MODULE VI
Using New Methods and Technologies

PURPOSE: The rapid penetration of the internet and spread of new information communication technologies (ICTs) is radically changing the game in FCV (and non-FCV) settings. The World Bank and other partners are experimenting with new monitoring and evaluation tools using social media, smart phones, and even remote sensing. The spread of open data, including in FCV settings, means that charting and measuring results is now more feasible than ever before. The Guidance highlights emerging ICT tools and their potential to enhance monitoring and evaluation. It also signals some limitations and risks.

Fortunately, a large number of multilateral and bilateral development institutions are moving toward **open data** and open software, including in the FCV sectors. The World Bank, for example, has recently ensured that data are technically and legally open, with a view of enhancing the accessibility of reliable and comprehensive data. Many other organizations also are opening their data for public and private use and developing and applying new applications to track trends, including in FCV settings. This is radical departure from the past when agencies (and governments) were less inclined to share data or deployed more conventional methods to monitoring and evaluation.

There is also evidence of a greater willingness among aid agencies to experiment with new ways and means of monitoring and evaluating interventions. The World Bank, for example, has pursued a number of innovative approaches to measuring results in FCV settings, including Afghanistan, DRC, Kyrgyz Republic, Mali, Pakistan, the Philippines, and South Sudan (see Table 3). The organization has experimented with the use of smart phones to review service delivery performance, remote sensing tools to track energy projects, solar-powered digital data collection to profile vulnerable populations, and many other tools.

Table 3. Innovative Approaches to Monitoring and Evaluation Led by the World Bank			
Country	**Project description**	**The challenge**	The Solution
Afghanistan	The National Solidarity Program is intended to improve access of rural communities to basic services through balanced elections and disbursement of block grants to fund village projects	The unpredictable security situation combined with limited access to project sites, corruption, and low capacities of government and village-level personnel	Based on a "cooperation agreement" with targeted communities, local monitors were recruited to track implementation and the security situation. Small informal oversight committees were also developed of gender-balanced teams (2 males and 2 females) resulting in 13,000 groups.
Democratic Republic of Congo	The ICT4Gov project seeks to improve participation to improve service delivery	Lack of confidence and trust in the government and corruption challenges	Introduction of mobiles to promote participatory budgeting—inviting geo-targeted SMS, voting on priorities, announcing voting decisions, soliciting feedback
Kyrgyz Republic and Tajikistan	The formation of a regional electricity trade network between Kyrgyz Republic, Tajikistan, Afghanistan, and Pakistan through a 750 kilometer, high-voltage direct current line	The challenging security situation has undermined access to key sites; corruption and limited capacity also undermine the project	The team developed high-resolution imagery for the entire project corridor, which maps topographic and hydrographic features, land use and vegetation coverage, erosion-prone areas, settlements, and pastoral areas. This allowed for granular assessment and minimized staff risk.
Mali	The project promotes durable solutions for IDPs through provision of information	The unstable security situation results in weak access to project sites and delays	Implementation of baseline data collection and a repeat panel survey using mobile phones/solar chargers to collect socioeconomic data every two weeks through call centers (phone credit incentives)
Pakistan	The public management reform program seeks to improve performance of public services in Punjab through transparency efforts	Petty corruption and absenteeism of personnel undermines the quality of service delivery and is difficult to monitor	Administration of citizen monitoring system that records cell phones of users and introduces follow-up from supervisory agents. Also, the use of smart phones to geo-tag activities related to anti-dengue projects to improve response.
Philippines	The Mindanao Rural Development Program seeks to improve livelihood opportunities and institutional agro and fishery service delivery	The unstable security situation, the high risk of corruption, and the low-capacity of extension personnel	Application of geo-tagging (SMS/photos/video) enabling implementing partners to validate and monitor sites without having to visit. Recruitment of two CSOs to monitor project components.
South Sudan	The introduction of High Frequency South Sudan Surveys to improve the overall assessment of security, social, and economic conditions	The insecure situation means that projects are often inaccessible and traditional survey processes can take too much time to generate findings	The deployment of survey enumerators with tablet computers running open source ODK assessment tools—what is called Computer Assisted Personal Interviewing (CAPI). Information was uploaded to Form Hub—a free cloud-based server—and improved speed and accuracy of data.

Using Big Data to Monitor and Measure Peacebuilding and State-Building Progress

The expansion of computing capabilities, spread of new technologies, and opening-up of datasets has given rise to an unprecedented volume of information for monitoring and evaluation. Indeed, in a single year—2013—more data were generated than in all of human history combined. And global data are increasing at a rate of 40 percent a year. The harnessing of these data can potentially provide a real-time and 360-degree view in risky and data-poor settings. It can and is informing early warning, real-time situational awareness, and real-time feedback and decision-making. It is being actively used in the private and defense sectors, but is still at a nascent stage in the FCV sectors.[59]

There is a growing discussion about the use of big data to measure results in FCV environments. A growing number of data scientists and quantitative researchers are testing the viability of big data analysis in fragile countries. Big data can be summarized as datasets that are so large and complex that they cannot be processed by everyday database management tools (see Box 13).[60] They tend to have at least the following attributes:

- they are digitally collected,
- they are passively produced,
- they can be automatically collected,
- they are geographically and temporally available, and
- they are continuously analyzed.

A considerable debate has emerged about their current and potential application, and wider implications for privacy and ethics. There is also agreement that they are no panacea. There are challenges to capturing, curating, searching, sharing, transferring, analyzing, and visualizing big data. Some experts also argue that the real revolution may be in "small data" or "long data"—small datasets that are loosely joined in an ecosystem.

The excitement about big data is its availability at potentially low cost. Big data, especially online information, can be harvested in real time, but also retrospectively. A hope is that online data—often referred to as digital exhaust—can be analyzed to shed light on a wide array of factors alternately driving fragility and conflict or that can measure the outcomes and impacts of peacebuilding and

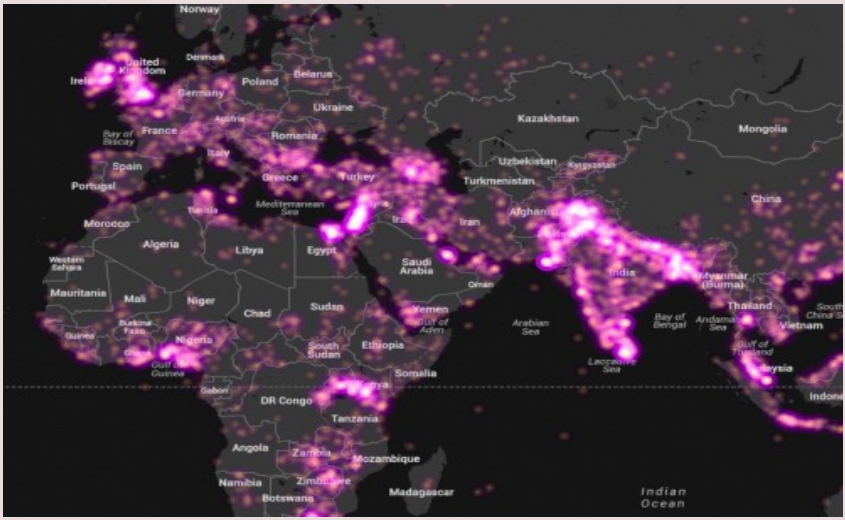
59 See special issue of Stability on "big data" and peacebuilding. See http://www.stabilityjournal.org/collections/special/new-technologies-peace-development.

60 Big data sizes are a constantly moving target, as of 2012 ranging from a few dozen terabytes to many petabytes of data in a single data set. See http://mike2.openmethodology.org/wiki/Big_Data_Definition.

Box 13. The Advent of GDELT: Big Data Event Monitoring for Tracking Change

The last few years has witnessed an explosion of new big data tools to track public sentiment in situations of fragility, conflict, and violence. The Global Data Event, Language and Tone Dataset (GDELT) is the largest public and global event data catalogue in the world. GDELT aggregates all major international, national, local, and hyper-local news sources in print and broadcast from every corner of the globe in English and vernacular. Data are automatically uploaded every 24 hours (and soon every 30 minutes) and coded using an algorithm. It codes all events by actors, types of events, location, time, and other attributes.

GDELT tracking the distribution of global protest (1979–2013)



http://news.psu.edu/story/292702/2013/10/25/research/penn-state-doctoral-student-creates-digital-map-global-future

GDELT is an open source big data tool that can be used to rapidly assess changes across a range of sectors. It can also provide "long data" trends. As the figure shows, it can track the intensity of insecurity or distribution of social protest in a country, state, or neighborhood. It can document the distribution of police or justice abuses. The dataset can also provide information on reported instances of corruption over time (by type, sector, and perpetrator). GDELT connects every person, organization, location, theme, and data source in the planet in a single source about what is happening, to whom, where, and how people feel about it.

state-building. Since a massive proportion of societies around the world are increasingly digitally literate and have ready access to basic Wi-Fi and telecommunications infrastructure, the capacity to "read" ambient data is growing. Already, social network and telecommunications data are being harvested and interpreted in mainstream development with assistance from groups such as Global Pulse.[61] While in many FCV settings there continues to be a digital divide, it is shrinking.

Relief and development organizations are already **harvesting strategic and operational data** directly from their operational sites. Such data can give digital signals about the effects of their interventions, but also unintended consequences. There are emerging examples of how agencies are harvesting routine data streams to track policy and programming outcomes (e.g., health access, school attendance); real-time records of access of users to basic services and related perceptions (e.g., banking, property, taxes); and social media to detect changes in attitudes and behaviors over time.

Digital content is expanding at an exponential rate and provides real-time data collection—or **data mining**—opportunities. Such content can include conventional press and media outlets as well as social media content—from Facebook, Twitter, Tumblr, and Instagram to other local platforms. Open source and private data mining technologies can be readily used to generate real-time monitoring of trending topics and to map out social networks. It can also be used to detect correlations with existing macro- and micro-level data (e.g., security metrics, price data, and victimization). For example, groups like Global Pulse and its partners have shown that there is growing evidence of such tools being applied in everything from using social media to track unemployment hikes, commodity prices (and the e-bread index), food security, and crisis-related stress.

Impressive amounts of data that detect the impacts of human behavior on the physical environment are now available. The idea is to track fingerprints through **remote sensing**. A combination of tools is available to track such transformations—including satellite imagery (to map land use patterns, construction materials for buildings, migration and livestock flows, and emissions and climate-related patterns). Examples include the Satellite Sentinel Project and partners such as DigitalGlobe that uses satellite imagery to track human rights violations. The use of automated pattern recognition can also detect subtle fluctuations over time.

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61 See the Global Pulse primer on using big data for development at http://www.slideshare.net/unglobalpulse/big-data-for-development-a-primer. Also consult the primer on telecommunications and mobile phone data for development at http://www.slideshare.net/unglobalpulse/mobile-data-for-development-primer-october-2013.

Using New Technologies for Digital Data Collection and Analysis on FCV

Mobile phones are revolutionizing monitoring and evaluation. When it comes to monitoring and evaluating peacebuilding and state-building, mobile technologies can be used in at least three ways: expanding data collection, strengthening beneficiary participation, and improved project management and coordination. Mobile phones can be used to gather information from target and control groups, as well as to send simple SMS, text messages, and email. SMS is a simple and easy way for agencies and communities to interact and, when appropriately set up, can allow for feedback on an array of priorities—ranging from governance, security, and justice to services and economic opportunities.[62]

At the most basic level, there are growing examples of the use of personal digital assistants (PDAs)—handheld devices—to gather survey-based data. Information can be gathered in real time, or uploaded when server connectivity is available. It can be facilitated by open software systems—like open data kit (ODK). Such tools typically consist of a mobile component (Android app), data storage (cloud), and a web-based form builder. A good example of a mobile-based data collection tool is the Kobo toolbox digital data collection suite that allows for rapid real-time information collection across multiple mediums.[63] While not problem-free,[64] they can enhance data transmission and decision processes.

Digital data collection promises to **speed up monitoring and evaluation processes**, while also reduce costs. Resources can be saved by, for example, eliminating the need for data-entry clerks and printing. Mobile-based data collection can also improve qualitative data collection by building visual and audio recordings directly into the data-collection process. As with any data harvesting, it is essential to adequately pretest and fully develop the software and train teams in the use of these kinds of survey tools. Likewise, it is vital to undertake a careful

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62 For example, in Georgia along the border with South Ossetia, the Caucasus Research Resource Center, with international support, has set up an early warning project across 18 communities that uses SMS text messaging and Ushahidi mapping. Users report security incidents to the Georgian Ministry of Internal Affairs and the European Union Monitoring Mission in real time. This free service has sped up response times by police and international observers and improved local perceptions of safety.

63 Together, these tools allow any practitioner to design and implement a research instrument for digital data collection, to conduct research in the field, and to aggregate the collected data into a database. The Kobo toolbox tool has been used in Angola, Bangladesh, Cambodia, Cameroon, Central African Republic, Chad, China, Colombia, Democratic Republic of the Congo, Haiti, India, Indonesia, Iraq, Japan, Kenya, Lebanon, Libya, Liberia, Sierra Leone, Sri Lanka, Sudan, and Uganda.

64 There are some concerns about digital data collection; specifically, concerns about tablet malfunction. Additional challenges arise from using new technologies since they may arouse suspicions, though they also promise less chance of data loss if survey tools are confiscated or lost.

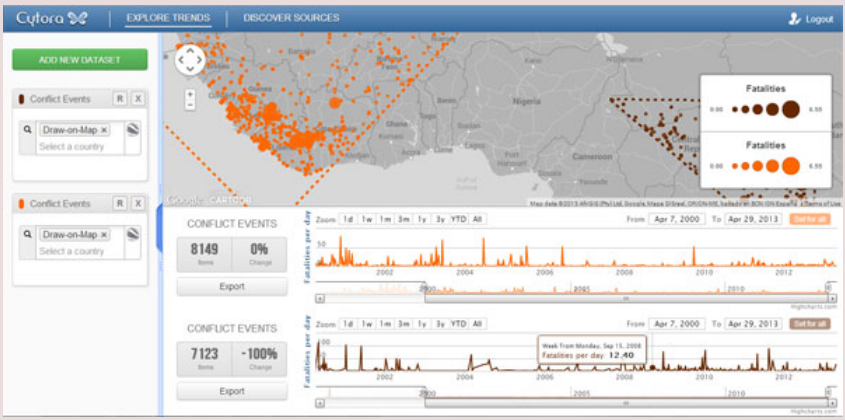
assessment of network coverage, connectivity, and ICT use and costs in situ.

Other recent innovations to mobile data collection include participatory video tools. Such methods allow for the collection of qualitative data that are often omitted from more traditional monitoring and evaluation systems. It tracks the program and project lifecycle over time and space through interviews, on-site visual monitoring, and monitoring more significant change stories. Crucially, participatory video monitoring can enhance the involvement of beneficiaries in the process when undertaken with facilitated techniques of a small number of trained experts. It tends to involve possible target groups, or representative samples of the population, in two to four week processes of data collection. Individual stories are collected and used to review program and project effectiveness.

Using Crowdsourcing for Real-Time Collection and Analysis of FCV

Crowdsourcing is receiving a great deal of attention in FCV circles. A growing number of agencies are starting to invest in a range of crowdsourcing tools for early warning and tracking violations, but also for mapping performance in FCV contexts (see Figure 3). These include programs harnessing mobile phones, as well as the use of social media channels and GIS technologies. Some donor agencies have partnered with major mobile providers to enhance coverage and generate scale in crisis response. A useful review of global experiences is the ICT in conflict and disaster response and peacebuilding crowd map that provides an inventory of relevant projects underway around the world.

Figure 3. Political Risk Analytics Platform



Source: http://www.cytora.com/

A **rapidly growing array of crowdsourcing tools** is emerging that can enhance monitoring and evaluation systems. For example, Humanitarian Tracker draws on a network of mobile phone users to track patterns of insecurity. It also protects the identities of reports and ensures the accuracy of its reporting through a set of filters. Innovations in data collection and filtering (validating and verifying) information are also leading to improvements for early warning systems and online mapping tools. Platforms such as Frontline SMS and Ushahidi have created novel tools to measure incidences of violence and harassment (see Box 14). These platforms—including crisis mapping and crowd mapping—can be adapted to FCV contexts.[65]

Box 14. Kenya's Hotbed of New Tech for Violence Prevention

Over the past decade, Kenya has emerged as a hotbed of innovation with new technologies. Much of this information revolution has been driven by the introduction of M-PESA, a mobile payment system. But it has also been enabled by comparatively high penetration of both digital connectivity and mobile phones. At least three now world-renowned initiatives have emerged in Kenya that capitalize on mobile phone–based technology to generate close-to-real time analytics of violence, conflict, and wider public sentiment. These tools are often developed on open software platforms and are now being used in many settings across Africa, the Americas, and Asia.

FrontlineSMS consists of a software platform designed for organizing communication with groups of people in FCV settings over SMS. The group has an office and developer team based in Nairobi. Today, thousands of public and nongovernmental organizations use FrontlineSMS to keep in touch with a large number of constituents who might otherwise not have access to the internet and are geographically spread out. To send and receive messages, FrontlineSMS simply requires a USB modem connected to a desktop or portable computer. The computer then copies SMS messages received by a phone onto the FrontlineSMS desktop application, which in turn can be used to visualize them in a manner similar to email. The application offers a number of features such as creating contacts and groups of contacts, replying to individual SMS, and sending alerts or surveys to groups or contacts. By using the group function, they can also home in on constituents from a designated area or users with specific

65 Crisis mapping and crowdsourcing have been used on numerous occasions since 2005, such as during post-election violence in Kenya (2008); earthquakes in Haiti (2010), Japan (2011), and New Zealand (2011); floods in India (2008), Colombia (2011), Russia (2012), and Indonesia (2013); and various hurricanes in the United State. However, crowdsourcing could increase digital noise at times when rapid solutions are required. In addition, where there is limited participation from the crisis-affected communities, decisions could be based on partial or inaccurate information.

(cont. box 14)

needs or skills. FrontlineSMS can also use it to communicate with their own employees to keep them updated with new information.

Sisi ni Amani–Kenya (SNA-K) is a Kenya-based NGO that deals with civic education and peace promotion. Their work combines traditional peace-promotion activities and an extensive field-based monitoring team with SMS messaging in affected communities. In February 2013, their innovative use of SMS and mobile technology for communication and violence interruption was recognized by a donation of 50 million SMS messages from Safaricom Ltd. As of the Kenyan elections in March 2013, their SMS platform had a subscriber base of over 65,000 individuals in six locations across Kenya. During the election week (March 3–9) the organization sent out 524,514 messages to subscribers. Targeted, carefully designed messages were sent in response to specific security concerns. During extensive follow-up recipients reported using the messages to resist peer pressure that is associated with participating in what is sometimes perceived as socially acceptable violent acts.

Ushahidi is an online mapping tool for crowdsourcing crisis information. The software was developed as a response to the media blackout in Kenya's disputed 2007/08 Presidential elections. The tool helped citizens tell their story through SMS and social media, relaying that information back to the geographic location where the story or incident took place. The software and the organization with the same name have grown quickly and the tool is used for various purposes by organizations all around the world. In 2010 and 2013, Ushahidi partnered with HIVOS, SODNET, CRECO, and other organizations to deploy two projects related to Kenyan votes. The first project monitored the Kenyan Referendum of 2010 and the second project, the 2013 General Elections. Uchaguzi Kenya 2013 was a short-term deployment of the crisis-mapping platform to act as an early warning and response system during the elections.

The possibilities of crowdsourcing are only starting to be appreciated. In the past, it was simply not feasible to collect data from disparate sources: either the data did not exist (or were too costly to collect) or the tools to collect them were not available or were of insufficient quality. New technology has allowed for great improvements in data processing and the possibility of aggregating and disseminating findings using both analog and digital means. Not only are traditional data collection processes being digitized, new tools are emerging to enhance interpretation. An excellent example is Google Fusion Tables that provides nontechnical teams with the ability to generate heat maps, point maps, graphs, and summary tables (see Table 4).

It is worth noting that while crowdsourcing tools hold promise, they also carry **risks**. Most experience with using crowdsourcing tools to monitor FCV is small-

scale and experimental. While the tools can offer terrific descriptive, predictive, and diagnostic insights, there are still concerns about their viability. Critics are concerned that such tools suffer from biases and blind spots. And as with big data, some critics note how few robust causal links can be drawn from correlations that may emerge from crowdsourcing analysis.[66] As with all monitoring and evaluation tools, a degree of caution should be used in their application and in the interpretation of data that results.

Table 4. A Typology of ICT Tools for FCV Monitoring

Generating data	Processing and communicating information	Improving decisions and reducing scarcity	Supporting relationships
Enhancing internet connectivity	Internet relay chat lines	Games and simulations	Social networking tools (MySpace, Change, LinkedIn, etc.)
Mobile or tablet-based surveys	Radio for peacebuilding and radio for peace	Online dispute resolutions	Online collaboration tools
GIS-Arc-view	Websites and information portals	Mobile phones and handhelds	Translation software
Satellite imagery and remote sensing	Data visualization tools		Blogs and social networking tools
Crowdsourcing	OpenNet Initiative		

Source: Adapted from http://www.idealware.org/articles/building-peace-through-information-and-communications-technologies

66 See Crawford (2013).

Additional Resources

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