Wireless Technology for Social Change:
Trends in Mobile Use by NGOs

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About The Vodafone Group Foundation and the UN Foundation Partnership

The UN Foundation–Vodafone Group Foundation Partnership is the leading public–private alliance using strategic technology programs to strengthen the United Nation's humanitarian efforts worldwide. The Partnership has three core commitments: (1) to develop rapid response telecommunications teams to aid disaster relief; (2) to develop health data systems that improve access to health data thereby helping to combat disease; and (3) to promote research and innovative initiatives using technology as an agent and tool for international development. Further information can be found at www.unfoundation.org/vodafone.

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Clockwise left to right: World Food Programme/ICT; DataDyne; Cell-Life; Télécoms Sans Frontières (TSF); FishMS; TSF.

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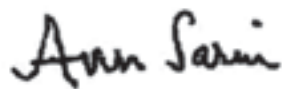*Credit: TSF*

Foreword

Mobilizing for Change

Four years ago, we stood together at the United Nations to announce a global partnership that would help bring innovative technology to bear on some of the world's most intractable problems. Since that time, through the United Nations Foundation–Vodafone Group Foundation Technology Partnership, we've brought the best of the business world together with dynamic UN agencies and other organizations to help collect and track health data in Africa, respond to humanitarian disasters across the globe, and drive forward policy changes related to technology and development.

This partnership is helping the United Nations achieve the Millennium Development Goals and tackle key health, social, environmental, and development challenges. Technology–especially wireless communication–is crucial to finding solutions to these problems. It can connect families separated by disaster, help emergency relief workers respond more quickly, empower farmers to ask for better prices in markets, help track the impacts of climate change, and so much more.

Our partnership is also constantly exploring new ways of applying technology to benefit developing countries, where mobile technology adoption rates are highest. To this end, we support original research to expand the discussion about how technology can help transform lives.

In this second publication in our Access to Communications Publication Series, the authors examine real-life examples of and trends in wireless technology solutions being used to drive change in the areas of health, humanitarian assistance, and environmental conservation. The compelling stories portrayed in this report demonstrate that telecommunications can be a powerful tool for positive change in our world.

We hope you'll join our efforts to harness technology and innovate on behalf of humanitarian causes and a better world.

Arun Sarin, CEO
Vodafone

Ted Turner, Chairman
United Nations Foundation

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We are also grateful for the participation of survey group Greenberg Quinlan Rosner Research and the many non-governmental organization (NGO) representatives who responded to the survey about how they are using mobile technology. We appreciate the partnership approach of the eight NGO networks who welcomed us to use their websites and email lists to reach a diverse set of NGOs with the survey—Idealist.org, InterAction, International Youth Foundation, MobileActive.org, New Tactics in Human Rights, OneWorld, SANGONeT, and ShareIdeas.

This report would not have been possible without the help of the NGOs and intergovernmental organizations profiled in this publication. We would like to thank all of the representatives from these organizations for the time spent sharing the results of their projects.

Finally, we would like to acknowledge the team that worked to produce the document you now hold in your hands. This includes copyeditor Lelani Arris, and Hal Kowenski and Karen Finkel at Linemark Printing.

GREENBERG QUINLAN ROSNER RESEARCH

A Survey of NGO Use of Mobile Technology for Social Change

Between December 10, 2007 and January 13, 2008, 560 non-governmental organization (NGO) workers participated in a survey designed to demonstrate how NGOs are using wireless technology to help reach various social, civil, economic, and political goals.

The survey was developed by Greenberg Quinlan Rosner Research, and distributed via the email networks of eight partner groups reaching a geographically and thematically diverse group of NGOs: Idealist.org, InterAction, International Youth Foundation, MobileActive.org, New Tactics in Human Rights, OneWorld, SANGONeT, and ShareIdeas. The survey was also shared with the contacts of the two sponsoring organizations: The Vodafone Group Foundation and the United Nations Foundation. Responses were collected from NGO representatives in all parts of the world.

NGOs' Use of Mobile Technology Very Widespread and Indispensable

Eight-six percent of NGO employees are using mobile technology in their work. NGO representatives working on projects in Africa or Asia are more likely to be mobile technology users than their colleagues in areas with more 'wired' infrastructures. Ninety-nine percent of technology users characterize the impact of mobile technology as positive. Moreover, nearly a quarter describe this technology as "revolutionary" and another 31 percent say it would be difficult to do their jobs without it.

	Total (%)
It has completely revolutionized the way my organization or project does its work	25
It would have been very difficult to do the work without it	31
It is/was very helpful for my organization or project	36
It is/was only somewhat helpful	8
Ultimately, it is/was more of a burden than a help	0
It was a waste of time and money	0

Applications of NGO Mobile Use Are Diverse

While voice and text messaging are still the most common applications of mobile technology among NGO workers, respondents report using wireless technology in a number of other ways, including photo and video (39 percent); data collection or transfer (28 percent); and multi-media messaging (27 percent). The survey also finds some NGO workers using mobile technology for more sophisticated purposes such as data analysis (8 percent), inventory management (8 percent), and mapping (10 percent). Importantly, the amount of money invested in mobile technology correlates to a higher diversity of application; those NGOs that spend more use this technology for higher-end functions. Users of mobile technology on projects with a health focus are also more likely to use mobile technology for data purposes.

Perceived Benefits of NGO Mobile Use are Enormous

The survey reveals that the key benefits of mobile technology for all NGOs include time savings (95 percent); the ability to quickly mobilize or organize individuals (91 percent); reaching audiences that were previously difficult or impossible to reach (74 percent); the ability to transmit data more quickly and accurately (67 percent); and the ability to gather data more quickly and accurately (59 percent).

Not surprisingly, then, 76 percent of NGO users said they would likely increase their use of mobile technology in the future. Many of these survey results are reflected in the case studies featured in this report.

Introduction

An estimated 3.5 billion mobile phones are now in use around the world–more people now have one than don't.[1] This remarkable revolution–widespread access to the most ubiquitous communication device in human history–has changed the way societies and communities organize themselves and do business.

We, the authors, set out in this report to explore the ways in which non-governmental organizations (NGOs) and other groups deploy and use mobile technology in their work to help solve some of the world's greatest problems. This study is not meant to be exhaustive or definitive, but rather to provide a view into how a number of organizations are using mobile technology to achieve social impact. We selected case studies that enabled an exploration of significant innovations, opportunities, and emerging trends, as well as the obstacles, in the use of mobile technology to advance social goals.

[1]UNCTAD (United Nations Conference on Trade and Development). *Information Economy Report 2007-2008* (UN Publications, 2008).

Credit: TSF

Innovative Uses of Technology Driving Change

Looking at the work of NGOs in three specific issue areas–health, the environment, and humanitarian relief–we found a number of creative and innovative uses of mobile technology for change. In exploring the various applications in these areas, we observed the following:

Innovation and Scaling

■ Organizations are thinking in creative, innovative, and often very entrepreneurial ways about how mobile technology can advance their social impact.

■ The potential to scale and replicate projects is significant. Although the vast majority of projects are ground-breaking, often they are pilot projects that are small in scale. Many of the organizations we talked to recognize that scaling their projects beyond a relatively small pilot and replicating them elsewhere will be vital to realizing the potential of mobile technology in the areas studied.

■ Creative partnerships are key to bringing promising mobile initiatives to scale. For example, SexInfo, a text message-based health information service for youth, was made possible through collaboration between the San Francisco Department of Public Health and a local nonprofit. Now it is being scaled up in a similar way in two new locations. Similarly, both Satellife's project in Uganda and the EpiSurveyor project piloted in Kenya and Zambia are being replicated and scaled to use mobile devices for health data collection and analysis in several additional countries.

- Sharing information and technical exchanges could reduce the amount of time it takes to launch a solution and reduce the associated costs. Smaller organizations, in particular, continue to exercise a great deal of trial and error when it comes to utilizing mobile technology in their work. ISIS-Inc., the parent organization of the SexInfo project (Case Study 4) spent nearly six months researching cost effective ways of implementing its text messaging-based health information service before a technology firm in Australia offered to provide a short code at no cost.

- More needs to be done to overcome the 'innovation silos' some organizations operate in, where advances and knowledge gained in the use of mobile technology do not necessarily transfer across organizational boundaries.

- We have seen in the health field that mobile technology is facilitating data collection; yet health providers and local and national governments are now facing the need to create back-end systems capable of aggregating and analyzing a wealth of new data. Systems are complex and multi-faceted and interventions in one area may require investments in others. In some cases, advances made possible through mobile technology demand more sophisticated back-end systems.

Social Impact

- Mobile initiatives provide greater opportunities for social impact that other information and communications technology (ICT) projects do not necessarily share. For example, physical access to mobile phones is obviously much greater compared to computers and other less readily available technologies. With rapid mobile phone penetration in many areas of the globe and growing mobile network coverage, access is increasingly assured. Likewise, mobile initiatives can be more affordable but the skills and training necessary to implement them less so.

- Mobile technology initiatives in this field are still emerging, with most of the projects we investigated at the 'proof of concept' stage. A report by the World Bank's InfoDev program states, "It is harder to find examples of analysis that moves beyond the project purpose to […] look at the conditions that might need to be in place to scale up interventions and what might be the impact of such activity."[2]

- While we can point to solid outcomes for the programs, for example, the number of clients served or number of text messages sent, strong evidence-based information about the widespread impact of mobile initiatives on international development goals is elusive. In our review of organizations' work and relevant literature, only rarely did we find solid impact assessments that evaluate whether an empirical link exists between a technology solution and the achievement of a social or international development goal.

- Investment in knowledge-sharing and impact assessments are vital to realize what we believe is the enormous potential of mobile technologies to further development goals such as those outlined in the United Nations' Millennium Development Goals. Several donors, such as Canada's International Development Research Centre, are now investing considerable resources to assess over several years the impact of mobile technologies in improving health, for example, to build a more solid body of evidence about social impacts.

[2]Chetley, Andrew, ed. *Improving Health, Connecting People: The Role of ICTs in the Health Sector of Developing Countries* (Washington, DC: InfoDev, 2006). *www.infodev.org/en/Publication.84.html.*

Challenges

- The costs of developing and deploying mobile technologies are often onerous for organizations, explaining, in part, why projects are small in scale. We found that many projects rely on heavily subsidized technology or transmissions or even direct donations by technology companies and mobile operators. While some players are willing to donate their services for smaller projects, there are questions as to whether scaled initiatives would receive the same level of support.

- The potential for scaling up 'mobile for good' initiatives may come with identifying commercial incentives, as is the case with Groupe Spéciale Mobile (GSM) Association (GSMA)/Safaricom initiative that we describe in this report, designed to protect human populations and elephants in Kenya. Identifying potential win-win solutions for businesses and nonprofit organizations holds promise for expanding and sustaining the impact of such initiatives in the future.

Lessons Learned

- Many of the same lessons learned in information and communication technologies (ICT) development and deployment apply to mobile initiatives. Our research has uncovered a set of potential best practices for technology deployment:

  - There need to be clear and realistic program goals and solid knowledge about the needs on the ground and of the intended beneficiaries.

  - Mobile solutions, as with any other ICT project, need to be appropriate to their environment to have impact, and be responsive to local needs and conditions.

  - Users need to be involved in the planning and design of mobile systems and they need incentives (such as increased efficiency or time savings) to use the technology.

  - Training for users needs to be a focus of mobile projects within an organization.

  - There needs to be a focus on the benefits of a given system rather then the technology per se.

  - Governmental ICT policies and regulatory frameworks should be consistent and predictable and foster an environment for innovation. There are still significant barriers in this arena, despite efforts by trade associations such as the GSMA to increase awareness of these issues for development.

We are hopeful that increased attention and investment into the real and concrete potential and actual use of mobile technologies will help improve lives around the world.

Credit: Cell-Life

I. Global Health

Mobile Technology in Health

The Millennium Development Goals (MDGs) acknowledge the centrality of health in reducing poverty and increasing human development. The role of mobile phones, as with other information and communication technologies (ICT), is under increasing scrutiny in the health arena, precisely because the stakes are so high and the potential gains from technology development so significant.

Take HIV/AIDS, for example. A 2007 report on the MDGs states: "The number of people dying from AIDS worldwide increased to 2.9 million in 2006, and prevention measures are failing to keep pace with the growth of the epidemic. In 2005, more than 15 million children had lost one or both parents to AIDS."[3]

Furthermore, of the one billion people living in extreme poverty, 75 percent live in rural areas. A report by InfoDev notes: "Health conditions in rural areas are generally poorer, and access to information, services, and supplies is most limited."[4]

Informa Telecoms & Media estimates that in mid-2007, mobile networks covered 90 percent of the global population, and that in 2008 worldwide mobile phone penetration will hit 50 percent, with well over 3 billion subscriptions.[5] With rapidly increasing mobile coverage around the world and expansion to rural areas where Internet access is still years away, mobile technology holds great promise for making health prevention and medical care more effective for the world's poorest people.

Mobile technology has been piloted in a range of health-related areas, including improving dissemination of public health information (e.g., disease outbreak and prevention messages); facilitating remote consultation, diagnosis, and treatment; disseminating health information to doctors and nurses; managing patients; monitoring public health; and increasing the efficiency of administrative systems. In all these areas, evidence exists that mobile phones can play a significant role. Further work is underway to look at the actual impact of mobile phones on improving health outcomes. The PanAsian Collaboration for Evidence-based e-health Adoption and Application (PANACeA), a project underway at the International Development Research Centre, is assessing the effect of mobile phones on improved health.

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[3]United Nations. *Millennium Development Goals Report, 2007* (United Nations, 2007).
[4]Chetley, Andrew, ed. *Improving Health, Connecting People: The Role of ICTs in the Health Sector of Developing Countries* (Washington, DC: InfoDev, 2006. *www.infodev.org/en/Publication.84.html)*.
[5]Informa Telecoms. *Mobile Industry Outlook 2008, 6th Edition* (London: Informa Telecoms, 2007).

Credit: DataDyne

While impact assessments and outcome measurements are hard to come by, there is evidence that text message reminders increase patient compliance in taking medication for such diseases as tuberculosis and HIV.[6] Yet much of the published evidence about the use of mobiles in health remains in the proof of concept stage.

The case studies featured here explore areas where mobile phones show great potential: health workers making better treatment decisions because of information delivered via the mobile network (e.g., Academy for Educational Development (AED)-Satellife), people making informed choices about their health with better access to information delivered via mobile phones (e.g., SexInfo), and the collection of medical data on mobile devices for better patient and public health management (e.g., DataDyne and Cell-Life).

In order to justify investing in the use of mobile technologies in the health sector in poor countries, much more attention needs to be paid to how such technologies effectively integrate and improve basic service delivery on the ground. Furthermore, the potential benefits in improved access, quality of care, and better clinical results need to be clearly demonstrated.

The challenge is how to move from proof of concept to larger scale implementations of promising projects. We are optimistic that with increased investments in evaluating the health impact of using mobile technologies and, more importantly, in the scaling of projects that are shown to work, we will see significant progress in some of the areas discussed. Lastly, we hope that there will be continued investment in new and innovative uses of mobile technology in exploring, for example, how mobile phones can play a role in maternal health.

[6]Vodafone Group. *The Role of Mobile Phones in Increasing Accessibility and Efficiency in Health Care. Vodafone Group Policy Paper Series* (Newbury, UK: Vodafone Group, 2006).

Delivering Patient HIV/AIDS Care *(South Africa)*

Issue: Confronting South Africa's HIV/AIDS Epidemic

Medical workers and doctors in South Africa are confronted daily with nearly impossible odds: over one-tenth of the South African population has HIV/AIDS, with younger age groups showing infection rates as high as 30 percent. With more than 5.6 million afflicted with HIV or AIDS, South Africa has the worst AIDS epidemic in the world.[7] The South African government began supplying anti-retroviral drugs in 2004. By 2006, 33 percent of people living with HIV/AIDS were receiving anti-retroviral treatment.[8]

A weak state health infrastructure and disparate system of rural clinics make consistent anti-retroviral treatment (ART) and patient monitoring extremely difficult. Eighty percent of the HIV/AIDS patients that do receive medical care rely on the government health care system. HIV/AIDS patients living in rural areas must travel long distances to reach a hospital. Frequently, they encounter a day-long wait as understaffed and under-resourced clinics attempt to cope with the high demand. Sometimes hospitals run out of the necessary drugs, and patients return home without medications. Secondary infections such as tuberculosis or pneumonia are common.

For those patients fortunate enough to be receiving ART, effective patient care monitoring is essential to reducing the risk of high toxicity levels from treatment, and to ensure a regular treatment regime. If

[7]See *www.avert.org/aidssouthafrica.htm.*
[8]WHO. *Towards Universal Access: Scaling Up Priority HIV/AIDS Interventions in the Health Sector* (Geneva, Switzerland: World Health Organization, 2007, *www.who.int/mediacentre/news/releases/2007/pr16/en/index .html).*

adherence to medication is not kept above 90 percent, HIV can develop mutations that lead to drug resistance, making first-line ART ineffective and worsening the epidemic.

Credit: Cell-Life

Response: Improving Treatment through Mobile Applications

Cell-Life, a non-governmental organization based in Cape Town, South Africa, created its "Aftercare" program to work with the public health system and its health workers to provide home-based care for HIV/AIDS patients receiving ART treatments. The mobile technology-based Aftercare program supports the effective treatment of HIV/AIDS patients, and covers other aspects such as voluntary counseling.

Each Aftercare worker is assigned to monitor 15 to 20 patients. The worker visits the patient in his or her home, and in a one-on-one session discusses the patient's current treatment. Using their mobile phones for data capture, Aftercare workers record information about patient medical status, drug adherence, and other factors that may affect a patient's ART therapy.

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Aftercare workers then relay this information via text message to a central Cell-Life database.

The data sent via text message reaches the Cell-Life server, where a care manager uses a web-based system to access and monitor the incoming patient information. The manager can also respond to Aftercare workers' questions and provide supplemental information to improve patient care.

The information collected not only facilitates individual patient care, but is also used to build a database of information on the severity and prevalence of the South African AIDS epidemic in these regions. The goals of the program include reduction of treatment errors, increased volume of patient data, and increased comfort for the patients as they receive HIV/AIDS care.

Outcome: Delivering Health Care for HIV/AIDS Patients

The Cell-Life Aftercare project was conceived as a joint project with the University of Cape Town and the Cape Peninsula University of Technology. The partners built a monitoring and evaluation system into the Aftercare program, and initial results indicated that the quality of care for patients has improved. A Women's Net and United Nations Children's Fund (UNICEF) report billed Aftercare as "one of the most experienced initiatives combining mobile phone technologies and AIDS management."[9]

In part, the efficacy of Cell-Life's work in South Africa can be attributed to the high prevalence of mobile phones. South Africa's mobile penetration rate is 41 percent, and mobile phone networks cover more than 90 percent of the country's territory.[10] The Aftercare program and technology were

designed with end users in mind. It functions in a participatory fashion, is simple and works consistently, and provides feedback to the counselors via text message when reports from the home health aides are received. The program has been able to keep costs relatively low by using data collection software that functions even on low-cost phones.

Challenges: Sustainability and Scalability

Two major challenges for Aftercare's future identified in several evaluations are long-term financial sustainability and the difficulty of implementation on a larger scale. Scaling the project to more areas is expensive and difficult because the system can only be used on one network using prepaid accounts. And because the software is written only in English, it would have to be translated into South Africa's eleven national languages in order to be successfully scaled.

Ulrike Rivett, founder and director of Cell-Life, says: "The single greatest risk [to effective patient monitoring] is the lack of resources to roll out ART effectively. The areas with the highest prevalence of HIV have a shortage of skilled medical personnel, lack of good nursing and management staff and have limited financial resources," making mobile health solutions all the more valuable.

[9]Shackleton, Sally Jean. *Rapid Assessment of Cell Phones for Development* (Women's Net and UNICEF, 2007, *http://www.unicef.org/southafrica/SAF_resources_cellphones4 dev.pdf).*

[10]The Economist Intelligence Unit, data accessed February 2008.

Credit: Cell-Life

Next Steps: Expanding the Cell-Life Model

Beyond securing the necessary funding, Cell-Life has identified a number of criteria that would influence the future of Aftercare. These include:

- further development of its data management software;

- expansion of its partnerships with other actors in the public health sector and commercial operators in South Africa;

- better interoperability between its systems;

- greater standardization for medical record collection forms; and

- the adaptation of the system to other chronic and acute diseases.

Cell-Life is also considering a migration to Java and GPRS (General Packet Radio Service) platforms to lower data transmission costs. They are also looking to enhance security measures and translate the program to other languages spoken in South Africa.

In a country challenged by a high rate of HIV/AIDS, a weak state health infrastructure, and a disparate system of rural health clinics, the Cell-Life Aftercare program is demonstrating how an innovative mobile application can improve patient treatment. If the program can overcome the significant barriers to expanding nationwide, it may provide a necessary tool for South Africa's ability to confront its HIV/AIDS epidemic through the delivery of effective treatment. ■

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Connecting Health Clinics and Remote Health Workers *(Uganda)*

Issue: Relaying Medical Care Information in Rural Areas

In developing countries, health care is often delivered by a lone nurse practitioner in a one-room clinic. As they battle AIDS, tuberculosis, malnutrition, malaria, and other diseases, the practitioners frequently lack access to electricity or running water, let alone medical information, a telephone, or the Internet.

Often the quality of care a patient receives is limited to whatever knowledge the nurse retained from basic training. In Uganda, per capita spending on health is US $57 per year. In Rakai, a rural district about 200 miles southwest of the capital city of Kampala, there is one doctor for every 22,400 people; in the Mbale district, a rural agricultural district where coffee and bananas are grown, there is one doctor for every 15,000 people. With medical staff stretched so thin and working under challenging circumstances, access to wireless-enabled health care information becomes a critical lifeline just when it is needed—at the point of care.

Response: Using Wireless Personal Digital Assistants to Bridge the Gap

To address this urgent need for point-of-care medical information, Academy for Educational Development (AED)-Satellife, a U.S.-based nonprofit organization, has implemented projects in more than a dozen countries where health professionals working in resource-poor areas use handheld personal digital assistants (PDAs) to transmit and receive vital data via a wireless or mobile network.

How It Works

AED-Satellife has used handheld computers for the last six years to deliver medical information at the point of care. It delivers medical information including disease treatment guidelines, continuing education materials, newsletters, and essential drug lists and databases. Nurses also receive national and international news articles on their devices.

AED-Satellife also has customized software for data collection on handhelds so medical workers are able to track patients and keep records electronically. Clinics are required to regularly send data on public health programs and routine epidemiological data back to the regional health centers.

Personal Digital Assistants

A PDA, or personal digital assistant, is a small, handheld computer that makes it possible to store, access, and organize large volumes of information. Personal digital assistants can exchange data electronically with other devices. They are sometimes also referred to as 'smart phones' when telephone capabilities are included.

Holly Ladd, Director of AED-Satellife, describes how handheld devices deliver vital information: "We have seen changes in practice, particularly around treatment for diarrhea. We emphasize in the medical treatment alerts that we send to the handheld devices in the clinics that re-hydration therapy is strongly recommended as a first course of action, particularly with kids. We have evidence that this is now used much more often as a first course of action in those clinics."

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Likewise, PDAs can streamline health data collection from remote areas. Ladd describes a recent typhoid outbreak that was detected early because clinics regularly reported cases with PDAs. "The outbreak was contained because we could see that something was amiss. This would not have been possible with paper and pencil reporting, which is much more time-consuming," she says.

AED-Satellife has pioneered the use of handheld devices that can perform the same tasks as a desktop or laptop computer in health-care settings in developing countries. The Uganda Health Information Network is an AED-Satellife Project operated in collaboration with Uganda Chartered HealthNet and the Faculty of Medicine of Makerere University. It is the largest of AED-Satellife's current projects using PDAs in health clinics.

Outcome: More Effective Data Collection, Better Health Care Services

Four years into the project in Uganda, 175 remote health facilities serving more than 1.5 million people are able to send and receive data and medical updates. AED-Satellife is replicating the project in Mozambique, having translated the software and materials into Portuguese, where 110 health centers are receiving medical updates and are collecting health information. It also launched in South Africa in spring 2008.

An evaluation of AED-Satellife's project in Uganda determined that handheld

computers result in "more rapid, accurate, and cost-effective data collection and reporting."[11] It found that a handheld computer network spanning two districts in Uganda indicated a 24 percent savings over traditional paper-and-pencil methods, and that further savings are expected as additional surveys are converted to the handheld format.

AED-Satellife has carefully documented its lessons learned from years of using PDAs in delivering and collecting health information in developing countries. The organization has produced a 'PDA Toolkit' complete with a step-by-step guide on how to deploy PDAs, including information on the opportunities available and how to assess an organization's readiness for using handhelds.

Ladd notes that AED-Satellife now knows "what users like and do not like, what incentives they need to use the PDAs, where we need to cheerlead, support, and evangelize. It turns out that delivering news and popular content—including gossip columns—onto the nurses PDAs is a great way to get users used to using them."

Next Steps: Coordinating with Key Partners to Bring Programs to Scale

In order to expand projects like AED-Satellife, the Uganda Health Information Network needs institutional support from the national healthcare system. In Uganda, the AED-Satellife project was initiated by two non-governmental organizations (NGOs) in conjunction with the Faculty of Medicine of Makerere University.

Although the District Health Services—Uganda's regional health system—was actively supportive, the Ugandan Ministry of Health initially wanted to wait until the viability of the solution was proven before

[11]AED Satellife internal evaluation

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making a decision about whether to become a direct implementing partner. AED-Satellife continuously updated the Health Ministry on the project, and in 2007 the Ministry indicated its intent to roll out the network to additional 20 districts.

Ladd says: "We have proof of concept now, and are working with the Health Ministry to scale the network from 174 health centers operating at the district level to an additional 20 health districts with approximately 3,000 additional health centers."

In Mozambique, AED-Satellife took a slightly different approach. That project, which began with the launch of PDA programs in 110 health centers, was initiated by the Maputo Ministry of Health and supported at that level. Engaging the Ministry of Health from the very beginning proved to be instrumental in ensuring project sustainability, and facilitating rapid skills transference to Ministry technical personnel.

As the program is brought to scale, the wireless connections established through the AED-Satellife programs are increasing health officers' knowledge of health care needs–even in the most remote areas–while sharing critical medical and health updates

with health workers. Particularly for remote, under-resourced areas, access to wireless-enabled health care information can serve as a critical lifeline for informed health care. ■

Developing Open Source Standards

There are now several consortia that aim to collaboratively standardize software for medical records collection. The Open Medical Records System (OpenMRS) is a free and open source electronic medical record application for developing countries (*www.openmrs.org*). The application has been used to manage patient and treatment information associated with HIV/AIDS and tuberculosis care in several countries in sub-Saharan Africa. Open Rosa, another consortium just now forming, aims to develop a mobile medical record system. Both consortia have received funding and are aimed at reducing redundancy amongst NGOs developing medical record systems, and standardizing the way medical data is collected and managed, both on computers and on handheld and mobile devices.

Credit: AED-Satellife

Lowering the Barriers for Access to Public Health Data
(Kenya, Zambia)

Issue: Monitoring Disease in Developing Countries

"It was the late 1990s and I was amazed by the lack of adoption of modern IT [information technology] in collecting health data, whether you were in Haiti or parts of the U.S.," recalls Joel Selanikio, a pediatrician, technologist, epidemiologist, and co-founder of the non-profit DataDyne.org. "Government agencies tend to lag far behind the private sector in pursuing new technologies."

Dr. Selanikio began his public health career working at the Centers for Disease Control and Prevention (CDC), a U.S. government agency. He traveled the globe investigating disease outbreaks. Searching for clues, he collected and analyzed health data, evaluated programs, interviewed patients, and was sometimes able to discern patterns others had overlooked. Yet, as is often the case in addressing public health concerns, his efforts were hindered by a lack of reliable, systematically recorded data. In a number of countries, critical health data was being collected through agonizingly slow paper-based systems—if it was collected at all. These gaps in access to up-to-date public health data made informed public health decision-making extremely difficult.

Having worked earlier in his career as an IT consultant on Wall Street, Selanikio began exploring the use of handheld computers to record field data. He discovered that while the hardware needed to collect data was readily available, the software required was often too complex and costly for use by those in developing countries.

Response: Collecting Health Data through an Open-Source Mobile Software Tool

In 2002, Selanikio teamed up with computer scientist Rose Donna to form the DataDyne Group, a non-profit dedicated to increasing access to public health data through mobile software solutions. Inspired by an earlier CDC product called Epi Info, Selanikio created EpiSurveyor, a free, open-

Credit: DataDyne

source, mobile data collection software tool. EpiSurveyor offers health data collection forms that can be downloaded at no cost and modified by anyone with basic computer skills. Selanikio and Donna believed that this technological innovation could empower developing country health officials with the tools needed to gather time-sensitive health data quickly, and without outside assistance.

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In many cases when developing countries track public health data, they do so by hiring programming consultants to customize the required IT solutions. This arrangement can strain limited resources, and in some cases also raise questions about health data ownership. Selanikio designed EpiSurveyor to lower the barriers of access to public health data through a user-friendly and easily adaptable health data collection tool. "We wanted to create a tool that the average person who knows how to word process could handle," Selanikio says.

How It Works

EpiSurveyor incorporates a Windows-based "Designer" forms-creation application, and a Java-based engine that can run on personal digital assistants (PDAs), smart phones, and soon, common mobile phones. Users start by downloading the software from the DataDyne.org website (*www.datadyne.org*). Then, using a desktop or laptop computer, they enter the health survey questions into the Designer program. The resulting form can then be published to a mobile device. For data that is collected via PDA or smart phone, once data is collected from the field the mobile device is synchronized with the computer. Data from multiple handsets can then be combined into a single data table for analysis.

Piloting the Approach

Shortly after developing EpiSurveyor, and working with Dr. Mark Grabowsky, then of the American Red Cross, Selanikio entered and won a grant from the World Bank's Development Marketplace Competition. They used the award to develop and test a beta version of the software in Kenya. At the same time, Selanikio and Donna were launching DataDyne, with the goal of creating mobile data products to address public health needs in developing countries.

In 2006, DataDyne entered into a partnership with the United Nations Foundation, The Vodafone Group Foundation, the World Health Organization (WHO), and the Ministries of Health of Kenya and Zambia to launch a pilot program that scaled the beta-tested software at the provincial level. Through the pilot, public health officials in Kenya and Zambia received training and mobile computing devices to support the fight against measles.

"For some time, we had been exploring how to use mobile technology to collect data on the ground that could be used by health officials in making life-saving decisions," says Mitul Shah, senior director of technology partnerships at the United Nations Foundation. "In Zambia and Kenya, for example, health officers traditionally traveled to remote facilities and recorded information, like stock levels, on paper. This information was then transferred manually to an electronic database, which took time. We wanted to systematize how health data was collected."

The pilot sought to contribute to the goals of the Measles Initiative, a partnership aimed at reducing measles deaths worldwide, that counts as its founding partners the American Red Cross, U.S. Centers for Disease Control and Prevention, the United Nations Children's Fund (UNICEF), the WHO, and the United Nations Foundation. From 2000 to 2006, the Initiative succeeded in reducing measles deaths in Africa by more than 90 percent. Still, monitoring measles vaccination rates and disease outbreaks in hard-to-reach areas was a complex and time-consuming task. While the Measles Initiative had worked with DataDyne in using PDAs for this purpose in the past, Selanikio realized that switching from a consultant-based solution to a country-owned process using EpiSurveyor would provide a more sustainable solution.

"The long-term goal [of the pilot] was to strengthen systems–to make clinics more responsive and train health surveillance officers to be able to report more accurately and on a more timely basis about measles and other priority diseases," says Andrea Gay, executive director of Children's Health for the United Nations Foundation and senior advisor to the Measles Initiative.

Credit: DataDyne

Outcome: Improved Public Health Response to Disease Outbreaks

Through the pilot, thirty provincial health supervisors in each country were trained in how to use EpiSurveyor on Palm Zire™ handheld computers. The health officers then used EpiSurveyor to collect management data about public health clinics–such as medical supply quantities and levels of staff training. In both countries, officers went beyond the purpose of the pilot to gather additional health data as new needs arose. In Zambia, for example, the supplied PDAs and EpiSurveyor software were used by health officers to conduct a post-measles vaccination campaign coverage survey–the very first time that such a survey had been independently conducted by in-country staff using PDAs.

Another instance in which local health officials modified the open source software to meet new health needs as they arose

occurred in Kenya, when political unrest and fighting in neighboring Somalia brought in waves of unvaccinated refugees–some of whom carried the polio virus. Despite the fact that the last native case of polio in Kenya had been seen more than two decades ago, the human migration introduced a new threat of disease outbreak.

Titus Kolongie, who works with the Kenya Expanded Programme on Immunizations (KEPI), was part of a cadre of health workers trained on EpiSurveyor who responded to the crisis. Using a PDA loaded with EpiSurveyor, he evaluated an emergency polio vaccination campaign that targeted individuals who may have come into contact with the virus as it entered Kenya. In total, KEPI was targeting almost two million children for vaccination, giving the polio virus fewer places to hide, and preventing life-long infections from a debilitating disease. Says Kolongie, "EpiSurveyor made things work efficiently, allowing us to collect information and conduct analyses quickly."

Even more remarkably, the pilot officers in Zambia learned of the outbreak investigation form created by the Kenyan team, downloaded it from the project website, and put it into use in Zambia with minor modifications. This adaptation of the software and forms came as great news to Selanikio.

"First, you had health professionals using the software–on their own initiative–to meet a pressing need," he explains. "Next,

Credit: DataDyne

you had health professionals in a different country sharing forms leading to the standardization of data. This is a potentially revolutionary change in the way we collect data." If comparable health data were available across countries, it would be easier to share best practices and implement more widespread interventions, he adds.

Challenges: Overcoming In-Country Logistical Constraints

Selanikio points out the challenge of measuring the effectiveness of a tool like EpiSurveyor in the face of independent variables that users have no control over. In some communities in Kenya, for example, lack of fuel and bad weather made it difficult for those trained to use EpiSurveyor to travel to clinics.

An abundance of new data is also generating a demand in government ministries of health for back-end data aggregation and analysis tools. This means that in some cases, until aggregation and analysis are embedded in the system, this new data may not be acted upon as quickly as one might hope. Still, this offers a real opportunity for further research and development to bring to fruition complete front- and back-end solutions.

Next Steps: Adapting the Application, and Bringing It to Scale

Despite these challenges, the results of the pilot have paved the way for wider applications of EpiSurveyor. "The results are very encouraging in that they demonstrate the potential for using mobile devices for widespread data collection," says Shah. "The Millennium Development Goals have underscored the need for better data—data that can help prevent the spread of disease, monitor child nutrition, and determine people's access to clean water.

Tools like EpiSurveyor offer great potential for helping to monitor these needs."

Based on the results of the pilot program, WHO is considering plans to implement EpiSurveyor in all sub-Saharan African countries. Starting in 2008, health professionals in ten countries will be trained to use the software in their work, particularly in the area of disease surveillance.

DataDyne is also working with Cell-Life (see Case Study 1), a non-profit developer in South Africa, to adapt EpiSurveyor to run on Java-enabled mobile phones. This will allow users of the software to transmit data wirelessly, thereby saving time and improving efficiency.

Because the software is open source and can be easily downloaded for free, hundreds of people and organizations have accessed EpiSurveyor and are using it—formally and informally—in their work. Among these are the Harvard and Johns Hopkins schools of public health. Those who seek to modify the EpiSurveyor code to create new functionality, rather than simply using it as provided, are required by the licensing agreement to make their source code open to others, thereby stimulating new innovations and the sharing of valuable tools.

For its part, DataDyne is focused on refining and adapting the software to address a wide variety of needs. "By adding functionality, we can use the platform to provide clinical updates, patient tracking and management, reference materials, and other tools," says Selanikio.

By the year 2010, DataDyne estimates that more than 1,000 public health professionals will be using EpiSurveyor for data collection and analysis. "We've just put our toe into the pool," says Selanikio. "Imagine where this could be ten years from now." ■

Connecting Youth to Sexual Health Information *(United States)*

Issue: Improving Sex Education for the Teen Population

It was while standing in front of the Mission High School near her home in San Francisco, California that Deborah Levine, executive director of Internet Sexuality Information Services (ISIS-Inc.), a nonprofit she founded that develops "high-tech solutions for sexual health education," conceived of a potential solution to a pressing public health problem.

Levine had recently been approached by the San Francisco Department of Public Health (SFDPH) to develop a website to address rising rates of sexually transmitted diseases among at-risk youth. In 2005, rates of gonorrhea among African-American youth, ages 18 to 25, had gone up over 100 percent, with African-American women being infected by the disease at 12 times the rate of American women of Caucasian descent.

As she watched a flood of teenagers emerge from the school's entrance, Levine was struck by how many were calling and texting their friends. So began her inquiry into how to use mobile phones as a health awareness and disease prevention tool.

Credit: ISIS-Inc.

Response: Reaching teens through text messaging

"The thing about mobile phones is that they're small and can be used privately to access information anonymously," says Levine. With 85 percent of the city's youth owning a mobile phone, a text-based approach simply made sense.

ISIS-Inc. and SFDPH had a history of collaborating in using information and communication technologies to address public health challenges. Now, they were poised to enter new territory in using mobile technology to promote teen sexual health.

"ISIS brought its experience in technology, innovation, and working at the community level," says Jeff Klausner, MD, SFDPH Deputy Health Officer. "We brought a long history of working in sexual health education and disease prevention, financial resources, and expertise in marketing, monitoring, and evaluation."

As Levine began researching her idea, she learned of a similar initiative in London. In 2002, The Brook Advisory Centre, a national charitable organization, launched a text messaging service that United Kingdom (UK) youth could use to access sexual health information and referral services (see sidebar). Levine received helpful ideas from Brook staff and set out to design a solution to address the needs of at-risk youth in San Francisco. The service would soon become known as "SexInfo."

A critical first step was informing and engaging local community members. ISIS-Inc. and SFDPH identified representatives of community organizations (e.g., high school health programs, public clinic staff serving African-American youth, juvenile
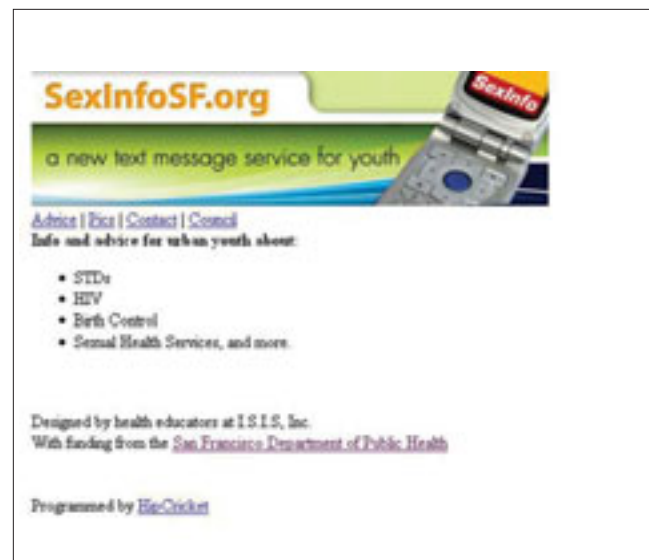
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probation officers, and local clergy) to serve on an Advisory Board. The group provided valuable feedback during the planning stage, and was consulted regularly thereafter.

Focus groups were also held with young African-American men and women to determine their needs and how they preferred to access sexual health information. Questions focused on young people's existing knowledge of sexually transmitted diseases (STDs), their sources of information, and their use of technology, including cell phones. "One hundred percent said this would be a great way to reach them and their peers," says Levine. Focus group discussions also emphasized the need for an 'opt-in' service, whereby users would control the type of information they received and when. "They didn't want anyone pinging them with messages or asking them to get tested for an STD," says Levine.

Based on this research, ISIS health educators initiated the content development phase of the project. They began by identifying key questions that sexually active youth, ages 12 to 24, most needed

answers to when it came to their reproductive health.

SexInfo was also designed to provide youth with information on where they could access free, confidential sexual health services. To address this need, ISIS-Inc. staff mapped youth-oriented clinical and social services in communities in or near where those young people they sought to reach lived. Staff then visited the clinics to gauge their relevance to youth.

Credit: ISIS-Inc.

"Ask Brook": Providing Young People in the United Kingdom with Sexual Health Information

In 2002, The Brook Advisory Centre, a UK charity, launched an enhanced "Ask Brook" information service providing young people with sexual health knowledge and support via telephone, the Internet, and text message.

To access the service via mobile phone, young people text BRK, followed by their postcode, to 81222. Subsequently, they receive information regarding sexual health services in their area. They can also select standardized responses to questions relating to contraception, pregnancy, sexually transmitted disease, and other sexual health issues. In 2006 and 2007, the service received an average of 100 text message queries per month.

According to Lisa Bartlett, Ask Brook Programme Manager, a major benefit of text-based services is that they are confidential and appeal to young people who are intimidated at the thought of talking about sensitive issues. "Once up and running, such services don't require a lot of resources beyond promotion," she says. Brook benefits from its name recognition and 40-year history. Given its relationship with local government and national health services, Brook is able to promote the service without investing significant ongoing resources.

For more information, visit: www.brook.org.uk

Developing the Technology and Launching the Service

ISIS hired HipCricket, Inc., a mobile marketing firm in Australia, to program the service and ensure the confidentiality of users. Next came the task of working with mobile operators to provide mobile phone subscribers with access to the service. HipCricket offered to let ISIS-Inc. use its five-digit 'short code' during the project's start-up phase. Levine was then able to work through an aggregator in the United States to obtain the short code (61827) now being used to access SexInfo. Short codes are generally used to market or promote a product or service to mobile users.

Prior to launching SexInfo, ISIS-Inc. worked with Youth United Through Health Education (YUTHE), a program of SFDPH, to develop marketing materials and test their appeal among local youth. Outreach materials included posters, palm-sized cards, and bus shelter ads. To engage parents and community members, ISIS-Inc. created a companion website (www.sextextsf.org) where the public could learn about the service and view the content of the text messages online. ISIS-Inc. has also created a mobile WAP (wireless application protocol) site that can be viewed on mobile phones (m.sextext.org).

SexInfo launched formally on 24 April 2006. Following the initial media campaign, ISIS-Inc. and SFDPH explored creative means of reminding youth about the service. One of these involved producing a public service announcement for television featuring a popular rap musician, Mistah F.A.B. The announcement was broadcast locally on Black Entertainment Television and MTV and is now available on YouTube.

Outcome: Texting the Relevant Information to Teens– Anywhere, Anytime

During the first 25 weeks of the project (April–October 2006), 4,500 individuals accessed the service, with 2,500 taking the steps to retrieve content and referrals. The top three messages accessed were: "What 2 do if ur condom broke," "2 find out about STDs" and "if u think ur pregnant." Table 1 demonstrates the number of inquiries per message.[12]

Table 1. Most Popular Messages

Most Popular	Message	Inquiries
#1	A1 (if ur condom broke)	523
#2	C3 (to find out about STDs)	486
#3	B2 (if u think ur pregnant)	372
#4	D4 (to find out about HIV)	277
#5	E9 (if ur sexually active)	199
#6	F6 (if they're cheating on u)	181
#7	F8 (if ur not sure u want to have sex)	158
#8	E7 (if u think u might be gay)	110
#9	E5 (Need to speak to some one now!)	78
#10	G11 (if u need a place to stay)	59
#11	F10 (if someone's hurting u)	44

"Working with the government–and in our case, the public health department–has helped enormously with evaluation efforts," says Andrew Woodruff, ISIS-Inc. Program Director. "We've found that a text-based approach can get the information into people's hands. They can be anywhere and access the information they need."

[12]Levine, Deborah, et al., "SEXINFO: A Sexual Health Text Messaging Service for San Francisco Youth," *American Journal of Public Health,* 98 (2008): 393–395.

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Challenges: Meeting Teen Needs with a Relevant, Usable Service

In 2007, ISIS-Inc. made a number of changes to the service based on initial results and a usability test. The test was carried out by Youth United Through Health Education (YUTHE) team members–college students–who went out on the street with a video camera and a professional market researcher to document how young people used the service. Roughly half of the young people surveyed reported difficulty in navigating the SexInfo menu of options. To simplify the user's experience, ISIS-Inc. has shortened the number of questions from eleven to four. Now, rather than entering two digits (e.g., A1) to obtain an answer to a question, users need enter only one. These changes have increased the percentage of young people who get to the resources provided by over 100 percent.

ISIS-Inc. is now looking to expand the online component of SexInfo based on evidence that its target group uses mobile technology to surf the web. By adding wallpapers, ringtones, and other items of interest to youth, ISIS-Inc. seeks to reinforce the service's overall appeal and impact.

While getting the technology right is critical, SFDPH's Klausner emphasizes the importance of finding the right partner(s) to develop an effective solution. "Frustrations can emerge between governmental and non-governmental organizations because they have different styles," he says. To address these differences, Klausner stresses the importance of mutually establishing timelines and facilitating regular and open communication.

Health Info-Lines: A Promising Tool in the Fight Against HIV/AIDS

Health information lines, accessible via a mobile phone texting service, are increasingly being looked to as a tool in the fight against HIV/AIDS. A new service, 'MyQuestion,' launched in Nigeria in November 2007, is directed at increasing HIV/AIDS awareness and promoting healthy behaviors among 10- to 25-year-olds. Through the service, young people can obtain answers to reproductive health-related questions by sending text messages, emailing, or calling a telephone hotline. Through providing varied options for accessing the service, it is hoped that even the most reluctant youth will find their comfort zone when it comes to asking sensitive questions.

During the first three months of the service, the mobile phone component has proven to be the most popular medium by far, with 14,000 text message responses sent to teenagers accessing the service.

A related monthly competition, 'MyAnswer,' invites young people to text in their answer to a question–for example, what is the difference between HIV and AIDS? Every month, ten of those who answer correctly win a prize. The contest encourages young people to research and reflect on issues that affect their health.

Both services are part of the wider eLearning pilot program, Learning About Living, in Nigeria. Learning about Living is funded by Oxfam Novib and the MacArthur Foundation and is being managed by One World UK, in collaboration with Action Health Incorporated, Butterfly Works, Nigerian Education Research & Development Centre, Federal Ministry of Education, Federal Ministry of Health, Education as a Vaccine Against Aids, and Girls' Power Initiative. To learn more, visit: www.learningaboutliving.com.

Credit: ISIS-Inc.

Next Steps: Expanding Text Services–To Other Cities and Other Public Health Issues

Steps are underway to adapt SexInfo's approach to Washington, DC and Toronto, Canada. In Washington, ISIS-Inc. is working with the local government and Metro TeenAIDS, a community health organization, to adapt the SexInfo approach. Rather than have youth call into the service, messages will be "pushed out" to young people who have signed up to receive information. In Toronto, ISIS-Inc. is collaborating with the Toronto Department of Public Health and hopes to launch SexInfo there by summer 2008.

Looking ahead, Levine is encouraged about the prospects for more nonprofits to incorporate text-messaging services into their health education and disease prevention efforts. "The more mobile technology work that's being done, the more costs will start to come down," she says. "We're still in the pioneering years of this in the U.S."

To an ever-growing worldwide population conversant in text messaging, anonymous, mobile-enabled services that provide real-time sexual health information are proving an easy way to communicate sensitive information, anytime, anywhere. Expanding these services to new geographic areas, and across other health issues, is a natural next step in the process of improving public access to health information through mobile phones. ■

Credit: TSF

II. Humanitarian Assistance

Mobile Phones in Disasters and Humanitarian Relief

Mobile technology plays an important role in communications efforts during the various phases of a humanitarian catastrophe—from the early warning phase through the immediate disaster response and longer-term reconstruction efforts. Stories abound about how mobile technology has been used in recent disasters, from reestablishing communications networks vital to the work of first responders to providing a first line of communications for refugees trying to reconnect with a loved one.

Communication needs differ in each unique situation, ranging from mass broadcasting of text messages in the early warning phase, for example, to decentralized two-way communication among relief workers and affected populations in the aftermath of a disaster.

Early warning systems involving mobile phones—both cell broadcast and text messaging alerts—are being considered or implemented in various countries. Because it can quickly and informally disseminate information from person to person, mobile communication is a good medium for information sharing both during and in the aftermath of a disaster. The case study on the World Food Programme's use of text messaging to inform Iraqi refugees of food shipments illustrates both the challenges and opportunities of text alerts.

There is evidence that neither the public nor emergency workers utilize mobile technology to its fullest potential. For emergency workers, key barriers include organizational and communication inefficiencies and breakdowns, as well as technical barriers such as overburdened systems unable to handle post-disaster traffic.[13] For the affected populations, emergency communication needs to take a priority and may necessitate prioritizing that particular traffic over person-to-person communication.

A 2005 Groupe Spéciale Mobile (GSM) Association (GSMA) study[14] found that in the immediate aftermath of a disaster the speed with which cellular networks can recover from damage—often within hours—plays a critical role in relief supply management and economic recovery. As the case study on Télécoms Sans Frontières illustrates, rapid restoration of networks is essential in the critical period right after a disaster.

Humanitarian Assistance

[13]Currion, Paul. *Emergency Capacity Building Report: Information and Technology Requirements Initiative. Assessment Report* (Emergency Capacity Building Project, 2006).
[14]Coyle, Diana. *The Role of Mobiles in Disasters and Emergencies* (London: GSM Association, 2005).

Credit: TSF

Our research underscores the importance of operators, governments, and relief organizations working closely together to ensure that mobile networks are available for critical communication, and that information is able to flow freely. The GSMA study states that: "in the case of developing countries in particular, mobiles are likely to be the dominant means of communication for affected members of the public. This flow of information–not mediated by broadcasting agencies or public authorities–ensures that people elsewhere quickly come to know what is happening and what help is needed. In the chaotic aftermath of a disaster, when people are displaced, buildings and infrastructure destroyed, no central authority can possibly hold all the necessary information and allocate resources in the place of greatest need."[15]

Hence, there is a need for government coordination with telecommunication carriers to ensure that there is rapid rebuilding after a disaster, and 'light touch' regulation to support this.

Text messaging-based fundraising appeals have grown increasingly popular in recent years, with private donations in many cases exceeding government expenditures in the wake of a disaster. This was especially true after the 2004 Indian Ocean tsunami, when millions of dollars were raised via text messaging–particularly in Europe. Even though donations are relatively small, their cumulative impact can be substantial.

Looking ahead, there are a number of opportunities for improving the effectiveness of mobile technology in disaster relief. As mobile infrastructure grows worldwide, early warning and last minute information dissemination become more viable, especially if there are strategic investments and agreement on standards. Similarly, efforts are needed to coordinate relief organizations more effectively and increase their internal capacity to take strategic advantage of mobile technology.

[15]Ibid, p. 33.

Delivering Food Aid to Iraqi Refugees *(Syria)*

Issue: Alerting Refugees to Food Aid Deliveries

Beneficiaries of the United Nations (UN) World Food Programme (WFP) are the poorest of the poor. As the frontline agency mandated to combat global hunger–and entirely reliant on voluntary funding–WFP must make stark choices about whom it can provide with food assistance. This year, WFP aims to assist 73 million people in 78 countries–knowing that there are a staggering 850 million hungry people worldwide.

About two million Iraqis have fled their country since 2003, and an additional 60,000 are leaving each month.[16] Syria has received the majority of these refugees and there are now an estimated 1.4 million Iraqis in Syria. The WFP has estimated that about 50,000 of the Iraqis in Syria need food aid.

Every month at distribution centers and warehouses of the Syrian Red Crescent, the WFP and Syrian Red Crescent provide eligible refugee families with basic food commodities, such as rice, lentils, and oil, and complementary items, such as sugar, tea, pasta, tomato paste, and bulgur.

Charged with coordinating these distributions, WFP alerts eligible families about food rations and directs them to the appropriate distribution centers. Previously, the WFP had used local non-governmental organizations (NGOs) who work with refugees to help get the word out. Since not all eligible families had regular contact with local NGOs, however, a new strategy was

[16]al-Khalidi, Ashraf, Sophia Hoffman, and Victor Tanner. *Iraqi Refugees in the Syrian Arab Republic: A Field-Based Snapshot* (Washington, DC: The Brookings Institution–University of Bern Project on Internal Displacement, 2007).

Credit: WFP/John Wreford

needed. To facilitate this process, the UN agency recently instituted a text messaging program to notify refugees about the availability of food aid.

Response: Using Text Messaging to Communicate News of Food Supplies

With a responsibility for coordinating the logistics and emergency communications for other UN agencies and NGOs, WFP is constantly looking for innovative ways of stretching its donations to benefit as many people as possible. The Iraqi beneficiaries described in the case study are far from typical in that they have access to mobile telephones.

Describing the genesis of the project, Haitham El Noush, program officer at WFP Damascus, says: "Last year we started distributing food to refugees in Damascus. But how were we going to announce distribution? We wanted to alert about 6,000 families in a pilot project when food was ready for pick-up. Someone in the office came up with the idea to use a text messaging service to alert these families."

In August 2007, WFP's program in Damascus contacted one of the mobile telephone operators in the country, to inquire about covering a portion of the costs of the text messaging. The operator agreed to provide an initial 800 text messages at no cost. El Noush notes: "The idea was new; this was the first time this was ever done. And it was simple: We sent a text message to people on our list to go to the distribution site and receive the food."

To bring the text message pilot program to scale, the WFP set up an account with a mobile marketing vendor to accommodate their bulk messaging needs. WFP buys text messages in bulk to secure a volume discount, and uses a list of phone numbers provided by the UN High Commissioner for Refugees (UNHCR) to target its food distribution alerts. WFP manages and distributes messages using a do-it-yourself dashboard on the mobile vendor's website. The message that is delivered to refugees provides a URL (uniform resource locator) where potential food aid recipients can verify whether they are eligible for food benefits.

Challenges: Reaching the Right Recipients with the Right Information

One of the limits of a program like this is that the messaging is only as targeted as the phone numbers on the contact list. Because people switch phone numbers or share phones, delivery of a message to an intended recipient is not always assured, especially in a sometimes chaotic environment. As a result, during the first month of the program, some messages were delivered to people not eligible for food aid, who were subsequently turned away at the distribution center.

El Noush notes that, "people thought the text message was like an entitlement and then showed up and wanted the food but had to be turned down." Learning this lesson, recipients are now directed to a website to make sure that they are indeed eligible.

Credit: WFP/John Wreford

However, says El Noush, even though "there are lots of internet cafes and people can have easy internet access, we still cannot be 100 percent sure that we don't exclude some people by this extra step. At the same time, text messaging really is the most effective way to reach people–everyone has a mobile phone and by sending some 35,000 messages we got a lot of visibility about the program." UNHCR is now asking individuals picking up food to update their phone number at the distribution center in the hope that this will reduce errors over time and ensure a more accurate list of numbers.

Another challenge of texting is the limited space-especially in Arabic. While a text message in English can accommodate 160 characters, a text message in Arabic can hold only 70. With such limited space, messages must be very clear to be understood by the recipient.

Outcome: Improved Awareness and Targeting of Food Aid

The initial distribution of text messages to 800 families was successful in reaching targeted recipients of food aid, and the program expanded rapidly. In the first six months of operation in 2007, WFP sent out about 35,000 text messages to 140,000 eligible people–approximately one message per registered family.

While some text messages went to people not eligible for food, most were successfully delivered and the families expressed gratitude and appreciation. Says El Noush, "The text messages have the side effect of creating news in the city by word of mouth. We are finding the program to be very effective. You give good news to people on their mobiles. People reported that they felt happy when they received the text messages from us, and told us that they felt that someone cares about them."

Credit: WFP/John Wreford

Next Steps: Bringing the Food Aid Alert Model to Scale

WFP's food aid text message alert program has grown rapidly. The first effort reached about 6,600 people through some 800 messages; approximately one message per phone number available for each family. The second round of messaging targeted some 30,000 individuals. At the time of publication, the WFP's list had grown to include more than 142,000 Iraqi refugees in Syria that it is reaching via text messaging. The target for 2008 is to notify a total of 362,000 Iraqi refugees in Syria about the availability of food aid.

Although this program has yet to be replicated elsewhere, the WFP is excited about the potential of the program. When conditions permit, as in the case of Iraqi refugees in Syria, communicating with large groups via text messaging can provide targeted delivery of essential information–including where one might find one's next meal. ∎

Facilitating Communication in Emergency Situations (*Peru, Indonesia*)

Issue: Essential Emergency Communications for Disaster Relief

On the evening of 15 August 2007, a 7.9 magnitude earthquake struck the coast of Peru, bringing down buildings, cutting power supplies, and disrupting communications. More than 500 people died and 1,600 were injured, with tens of thousands more left homeless.

As with other major international disasters, relief agencies across various government, non-governmental, and intergovernmental bodies activated to deliver food, medicine, and supplies to those in need. Yet none of these groups could operate effectively without a communications system enabling them to share information among themselves, and with operational headquarters.

Response: Deploying Rapid Response Emergency Communications

Télécoms Sans Frontières (TSF), or Telecoms Without Borders, a nongovernmental organization (NGO) headquartered in France, uses mobile telecommunications to help reestablish these vital communications networks in the response to and management of humanitarian crises. Within hours of the earthquake in Peru, five staff and volunteers boarded a commercial aircraft from TSF's Latin America regional office in Managua, Nicaragua to Peru's capital city of Lima. With them, they carried everything they would need to set up emergency telecommunication operations–satellite

Credit: TSF

phones, mobile phones, routers, laptops, fax machines, printers, and scanners.

Within 24 hours of their arrival, the team had established temporary telecommunications centers in three of Peru's hardest-hit areas: Pisco, Inca, and Chicha. Over the next ten days, a broad range of disaster relief agencies used TSF's service to coordinate relief efforts and help save lives. These included the Peruvian Ministries of Health and Education, the National Program for Food Assistance, the United Nations (UN), and local and international NGOs. Satellite phones were also made available so that local residents could contact family and friends. In all, more than 17 agencies and 1,400 families accessed TSF's services over the course of its deployment.

Outcome: Providing Vital Communications Services When and Where Needed Most

In 2006 and 2007 alone, TSF responded to 17 emergency situations around the globe—facilitating relief efforts in southern Lebanon during the Lebanon-Israel conflict, helping survivors of a cyclone in Bangladesh, and assisting victims of the ongoing civil war in the Democratic Republic of Congo.

How It Works

In May 2006, after a 6.3 magnitude earthquake struck southern Java in Indonesia, TSF was among the agencies to respond. Rajan Gengaje, head of the UN Disaster Assessment and Coordination team—a stand-by team of disaster management professionals working closely with the UN Office for the Coordination of Humanitarian Affairs (OCHA)—described his experience working with TSF in Java.

"TSF's technical skills, the availability of professional support staff, their speed of deployment, and excellent understanding of the international humanitarian response environment certainly add value to the UN's response initiatives," he said. "During the crisis in Yogyakarta, TSF offered vital information management support and helped train volunteers to use mobile GPS units to monitor needs on the ground."

The origins of TSF's work date back to the late 1990s when TSF co-founders Jean-Francois Cazenave and Monique Lanne-Petit were volunteering with humanitarian missions that took them to Kosovo, Afghanistan, and Iraq. Refugees would pass Cazenave slips of paper asking if he would contact their loved ones abroad.

TSF was founded in 1998 with the goal of providing disaster survivors with three-minute phone calls that enable survivors to place a call to a loved one—often to confirm family members' whereabouts or to request assistance. Today, its services have grown to include establishing communications centers for relief groups, including UN agencies.

TSF has put in place a 24-hour emergency monitoring system and coordinates closely with the UN Office for Coordination of Humanitarian Affairs (OCHA) and the UN Children's Fund (UNICEF) before deploying to a particular location. Headquartered in Pau, in southwestern France, TSF has field offices in Managua, Nicaragua and Bangkok, Thailand. The majority of the telecommunication experts TSF deploys are volunteers, who receive a modest stipend for their time in the field. Most are students or recent university graduates in their twenties or professionals over 50 with backgrounds in information and communications technology (ICT) and engineering.

TSF's work in support of UN agencies is supported by a joint grant from the United Nations Foundation and The Vodafone Group Foundation. TSF is also supported by a diverse group of public and private sector donors, including the European Commission's Humanitarian Aid Office, and telecommunications and technology companies such as Inmarsat, Eutelsat, AT&T, Cable and Wireless, and Vizada.

Challenge: Keeping Apace with Technology Developments While Staying the Course

A key challenge, according to TSF Information and Communications Coordinator Oisin Walton, is keeping up with changes in technology and determining how best to adapt new technologies to meet needs in the field. Currently, TSF maintains an inventory of

50 data transmitters, more than 100 phones, and assorted computers. A mainstay of TSF's work is the Inmarsat BGan, which offers voice, fax, and broadband Internet connections. For longer duration emergencies, TSF employs a Very Small Aperture Terminal (VSAT), a satellite dish that can facilitate data transmission from several satellite phones. TSF's mobile "visio-emergency" video system allows for satellite transmission of live videos filmed at the site of an emergency. Similarly, TSF can set up a video conferencing system capable of linking field staff with headquarters.

Looking ahead, Walton acknowledges that the sustainability of TSF's efforts is a key issue. The bulk of funds TSF receives are directed at immediate disaster service provision, and not at strengthening TSF's long-term capacity to respond to emergencies. TSF is making the case for the vital importance of disaster communications to corporations and other funding organizations that support more traditional relief measures such as the provision of food, water, shelter, and education.

Next Steps: Expanding and Developing Services to Improve Emergency Response

Following each assignment, TSF staff conduct a thorough debriefing on what went well and where future improvement is needed. Among those areas being looked at is how to expand the use of TSF services by governments and large NGOs, many of which rely on their own telecommunications capacity, and the development of new services in cooperation with TSF's existing partners.

TSF is exploring a number of ways to improve and expand its emergency services. For example, it is looking into what would be required to set up 'cyber cafes' in relief areas that would enable affected individuals to send emails to family and friends about their situation and needs. It is also exploring how to play a greater role in prevention efforts

through helping communities prepare in advance of an emergency, particularly in cases where annual weather patterns predictably lead to flooding or droughts.

In Nicaragua, for example, following its emergency response to Hurricane Felix in September 2007, TSF installed an emergency communications network in the remote North Atlantic Autonomous Region of the country, where no traditional communications exist. The network will allow for improved response in the event of future emergencies.

TSF is also looking at expanding its use of mobile technology, and setting up temporary Groupe Spéciale Mobile (GSM) networks at base camps. "With GSM networks being reestablished faster and faster in emergencies, we are looking at ways of using more GSM technology." He adds: "When mobile networks are disrupted, we could deploy equipment capable of connecting to the network outside the affected area."

TSF's work alongside UN agencies, national governments, and other disaster relief groups demonstrates the crucial role of mobile and other communications technology in all stages of disaster relief. TSF has consistently delivered rapid response emergency communications to support humanitarian activities, and has frequently provided a first line of communication for refugees and other populations affected by disasters. Continuing its work on building the capacity of mobile communications to play a role in disaster prevention and preparedness could be a promising area for TSF's growth. Another area for exploration is the use of mobile phones for money transfer services ('m-transactions') during disasters. M-transactions have the potential to meet a widespread need during challenging circumstances. ■
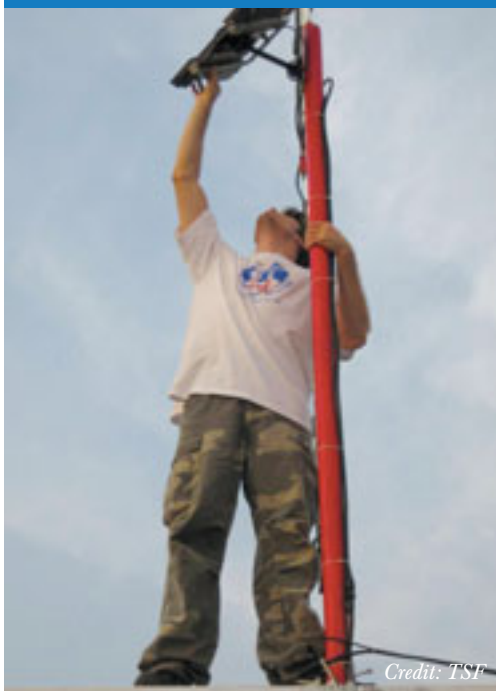
Humanitarian Assistance

Credit: TSF

Text Messaging Critical News in the Aftermath of a Disaster

More than 5,000 people died and 1.6 million were displaced as a result of the May 2006 earthquake in Yogyakarta and Central Java in Indonesia. During the days and weeks following the disaster, ordinary citizens received valuable news via text message. The text messaging service was put in place by Internews, a U.S.-based NGO that works to improve people's access to information around the world.

The service was run through an emergency AM radio station, Radio Punokawan, established by the Indonesian Press and Broadcast Society, with support from Internews. In addition to radio broadcasts, important information was sent and received from the newsroom via text messaging. Outgoing messages warned of aftershocks and identified communities that had not yet received government assistance. More than 180 Indonesian journalists distributed and received information through the service.

Credit: TSF

Humanitarian Assistance

Text Messaging as a Violence-Prevention Tool *(Kenya)*

Issue: Providing Real-Time Information in Times of Crisis

Following the December 2007 presidential election in Kenya, waves of political and ethnic violence swept the country. The election, which returned President Mwai Kibanki to office, was marred by widespread allegations of vote rigging. To help stem the violence, human rights advocates in the country quickly mobilized by creating a text messaging 'nerve center.' That center served as a vital tool for conflict management and prevention by providing a hub for real-time information about actual and planned attacks between rival ethnic and political groups. The text messages, sent in by human rights advocates, religious leaders, and others, were then relayed to local Peace Committees for response.

The initiative was funded by Oxfam Great Britain (Oxfam-GB)—a development, advocacy, and relief agency—as part of its emergency response. Oxfam-GB has employed several text messaging strategies as it develops its knowledge and evaluates the effectiveness of that platform as a fundraising, awareness-building, and advocacy tool.

Response: Connecting Communities in Crisis through Mobile Communications

As part of its emergency response during the crisis in Kenya, Oxfam-GB provided financial support to PeaceNet, an umbrella body made up of Kenyan organizations and individuals dedicated to human rights, peace, and justice.

"Before the elections, PeaceNet was gathering information around Kenya to make sure nothing went awry," explains Philippa Crosland Taylor, Oxfam Country Programme Manager in Kenya. "After the election, they decided it would be valuable to have people text into a nerve center, which could then pass information along to relevant authorities and the police. Sometimes if you put a few policemen or elders in place, you can prevent something unfortunate from happening."

Oxfam-GB's contribution of roughly £36,000 was used to support PeaceNet's field operations and headquarters costs during the crisis. Oxfam-GB also used its connections to negotiate a deal with Celtel, the second largest mobile phone network in Kenya, to halve its ordinary rates for those transmitting and receiving messages through the text message 'nerve center.'

Outcome: Communicating by Mobile Phone to Avert Crisis

Through facilitating emergency communications, PeaceNet's text message 'nerve center' was able to prevent violent incidents in the weeks and months following the election. For example, in the city of Eldoret, PeaceNet mobilized local non-governmental organization (NGO) and religious leaders to form Peace Committees to offer early warning of violent activity and to serve as intermediaries. When one local citizen learned of a pending attack against a camp for internally displaced people, a text alert was sent to the text message 'nerve center.' It, in turn, alerted the Peace Committee in Eldoret, which took steps to avert the attack.

During another instance, following the murder of a member of the Kenyan Parliament, a group of young people made plans to attack residents of a particular ethnic community. Once the 'nerve center' was alerted, it notified Peace Committee members who persuaded the youth to go home.

Humanitarian Assistance

Credit: Tom Baldwin/Oxfam

"In the wake of a government ban on live broadcasting of incidences of violence, the SMS Center became a lifeline for informa-tion by linking Nairobi to incidences as they happened on the ground," says Barasa Mang'eni, PeaceNet-Kenya program officer. "The initiative encouraged local level dia-logue and mediation to stop violence and fa-cilitated communication to security forces, the Kenya Red Cross, and UN Office for Coordination of Humanitarian Affairs. Civil society actors were linked to peace processes at the community level, enabling them to contribute to nonviolence advocacy."

Challenges: Diverting Time, Attention, and Expertise to New Outreach Efforts

While encouraged by the successes of the text message 'nerve center' in preventing violence

A Mobile Advocacy Case Study: The Make Poverty History Campaign

In 2005, Oxfam-GB launched a text message-based outreach initiative as part of its role in the Make Poverty History Campaign. Make Poverty History, an alliance of United Kingdom charities, advocacy groups, and faith-based organi-zations, set out to mobilize people to sup-port the Global Call to Action Against Poverty, the largest anti-poverty move-ment in the world, representing more than 150 million people in over 100 countries.

Advertisements were placed on several campaign websites and in newspapers urging people to text the keyword "BAND" to receive a white wristband, the global campaign's symbol. Users would then receive an automatic response requesting their name, street number, and postal code. Oxfam-GB benefited from the fact that they were able to use a shared short code, provided by a mobile marketing solutions provider, to facilitate the campaign. Approximately 50,000 people ordered their white band through the Oxfam text messaging campaign. Users were charged £1.50 per text conversation to cover packaging and postage costs, taxes, and network and aggregator fees.

While Oxfam-GB relied on a shared short code for its White Band appeal, it has since purchased a dedi-cated short code. It is currently using the code to en-courage people to sign up for various campaigns or set up a regular gift. For example, individuals can text in to receive updates on actions they can take and events related to issues like climate change. "The beauty of texting is its immediacy," says Pierino Cioffi, marketing and communications officer for Oxfam-GB. "We believe nearly all text messages get read." Emails sent by charities and commercial players in the United Kingdom, on the other hand, have an open rate of roughly 20 percent, he adds.

A valuable byproduct of the campaign was the collec-tion of names and phone numbers to be used in future outreach efforts. Oxfam-GB continues to send text message alerts about public demonstrations and fundraising appeals to several thousand of its white band responders who agreed to receive future an-nouncements.

KENYA

International Boundary
Province Boundry
City Markers
Roads
Rivers

in Kenya, and its text message outreach efforts related to the Make Poverty History campaign, Oxfam-GB emphasizes that its use of mobile applications remains in the preliminary stages, and has yet to develop into a cohesive strategy for employing mobile applications in the future. Part of the challenge lies in developing the necessary expertise. Oxfam-GB relied heavily on a mobile marketing firm for support and advice during the White Band campaign.

Oxfam-GB's experience in using text messaging as an awareness-building tool mirrors that of many NGOs. Because text message-based advocacy is relatively new, expertise is limited and few successful case studies exist. Set-up costs are also a big factor. Particularly in the area of fundraising via text messages, those NGOs that have claimed successes tend to be well known and represent causes that elicit an emotional response that drives people to take immediate action.

Mobile Fundraising: Supporting Disaster Victims in the United States

In the aftermath of Hurricane Katrina in the United States, the Wireless Foundation partnered with the American Red Cross to develop a mechanism through which citizens could make fast, easy donations. In just two months, more than US $100,000 was raised for the American Red Cross to assist hurricane victims. Realizing this arrangement could help victims of future natural disasters, the partnering organizations established a permanent text messaging response system.

The result was Text 2HELP™. Through the program, customers of participating wireless carriers simply text message "2HELP" (24357), with the keyword "GIVE," to make a $5.00 donation to the American Red Cross Disaster Relief Fund to support relief efforts in the event of a large-scale disaster.

The amount appears on the customer's bill, or is debited from prepaid account balances, with 100 percent of the donation amount going to relief efforts. Those using the service are charged the customary fee for transmitting a text message. Individuals are able to make up to four $5.00 donations on their account at a time.

Text 2HELP™ is made available in the event of a large-scale national disaster. In February 2007, for example, the program was activated to raise support for tornado victims in central Florida. It was activated again during the wildfires in California in late 2007. Funds were used to provide food, shelter, counseling, and other assistance.

The American Red Cross is part of the International Red Cross and Red Crescent Movement, a global network of over 180 national societies that work to restore hope and dignity to the world's most vulnerable people. Established in 1881, the American Red Cross provides fast relief to victims of natural disasters and helps people to prevent, prepare for, and respond to emergency situations.

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Next Steps: Increasing Organizational Reach through Mobile Phones

Looking ahead, Cioffi is encouraged by the potential for people to be able to make donations via the Internet on mobile phones that are wireless access protocol (WAP)-enabled. "From our point of view," says Cioffi, "we see mobiles as a way that people can spontaneously donate. If they see a billboard or a poster, they can do so right away."

Text messaging has emerged as an increasingly powerful tool in humanitarian crises–helping to disseminate life-saving information, providing critical news updates, and mobilizing people to make donations to help those in need. As the use of mobile phones keeps expanding, the power and reach of these strategies will only continue to grow. ∎

Text Messages Received by the 'Nerve Center' About Election-Related Violence in January 2008

"We have been alerted that it is not safe tonight, in Bamburi, Utange, home area. We a asking 4 security here please."

"Over 400 people with no food or water holed in Huruma PCEA church in Eldoret for three days. Help needed immediately."

"I humbly ask for security in the church we are in, Elgon view, Eldoret as we have heard of the killings in the Kiambaa church."

"People evicted from their homes in Saboti, are starving no basic needs, food, blankets, etc. People are camping at Kiungani, Kiminini and Sikhendu Kitale."

"People fleeing to Kitale from Gitwamba (very serious) torching of houses, lootings, etc. RED CROSS if possible, should assist."

"The situation in Narok south is bad. People have camped at the catholic church in Mulot and there are fears that they may be attacked tonight."

Credit: FishMS

III. Environmental Conservation

Using Mobile Phones to Protect the Environment

Around the world, mobile phones are being used in the environmental arena–from efforts to promote wildlife conservation to environmental advocacy to educating and influencing consumers about the environmental impact of their purchasing decisions.

In the area of conservation, mobile phones are used to track wildlife and provide an early warning system designed to mitigate human/animal conflict. Central to these efforts is improving communication among local stakeholders, non-governmental organizations (NGOs), and government agencies. For conservation efforts to be successful, all stakeholders, including local residents of sensitive areas, must be engaged and their interests taken into consideration. As the case study on wildlife conservation in Kenya shows, opening up communication channels using mobile phones can play a valuable role in community-based conservation efforts.

Mobile technology is also being used to monitor wildlife. One pilot project initiated by Save the Elephants in Kenya employed Global Positioning System/Groupe Spéciale Mobile collars to track elephant movements. Unlike the more expensive satellite/very high frequency tracking systems, mobile communication inexpensively pinpoints the elephant's location and text messages the coordinates back to the researchers. These efforts are in the beginning stages but show great potential for making animal tracking easier and more precise.

The case study on Greenpeace Argentina's efforts to protect forests and pass environmental legislation demonstrates the use of mobile phones in environmental advocacy. Text messages, because they are immediate and direct, offer an effective way to alert constituents about important news and move them to action. If the action is a phone call to a decision maker (e.g., a legislator), mobile communication is especially useful.

There is growing evidence that mobile phones can move people to action more effectively than other media. A number of campaigns reported to us a response rate of 20 to 45 percent for text appeals, which is considerably higher than that recorded for email alerts.

This data is supported by research from the commercial market that shows that text messaging works to influence decision-making and purchasing behavior. Existing research studies reflect that mobile communication can influence how people feel about a product or brand, and affect their behavior. One study concludes: "The reported

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increased likelihood to purchase is the most important finding of this research; on average this was 35%, but it was as high as 71% for one [text message] campaign."[17]

Given these findings, we sought to investigate some of the text message services that disseminate data on products and companies with the goal of getting consumers to buy or use environmentally sustainable products. While text messaging information lines are proliferating, we have not seen direct evidence that they influence consumer behavior other than by inference based on data from the commercial sector.

Lastly, we looked into using mobile phones as environmental sensing devices, an emerging area that is attracting both commercial and academic interest. Several pilot projects illustrate what may be possible in the future when it comes to applications such as monitoring air quality. Such applications are in the experimental stage and remain relatively expensive for widespread public use.

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[17]Rettie, Ruth and Ursula Grandcolas. "Text Message Advertising: Dramatic Effect on Purchase Intentions." Unpublished paper. Accessed 1 March 2008 at *www.kingston.ac.uk/~ku03468/docs/.*

Text Messaging to Save Trees *(Argentina)*

Issue: Protecting Argentina's Forests

Every hour, trees covering an area the size of forty soccer fields are cleared from the old growth forests of Argentina, home to indigenous tribes and numerous endangered species. According to Greenpeace, 300,000 hectares (3,000 square kilometers or 1,150 square miles) of native forest are cleared in Argentina each year. To confront this rapid deforestation, Greenpeace Argentina used the web, mobile phones, and publicity on television and in newspapers to gather 1.5 million signatures for a petition supporting *La Ley de Bosques*, or the Forest Law.

Response: Mobilizing the Public for Environmental Protection

The Forest Law, Argentina's first federal forest protection act, was passed in 2007. It includes a one-year moratorium on clearing native forests, giving the forest service time to develop appropriate forest management regulations. The law, funded in part by an export tax on genetically engineered soy, also establishes public hearings and environmental impact studies.

Greenpeace was able to effectively advocate for the *Ley de Bosques* by building a large database of supporters. Through a form on the organization's website, individuals were asked to sign a petition supporting the Forest Law, and submit both email addresses and mobile phone numbers. About 300,000 phone numbers were collected from this web form, and an additional 50,000 were collected via other means, such as email or through volunteers stationed on busy streets. This 350,000-number mobile phone list is one of the larger active mobile phone lists used in advocacy today. By the end of the campaign, over 1.5 million people had signed the petition supporting the Forest Law.

Greenpeace used their mobile phone network in several ways. The organization collected about 3,000 signatures for the petition via text messaging. Greenpeace also sent out text messages asking people to call specific legislators to lobby for the law. Text messages were sent out to specific target audiences, so that people would be directed to their legislator. Finally, Greenpeace used the mobile network to send urgent alerts about other actions or news.

Using text messaging for advocacy requires an active list of mobile subscribers who have agreed to receive communications from a campaign. Hernan Pablo Nadal, Greenpeace Argentina's online organizer, describes how Greenpeace expanded its mobile list: "Two years ago, we had 10,000 mobile numbers. By October 2007 with a lot of outreach, we had 45,000 numbers. With the campaign for the Forest Law, we gave signers of the petition the option of giving us their mobile number. As a result, we now have 350,000 mobile activists and 1.5 million people on our list–and a law on the books that protects Argentinean forests."

The Forest Law campaign was not the first time that Greenpeace Argentina successfully used mobile phones for a campaign. In 2005, Greenpeace lobbied for a "Zero Waste" law in

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Buenos Aires that mandated that the government reduce urban waste sent to landfills by 50 percent by 2012, and by 100 percent by 2020. The city produces between 4,000 and 5,000 tons of waste each day. Using text messages, Greenpeace encouraged supporters to call their legislators and urge them to pass the bill during critical hearings, and prior to city council votes. Greenpeace also used text message alerts to coordinate lobbying meetings and demonstrations. As a result of this comprehensive approach, the Zero Waste Law was successfully passed.

Outcome: A Rapidly Deployable Cadre of Activists

Greenpeace Argentina has established itself as one of the premier advocacy organizations in the country and region. Alongside the direct-action flair for which Greenpeace is famous, its grassroots organizing, online advocacy, use of social media, and innovative use of mobile technology has enabled it to win remarkable legislative victories in Argentina.

Organizers are clear about what makes mobile messaging effective in an advocacy context: the ability to mobilize large numbers of people wherever they are at a given moment. As demonstrated by its legislative victories, Greenpeace Argentina has been particularly effective at deploying this tactic during strategic times, such as in the lead-up to legislative deliberations. Greenpeace Argentina has also used text messaging to mobilize supporters to attend mass rallies.

Says Nadal, "We mobilized our database of *móvil activistas* even from inside the Congress building several times. City politicians from Buenos Aires are used to being pushed by Greenpeace, but this was a national campaign and representatives in Congress are not used to our pressure. Our constituents made some 300 calls an hour to legislators. That definitely made an impression."

Challenges: Managing and Maintaining a Growing List

With relatively scant resources, Greenpeace Argentina has long shown that it can still achieve impact. The organization used an in-house technical team to write the software handling bulk text messaging, keeping costs low. Beyond those programming costs, Greenpeace Argentina spent about 1,000 euros[18] per month on text messaging transmission charges, at about 5 euro cents per message. As Nadal notes, "Negotiating the costs with the telecom carriers is imperative now that we have such a large mobile list of 350,000 numbers."

With so large a list of mobile constituents, list segmentation—or the process of targeting specific constituents based on some characteristic—becomes important. Yet this would require merging mobile contact information with a sophisticated database of constituent information. Because the mobile constituent system that Greenpeace Argentina is using is homegrown, integrating it with their member and supporter database has presented challenges.

Response metrics for text messages are notoriously hard to determine, so it is not clear how many people read a message or forward it to a friend. Greenpeace Argentina reports anecdotal evidence that about 15 to 25 percent of mobile activists report back to the organization that they participated in a particular action. This is a high response rate for a direct marketing effort, and can be explained in part by the strong commitment of the organization's supporters.

But as Nadal notes, "Mobile marketing for NGOs [non-governmental organizations] is hard and is just starting. There needs to be a greater depth of discussion with the carriers and vendors in many countries about what

[18]Greenpeace Argentina uses the euro as its benchmark currency because the organization's headquarters are based in Europe.

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nonprofits need." In Argentina, as in most other countries, text message marketing is almost entirely focused on commercial uses and often associated with selling content. Greenpeace is now exploring hiring a mobile vendor that is capable of handling the volume of supporters on its mobile list, and is also negotiating directly with Argentinean mobile carriers for more favorable text messaging rates.

Next Steps: Replicating the Greenpeace Argentina Model

The work of Greenpeace Argentina in using mobile phones in advocacy campaigns is closely watched–not just by intermediaries such as MobileActive.org that are monitoring the industry–but also by other advocacy organizations, and, of course, by Greenpeace affiliates in other countries. Several other Greenpeace offices will test the Argentinean method of mobile activism in 2008. Greenpeace Argentina, meanwhile, has set its own goals, including expanding its mobile infrastructure with a more robust platform; integrating its mobile activist list and constituent database for better list segmentation; increasing sending speeds and delivery rates; and generating better reports on actions taken.

Greenpeace Argentina's text messaging campaign clearly struck a chord with the general population. The tremendous participation rates have not only empowered the organization with a core group of mobile activists, but have also demonstrated the power of mobile phones to serve as an effective tool to influence political change. ■

Live Earth's Mobile Campaign

Live Earth, a global music event on 7 July 2007, raised awareness about climate change through live concerts in Hamburg, Johannesburg, London, New York, Rio de Janeiro, Shanghai, Sydney, and Tokyo. The 24-hour concert was broadcast on television and streamed online to an audience of an estimated two billion people. Live Earth also featured a coordinated four-country text message advocacy campaign encouraging individuals to pledge to take action to solve the climate crisis.

The campaign generated thousands of text message sign-ups and action pledges via text message (exact figures were not released by the campaign). Audience members in the four countries were able to see their mobile pledges projected on giant screens at event venues and on television.

However, with little time to prepare and no engagement prior to the events, the text messaging component was well integrated with the broadcast of the show in only three countries–a critical success factor for a live-event mobile campaign.

Catherine Geanuracos, senior strategist for interactive media for the campaign, notes: "It's amazing how few people are thinking about how to use a mobile as community organizing tool. One of our successes was a group on Twitter (a mobile and online social network) that had thousands receiving updates on the event and a daily climate change tip, fostering a sense of community via mobile."

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A Survey of Text Message 'Infolines' *(South Africa, United Kingdom)*

A number of environmental groups are embracing text messaging as a means of engaging key stakeholders, whether in their capacity as community members or consumers. This case study surveys several of these initiatives.

FishMS: Alerting Consumers to Endangered Stocks

Imagine this scenario: A woman in Johannesburg, South Africa, stands at the fish counter in her local supermarket and texts the name of a fish to a phone number. Within seconds, she receives back information via a short text message informing her whether the fish is legally and sustainably harvested, and advising her whether "to tuck in, think twice or avoid completely."

The shopper is using FishMS, a text messaging-based service that provides point-of-sale information about the impact of fishing on fish stocks, enabling consumers to make informed choices about the seafood they purchase.

The Southern African Sustainable Seafood Initiative (SASSI), a project of the World Wildlife Fund South Africa, condensed available research on local fish stocks into wallet-sized cards that organized species into three color-coded categories: green for species that are not over-fished; orange for fish that are legal to sell, but where stocks are jeopardized; and red, indicating fish that are illegal to buy and sell in South Africa.

With the collaboration of local information technology company iVeri Payment Technology and their programmers, SASSI moved this system to a mobile platform, enabling a wider group of consumers to access more regularly updated data.

According to SASSI coordinator Jaco Barendse, mobile phones are "the ideal way to combine technology and information with the growing awareness that the ocean's resources aren't infinite." And because the data are interactive (unlike the wallet cards), FishMS also provides data about trends in consumer behavior. "We can see that the market is responsive, especially to press stories," he says. "If something was in the news about a certain type of fish, you can also see the spikes [in text-based queries about that fish] the next day."

Between December 2006 and February of 2008, the service received 30,000 queries from 7,254 individual users, indicating that some users send repeated queries.

Other Text Message 'Infolines': Climate Change, Healthy Toys, airTEXT

FishMS was the first of a growing number of environmental text message information services that use mobile technology to provide just-in-time information about the environmental impact of products and companies. Text message 'infolines' work when consumers text the name of a product or company to a short code (a five-digit phone number) to receive back information, providing 'just-in time' information at the point of purchase. For the information lines

Credit: FishMS

described here there are no costs to the consumer other than standard text message charges.

Climate Counts

One of these text message-based information services is the U.S.-based Climate Counts, which enables consumers to check companies' environmental sustainability ratings, and compare them with their competitors. The information, in the form of a scorecard that is delivered via text message back to the user, reflects the self-reported efforts of companies to address climate change.

Climate Counts has compiled an index based on whether companies have measured their climate 'footprint,' reduced their impact on global warming, supported (or suggested intent to block) progressive climate legislation, and publicly disclosed their climate actions. It is funded by U.S. yogurt company Stoneyfield and powered by Mobile Commons, a mobile vendor that provides the messaging technology.

Healthy Toys

Healthy Toys is a project of two U.S. environmental organizations and Moms Rising, an advocacy organization. It enables parents or guardians to verify whether children's toys or products are safe to use. Users can send via text message the name of a toy or product and receive back information about the chemical content of toys. The database can be queried via

mobile phone or the web, and contains more than 1,200 products.

airTEXT

Similarly, numerous air quality information services are available that push information about dangerous levels of pollution to citizens. In the United Kingdom (UK), airTEXT is a free air quality information service for people in London. Users who sign up for airTEXT receive voice or text message alerts when air pollution is forecast to be higher than normal. The service is aimed at people who suffer from heart and breathing problems, whose health or quality of life may be affected by air pollution. Similar services exist for specific locations in the United States.

Air Quality 'Infoline' Services

airTEXT (www.airtext.info/): When users register with the UK-based airTEXT service, they specify for which borough of London they'd like to receive information. When the pollution level for that borough reaches a moderate or high level of air pollution, they receive an alert from the system.

Arizona Department of Environmental Quality (ADEQ) text messaging alerts (www.azdeq.gov/sms.html): The ADEQ offers a text service that sends users alerts when there is a high pollution alert in the Greater Phoenix Area.

Ergo (www.urban-atmospheres.net/Experiments/Ergo/index.html): Ergo is a U.S.-based system that provides real-time air quality readings based on data from the Environmental Protection Agency. Users can receive daily messages with air quality information for a specific zip code or can receive a one-time reading for an area of their choice.

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Unlike the text information services that function as a 'pull' service, where a consumer actively queries a database, most air quality information services function on a 'push' basis, that is, a consumer signs up and then automatically receives updates about dangerous air quality levels and pollution information via text message.

How 'Infoline' Services Work

All text infoline services rely on a platform to handle the query and delivery of messages, and a database that contains information pertaining to users' queries. When information is needed, a user actively queries a database via a text message keyword sent to a short code or a regular phone number. The user receives a text message response with the results from that database, customized to fit the 160-character limitation of most text messaging services. Alternatively, a user can sign up (such as on the Web) to receive text message alerts to his or her mobile phone.

Most text messaging infoline services also follow a similar model in how they convey results. Similar to the three-tiered system of FishMS' response—used to indicate whether a consumer should buy, consider, or abstain from buying a particular fish—Climate Counts uses a three-point scorecard to indicate whether a company is 'stuck,' 'starting,' or 'striding' in its efforts to lower its carbon footprint. Research shows that it is helpful to associate an indexed result with a recommended action. An air quality numeric value, for example, is not as useful as a message that states "unhealthful air, stay inside."

Challenges: Managing an Effective 'Infoline' Service

For groups with limited funds, text messaging infoline services can be expensive to set up and maintain. Gathering and compiling comprehensive data that are

reliable, well indexed, and ready for queries are not simple tasks. In fact, all of the services profiled here already had data compiled and available through other channels, such as in print or on the Web. And all groups already had made considerable investments in collecting, verifying, and organizing this information. For these groups, all that was needed was to make the data they already had available via a mobile channel.

Another cost to consider is the fee to the vendor that provides the delivery platform. Vendor costs range widely, depending on country and complexity of delivery, but average a few thousand U.S. dollars per month. Lastly, groups need to consider the transmission costs for communicating via text messaging with their constituents. Obviously, the more popular an infoline service, the more text messages need to be sent to consumers and the higher the message delivery charges will be. In-kind donations from telecommunications providers can drive these costs down, but this strategy can also raise questions about project sustainability.

There are also significant social marketing challenges that limit user uptake. Non-governmental organizations offering these infoline services must deploy an intensive

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and effective marketing campaign to get consumers to remember to use the service, and which number to text to. Another limiting factor is that aggregating reliable and accurate data on hundreds or thousands of products, services, companies, or other data points is very expensive and time-consuming.[19] Climate Count's database, for example, so far includes climate change information on only 56 companies.

Next Steps: The Future of 'Infolines' Advocacy

At the present time there is still little evidence to demonstrate that these services are actually changing consumer behavior. Overall usage, measured by total number of subscribers to infoline services described in this case study, is small, ranging only in the thousands. Yet the potential of this tool is clear.

Just-in-time information sharing via text message infolines, as in the case of FishMS, can transform consumers into activists whose purchasing power can exert pressure on retailers or fishing companies. Groups considering using an infoline service should ask themselves not only what information they want to relay to the consumer, but also what further steps they recommend the consumer take. In the final analysis, the real value of these services will be judged by their ability to use information to change behavior, resulting in concrete and measurable actions by consumers and other constituents. ∎

mobGAS: Tracking Greenhouse Gas Emissions

A mobile application called mobGAS can be used to track individual emissions of greenhouse gases. The application, developed by scientists at the European Commission's Joint Research Centre, tracks the emissions of carbon dioxide, nitrous oxide, and methane based on information on daily activities entered by the user. Users can enter the information on a website or their mobile phone and then compare their emissions with national and international averages.

The application is particularly useful on mobile phones because users can enter data about activities that cause emissions–like watching television, driving, or cooking–at any time. By helping users make connections between their daily activities and greenhouse gas emissions, mobGAS hopes to encourage individuals to make lifestyle changes. The application also offers tips on how to modify activities to decrease emissions.

According to Tiago de Sousa Pedrosa, a project coordinator, mobGAS was downloaded more than 3,000 times between December 2007 and February 2008. By raising awareness of individual emissions, mobGAS hopes that the application can spark higher-level change.

[19]A team at the University of California at Berkeley (United States), is compiling a massive database of the health and environmental impact of thousands of products and services. This meta-database would be accessible to environmental advocacy and consumer organizations worldwide, decreasing the relative costs to individual organizations of having to aggregate this information themselves.

Environment

Environmental Monitoring with Mobile Phones *(Ghana)*

Issue: A Need for More Comprehensive Data on Urban Air Quality

"We need to shatter our understanding of mobile phones as merely phones and celebrate them in their new role as measurement instruments," says Eric Paulos of Intel Research in California (United States), a pioneer in the so-called urban-sensing movement. His desire is to add 'super-sensing' tools that transform ordinary mobile devices into tools that can collect and help track environmental trends.

More than 3.5 billion people carry mobile phones today, and researchers are beginning to notice mobile phones' ability to become the 'ultimate data collection machines.' Mobile sensing–also known as 'participatory sensing,' 'urban sensing,' or 'participatory urbanism,'–enables data collection from large numbers of people in ways that previously were not possible. By affixing a sensory device to a mobile phone, mobile sensing provides the opportunity to track multiple data points and collect dynamic information about environmental trends from ambient air quality to urban traffic patterns.

Or as Debora Estrin, a prominent researcher in this field from the University of California at Los Angeles, put it: "We can now manifest the previously unobservable in science."

Response: Empowering Citizens with Data Collection Devices

Mobile sensing represents an important shift in mobile device usage from communication tool to a 'networked mobile measurement instrument.' By aggregating thousands of data points transmitted by individual mobile phones, mobile sensing can paint a complex and dynamic portrait of the environment in which users are based. There are efforts underway to use sensing-equipped mobile phones to monitor a range of environmental factors, from ambient air pollution to transportation and traffic patterns to noise pollution.

The World Health Organization estimates that more than 4.6 million people die annually from the direct impact of air pollution–more than from car accidents every year.[20] According to Paulos, in many cases our knowledge of ambient air quality is limited to "a small handful of government-installed environmental monitoring stations that use extrapolation to derive a single air quality measurement for an entire metropolitan region." He argues that this "sparse sensing strategy does little to capture the very dynamic variability of air quality that depends on automobile traffic patterns, human activity, and output of industries."

To demonstrate the potential of citizen-generated environmental data, Paulos and his team ran a small-scale project in Accra, Ghana, where they equipped a small group of taxi drivers with devices that gauged the amount of pollution in the air. Accra has generally poor air quality, generated by tailpipe emissions, dust, and the common practice of domestic cooking outside using wood, charcoal, and other fuel sources that can spread harmful pollutants across the city. To help monitor air quality, Accra has a stationary monitoring system installed by the U.S. Environmental Protection Agency. This tool makes it possible to compare data from a stationary point with the mobile air

[20]World Health Organization (WHO). *WHO Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide: Global Update 2005* (Geneva: WHO, 2006).

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monitoring of the Intel Berkeley research project.

Outcome: A Clearer Picture of Polluted Air

In the Accra study, seven taxi drivers were provided with a dash-mounted global positioning system (GPS) device and a tube to hang from their passenger window. The tube contained a carbon monoxide sensor. Similarly, three students were each given a mobile clip sensor pack containing a GPS device, and a carbon monoxide sensor. The taxi drivers and students were asked to carry their sensors as much as possible during their normal everyday activities. Throughout the day, the sensing system automatically logged sensor data. At the end of each day, the pilot participants dropped off their sensor packs at a central location where the data was then extracted and the sensors recharged.

Paulos notes: "This study allowed us to collect actual air quality sensor data by citizens across an urban landscape. It also influenced our design for an integrated air quality sensor with a mobile phone." Variations across smaller neighborhoods and different parts of the city are clearly visible.

The data gathered provided a previously unmeasured map of carbon monoxide and air quality across the city. Colors in this image represent the individual taxi drivers' readings while the size of the patch indicates the intensity reading of carbon monoxide during a single day. Variations across smaller neighborhoods and different parts of the city are clearly visible.

Challenge: Harnessing the Potential of the Mobile Sensing Platform

Intel's mobile sensing pilot in Accra produced some interesting unanticipated outcomes, including a 'human aspect' that
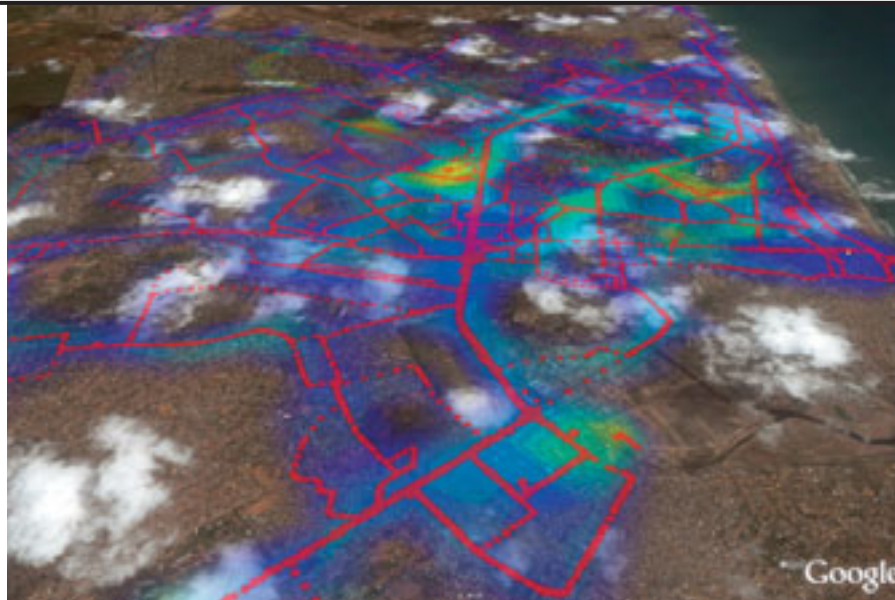
A heat-map visualization of carbon monoxide readings across Accra, Ghana rendered atop Google Earth. Colors represent individual intensity reading of carbon monoxide during a single 24-hour period across the city. Red circles are locations where actual readings were taken.

resulted from the participatory data collection process. Paulos tells the story of how Accra taxi drivers, who met at the end of the day at the mobile sensing device charging station, began to share their data, look at roads and areas that were particularly polluted, and trade tips on how to avoid certain routes. He notes that this incident illustrates the potential of 'participatory sensing' to both yield rich and interactive environmental data critical for public health and pollution reduction, and motivate people to become active participants in their environment.

Another area for further exploration is the ability of mobile sensing to contribute to public health by linking health with environmental factors that have not been available before. For example, even though we know that there is a link between asthma symptoms and air pollution, previously it was not possible to directly correlate an individual's symptoms with their exposure to air pollutants. Measuring people's lung performance while measuring ambient air pollution exposure could shed new light on the links between air pollution and asthma, perhaps resulting in better treatments.

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Research is also underway to assess whether it is possible to detect avian influenza viruses and other diseases through mobile sensing devices. Similar linkages may be possible in other issue areas, such as in emergency detection and warnings, which are important to public safety, and emergency and disaster response applications.

Next Steps: Securing a Future for Mobile Sensing

Users in mobile participatory data collection projects are divulging private information about their location and context. Security and privacy are therefore of concern. There is considerable discussion about how to ensure privacy while still transmitting useful information. This could include giving users the choice of only selectively sharing direct observations, and designing protocols that ensure a person's anonymity.

Mobile sensing is an emerging area where costs and benefits to date are hard to determine because it is still so early in the research cycle. However, it is also a rapidly developing area of inquiry that will likely see considerable activity and interest, not just on the part of university or commercial researchers but also on the part of citizen groups and environmental advocates.

Using mobile phones as sensing devices and aggregating "crowdsourced" data into sophisticated and previously impossible environmental maps is an emerging field with only preliminary trials. Yet while still in early phases of concept development, the potential of mobile sensing to contribute to environmental conservation and related fields is clear. Ongoing research in this area will continue to provide fascinating data for researchers, citizen groups, and environmental advocates. ∎

Mobile Sensing Device or Mobile Sensing Phone?

While the early Accra project used mobile sensing devices but not mobile phones, Paulos and his team are now working on integrating a sensor into a mobile phone as a prototype of a more integrated platform for collecting data in California.

Meanwhile, in Cambridge, England, mobile phones are being used by bicycle couriers to gather pollution information. Each phone is connected via Bluetooth to a sensor attached to a courier's bike. The sensor monitors air pollution while the phone transmits the data back to a research lab at the University of Cambridge. Custom software reports levels of air pollutants and a GPS transmits the exact location of the courier.

Commercial players such as Nokia are beginning to enter this field as well. Nokia recently featured a concept phone with a wearable eco-sensor that detects carbon monoxide, particulate matter, and ground-level ozone. Data would be transmitted to the phone where a user could choose to share the environmental data, aiding in research and increasing environmental awareness.

Environment

Protecting Wildlife and Human Wellbeing *(Kenya)*

Issue: Humans and Animals Competing for Land

The Laikipia District of north central Kenya is a popular tourist destination, teeming with wildlife. Covering 9,700 square kilometers, Laikipia comprises a patchwork of small farms, large ranches, privately owned conservancies, and government land. Some 5,000 elephants, the second-largest elephant population in the country, inhabit the region. As farmers, ranchers, and these animals struggle to co-exist, the region has gained a reputation for being one of the worst areas for human–elephant conflict, with more than 3,000 incidents occurring annually.

Human-wildlife conflict is a growing phenomenon around the world as human populations place mounting pressure on ecosystems, wildlife habitat is reduced, and animal migration routes are made inaccessible. As a result, humans are susceptible to injury, and even death, and animals suffer attacks by humans. In Laikipia alone, an average of five people and ten elephants are killed each year as a result of human–elephant conflict.[21]

"The tension [in Laikipia] stems from communities having their crops damaged by elephants," explains Dr. Max Graham, Associate at the Department of Geography, University of Cambridge (United Kingdom), who has been studying and working in Laikipia for almost a decade. "There's a perception that the elephants belong to the government and ranchers, both of whom benefit from tourism. Meanwhile, communities suffer. Farmers get killed. Elephants get speared or poisoned."

[21] *Conservation Kenya: Final Report* (GSM Association & Safaricom Ltd., 2007).

Response: Push-to-Talk Technology Program Launched in Laikipia

Believing that mobile technology could offer a solution, the Groupe Spéciale Mobile (GSM) Association (GSMA) Development Fund, together with Safaricom Ltd., Wireless Zeta Telecomunicaciones (Wireless ZT), Nokia, the Nokia Siemens Networks, and local conservation organizations, collaborated in launching a pilot project in Laikipia. Using GSM technology, the project sought to facilitate cost-effective communication among local communities, government wildlife service personnel, and private landowners through an early warning system that would allow farmers to preserve their crops while protecting wildlife.

The pilot utilized 'Push to Talk on Cellular (Phones)' (PoC) technology, which combines the functionality of a walkie-talkie or two-way radio with a mobile phone. PoC enables communication between two individuals, or a group of people, and is particularly useful in connecting a user group intermittently over a period of time (e.g., a working day).

Credit: GSMA

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A benefit of PoC is that it can be used alongside voice and data services on a single handset. Users can make standard phone calls and send text messages, while also accessing two-way communication and group talk through the press of a button. Because network resources are used only for the duration of each talk 'spurt,' PoC technology requires less airtime, demands less energy, and is less costly than a conventional phone call.

Equally important was finding a solution that would be sustainable and scalable over the long term. To address this need, the pilot was designed to test the commercial viability of the proposed solution. If the product could be successfully sold–at a discounted rate to nonprofits–it would stand a far better chance of making it in the marketplace.

"The goal was to develop a sustainable project that an operator could use commercially as an incentive to keep it running in the field," explains Christina Greenwood, Project Manager, GSMA Development Fund, who worked on developing the pilot. "At the same time, we were looking to offer the service at a

Credit: GSMA

Planning the Push-to-Talk Pilot

The PoC pilot was carried out at three sites in Laikipia from 3 November to 3 December 2007. Prior to launching the service, community members filled out a simple questionnaire aimed at identifying existing warning systems and challenges. The questionnaire pointed to a prevailing atmosphere of mistrust, with ranch owners and government rangers perceived as not doing their part to alert local community members of elephant dangers.

Key indicators for measuring the project's effectiveness were also identified. These included reducing the number of elephant crop-raiding incidents, improving crop harvests, reducing the number of human injuries and deaths, and reducing injuries to elephants.

Fifty people, including community-elected scouts, government rangers, and private landowners, received training in how to use the handsets, how to make group and one-to-one PoC calls, and the protocol for communication between users (e.g., "copy that" to mean you have received a message, or "over" to indicate that a user has finished speaking).

Once trained, individuals patrolling the fences surrounding farms and ranches were charged with calling other group members to warn of elephants coming in close proximity to private landholdings. The trial was carried out across three different human–elephant conflict sites. Over the course of the 30-day trial, 84 incidents were reported.

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subsidized rate, or with lower tariffs, to nonprofits to make sure they could access it."

Outcome: Successfully managed human–elephant conflict

Based on data collected and exit surveys, the pilot was found to reduce the number and severity of human–elephant conflicts in the four areas covered. Said Dickson Kamau, Chairman of the Rumuruti Forest Association: "Push-to-talk has helped us a lot. Before they [the game rangers] would never come to scare the elephants back [to the forest] but with this they could not make excuses because there were many of us listening."

Credit: GSMA

One hundred percent of PoC users engaged in the trial found the service to be helpful in managing human–elephant conflict, with 72 percent of users reporting that PoC helped provide an early warning system to reduce crop raiding, and 41 percent claiming that PoC was most useful in improving communication among all stakeholders.

A significant result of the pilot was reduced tension and improved trust among farmers and community members, the Kenyan Wildlife Service (KWS), private landowners, and local law enforcement officials. The PoC trial enhanced communication among these stakeholders and, in particular, helped community members recognize that conservationists were there to help them.

In Mwenji, for example, the trial focused on the monitoring of an electrified fence. When elephants tried to break the fence, security guards hired to patrol the perimeters of private ranches were able to report the incidents to community members and conservancy rangers who could take action. "It forced the guys who were meant to act to act," says Graham. "Because there were ten people listening it created collective pressure and improved accountability."

In Rumuriti, the trial had an unexpected effect. Local scouts assigned by a community association to patrol the area used the phones to alert KWS officials of the location of elephants to reduce incidents of human–elephant conflict. With the phones, they were also able to report illegal logging and animal theft in the area. The trial "helped with policing elephants and the forest," says Graham. "It was the first time we were able to empower the community to play such a role."

In Ex-erok, the phones were used by security patrols to alert KWS officials to both elephant incursions and animal stock theft. Graham cites three occasions when farm animals such as goats were recovered as a result of easy and fast communication.

Challenges and Lessons Learned

The primary challenge this project faced was securing the right partners to address the diverse needs of the stakeholder groups. Preparations for the program required coordination among a broad range of stakeholders–from telecommunications and technology groups to local nature conservancies. Only a multi-sector partnership could adequately cover all aspects of project work, from assessing the needs of Laikipia communities to the project's commercial feasibility.

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The project would only work if local communities adopted the technology solution. Here, non-governmental organization partners such as the University of Cambridge Laikipia Elephant Project and Laikipia Wildlife Forum were essential. These groups developed trusted relationships with the community that engendered good will for the project. They also could identify community users, and assist with the training, monitoring, and assessment.

While the results were positive overall, an important lesson emerging from the trial was the cost and time needed to keep the phones charged. Because they were used more often than traditional handsets, the phones needed to be charged more frequently. This required that users visit charging stations several kilometers away, and incur additional costs. To address this issue, project partners are exploring the inclusion of a solar or wind-up charger in future applications of PoC technology for conservation uses.

Another lesson involved the time needed to train local citizens to use the product. Given that most trial participants were accustomed to more rudimentary phones, each needed to learn to operate the more sophisticated handsets donated for the trial.

Next Steps: Further Exploring PoC Strategies for Environmental Conservation

A decision is still pending with respect to future expansion and/or replication of the PoC trial in Kenya. What is clear is that mobile technology holds considerable potential for strengthening wildlife conservation efforts in such areas as monitoring animals, reducing conflict among humans and wildlife, enhancing stakeholder communication, and increasing public awareness of endangered species. In much the same vein as the PoC trial, a text

Credit: GSMA

message-based 'early warning' system has been established in South Africa, enabling Kruger National Park authorities to contact local communities outside of the park's borders in an effort to reduce human–elephant conflict there.

Mobile technology is also being employed to raise awareness of endangered species. In 2003 and 2004, Fauna Flora International (FFI), a UK-based global conservation charity, launched Wildlive! with support from Vodafone UK and The Vodafone Group Foundation. Through the initiative, subscribers were able to track the progress of FFI conservation projects, access conservation news, and enter competitions. Customers paid a fee to download animal screensavers and animal sounds as ringtones, with 100 percent of profits going to FFI. The initiative was timed to coincide with FFIs 50th anniversary celebration and in 2004 raised £100,000 to support FFI's mission. Similar mobile fundraising efforts aimed at protecting endangered animals have been launched in other parts of the world. ■

Recommended Readings

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