regimes, it is also more difficult for NGOs and social entrepreneurs to launch a crowdsourcing initiative.
2. *No data is being shared.* The relatively slow progress of e-government in industrialized countries shows that even democracies are hesitant to share their official data. The less legitimate a government feels, the more secretive it tends to behave, and vice versa. In a phone interview on the launch of "Open Kenya" on July 8, 2011, Paul Kukobo, Chief Executive Officer of the Kenya ICT Board, made the following statement: "Sharing internally was a problem in the first place. That was why the parliament secretary taking a huge role was a big deal, in terms of talking to colleagues about opening up this data. Technical challenges were not where the headache was—we have plenty of skill and partners here to do that—it was in getting the data in the first place, in the form that we

needed it. Plenty of data wasn't in digital form or usable, and was trapped in agencies."[27]

3. *The wrong crowd / digital divide / participation inequalities*. A theoretical prerequisite for the use of crowdsourcing in participatory/democratic decision-making processes is universal technology access. Since this is an ideal and not a universal reality, capacity building, mediators, and transcription tools are necessary to prevent the digital divide from excluding the most vulnerable members of the population from participation, though this can be very costly. In crowdsourced projects such as OpenStreetMap and Wikipedia, a small group of participants contribute very significantly, while a very large group of participants contribute only occasionally. Demographically, educated young males are usually overrepresented. Since governments with weak governance processes usually base their power on the support of elites, they have less incentive to reduce these inequalities. Therefore, there is a high risk of elite capture or at least strong demographic bias if not mitigated by additional measures.
4. *The crowd is being manipulated*. The limitation of a plain wiki is that it can only show "what is," and not "what should be." More sophisticated systems aim to provide tools for meaningful deliberation by using semantic tags, levels of control, or scoring to mediate disputes. However, this risks unduly empowering a clique of moderators who possess no public legitimacy (similar to the wiki problem of "sysop vandalism"[28] or "administrative censorship"). On the other hand, the simpler the processes and structures of a deliberation platform are, the higher the risk that minority opposition will be drowned out. In platforms that aim to combine crowdsourced contributions with official ones, a lack of trust will accentuate these problems, especially in environments of weak governance.
5. *The crowd is being attacked*. Contributors can be attacked, both virtually—e.g., by being spied on—and physically. Especially in a context of human rights violations and conflict, governments, rebels, or terrorists can abuse GPS-based data provided by individuals on the ground for military action. Crowdsourcing contributors can be incriminated through national security moles.
6. *The crowdsourcing process is not effective*. A general challenge of crowdsourcing is managing contributions. Chaotic data and/or deliberation structures can make crowdsourcing ineffective. In order to solve this problem, highly sophisticated management structures that address the usual concerns have been designed for crowdsourcing software.
7. *The clash of paradigms*. The problem, however, becomes more complex if official government and/or donor data is combined with crowdsourced data that usually does not follow the same information management standards. Uncertainty regarding the quality of data is often cited as a major obstruction to its wider use.[29] Rahemtulla et al. argue that "crowdsourced data will only be fully adopted if the user organizations can have trust in the data being fit for its intended purpose. Critics argue that such informal ad-hoc data collection does not typically adhere to formal standards of geometric precision or meta-data consistency or even provide consistency in coverage or detail. Despite this, the volume of such data can be large and gives rise to the opportunity to acquire a density of sampling often far exceeding what can be formally acquired and this

can in-turn assist in the process of validation and error reduction. Furthermore, the currency of the data, particularly where the topic of capture relates to human activity, will often be much more up-to-the-minute than formal survey data. This comparison, however, illustrates that while the content, quality and attributes of crowdsourced and authoritative data are different and can even be apparently conflicting in detail, both have informational value. Through a considered combination they can complement each other to provide a more complete, up-to-date, people-centric and richer picture of such humanitarian disasters than either could provide in isolation."[30]

8. *What next? Does crowdsourcing equal accountability?* Crowdsourcing is only the first step toward better results. The next step is to understand how that data is being used to hold those in power accountable. As Tsai and others acknowledge, "formal institutions of accountability are often weak in developing countries, which often lack strong bureaucratic institutions for controlling corruption and making sure that lower-level officials are doing their jobs. Democratic institutions such as elections that allow citizens to hold local officials accountable may be unreliable or even nonexistent. Yet even in these countries, some local officials perform better than others. Under these conditions, how do citizens make government officials provide the public services that they want and need?"[31] As stated by Rosanvallon, the three accountability mechanisms of indirect democracy—oversight (monitoring and evaluation), prevention (collective civil society action concerning policy), and sanctions (tracking of abuses for evidence in court)—can be strongly empowered through crowdsourcing.[32]

To summarize, the core risks and challenges arise around the concept of trust. These challenges increase with the loss of governance capacity and legitimacy typical of fragile states.

The Experience of the Crisis Mapping Community

The Emergence of the Crisis Mapping Community—The Case of Haiti

The first and principal objective of disaster response is to obtain "situational awareness," i.e., a detailed picture of the situation on the ground, the scale of the damage, and above all, the needs of affected people. In other words, an assessment with firsthand information is needed as fast as possible in order to plan and conduct relief efforts. In 2008, Ushahidi was created, and it remains one of the most important open-source platform providers for crowdsourcing crisis information. This system was initially established to report and map violence during the 2008 post-election period in Kenya and has since been used to track a variety of crises and other issues on global, regional, and national scales. The purpose of the platform is to gather distributed data from the public via several media and communication channels (i.e., SMS, email, and web) and to visualize it on a map or timeline. The objective is to facilitate a better understanding of the needs of people affected by natural/man-made disasters or other issues and create direct and immediate links between different stakeholders, such as crisis-affected people and assistance-providers. Such a system has been shown to empower respondents to collect information together and help guide and coordinate

humanitarian response efforts on the ground.[33] Whether used for crisis response or long-term development, such timely information is critical to decision-making, monitoring and evaluation, and coordination of multi-stakeholder efforts.

The most prominent crowdsourced crisis mapping initiative to date appeared in the wake of the 2010 Haiti earthquake—an undertaking that allowed relief agencies to act with unprecedented speed. Immediately after learning about the earthquake on CNN, the social enterprise Ushahidi set up the Ushahidi Haiti map and—with a team of volunteers from The Fletcher School of Law and Diplomacy at Tufts University—used Digicel's free SMS short code (4636) to crowdsource needs assessments from the disaster-affected community. Local radio stations disseminated information about the short code. The concept of "Mission 4636" was as simple as it was revolutionary, making use of widespread mobile communications, highly motivated volunteers, and the most immediate source of situational knowledge: the affected local population of Haiti. During the first week, volunteers mapped some 1,500 reports based on information from Twitter, Facebook, and online news, even before they began to receive text messages. A team of graduate students at The Fletcher School mobilized an active partnership with Ushahidi within hours of the earthquake and provided a key element of volunteer support in reviewing and curating incoming crisis data.[34]

Both the strength and weakness of crowdsourced information management derives from its participatory openness.

Both the strength and weakness of crowdsourced information management derives from its participatory openness. Making sense of received text messages and categorizing information appropriately has been a consistent challenge. The importance of filtering and verifying text messages or crowdsourced information in general is among the lessons learned from the Haiti experience. Most of the criticism of crowdsourced crisis mapping as it was conducted in Haiti takes aim at the overflow of information and lack of coordination with humanitarian agencies for immediate action.[35] But such criticism comes at a time when the active online community has already progressed substantially. The Standby Task Force, an online volunteer community, has incorporated lessons learned and improved processes through simulations and trainings for deployments with a much more structured framework, and a comprehensive, modular approach to the various steps of crisis mapping.[36]

Participatory Post-Conflict and Recovery Mapping—The Case of Sudan[37]

The transition from an emergency to a post-emergency situation is always highly complex. On one hand, the population is still severely affected and in need of humanitarian support; on the other hand, local actors usually call for a longer-term perspective to peacebuilding and recovery. In most cases, government wants to take the lead, but faces severe capacity and/or legitimacy deficits. Sudan, both during and

after the Comprehensive Peace Agreement (CPA) period, is one of the best examples of the manifold challenges arising from such a transition.[38] Sudan's security, political, and socioeconomic situation is extremely intricate, constantly shifting, and subject to regional crises. A multitude of actors have been working on poverty reduction and peacebuilding: two UN peacekeeping missions, almost all existing UN agencies, more than 300 international aid agencies, and more than 2,000 national NGOs have participated in partnership with the governments both North and South to deliver critical humanitarian and development aid. These challenges and complexities call for effective tools to assist actors in identifying, prioritizing, and coordinating interventions that can enhance peace and stability.

The UNDP Sudan Crisis and Recovery Mapping and Analysis Project (CRMA) project has been working since 2007 with key international, government, and community actors across the country's conflict-affected areas to respond to the need for enhanced coordination and prioritization. The core objectives of the CRMA are to build local capacities for crisis mapping, conflict analysis, and strategic planning; to institutionalize evidence-based and conflict-sensitive planning across the UNDP portfolio; to enhance knowledge management and coordination for the UN "Delivering as One;" and to explore innovative GIS-enabled platforms and participatory methods for early warning and conflict prevention. The project is based on four principal, interconnected mechanisms as follow.

First, a core component of the support has been the establishment of an Information Management Working Group (IMWG) of the UN Country Team, the first of its kind at thecountry level, to facilitate the development of a coherent information management approach for the United Nations agencies and NGOs in Sudan, in cooperation with local authorities and institutions. The IMWG has developed a formal information-sharing platform that provides all recovery and development actors with a common, basic package of relevant baseline information for their individual analyses, planning, and programming efforts. [39] Every quarter, the IMWG produces a state-by-state Digital Atlas containing multisectoral and georeferenced information from all participating actors. Datasets are sourced and dated to facilitate queries and temporal analysis. Maps can be exported, saved, and printed.

Second, CRMA has worked with government and community actors to develop a blueprint for state and community-level participatory mapping workshops that capture community perceptions of priorities and emerging risks. Priorities and risks are grouped along socioeconomic and security lines and identified for specific geographic and thematic areas. Qualified participants are drawn from a socially and culturally diverse group of people, seeking to ensure as wide representation as possible.

Third, community perceptions of threats and risks with regard to crisis and recovery are fed into an analysis and planning support process. Making use of the interactive community mapping process as well as the baseline data collected through the information management platform, CRMA supports state governments, UN agencies, and NGOs alike in ensuring that their strategic planning, design, and targeting

of interventions are evidence-based and conflict-responsive. Working together with state governments, CRMA supports the development of a State Situation Analysis using a mixed-methods and participatory approach. This analysis in turn becomes the backbone and evidence base for the government's own development and revision of their five-year state strategic plans. Further, this joint analysis product facilitates coordination and collaboration amongst all major actors in designing joint needs assessments, disaster risk reduction programs, early warning systems, and monitoring and evaluation.

Fourth, a comprehensive capacity development program is deployed, focusing mainly on developing the capacity of local authorities, ensuring that the processes, skills, and tools needed for continued data collection, knowledge management, and analysis for evidence-based and conflict-responsive strategic planning are institutionalized.

The participatory mapping and analysis of community perceptions of threats and risks serves multiple purposes. It can help to identify priority areas for intervention across sectors in a post-crisis and recovery setting by localizing concentrations of threats and risks pertaining to a particular issue, such as community security, access to health services, or environmental degradation. As all threats and risks are geolocated at the village level, it can provide detailed contextual information about a specific location of interest to actors, shedding light on how different threats and risks interact and impact the community locally. Beyond collecting grassroots information, this process presents an important opportunity for diverse communities to come together in the aftermath of crisis to discuss challenges, differing perceptions of the situation, and views toward the future. This process fosters open dialogue in a safe setting where opinions are heard and valued rather than silenced and criticized. Though peacebuilding and indeed statebuilding, per se, have not been articulated as discrete focuses of the CRMA, the crisis and recovery mapping process has become an important tool in bringing communities and local authorities together, gaining a broader understanding of the situation and jointly developing priorities for the future. The process has thus contributed to the strengthening of the relationship between state and society, building trust and improving the legitimacy and accountability of the state.

Realizing the potential of combining participatory methods with innovative GIS-enabled tools and new technologies, CRMA has now started to explore the possibility of designing an early warning system for its local government partners. This system would be based on the continuous monitoring of a carefully selected set of minimum essential indicators from the CRM data, updated via an SMS reporting tool and integrated into a specifically tailored database, whether on- or offline, using a combination of crowdsourcing and trusted networks of community-based rapporteurs. This information would provide the foundation for thematic and area-based conflict analyses that would in turn inform the targeting and design of conflict prevention and peacebuilding interventions. The ownership and management of the early warning system would be firmly embedded within the local institution, with the possibility of requests for support from international actors for the particular interventions

identified and designed.

Mapping for Sustainable Development—Participatory GIS and Community Forestry Management in Nepal

Unlike the context of a crisis or recent conflict, where people are desperate for rapid assistance and motivated to contribute information, development and poverty reduction are longer-term activities where sustained civic participation may be more difficult to cultivate. Incentive structures for citizen-led development mapping, information aggregation, or monitoring in a non-crisis context must be more explicit—beyond providing for day-to-day survival in a humanitarian emergency, these structures must be directed toward consistent access to economic and livelihood resources, with a view to sustained progress and optimal economic, ecological, and social outcomes, and better governance to ensure consistent progress and support. Interactive engagement in decision making should engender the attitude that participation is a right, not merely a means to achieve outsiders' project goals.[40] Therefore, several conditions are requisite to crowdsourcing for development: appropriate incentives for participation; government/authority approval of the activity; and sufficient technical aptitude, access, and support for the target population to actively engage.

Interactive engagement in decision-making should engender the attitude that participation is a right, not merely a means to achieve outsiders' project goals.

The confluence of GIS and community knowledge is valuable for multiple applications in the developing world, especially for resource management and planning, and when the resources in question—such as land—are highly conducive to spatial definition. Land tenure is one of the most pressing issues in the developing world, as the vast majority of the global poor engage in agriculture as their primary economic activity. Not surprisingly, land rights and usage are disproportionately important assets of the rural poor. Land is a valuable, finite resource of oftentimes disputed ownership, so ambiguity around land rights and proper usage can disrupt agricultural production, contribute to deforestation, and adversely affect the lives and livelihoods of the rural poor. Conflict, displacement, and inequitable legal status compound the issue further. In the following case study examining the experience of participatory GIS (PGIS) for forestry management in Nepal, inclusive, crowdsourced approaches to land tenure and management of natural resources are shown to have net positive effects.

The visual medium of maps as well as aerial photography, provide a dual benefit. They are simultaneously digestible to the non-literate or undereducated,[41] and particularly useful for forestry and natural resource management, which is a critical sustainable development issue. Participatory GIS (PGIS) provides a platform for communities to delineate their claimed territories and resources, determine usage

rights and management imperatives, and generate local consensus, whether through top-down engagement or in a community-driven petition to the government.[42] The following case illustrates the potential long-term effects when government agencies decide to incorporate the knowledge and needs of local communities into sustainable practices and create new, multidirectional information flows.

Community forestry was introduced in Nepal in 1978, with the dual objective of reducing environmental degradation and deforestation while improving access to forest resources needed for subsistence.[43] Since then, Nepal has made significant efforts to engage its rural population through PGIS. In 1999, over 8,000 selected forest sections had been officially handed over to locally managed Forest User Groups (FUGs), then representing almost one million households.[44] By 2003, there were over 13,000 active FUGs, representing over 34 percent of Nepal's population.[45] Surveys conducted between 1978 and 1992 suggested a significant positive correlation between community forestry programs and reduced rates of deforestation.[46] Out of the village development communities (VDCs) surveyed, those with formally instituted community forest management experienced much smaller net losses of forest cover than those without: 1.9 percent versus 9.9 percent, respectively.[47]

The Nepal methodology dictates that rural groups must apply for FUG status. After consultation with government representatives and technical partners, and provision of information about the concerned area, the approved FUG is granted certain usage rights and management responsibilities for segments of forest. Legally recognized, the FUGs are entitled to all benefits of the forest resources in the agreed area and are made responsible for conserving and sustainably managing the forest.[48] In terms of structuring incentives for participation in this process, it is clearly to the advantage of forest-based communities to become FUGs. Legal land tenure status is instrumental for the rural poor to become more productive and ensure better stewardship of the land. Land tenure generates stability for families and communities; however, tenure is complicated and not always easy to secure or grant due to political biases, displacement, refugees, presence of current tenants, or the government's private and economic interests. If community management and legal rights over land coincide with the government's desire for an inclusive, locally-managed, and decentralized mechanism for forestry management, the benefits to both the governed and governing are very clear.

Mapping has proven to be an ideal medium for engaging rural communities in Nepal. Many of the participants in question are not literate and, therefore, benefit from visual information media to dictate and interpret the dimensions and landmarks of their forested areas. Mapping exercises have encouraged discussion between villagers and helped with information transfer between villagers and the government, as well as between villages.[49] Delineation of proposed FUG areas is a critical function of the local community and helps generate an upward informational flow that the government can use.

The prolonged social impact of PGIS for forestry management in Nepal has proven

significant, as evidenced by the Federation of Community Forestry Users, Nepal (FECOFUN), a formal network of FUGs whose incorporation empowers collective action. The overriding goal of FECOFUN is to ensure equitable access to resources for about 8.5 million forest-dependent Nepalese. Not just an informational resource for FUG applicants and members, FECOFUN supports programming, training, and research in sustainable usage; helps with alignment under REDD+ regulations, resource-based conflict transformation; and more.[50]

Of course, PGIS is not a perfect instrument—in Nepal's case, it faces challenges of both accuracy and participation. As Richard Mather cites, "Participatory maps based only on community perceptions … have certain limitations, including their lack of reliability as a means for establishing the scale of areas (the size of features is often portrayed to reflect subjective importance rather than physical scale) or as a means of determining boundary information."[51] In addition, a beneficial outcome of PGIS in Nepal has been to engage non-literate individuals, women, and marginalized groups, but participation by women has not yet reached desired levels. Due to traditional community social structures, broad representative participation is hard to achieve, though the cohesion and organization of these rural communities is critical in forming and managing a FUG. Imperfect participation reduces legitimacy and, therefore, threatens project effectiveness and empowerment. Strong bias is introduced when the main respondents are traditional leaders, while women and people of lower status remain underrepresented. An additional problem stems from the lack of specificity or accuracy of crowdsourced information. As underscored by Minang and McCall, "it is arguable that GIS and indigenous spatial knowledge may be inherently incompatible because of a dichotomy between the reductionism and ultra-precision of digitized geo-data, and the fuzziness, ambiguity, and synthesicity of 'natural language' spatial knowledge."[52] Minang and McCall also posit that there are deficiencies in ways that information is stored and communicated in the context of traditional community management, and that data is rarely quantified, making analysis more difficult.[53] Despite inaccuracies and sampling problems, the trend of PGIS in Nepal has good implications for local economies and livelihoods, forestry conservation, and broad-based collective political mobilization.

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Kenya Open Data and Huduma—A Paradigm Shift for Governance in Kenya?

In July 2011, the Government of Kenya officially made available its statistics and data on

government spending, health and poverty indicators, public service delivery including primary schools, and much more.[54] By releasing its data to the public, the Kenyan Government has made it possible for developers, statisticians, civil society groups, and researchers to analyze, engage, and criticize state management, budgeting, and welfare in entirely new and empirical ways. It has also opened its doors to evaluation and criticism more than ever before, breaking with the longstanding stereotype of unapologetically insular government systems in Africa. With significant support from the World Bank and the Mapping for Results program of the World Bank Institute, Kenya has taken the first steps toward empowering citizens through openness of information. A desired outcome of the open data initiative is to crowdsource independent developers who can create new and useful tools, applications, and analyses for institutions, companies, and the general public, making use of new resources to hold the government more accountable.[55] Ideally, greater transparency through open data on government spending, parliamentary proceedings, and public service delivery could also have a dampening effect on corruption in the country.

This case demonstrates several key elements of mainstream crowdsourcing systems, including hub openness and multi-layered data-types. Self-selection of participants is evident, as citizens with expertise in statistical analysis will be motivated to make use of raw government data. Other applications being built around or in concert with the open data initiative will cater to broader segments of Kenyan society. A central platform for information dissemination, Kenya Open Data functions as a neutral hub for citizens of all kinds to use. While it is yet unclear whether the government will provide data in a timely, accurate, or consistent manner, all of these steps are encouraging. Of course, observers and Kenyan citizens alike hope sincerely that the government's new commitment to transparency will breed self-correcting behavior and contribute generally to increased quality of life and government responsiveness.

So far, there has been a significant demand for data—a hopeful trend for proponents of crowdsourcing new applications and using government data to improve governance and development. As of August 17, 2011, there had been more than 100 individual requests for specific datasets, often accompanied by brief justifications or proposals for new application development. Though we have yet to see new, useful applications as a result of making data open and available, it is encouraging that the government has recognized the demand for data and responded appropriately. It is also worth noting that not all Kenyan government departments have been equally supportive of this move.

But there are efforts to even go one step further and offer a government response to citizens' public service delivery complaints modeled after the U.S.-community service SeeClickFix. In concert with the Kenyan Government's new open data initiative, an Ushahidi-based crowdsourcing platform called Huduma was launched in February 2011.[56] The platform employs an SMS, email, and Twitter reporting system and allows citizens to submit reports on infrastructure needs, supply or utilities shortages, and other problems with government services and conduct. There are six categories

for reporting: education, governance, health, infrastructure, water, and justice. Contributions can be submitted anonymously but show the location of the sender. Several Kenyan ministries attended the launch of Huduma,[57] but the extent and quality of their participation and willingness to adopt Huduma into their operations remains to be seen. Huduma was scheduled to become fully functional nationwide in August 2011.[58] However, as of mid-September 2011, out of more than 3000 reports submitted by citizens, only 12 were assigned to one of the six basic categories, and none had been resolved. Still, as a first step, the citizens who produced their reports can see them published online on a central platform. It will be interesting to follow how these reports—which make specific local issues and needs visible to the global public for the first time—will be handled by the government.

Crowdsourcing for Monitoring and Evaluation

Beyond tracking human rights abuses and monitoring elections, crowdsourcing can also serve as a complementary monitoring and evaluation tool for development and humanitarian programs seeking to implement a direct feedback loop from their beneficiaries. When critics doubt the validity and representativeness of crowdsourced data, they fail to appreciate that all other monitoring and evaluation tools and methods, whether surveys or focus groups, participatory rural assessments, training participants, or involvement of local partner organizations, necessarily face similar challenges. Although it cannot provide perfectly unbiased sampling, crowdsourcing has the potential advantage of being open to anyone with access to a mobile phone. Where organizations need to have situational awareness, they should be able to rely on ad-hoc sources that effectively scrutinize the accuracy, objectivity, and credibility of the information supplied. Crowdsourcing platforms have already installed methodologies to crosscheck information, minimizing the possibility of error or abuse.

The threat and risk maps produced by UNDP Sudan provide spatial risk assessments that can inform programmatic responses in Sudan's post-conflict states. The dynamic use of such spatial risk assessments over time demonstrates an even more compelling use of crisis maps for decision support. Due to a changing post-conflict environment, projects designed six months ago may no longer be achieving the intended impact. Regular updates on the changing context allow donors and government to adapt their programming respectively. Crisis mapping can play a pivotal role in this decision support process.[59] Patrick Meier proposes "basemapping" as a new concept in monitoring and evaluation that uses three types of mapping: the current situation (baseline), the ideal situation (intended impact), and an ongoing mapping process to measure progress from the baseline to the intended impact.[60]

In the emergent field of rights-based design, monitoring and evaluation, the incorporation of crowdsourcing systems holds great potential for influencing power dynamics between the traditionally governed and those in power. By creating new participatory spaces for marginalized segments of society to be heard, ICT for development (ICT4D) and crowdsourcing can revolutionize several aspects of

development—participatory rural assessments and project planning can be made less biased and more robust. In addition, new pilot programs are starting to examine the usefulness of ICT-based crowdsourcing to evaluate the impact of economic development, the results of which are yet to be seen. In any event, exercises in program evaluation should become more efficient, accurate, and targeted, as crowdsourcing and ICT4D solutions are adopted by practitioners, donor organizations, and developing country citizens.

Recommendations for Donors—Applying Crowdsourcing and Interactive Mapping for Socioeconomic Recovery and Development

Crowdsourcing systems present donors with an opportunity to enhance local ownership and facilitate broader participation in development and governance. As Ken Banks posits:

> The default position for many people working in ICT4D is to build centralized solutions to local problems—things that 'integrate' and 'scale.' With little local ownership and engagement, many of these top-down approaches fail to appreciate the culture of technology and its users . . . My belief is that users don't want access to tools, they want to be given the tools. There's a subtle but significant difference. They want to have their own system, something which works with them to solve their problem.[61]

Crowdsourcing requires significant contributions by volunteers. Yet processes driven by volunteers are less predictable and less controllable than formal processes. The question remains: is institutionalizing crowdsourcing (as in the case of national elections) always the best option? Fragile states, for instance, can be characterized by a lack of trust in public institutions. Therefore, ownership of the crowdsourcing, as shown in the case of the Open Data initiative, becomes a key issue, both on the side of government and on the side of potential users. The willingness and personal engagement of volunteers is based on a vision or specific objective that an official donor or government institution may not evoke in the given population. An initiative that is perceived to be externally driven will only work in an emergency, crisis, or similar short-term context. However, donors can play a pivotal facilitation role. When applied to a particular project design, the analytical tool for assessing crowdsourcing success factors presented in Part I can provide guidance in this regard.

There are meaningful ways in which donors can maximize the impact of crowdsourcing for better governance. Exploring the role of donor and government institutions in reactive and proactive crowdsourcing, the focus should be on creating awareness among officials to foster an understanding of the opportunities presented by this new mechanism. Crowdsourcing tools need first to be acknowledged by a wider group of professionals and become a valid input to guide decision making for these institutions. Rather than establishing separate crowdsourcing mechanisms in isolation from initiatives on the ground, official institutions need to find ways to cooperate with

the existing online communities and harness their potential to provide information and facilitate crowdsourced processes. The principle for the use of country systems in partner countries is equally applicable to civil society mechanisms, including traditional as well as modern virtual forms. In order to transform reactive crowdsourcing into proactive peacebuilding, democratization, and development programs, community engagement is indispensable to ensure a transition from short-term projects to sustainable processes carried out with broad-based ownership.[62] Donors can provide funding or technical advice to the setup of crowdsourcing initiatives by local institutions or groups.

Donors can also offer a crucial contribution at the level of the enabling environment. Donors are well equipped to help increase the political space for crowdsourcing by presenting the opportunities and advantages of crowdsourcing and interactive mapping to government authorities and taking the government's interests into consideration with regard to the potential of crowdsourcing for improved development planning, reduction of transaction costs, added value to e-government services, increased aid transparency, and improved relations with the public. Donors can thus suggest incentives to governments to support, or at least to permit, crowdsourcing processes.

Donors possess the convening power to bring all major stakeholders to the table. In addition, donors can offer financial incentives for local governments to collaborate, such as performance-based investment funds. Local government's implementation and performance can then be effectively monitored and evaluated by a civil society-based crowdsourcing mechanism.

The process of collaborative governance and decision-making is a factor in mediation and conflict prevention, the importance of which cannot be overestimated.

The cases of Nepal and Sudan demonstrate that donor-supported offline participatory mapping continues to play an important role in breaking down ethnic-social divisions and engendering inclusiveness and thus conflict sensitivity in community recovery and development planning. The process of collaborative governance and decision-making is a factor in mediation and conflict prevention, the importance of which cannot be overestimated. After the map has been agreed on, the mapping results can be digitalized by donors or governments and thus made available to the public. Participatory mapping can double as a training exercise for communities and authorities, and at later stages can be enriched by local community members through mobile phone-based crowdsourced tracking of development progress and activities. An innovative design of the planning process that combines traditional one-time participatory community mapping for planning and evaluation with continuous mobile interactive mapping for tracking and monitoring creates a (typically absent) feedback loop to and from the local level. Designing the intervention as a process, not a project,

and allowing the data generated through participatory mapping and crowdsourcing to guide overall planning decisions are crucial conditions for success. The inductive approach used in Sudan is an example of how mapping categories were developed by stakeholders, instead of being dictated by the facilitators. Planning data generated through such processes can legitimately inform state- and national-level development and poverty reduction strategies. In general, platforms that start at the community and locality levels, e.g., for collaborative community planning, seem the most promising, since their lower initial level within government reaps higher immediate benefits and presents a lesser political threat to government leadership.

The cases outlined in Part II present opportunities for governments to share information with the public and foster broader participation. Providing inclusive access to telecommunication and preventing the harassment of crowdsourcing activists is fundamental. Equally important are linkages with civil society and the private sector to facilitate the inclusion of population groups hitherto subject to the digital divide. All of these factors are plausible and beneficial advocacy positions for donors. Such advocacy could be part of the political dialogue within budget support programs or other significant multi-donor programs. The willingness of donors to gather and share their data, and to make them publicly available through an open-aid mapping process with crowdsourced feedback loops involving beneficiaries, can be an important incentive for governments to become more open. Ideally, crowdsourcing initiatives for development will be closely linked to an open government program, as attempted by the Kenyan government. However, open government programs cannot be donor-driven. They must be characterized by strong government ownership and leadership in order to have a chance at succeeding.

Last but not least, by means of their reputational impact, donors can significantly increase critical success factors by creating linkages and trust of a crowdsourcing initiative, especially in a fragile state context where strong initial government support may at times not be an option. In fragile state contexts, crowdsourcing can be made more difficult by government regulations and actions, but it can also draw more attention and motivations from the crowd, especially if there are otherwise limited options to express opinions. As the early experience has shown, crowdsourcing and GIS-based interactive mapping are already widely used practices of citizens within developing countries. Whether they will have a significant impact on governance depends largely on how governments relate to this emergent phenomenon. Embracing the potential of crowdsourcing, especially for participatory development planning and monitoring of issues by citizens, could increase governments' accountability and ultimately their political legitimacy, in the eyes of citizens and donors alike.

Endnotes

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