



Objective: Use cell phones to obtain high-quality, verifiable, and real-time information about events that take place in hard-to-reach areas.

The Motivation

Between July 30 and August 4, 2010, some 179 women were raped in the Eastern Congolese town of Luvungi. Tragically, this is not an exceptional event in conflict-torn Eastern Congo. What was exceptional is that we heard about it. Atrocities such as this often go unnoticed because of the lack of accessibility to these villages, both due to poor infrastructure and to the simple fact that fighting makes it too dangerous to get close. The inability of international organizations and humanitarian NGOs to collect information under these conditions hampers the provision of assistance in a timely and effective manner.

In an effort to address this difficulty, Columbia University (with support from USAID) began the Voix des Kivus project in summer 2009, disseminating cell phones in many of these inaccessible Congolese villages with the purpose of collecting information on the conditions on the ground. After operating for more than a year and a half as a pilot in Eastern Congo, the resultant data collection *Voix des Kivus* suggests that obtaining verifiable, high-quality data in real-time from these hard-to-reach areas is not only possible, but needs less expense and oversight than previously thought.

The Concept

Voix des Kivus provides a means by which populations in South Kivu can post accounts of events that affect their daily lives, from disease outbreaks and crop failures to population movements and conflict incidents. For participating communities it provides a system for creating histories, archiving testimonies, and communicating with the rest of the world. The information gathered forms an important resource to researchers and practitioners working in the region, providing a tool to learn more about the situation on the ground in distant, difficult-to-access areas.



Often, especially at moments when a village is hard to reach due, for example, to armed combat, we want to know what happens there. *Voix des Kivus* provides a solution to this problem. Photo: VDK.

The Pilot

Voix des Kivus is currently running as a pilot project with the aim to assess the feasibility of using a decentralized cell phone based SMS platform for collating events information. The dual aim of the pilot is to both assess the technical feasibility of such a decentralized system in the region and the utility of the program to participating communities and potential users. Launched in four villages in the summer of 2009, the pilot has been monitored closely in order to evaluate and address any concerns raised by participants. Presently (beginning 2011) the program is operating in 18 villages in the war-torn province of Sud Kivu in the Democratic Republic of Congo.

The People

In each village participating in *Voix des Kivus* there are three cell phone holders: one representing the traditional leadership, one representing women's groups, and one elected by the community. Holders are provided with a phone, monthly credit, and a codesheet that lists possible events that can take place in the village. After the village grants its consent to undertake the project and holds an election to select the third phone holder, the holders receive (at a minimum) two days of training in using the phone. After this time, holders participate publicly and make themselves available to any village member who seeks to post messages through them. Continued engagement by holders requires that they post at least one message a week, although that message may be empty if no events of note have occurred. Holders send information on a purely voluntary basis and are reimbursed simply for the cost of each message sent.

The Technology

The technology for *Voix des Kivus* is cheap to set up and simple to use. Built on the freely available FrontlineSMS software, the system allows holders to send numeric or full text posts from almost any cell phone. On the receiving side a standard cell phone linked to a laptop linked to the internet comprise the necessary equipment. With other freely available software, messages received are automatically filtered according to origin, coded for content, cleaned to remove duplicates, and merged into a database. Graphs and tables are automatically generated which can then be automatically mounted into bulletins spanning any period of interest and with different levels of sensitivity. Translations of non-coded text messages (often from Swahili into French and English) are undertaken manually. The software and code used for this is available free of charge upon request (see the *Voix des Kivus Implementation Guide* for more information).



After the approval by the village chief, a general assembly is organized to introduce *Voix des Kivus*. Only with village consent does the project continue.



The general assembly is followed by an election to choose the third phone holder in which everybody is free to stand.

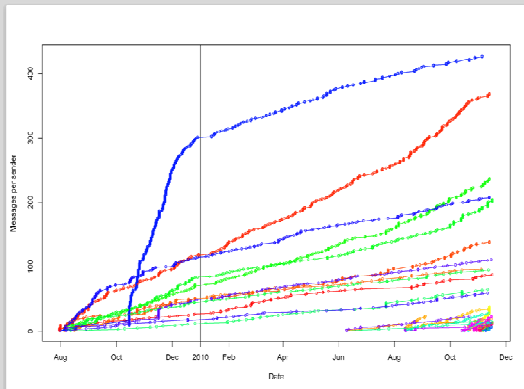


When the third holder is chosen an extensive training of at least two days takes place.

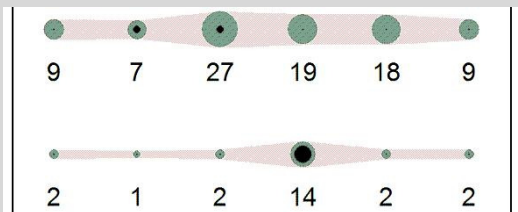
Photos: VDK.

The Data

Data from public reporting using the *Voix des Kivus* system is gathered and collated without editing the content of the message (except to remove duplicate entries). We have undertaken steps to informally verify the data during the pilot, but have yet to set up any systematic auditing procedures. As such, reports thus far should be viewed and interpreted as statements made by village representatives and not as independent assessments of conditions on the ground.



The figure gives the cumulative number of messages sent per phone holder since the summer of 2009. Phone holders show no sign of reporting fatigue.



Because there are three phone holders in each village an event might be reported by more than one holder. This internal validation mechanism is visualized in the second figure above: a row is a village over time, a green circle the total number of events in that village during a week. The black circle inside reports the number of events that are reported by at least two holders. *Figures: VDK.*

Phone holders have sent over 4,000 pre-coded messages and more than 1,000 text messages since the start of the project. This response rate is

especially encouraging considering that the pilot for *Voix des Kivus* consisted of just four villages from August 2009 until the end 2010.

Dissemination of the data

The constant flow of incoming data from our phone holders is kept in a database and captured in weekly bulletins. Each Monday a bulletin is produced and disseminated that presents events that took place in the preceding week. Because of the sensitive nature of some of the information there are two different types of bulletins: 1. the nonsensitive bulletin (without village identifiers) which can be distributed widely and is made available online, and 2. the sensitive bulletin (with village identifiers but without holder identifiers) that is shared with organizations that have received clearance from *Voix des Kivus* and its phone holders. The latter includes several development organizations based in Bukavu, DR Congo who can use the data to evaluate the situation on the ground through out the region. Also, all data collected and compiled is returned to the villages. For the nonsensitive bulletin please see: <http://cu-csds.org/projects/event-mapping-in-congo/>

The Potential

In January 2010 after consultation with the holders, *Voix des Kivus* introduced two extensions:

1. No longer is the program solely an information receiver - every second week we send prices of local goods to the holders;
2. Holders can now add a code to their SMS indicating the level of sensitivity and with whom the message is to be shared.

Real-time data relay systems like *Voix des Kivus* have tremendous potential to aid development work the world over. First, while *Voix des Kivus* has only been implemented in Eastern Congo, the approach can be implemented in any (hard-to-reach) area in any country with cell phone coverage. Second, beyond the purpose of reporting (crisis) data, a system like *Voix des Kivus* could be used for many purposes, including as a(n):

- Early warning mechanism;
- Tool to prioritize (development) interventions;
- System to relay information to villages. While we now relay price information, in the same way information on commodity prices, events announcements, medical and technical data could be provided;
- Automated information request system, which could have important governance and development applications. For example if an organization maintained information on small grants, then users from a particular village would be able to send an SMS to request information on the status or size of their grant and receive an immediate automated response with the information.
- System for once-off gathering of information on other topics. Such technology could soon be used to run the DRC's first phone survey!

What about electricity?

At the start of the project this was indeed a problem as phone holders had to walk six to eight hours to charge their phones (and they did). For 15US\$, however, solar-powered phone chargers solved this problem.



More information

If you are interested in implementing a similar project, please consult the **Voix des Kivus Implementation Guideline** and feel free to contact info@voixdeskivus.org with requests for more information.

Better Data Because of Crowdsourcing

An important question is whether the messages received can be trusted. Here we find the true value of crowdsourcing. Crowdsourcing works with phone holders that are pre-selected, and only they can send in information. With crowdsourcing, on the other hand, everybody can send in information. Crowdsourcing has three main advantages for data quality:

1. The data received is representative;
2. A long term relationship is established between the holder and the Voix des Kivus program;
3. Because more than one holder is selected in each village internal validation is possible.

	Crowdsourcing	Crowdsourcing (eg. Voix des Kivus)
Broad-based	✓	✓
Representative	?	✓
Real time	✓	✓
Verifiable	?	✓
Cheap	✓	?
Safe	✓	?
Non-manipulable	?	✓

Because Voix des Kivus reimburses the holders it is possible that a crowdsourcing system is more expensive. Also, in a crowdsourcing system the phone holder is less easily identified as an information provider and therefore this system could be safer.