MOBILE TECHNOLOGY IN EMERGENCIES

Efficient cash transfer mechanisms and effective two-way communication with disaster-affected communities using mobile phone technology

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Vodafone Foundation

Save the Children

Save the Children works in more than 120 countries.
We save children's lives. We fight for their rights.
We help them fulfil their potential.

The Vodafone Foundation invests in the communities in which Vodafone operates and is at the centre of a network of global and local social investment programmes.

In countries in which Vodafone operates, social investment is delivered by a unique footprint of 28 Vodafone Foundations and social investment programmes. These programmes are directed and chosen by the Foundation Trustees and receive funding from the Vodafone Foundation in the UK as well as their local Vodafone company.

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FOREWORDS

Technology – particularly mobile technology – has dramatically changed the landscape of the world we live in. To have the greatest impact on children's lives we need to embrace these innovations and harness their transformative potential.

This report comes at a time when we are at a tipping point – a time when we have made dramatic progress in the last ten years reducing child deaths, increasing the numbers of children in school and lifting millions out of poverty.

We could be the generation that stops children dying needlessly. Harnessing technology and working with the right partners is crucial to making that happen. We know that to achieve the greatest impact for children we need to find new ways of working and fresh approaches. We need to be collaborative, innovative and creative. There are an increasing number of emergencies and we need to ensure we are responding in the most effective way we can.

Mobile technology can become a core tool in effective emergency response, and by collaborating with mobile network operators, governments and other NGOs we could achieve so much more. I very much hope you will join us on this journey.

Justin Forsyth
Chief Executive, Save the Children

In an emergency situation, speed of communications is critical and can mean the difference between life and death.

The Vodafone Foundation aims to be one of the first responders in a disaster, providing instant communications and fundraising support over our networks. Solutions do not need to be complicated; simple text services can have a huge impact in sharing information and re-connecting families. Vodafone's Instant Network can be dropped into any crisis area within 24 hours and supported by Vodafone volunteers. When deployed in Kaikor, in Kenya, 260,000 calls were made using the Instant Network in just a month and a half.

At the heart of the Vodafone Foundation is the belief that mobile communications technologies can address some of the world's most pressing humanitarian challenges. Our responsibility is to use our innovative mobile technology in mobilising social change and improving people's lives.

Jeffrey Sachs, Director of the Earth Institute at Columbia University, has described the mobile phone as the "single most transformative tool for development". Our networks provide coverage to 82% of the Indian population, 99% of the Egyptian population and 99% of the South African population – more than 1.1 billion people in those three countries alone. Vodafone's global scale and coverage means that along with our partners – like Save the Children – we really do have the power to change the world.

This report outlines some of the ways in which communications technology can be used innovatively to address the challenges in a crisis. We cannot act on them without the support of our partners, governments and non-government organisations. I hope you are inspired to do this with us.

Andrew Dunnett
Director, The Vodafone Foundation

ABBREVIATIONS

CaLP	Cash Learning Partnership
CDAC	communicating with disaster-affected communities
CFS	child-friendly spaces
COW	cell on wheels (temporary base station)
CTP	cash transfer programme
DFID	Department for International Development
ETC	Emergency Telecommunications Cluster
GSM	global system for mobile communications
GSMA	Global System for Mobile Communications Association
IASC	Inter-Agency Standing Committee
IFRC	International Federation of the Red Cross
INGO	international non-governmental organisation
ITU	International Telecommunication Union
IVR	interactive voice response
LMMS	last mile mobile solutions
M&E	monitoring and evaluation
MNO	mobile network operator
MoU	memorandum of understanding
MVNO	mobile virtual network operator
NAO	National Audit Office
NGO	non-governmental organisation
OCHA	Office for the Coordination of Humanitarian Affairs
SDC	Swiss Agency for Development and Cooperation
SIM	subscriber identity module
SMS	short message service
SPO	strengthening participatory organisation
SWOT	strengths, weaknesses, opportunities and threats
TSF	Télécoms Sans Frontières
UBL	United Bank Limited
WAP	wireless application protocol
WASH	water, sanitation and hygiene
WFP	World Food Programme

EXECUTIVE SUMMARY

MOBILE PHONES CAN TRANSFORM EMERGENCY RESPONSE

Children across the world are affected by humanitarian emergencies and there is urgent need for innovative approaches to tackling such crises more effectively. Mobile phones are increasingly accessible to those affected by crisis and can play a strategic role in the delivery of rapid, cost-effective, scalable humanitarian assistance. However, the full potential of mobile phones to work as transformative tools in emergency response has not yet been realised.

This research identifies three key themes that should be addressed in order to change this situation: increasing accountability, building preparedness and prioritising collaboration. Making progress with each of these issues is dependent on a shared commitment from INGOs, MNOs and governments.

To realise the potential of mobile phones in emergency response, three strategic issues must be addressed:

Increase accountability: Ensuring accountability to beneficiaries is an ongoing challenge in emergency response environments, because it is costly and time-consuming to facilitate two-way communications. The most vulnerable are often excluded and there is the risk that increased use of mobile technology could exacerbate this trend. However, when used effectively, there are powerful ways in which the use of mobile phones can facilitate the flow of information and empower new voices, including the most marginalised, to participate and inform the humanitarian response. Mobile phones can be used as tools for conducting needs assessments, facilitating rapid mass communication, and improving transparency through feedback and complaints mechanisms.

Build preparedness: There is a widespread lack of awareness regarding how mobile phones can be used in emergency response. The main reasons for this are a lack of training for humanitarian staff, a lack of preparedness and the limited opportunity to innovate in the high-pressure environment of an unfolding emergency. There is significant opportunity for coordinated training, building organisational capacity and equipping staff in advance of an emergency so that they are confident and competent to realise the benefits of mobile technology.

Prioritise collaboration: The use of mobiles in emergency response is hampered by a lack of collaboration and knowledge-sharing between humanitarian agencies, MNOs and governments. There has been a lack of understanding regarding the strengths that each sector offers, leading to a lack of coordination and ineffective responses. Realising the potential of mobile phones in emergencies is dependent upon determined collaboration between all stakeholders, investing time and resources in building partnership and shared understanding before an emergency. This enables efficient and coordinated responses that utilise the strengths of each sector and facilitate integrated solutions.

RECOMMENDATIONS

In order for the humanitarian sector to realise the transformative potential of mobile phones more fully, it is recommended that:

1. **INGOs:**
- Introduce and prioritise mobile-based services throughout emergency preparedness, contingency planning and response, such as rapid needs assessments, large-scale two-way communication, and 'feedback and complaints' systems.
- Ensure that this is prepared for in advance through staff training and establishing databases of beneficiary contacts and software for processing. Alongside this, plan for appropriate hardware to be available in a response, with global level technical specialist staff to provide training and guidance.

- Work with other agencies within the cluster system to move towards mainstreaming mobile-enhanced responses to emergencies – recognising that the lack of coordination and collaboration on the use of mobiles in the current humanitarian system can act as a barrier to effective response.
- Advocate for agreements from relevant authorities for use of mobile phones in different emergency scenarios, negotiating and agreeing on partnership models with MNOs in vulnerable, high-risk countries.

2. **MNOs:**
- Prioritise increasing network coverage for the most remote areas in the midst of emergencies, utilising available innovative technologies.
- Develop a training programme, including simulation exercises, that can help humanitarian agencies learn about the range of different uses of mobile phones and how these can be applied in emergencies.
- Work with INGOs to transition from single-function to multi-function services through mobiles.
- Work to facilitate temporary reductions in service charges to allow more partnerships with INGOs for mobile cash transfer in emergency contexts.

3. **Governments:**
- Recognise the need to incorporate emergency support for communications as an essential component of response efforts: the restoration of mobile networks should be regarded as a life-saving humanitarian priority.
- Work to improve national regulatory environments to facilitate effective national mobile-based interventions and allow data sharing for humanitarian purposes.

In addition, it is recommended that Save the Children and Vodafone:

1. Collaborate to build the capacity of humanitarian workers so that they can make effective use of mobile phones in emergency response, by developing a comprehensive training programme based on a 'Mobiles in Emergencies Universal Resource Pack'.

2. Conduct field testing of the proposed solutions in a selected country, assessing viability and engaging directly with beneficiaries.

PHOTO: VODAFONE

Vodafone Instant Network deployment, Kenya

I INTRODUCTION

BACKGROUND

Increasing numbers of children around the world are affected by humanitarian emergencies and there is an urgent need for innovative, scalable, cost-effective approaches to tackling these crises. Alongside this, digital technology is spreading rapidly across the developing world, and the mobile phone is becoming increasingly accessible to families and children affected by disasters. There is significant potential for mobile phones to play a strategic role in helping deliver rapid, effective, accountable humanitarian assistance. Having access to the right information and communication at the right time can save lives and protect children.

Save the Children aims to increase the number of children it reaches to 10 million a year by 2015, and to increase the impact and quality of its responses. Effective use of mobile technology in first-phase emergency response can help realise this goal. However, Save the Children and other humanitarian organisations often struggle to make effective use of mobile phone technology due to a range of challenges and constraints. This research is the first stage in exploring how humanitarian organisations can collaborate with mobile network operators (MNOs) and governments to tackle these challenges and utilise the transformative potential of mobile phones more fully.

OBJECTIVES OF THE RESEARCH

This report reviews current literature and engages with primary research in order to provide an initial foundation for Save the Children and Vodafone regarding the effective use of mobiles in emergencies.

The four specific objectives of the research are to:

1. Explore how to overcome obstacles to the effective use of mobile phone technology in emergency response, in relation to distribution of cash to support food security and livelihoods, information sharing, two-way communication with affected communities, and other potential integrated services.

2. Understand more fully how mobile services can make emergency programming quicker, more effective, more efficient, more accountable and more transparent through the use of mobile phones.

3. Determine what recommendations could be applied across Save the Children's emergency programmes to build preparedness and capacity to respond, and provide guidance for appropriate routes forward in light of this.

4. Recommend next steps for field testing in emergency response in future Save the Children programmes, and provide wider practical recommendations for the sector as a whole (including INGOs, MNOs and governments).

CONTEXT

This report is an initial exploration of the effective use of mobiles in emergency situations. It provides a foundation to build upon, based on the premise that mobile phones offer significant transformative potential in emergency situations. However, this report should be read with the following issues in mind, which are each explored in more detail throughout the report:

• Increasing the use of mobile phones in emergency response is complicated and has significant social consequences and technical constraints that require ongoing assessment. Technical capacity is constantly increasing and with it comes the potential for increased social impact. However, this is only potential, it is not an inevitable impact, and to be realised it requires careful planning, training and field testing; technology does not inevitably work for the good of the most marginalised.

• There is an inevitable element of risk when innovating with new tools in a development or emergency context. Too many technology-based interventions are introduced without due diligence and with a lack of awareness regarding the potential unintended negative consequences.

However, if humanitarian organisations ignore the changes that are taking place and resist investing in the transformative potential of innovative technology, then they will become increasingly ineffective. Humanitarian organisations such as Save the Children can take a lead in ensuring that the benefits of mobile technology can be used to benefit the most marginalised.

- The digital world is changing fast and any technology-based solution that is suggested today may be outdated within a couple of years. In the light of this it is important to avoid prescriptive approaches, to remain responsive to change, and to recognise that what works in one location should not be assumed to necessarily work elsewhere. In light of this, the appropriateness of a technology-enhanced response to an emergency should always be assessed on the basis of the benefit it brings to the intended beneficiaries.

Realising the transformative benefits of mobile technology requires significant changes in the way humanitarian organisations approach emergency response. This report identifies the relevant opportunities and challenges, and explores how to overcome obstacles and move forward in a way that assesses and mitigates the inevitable risks.

The report is written for informed practitioners, familiar with the language of emergency response. It is intended to be accessible for those without detailed technical knowledge, and it avoids technical language as much as possible. The report recognises that mobile phones are already being used to good effect in a wide range of emergency response situations. Annex E provides an illustrative overview of 15 ways in which mobiles could be used in emergencies, covering: feedback and information gathering resources; mobile cash transfer; decision-making resources; content and communication resources; and 'big data' management. Annex F builds on this by listing and describing 16 examples of different mobile data collection tools, such as Ushahidi and FrontlineSMS, which are currently being used in humanitarian situations. These two annexes should be used as a resource throughout the report, demonstrating how the potential of mobile phones

is already being realised. Annex H provides a table with a detailed illustrative summary of the current uses of mobiles in emergency in each research country. Annex I provides a cross-cutting SWOT analysis of using mobile phones for cash transfers in emergency situations and using mobiles for two-way communication in emergency situations.

STRUCTURE

The report begins with an initial review of the literature and an explanation of the methodology adopted. The analysis is structured into three themes in order to address the research objectives: **accountability, preparedness and collaboration**. It is structured into these themes because they emerged through the research process as being the three most strategic areas of opportunity and challenge for the humanitarian sector engaging with the use of mobiles in emergencies.

Each of these themes begins with a summary and an explanation of the key related obstacles and opportunities, and ends with a series of recommendations specific to the three sectors of INGOs, MNOs and governments. Within each of the analytical themes is a combination of primary and secondary research, drawing on interviews with Save the Children field staff and on a wide range of relevant literature. These three themes each require significant attention in order to fully maximise the possibilities for scaling up the use of mobile phones in emergency response. It should be noted that the three themes are not exhaustive and do not cover all relevant issues regarding effective mobile phone usage. Rather, they represent three pivotal issues that should be considered priorities to address.

Following the three analytical themes is a special focus section on mobile cash transfer, in recognition that this has been a leading context for the use of mobiles in emergencies and, therefore, has lessons applicable for wider use. The report ends with recommendations that link back to the research objectives and that identify the immediate priorities to address for Save the Children, Vodafone and the wider sector.

2 THEORETICAL CONTEXT

Mobile phones are transforming the
nature of communication across the globe.
The International Telecommunication Union
(ITU) estimates that globally there are
85.7 mobile subscriptions per 100 inhabitants.
In the developed world this is 123 per 100
and in the developing world this is
77.8 per 100 (ITU, 2011).

This initial theoretical context explores how mobile
phones are being used as tools in emergency
response, providing a foundation for the analytical
themes. It reviews current emphases in the literature
and lessons learned, identifying gaps and focusing
on the potential risks and benefits for the most
marginalised end users.

The way in which people live and communicate is being
shaped by mobile phones, with implications across
all sectors of development work. The technology
is changing diaspora connections, the structure of
remittances, food pricing, transparency, corruption and
governance, WASH programming, feedback mechanisms,
and monitoring and evaluation. Yet the basic functions
relied upon in mobile phones are often disrupted by
disasters and emergencies, meaning that they are not
often fully harnessed to make the positive difference
they could do in these situations (SDC, 2011).

Over the last 20 years there have been repeated
calls for improved communication mechanisms for
humanitarian response in disasters and emergencies

(Wynn-Pope, 2012). The recent advances in mobile
technology provide a unique opportunity to realise
this improvement, reimagine appropriate approaches
across the sector (Williams & Gilchrist, 2012), and
make progress in the wider Save the Children priority
for 'early warning, early action' in emergencies.
However, the humanitarian sector is lagging
considerably behind the mobile technology innovation
curve. Most of the creative and innovative use of
mobile phones in emergencies is coming from the
grassroots: community groups and local enterprise.
As Wall (2011b p.3) notes:

> "All available evidence suggests that when it comes to
> communications between responders and the affected
> community, disaster survivors are actually far more
> comfortable with technology based information systems
> than humanitarians are. Humanitarians tend to have a
> poorer understanding of such systems and view them
> with considerable scepticism."

Any effective use of the mobile phone in emergency
situations should first and foremost be tailored
towards the needs and abilities of the affected
community. This remains the top priority and it is
vital that any proposed solutions are of use to these
beneficiaries. The most marginalised are also those
most likely to be located in areas of low infrastructure
and low mobile coverage. In light of this, the report
is practical throughout, working with scenarios and
recommendations that can deliver tangible and
lasting change.

TABLE: HOW THE CRITICISMS OF USING MOBILES IN EMERGENCIES CAN BE OVERCOME

Common technical challenges with use of mobiles in emergency	Ways to overcome these challenges
Network capacity is limited and unreliable	
Mobile network capacity may be inadequate for coping with demand following disasters, leading to long delays and uncertainty regarding whether SMSs sent are being received (Yap, 2011). After the earthquake in Haiti, systems were overloaded and it is estimated that SMSs were received only 60–70% of the time. On several occasions SMS blasts from humanitarian agencies crashed mobile networks for several hours (Nelson & Sigal, 2010).	MNOs can build capacity to deploy or re-establish network faster in areas affected by disasters. MNOs, governments and INGOs can work to maintain databases of users needing priority access in emergencies so that those saving lives can avoid congestion. MNOs, governments and INGOs can encourage non-emergency responders to use SMS as opposed to voice, if necessary, to reduce risk of congestion, and to consolidate communications campaigns so that the same messages are not repeated from different sources.
The most marginalised cannot access mobile phones even outside of emergencies	
Some disaster-affected communities have low levels of phone ownership and low exposure to technology. Those who do have access to mobile phones are unlikely to be the most marginalised.	When assessing the appropriateness of using mobile phones in disaster response it is important to consider which technologies affected communities are already using, how they are using them, and what are their preferred channels of communication (Infoasaid & FrontlineSMS, 2011). Mobile phone calling booths can be established to offer free calls, SMS, phone charging and data so that affected civilians without phones, credit or power on the phone can communicate with family. (For example, earthquake in Turkey, Smart and Globe in the Philippines and Telkom in Indonesia.)
There are too many institutional and operational barriers in place	
Lack of clear operational frameworks for co-operation amongst MNOs, NGOs and governments, and institutional barriers from unprepared or ineffective bureaucracies, increase the time and effort required to set up new communication systems in emergency contexts. Getting MNOs to collaborate and synchronise is challenging (Williams & Gilchrist, 2012). When combined with the difficulty of negotiating contracts, establishing guidelines and training staff, this is a major obstacle to the uptake of mobile phone use in emergency situations (Smith *et al*, 2011). Although often theoretically possible, the procurement and distribution of mobile phone handsets and SIM cards is time consuming and costly in terms of financial and human resources (Poisson, 2011).	MNOs, governments and INGOs can map vulnerable areas and pre-position telecom assets to reach affected communities faster in emergencies. Support can be gained from the Emergency Telecommunications Cluster (ETC), GSMA and ITU. Promote regional and national drills involving the general public, NGOs, MNOs and the government, building on resources such as those used in Japan and New Zealand (Shake Out, 2012). Agree and standardise frameworks for cooperation among MNOs, NGOs and governments so that agreements can be put into place before emergencies, and made readily available in a standard form without lengthy negotiation.

Common technical challenges with use of mobiles in emergency	Ways to overcome these challenges
Emergencies often mean significant damage to mobile infrastructure	
Infrastructural damage such as power cuts, mobile network outages and the time taken to repair damaged infrastructure all constitute major obstacles to using mobile phones in emergency situations (Infoasaid & Frontline SMS, 2011).	New technologies are being developed to provide rapid help in overcoming the challenges of infrastructure damage and establishing systems. This includes stand-alone communication networks, such as Vodafone's instant network solution, a portable GSM network designed for use in emergency situations where regular mobile phone networks have been damaged (Vodafone, 2011). Significant research into innovative use of mobiles in contexts of government censorship for 'off-grid' and ad-hoc communications can also be applied to overcome infrastructural damage in emergency situations (Glanz & Markoff, 2011; Loftus, 2011). Regulations for emergency provision of mobile networks can be temporarily relaxed, so that temporary infrastructure can be made operational by NGOs without lengthy procedures for permission for spectrum use.
The initial cost of investment in mobile technologies is too high	
Humanitarian agencies may have insufficient financial resources to invest in new technologies, have limited capacity to trial and adopt new ways of working, lack knowledge about new technologies and consider them to be too high risk or beyond their humanitarian remit (Smith *et al*, 2011).	MNOs can encourage a vision and help provide evidence to INGOs of the long-term cost-savings of technology and extended relationships, which distribute the up-front costs over a longer period. MNOs can support NGOs and governments through programmes such as Vodafone's 'Mobile for Good', seeking to bring the private and public sectors together.

3 METHODOLOGY

A total of six interviews were conducted with Save the Children staff in Niger, Kenya, Somalia, Bangladesh, Afghanistan and Pakistan (Annex G).

Each interview lasted about 60 minutes and was spilt into three sections of general introduction questions, scenario-based questions, and building block responses (Annex A). Additional follow-up interviews were conducted with three of the initial six Save the Children staff. The interview countries were selected because they are prone to disasters and represent a range of susceptibility to slow-onset, cyclical and rapid-onset crises. They are also countries in which Save the Children is already working. It should be noted that of the six countries involved in the research, Vodafone is only involved directly in Kenya and Afghanistan via partner markets. Three additional interviews were conducted in order to learn more about the role of the corporate sector in emergency response. The first of these was with the Managing Director of Mezzanine, a mobile health solutions company based in South Africa that is linked with Vodafone. The second was with staff members of Vodafone Turkey. The third was with the Instant Network Programme Manager of the Vodafone Foundation.

The intention was to engage primarily with humanitarian workers rather than mobile technical experts. This was in order to establish the current realities of their situation, how they consider that mobiles can be used in emergencies, and suggest recommendations accordingly. The second stage of the interviews was based on three potential 'scenarios' of how mobile phones could be used in a range of different emergency contexts at a local, regional and national level (Annexes B, C and D). These scenarios were refined through dialogue with key stakeholders and then used with the interviewees in order to provoke rich, practical interaction. The scenarios were deliberately designed to be positive in order to generate dynamic feedback and interaction. This theoretical modelling of scenarios and potential solutions proved to be an effective methodological tool for showing the potential and the limitations of different uses of mobile phones.

The scenarios were designed to be easily adjustable for specific contexts, recognising the diverse nature of emergency response situations. Emergencies are unique and are characterised by complexity and rapid change, and as such can never be fully encapsulated through theoretical modelling. Nonetheless, this type of modelling is a valuable tool for identifying patterns and similarities in the opportunities and challenges faced, and therefore provides insight into which technology-enhanced response will be effective in different contexts. There are a large number of other relevant organisations and experts that were not consulted during this research because of the limited scope and time frame. Priorities for future research are outlined in the report recommendations.

TABLE: KEY MOBILE INDICATORS FOR EACH RESEARCH COUNTRY

Indicator	Mobile penetration (subscriptions per 100 people in 2011)	Mobile network coverage as % of population	Mobile network coverage as % of geographical area	Availability of mobile money (1 = none, 5 = widely used by all MNOs)	Number of MNOs nationally
Notes	This is different from a % figure because many people have more than one subscription. (ITU, 2011, MNO Directory, 2011)	Mobile Network Coverage statistics are provided by MNOs, in many cases for marketing purposes, and are not always reliable.	Current geographical coverage is difficult to determine – the noteworthy trend is that sparsely populated countries may have high 'population coverage' figures and low 'geographical coverage' figures.	This is based on the GSMA's data on the number of mobile money deployments relative to the number of MNOs. (Mobile Money Tracker, 2012)	Not including MVNOs, based on information from the ITU and GSMA websites.
Kenya	65	90%	34%	5	4
Somalia	26	85%	unknown	3	7
Bangladesh	56	97%	90%	5	6
Afghanistan	54	85%	unknown	4	5
Niger	27	65%	est. 20%	2	3
Pakistan	62	90%	est. 40%	3	5

4 ANALYSIS: ACCOUNTABILITY

Obstacle: Ensuring accountability to beneficiaries is an ongoing challenge in emergency response environments. Soliciting two-way communication and feedback from beneficiaries is costly and time-consuming, and the most vulnerable are often excluded; mobile technology could serve to exacerbate this trend.

Solution: The appropriate use of mobile phones can facilitate the effective flow of information and can empower new voices to participate and inform the humanitarian response. When implemented effectively this can ensure that a greater range of needs can be met as part of an effective response, and accountability is enhanced.

Summary: The discussion on accountability focuses on understanding needs through promoting feedback and two-way communication; ensuring access for the most vulnerable; facilitating the most appropriate response through effective needs assessment; and the potential and limitations of mass messaging.

PROMOTING FEEDBACK AND TWO-WAY COMMUNICATION

Mobile technology has the potential to deepen engagement with disaster-affected communities by enabling them to individually and directly communicate with humanitarian agencies (CDAC, 2012). The appropriate use of the mobile phone can not only facilitate the flow of more information, but can empower new voices to participate and inform the humanitarian response, ensuring that a greater range of needs can be met and that accountability is enhanced.

As noted by the interviewee in Afghanistan: *"we want the community to be empowered to lead their own response. People can be motivated through mobile phones to have their own forums and discussing their own issues to solve."* He recognised that this is of limited practical benefit currently in much of Afghanistan because of limited coverage across many rural regions, but he looked forward to the future possibilities. In Bangladesh it was noted that mobiles are well established across the country, having been used in a development context for a long time, with positive impacts. Effective systems for use of mobile phones in facilitating communication in emergencies have now been established:

> *"When there is a flood, beneficiaries contact us and we contact them, we explain things like where the cyclone shelters are, where the flooding shelters are, who are their local representatives. This is a formal process and involves communication with a lot of organisations – we communicate with the programme managers of the respective NGOs and local partners and then they get the messages out to their volunteers and beneficiaries like that. In emergency response this has enormous potential – because there are some areas where the TV and radio is not available. Someone can send an SMS to colleagues and they can ask for people to spread it to others and get the message to the remote corners of the country. Mobiles are working very well – because SMS can be sent quickly in an emergency situation."*

The benefits of communication through mobiles was shared by the interviewee in Niger who noted: *"the most significant opportunity from using mobile phones in emergency response is the way in which they make communication easier, we can communicate with those in far places. Niger is not densely populated, especially in the rural areas which are worst affected by drought and lack of food, so this is very important for them."* However, the lack of mobile coverage was identified as a significant constraint, as *"the networks do not cover all of the beneficiaries – in fact in many of the areas which are worst-affected, there is poor access to mobile networks."*

CASE STUDY: MAKING CONNECTIONS IN THE MIDST OF CONFLICT

Mobile technology has been seen to be a useful tool for making connections with hard-to-reach conflict-affected populations. Souktel is a Middle Eastern mobile phone platform originally designed to allow young people affected by the ongoing tensions in Gaza to seek employment through a messaging platform. Souktel has expanded to add a crisis response service that connects aid agencies with people who need assistance in the West Bank, Gaza, Somaliland and Iraq (Smith *et al*, 2012). 'AidLink alerts' is another service that allows humanitarian agencies to send custom SMS to thousands of community members or staff from an ordinary mobile phone. Similarly, 'AidLink surveys' enable agencies to conduct fast SMS-based polling, monitoring and field data collection, with results instantly viewable for quick decision-making. Twenty leading aid organisations are using these services, from OCHA to the IFRC, and the technology requires no special hardware beyond a basic mobile phone, managed from multiple locations without the need for internet access (Souktel, 2012).

In Pakistan, the most significant opportunity from mobile use in emergencies was considered to be *"the fact that it can act as an early warning system. It can get us the information we need – when we don't know about a particular issue and we cannot access an area because of the emergency – the population can inform us about the reality of the situation on the ground."* Again, in Pakistan, the network coverage remains an obstacle to participation both through intended blackouts due to political instability, ongoing problems with the network or specific network challenges caused by natural disasters.

Vodafone states that it is actively engaging with this challenge and working to increase mobile coverage for such marginalised regions. The company has invested nearly $13 billion in deploying networks in emerging markets in the last four years. The combination of increasing mobile coverage and decreasing cost of mobile devices means that the most marginalised are likely to have increasing access to mobile phones.

Despite the ongoing challenges of network coverage, ensuring reliable, two-way communication is increasingly established as a vital component within emergency response (Wall, 2011b; Wall & Robinson, 2012; Internews, 2011a). Indeed, Wall (2011b p.3) suggests that "the process of accessing information and being listened to matters as much as the content." Reporting back to the CDAC after the Haiti earthquake, Ljungman (2012 p.5) recommended that "the international humanitarian community – in particular, the Inter-Agency Standing Committee (IASC) principles, NGOs and donors – should consider the coordination of two-way communication with disaster-affected communities as a vital and standard component of emergency response." Similarly, Internews (2011 p.4) report that their survey from refugee camps in Dadaab, Kenya, "showed that refugees consider access to information critically important to their daily decisions inside the camp." Again, this is reflected in the feedback from Somalia, where the interviewee advocated a proactive approach to using SMS beyond data collection, telling us: *"you should be actively reaching out to people to find out what is happening, what is lacking and what we should be focusing on – then use the technology to build more rapport with the beneficiaries."*

A common related theme in the interviews was the effective use of mobile phones in facilitating a 'feedback and complaints' mechanism in the midst of emergency response programmes in Pakistan, Somalia, Afghanistan and Niger. In Afghanistan it was noted that the presence of a mobile complaints line enables greater transparency as the beneficiary is able to make direct contact with the M&E team, rather than having to communicate through the project manager. It also enables closer interaction with those who are cut off from physical contact: *"although there is no access in some areas, we communicate the contacts for the M&E person so that if there are any complaints then anybody can call the person and give feedback to them. People can move to the place where they can find the mobile signal and then they can communicate with us."*

IFRC'S USE OF A FREE QUESTION AND COMPLAINTS HELPLINE

Proactively prioritising listening to beneficiaries through the use of technology has been pioneered by the IFRC. They established a free questions and complaints phone line as part of their communication strategy for the shelter camp at Annexe de la Mairie in Haiti, alongside posters, a sound truck and community mobilisers. Management of the questions and complaints service was outsourced to a local Haitian technology company with detailed question and answer sheets provided by the IFRC for call centre staff. These were regularly reviewed and updated as necessary and removed a considerable administrative burden for the IFRC. Alongside this, specific questions could be logged and followed up by the IFRC's dedicated beneficiary communication team. In an evaluation, 85% of callers reported being satisfied with the phone-in service, even though fewer callers were satisfied with the

IFRC itself. This highlights that beneficiaries still value the opportunity to ask questions and raise complaints even if they are not entirely happy with the organisation in question. Use of an external company meant the service was impartial, as IFRC staff did not answer calls, and the number of call centre staff could be scaled up or down depending on demand. A significant level of preparatory work was needed to determine how all aspects of the system would function, but once established it ran effectively. The system acted as an early warning indicator of problems within the camp and built trust, as beneficiaries felt that the IFRC cared enough to listen to their concerns. In addition, there was a high uptake by women due to expressed preference for oral communication and systems through which their calls would be answered by an individual rather than an automated system (IFRC, 2011; Wall, 2011a).

Similar approaches are being used by other NGOs. SPO in Pakistan has used FrontlineSMS to receive beneficiary feedback on their food and shelter distribution processes following the 2010 floods in Pakistan. Their SMS complaints and response mechanism was appreciated by beneficiaries for the opportunity it afforded to discreetly communicate with the NGO, providing an alternative to traditional complaints mechanisms mediated through village councils (CDAC, 2012). Similarly, following the 2010 earthquake in Haiti, free phone hotlines proved popular among affected communities as oral communication of their needs and concerns (Wall, 2011a).

As a result of such initiatives, those affected by crises and disaster can become active participants in crafting appropriate responses. Mobile technology enables emergency communications to be an empowering, responsive and targeted two-way medium, rather than solely traditional broadcast media. This qualitative change in the way the humanitarian community can engage with those affected by crisis, means that beneficiaries have "a voice in decision-making" (Chazaly, 2012), and are more visibly active participants in the response, rather than passive recipients. This offers the opportunity to meet expressed needs rather than assumed needs.

ENSURING ACCESS FOR THE MOST VULNERABLE

Throughout the research the concern that mobiles may fail to include the most marginalised or vulnerable in society, particularly women and those who are unable to read, was raised repeatedly. The issue of inclusion was particularly emphasised in Somalia, where the interviewee identified perpetuating the exclusion of the most marginalised who do not have mobile access as the most significant threat when using mobile phones:

"Do the most vulnerable have access? Whether they do depends on many different factors. It would be important to make sure that everyone had access in order not to marginalise people. Those who have phones are those with the most resources; it could mean that the powerful are the ones that get access to the information we are trying to give and this would exacerbate things. The displaced in Mogadishu, IDPs in general, child-headed households, minority clans are the most vulnerable… you need to make sure that the vulnerable groups are considered."

However, several examples were cited where programmes could be designed to overcome this issue: in Somalia and Kenya the interviewees explained

how the use of trusted community representatives to pass on messages received via mobiles ensures information reaches the intended audience, including those without mobile access. It was noted that a mechanism such as this would need to be built into any mobile-based response. Such approaches are widely recognised in the literature (Williams & Gilchrist, 2011). Agencies also choose to engage with the issue of potential exclusion of the illiterate by using voice-based technologies to deliver information. In post-earthquake Haiti, the IFRC response included an automated voice-based freephone hotline that received more than 875,000 calls from Haitians seeking information on health, hygiene, cholera, hurricane preparedness, gender-based violence and shelter. This service was especially appreciated for allowing discreet and anonymous access to sensitive information, including topics such as gender-based violence (Chazaly, 2012).

The most vulnerable are often less likely to have access to mobile phones. However, this is not always the case, with some countries having unusually high rates of mobile adoption among children. For example, in Egypt 94% of 8–18 year-olds have mobile phones (GSMA & NTT Docomo, 2010). There are also a few

significant cases in which children and women may have access to mobile technologies because of the specific nature of their vulnerability. For example, victims of sexual and physical abuse may be given a mobile phone by their aggressors in order to control and manipulate them. Mobile phones are common gifts for transactional sex with vulnerable young girls in east Africa (Fox, 2010) and the vulnerability of these groups is exacerbated further during an emergency.

FACILITATING EFFECTIVE NEEDS ASSESSMENT

Interviewees were questioned regarding the potential for increasing accountability through mobile-based needs assessment. The range of responses demonstrates the need for country-specific approaches that are responsive to the varying levels of pre-existing exposure to mobile phones. For example, in Niger it was noted that *"the people who are too poor to work and are very vulnerable often cannot use a mobile well enough to engage with an SMS campaign or things like that… needs assessments or surveys which expect participation from every beneficiary would not be*

CASE STUDY: THE POTENTIAL ROLE OF SOCIAL MEDIA

It is clear that the priority concern of the humanitarian sector is to focus on those technologies which are currently most widely available among the most marginalised. At present this is radio and mobile phones. However, it is worth noting the rapid expansion of Facebook and Twitter across the developing world, with Facebook proactively developing low-bandwidth options ('0.facebook' or 'facebook zero'). There is need for further research in order to ascertain what proportion of populations affected by emergencies are currently active social media users, and therefore what place social media should begin to play in emergency response (BBC, 2012). The next few years will see emergency response initiatives strengthened by increasingly complex real-time social media dialogue. This should be engaged with now, considering the implications for bypassing official humanitarian channels and determining how the humanitarian sector can engage with and prepare for increased social media in emergencies.

Lessons can be learned from emergency response in the developed world in this regard. One pertinent lesson has been the high level of human resource input that is required in order to sustain two-way communication through social media. The American Red Cross is famous for making effective use of social media as part of its emergency response programming, but achieving and sustaining this requires extensive investment and an ongoing system of support behind the scenes (idisaster 2.0, 2012). GSMA observe that children who have access to mobile phones often use them for social media. Use of social media in emergencies in wealthy countries, and in political crises (particularly the Arab Spring) in middle-income countries, is already widespread, and the adoption of social media by young people in low-resource settings has begun to be a significant feature of their mobile usage (GSMA & NTT Docomo, 2010).

feasible in most situations." It is therefore likely that in Niger, solutions involving mobiles would need to be based on group communication, with any SMS-based needs assessment distributed through village heads, in a similar model to the use of trusted community representatives noted above. The interviewee confirmed that *"the use of surveys would work on a village level, and this fits in with how they communicate now. We would have the contact information of one person in the village who is a representative and passes on the message to the others in the village or responds on their behalf."*

In contrast, in Bangladesh, while it was acknowledged that *"in some cases with the extreme poor they are not familiar with SMS"*, the idea of using mobile phones for rapid needs assessment was received enthusiastically: *"it could be very helpful to do this with the mobiles after the emergency happens. We could get fresh information regarding the local conditions and that would be very useful."* Similarly, in Kenya it was suggested that, as long as beneficiaries could access phones, then *"it would really help the assessment process."*

There is a wide range of familiarity with mobile technology across disaster-affected countries. In Kenya, Bangladesh and Pakistan, interviewees noted that mobile phones are familiar to most of the emergency-affected communities. In contrast, the interviewee in Niger said that the first obstacle for some beneficiaries would be *"actually to just have a mobile phone"*, followed by the second obstacle of *"knowing how to use it"*. Similarly, in Afghanistan, it was noted that high call charges meant that some

beneficiaries would be reluctant to engage in any mobile-based interaction that they had to pay for. In Somalia the lack of mobile coverage is a significant factor in keeping mobile ownership at some of the lowest levels in the world.

THE OPPORTUNITIES AND LIMITATIONS OF MASS MESSAGING

There is a wide range of different approaches adopted for mass communication through SMS (Wall, 2011a; Williams & Gilchrist, 2012). Each of these approaches, to varying degrees, faces the challenge of limited receptiveness of recipients perceiving general information messages as 'spam'. This concern has been especially pertinent when it is difficult to target SMS, in areas with high numbers of unregistered SIM cards (Smith *et al*, 2012). This has been exacerbated by a lack of coordination mechanisms at the field level to ensure the consistency of information provided by different agencies, to prevent duplication of efforts and to coordinate across different types of media (Wall & Robinson, 2012). In response to this, a cross-cluster coordination mechanism, piloted in Haiti and provided by the deployment and dedicated staffing of the Communications with Disaster Affected Communities (CDAC), delivered beyond expectations and highlighted the need for greater communications coordination in future disaster-response efforts (Wall, 2011a).

CASE STUDY: PROCESSING AND MAKING USE OF CROWDSOURCED INFORMATION IN NEEDS ASSESSMENTS

Volunteer technical communities are developing valuable tools for data collection and visualisation across the world that have the potential to contribute significantly to the needs-assessment process. However, the lack of appropriate data verification standards and formal interfaces to facilitate information exchange with the humanitarian system is restricting their potential contribution to disaster-response efforts. The recent proliferation of mobile data collection tools (Annex F) has led to increasingly complex data flows in emergency situations, including

crowdsourced incident reports and crisis maps. As a result there is now urgent need for increasingly refined systems for processing, managing, sharing and using this information. One well-developed tool for filtering and verifying crowdsourced data is SwiftRiver from Ushahidi. Current limitations of such systems include the fact they tend to log a relatively small number of individual incidents in comparison to the size of the affected population, thus limiting usage for humanitarian agencies in informing emergency programming (Currion, 2010; Harvard Humanitarian Initiative, 2011).

This was confirmed through the interviewee in Pakistan who noted the significant challenge of using mass messaging in emergencies because of the associated fraudulent schemes, which flourish in the absence of effective coordination: *"Here in Pakistan, false messages get sent out by people via mobile phones, where people are promised $100,000 if they register and spend $5. This could be an issue… we have heard so many stories about the abusers who go door-to-door in the community and claim to be from the organisation and ask for a fee for registration for the programme that will then entitle them to services. Then when they have the money they flee. People are told they have won prizes, etc. – these abuses are pretty common on the mobile networks already."* This is clearly a human challenge, exacerbated through technology, and it was noted by the interviewee that it could be effectively addressed through better coordination: *"We would need to have a universal access number so that the communities know that this is the legitimate number that they can call. Alongside this we need proper education of the target communities. We need to educate people as to what is the official Save the Children number – that is the only authentic number that you will receive messages from, nothing else."*

In Haiti, the IFRC opted to deal with the limited receptiveness of recipients to mass messaging by branding and targeting the messages. It was necessary for the IFRC to make their messages recognisable because SMS was such a widely used mass communication tool. Indeed, some mobile

CASE STUDY: USING SMS TO REACH POPULATIONS IN HAITI

Following the earthquake in Haiti the IFRC sent out more than 45 million SMSs to subscribers of the mobile network, Voila. Of the people who had received an SMS from the IFRC, 95% reported that they found the information useful and 90% changed something in their lives or made some kind of preparation as a result, suggesting that it was both relevant to people's needs and effective in stimulating behaviour change. Advice on health and hurricane preparedness was the most highly valued, remembered and shared (Chazaly, 2012). The public health SMS broadcast service provided by the Thomas Reuters Foundation in the aftermath of the Haiti earthquake also recorded similarly promising results: 97% of those surveyed reported that the information they received was practical and trustworthy, and 74% said that they changed their behaviour based on the information (Nelson & Sigal, 2010).

CASE STUDY: USING SMS AND VOICE-BASED TECHNOLOGIES TO DELIVER INFORMATION TO COMMUNITIES AFFECTED BY ONGOING DROUGHT IN KENYA

ActionAid and Infoasaid run a project in Kenya which aims to combat food insecurity among communities affected by ongoing drought, using FrontlineSMS (an SMS platform) and FreedomFone (interactive voice-based software) to deliver information via SMS and recorded voice messages (Taylor, 2011a; FrontlineSMS, 2012b). Livestock prices and staple food prices from the Ministry of Livestock and Ministry of Agriculture are regularly transmitted via SMS and displayed on community noticeboards, and are discussed in community meetings to help people make decisions about where to sell their livestock and purchase food staples. Recorded voice messages with the same information are also available by calling a free phone number (Taylor, 2011a).

users, especially those subscribed to Twitmobil, were receiving so many SMSs that they were not even opening and reading all that were sent to them (Chazaly, 2012). The IFRC also pioneered a partnership with the Haitian mobile network operator Voila and its parent company, Trilogy, to develop an SMS system that targeted recipients by their geographic location, giving scope for more nuanced messaging than blast SMS (Wall, 2011b). Similarly, Digicel, the other Haitian mobile network operator, responded to cholera outbreaks by developing an SMS system that sent a message to anyone who travelled through identified cholera hotspots, alerting them to the dangers and advising on basic precautions (Wall & Robinson, 2012). In addition, the GSMA Disaster Response Programme has developed a number of useful resources for MNOs in emergency response (http://www.gsma.com/mobilefordevelopment/programmes/disaster-response/).

ACCOUNTABILITY RECOMMENDATIONS

INGOs: Introduce mobile-based 'feedback and complaints' systems, and mobile data-collection systems for needs assessments as a standard aspect of emergency response. Building on this, prioritise two-way communication, taking necessary measures to ensure inclusion of the most marginalised.

For MNOs: Prioritise increasing network coverage for the most remote areas in the midst of emergencies, utilising available innovative technologies such as Vodafone's instant network solution.

For government: Recognise the need to incorporate emergency support for communications as an essential component of first-phase disaster-response efforts; the restoration of mobile networks should be regarded as a life-saving humanitarian priority.

PHOTO: COLIN CROWLEY/SAVE THE CHILDREN

Abdi is a community health worker in north-eastern Kenya. With no electricity in his village, Save the Children provided Abdi with a mobile phone and a solar charger so that he can call for assistance with medical emergencies in his community.

5 ANALYSIS: PREPAREDNESS

Obstacle: There is a widespread lack of awareness regarding the potential for mobile phones to be used in emergency response. This is linked to the lack of training for humanitarian staff, lack of organisational and programmatic preparedness, and limited opportunity to innovate in the high-pressure environment of an unfolding emergency.

Solution: Humanitarian organisations and MNOs can work in collaboration to prepare to make effective use of mobiles in advance of an emergency. Training can equip staff so that they are confident and able to realise the benefits of technology, particularly in contexts known to be prone to disasters.

Summary: This discussion of preparedness focuses on advance preparation, with a particular examination of timely planning and decision-making; as well as training and building organisational capacity.

PREPARING IN ADVANCE OF AN EMERGENCY

Without adequate planning and foresight, enthusiasm for technology can prove counter-productive. As an example, Smith (2012) discusses the negative use of mobile phones as part of a response in the DRC where "a phone-based application was commissioned by head office without consideration of the realities of field operations, including the need for long battery life and night-working." As Smith (2012 p.xi) notes, "adopting a new technological solution in the midst of a humanitarian emergency with no prior preparedness creates difficulties and can slow down response times." This was confirmed by the interviewee in Somalia, who explained that: *'Introducing a new technology cannot be done in the midst of a crisis situation – first implementation needs to be in a normal*

environment so that we can sort out the bugs… these are the practical things that mean, in a sudden-onset emergency, using a new technology can be a kiss of death because it creates another obstacle towards providing the services you need to provide."

When asked what measures should be put into place before an emergency, the interviewee in Somalia advised that the key priorities were to *"test it out and decide in advance what scale and what capacity is needed, test service providers in advance, educate donors on the appropriateness of different interventions… we would have to give ourselves time to test and see if it would work."* Alongside this, the need to remain responsive to diverse needs was highlighted: *"The challenge in Somalia is that you do it in one place so you think you can do it in another. But you can't. The bugs would be different in each location and the MNOs would be different in each location."*

In the first instance, simply gathering the information that will allow contact with affected populations is an essential part of advance planning. The interviewee in Niger emphasised this, saying that in his experience the most important aspect of building preparedness before a rapid onset crisis is *"to have the phone numbers to be able to contact someone from the affected area, and even to have several numbers in case one phone is not working."*

Once this information is gathered, preparing communities for the information they will receive in the event of an emergency is vital. When an affected population is already familiar with the type of information that will be distributed in an emergency, they are able to put the information to better use. The information is not necessarily then completely new, but rather a timely reminder of facts they have already been made aware of through their mobiles. In Bangladesh, the interviewee noted that: *"if people are aware about the disaster situations in advance, about the cyclones, the flooding, the tidal surges, then they would have a good opportunity to protect their assets and their lives … the mobile phone is the most significant tool for*

distributing information in an emergency situation." He went on to emphasise the transformative impact that using mobile phones to educate and prepare communities in advance had had on the country: *"Now in our country the casualties are very low from emergencies because people are more informed… people are communicating and being informed through mobile phones. We are using SMS to reach into the remote areas. The use of mobile phones is one of the most significant ways that people are protecting themselves."*

Timeliness is also vital when disseminating emergency messages. Once a community has been educated and informed about the types of emergency likely to affect it, and about useful ways to respond, the notification that an emergency is now unfolding must reach the community as quickly as possible. The interviewee in Kenya emphasised this, explaining that *"one of the key challenges is to send out the early warning information… Often a drought or a flood is predicted, but for this message to reach the remote pastoralists, the message comes too late for them. There is a lot that can be done to improve early warning systems. If this is done then it will really avert a lot of vulnerability – otherwise it is too late for them to move with the animals or to sell the animals. If the mobile programme and ability to communicate is increased then that will really help."*

ADVANCE PLANNING AND DECISION-MAKING

The speed of emergency programming in disaster-prone areas can be increased by focusing on preparedness and contingency planning activities. These may include exploring 'preferred supplier' arrangements, 'pre-qualifying' private sector actors such as network operators with mobile money services, and drawing up 'pro forma' contracts whereby service terms are negotiated in advance based on in principle discussions about costs and practicalities (Austin & Frize, 2011). Opportunities could also be pursued to engage with global banks, card associations (such as Visa and MasterCard) and remittance agencies (such as Western Union and Moneygram), in order to explore solutions that could be implemented and replicated in multiple countries with multiple local partners, leading to a reduction in set-up time in different contexts (Harvey *et al*, 2010).

Another important factor that affects the timeliness of aid delivery is the capacity of the first responders to make complicated and high-pressure decisions. Those who may have the experience and capacity to effectively make decisions, and quickly understand the highly dynamic and rapidly evolving situation, may not be able to access the worst-affected areas. Therefore, the use of mobile phones to improve two-way communications between affected communities and humanitarian organisations, as well as field staff and supervisors, both in real-time or through reference guides, can aid greatly in making important decisions with confidence, consistency and accountability.

As well as facilitating communication itself, mobile phones have the potential to provide vital additional information for humanitarian workers that can assist with the rapid decision-making that has to occur in an emergency situation. The opportunity to communicate this information simultaneously to beneficiaries in the field and staff in a central office facilitates and streamlines decision-making, again allowing more timely responses (Coyle & Meier, 2009). Research from the UN and Vodafone (Kinkade & Verclas, 2008) shows the importance of automated data-collection for making critical decisions: "In a number of countries, critical health data [was] collected through agonisingly 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." While mobile data collection tools are increasingly available and utilised, a lack of preparedness and standardisation of the data collected – and of the processes for collection – results in ongoing and ultimately unnecessary challenges for humanitarian crisis response.

TRAINING AND BUILDING ORGANISATIONAL CAPACITY

Central to overcoming such challenges is mainstreaming training and the development of humanitarian organisational capacity to use mobile phones. In all of the countries interviewed there was an expressed need for capacity building for staff and beneficiaries in order to facilitate preparedness. Indeed, in Pakistan, the interviewee noted that a large proportion of those working as technicians were still unaware of the more advanced uses of a mobile phone, and therefore their training should constitute a strategic priority.

When asked what is the most significant way to overcome the challenges faced with using mobiles in emergency response, the interviewee in Bangladesh gave a clear response that again refers back to the need for preparation and training: *"we need to know where we will refer the problems we face… training will be needed, showing how we can overcome the different challenges – it needs to be clear in advance of an emergency situation. If preparation is done in advance then these things will not be a problem."*

In Bangladesh preparation and training were again emphasised in relation to the practicalities of sourcing alternative power supplies, such as solar panels, and having the required knowledge regarding how to use them: *"this is something that could be prepared for in advance… without the training it is not possible."*

In Somalia, the interviewee emphasised a related angle, suggesting that the most effective way to go about improving knowledge and organisational capacity at country level was through country-to-country collaborative training: *"see what different potentials are in each country, what is applicable in one country may not be in another… compile what other people are doing in different countries regarding mobile phones and share them and do this with other NGOs as well."*

Throughout the interviews it became clear that providing advance training on the use of mobile phones in emergency contexts to likely first-responders and their supervisors is essential if this tool is to be utilised to the full. The recruitment and deployment of specialist advisors in this area who can contribute to surge capacity in an emergency may also serve to support field staff as they begin to integrate the use of mobile phones into their responses.

PREPAREDNESS RECOMMENDATIONS

For INGOs: Conduct a survey of all Save the Children and other INGO programme staff in relevant countries in order to establish a baseline of their current competency level in regard to use of mobile phones. Provide training on use of mobile phones in emergency response to likely first responders and their supervisors, and consider the addition of mobile specialists to the Save the Children emergency rosters. Ensure that mobile phone numbers of all beneficiaries within at-risk populations are stored on a database, and that the required infrastructure for mass messaging is prepared in advance.

For MNOs: Develop a training programme that can help humanitarian agencies learn about the range of different uses of mobile phones and how these can be applied in emergencies, covering different levels and topics to reflect varying pre-existing knowledge and experience. Work to establish networks of country-to-country collaboration so that humanitarian agencies and MNOs can learn together through peer-to-peer training and support, skills and knowledge sharing. Pre-arrange rates, roles, responsibilities and other practicalities of partner-based response to emergencies with humanitarian actors.

For government: Facilitate legislation for emergency mobile network usage so that NGOs can set up temporary, short-range, ad-hoc networks where necessary. Initiate disaster preparedness strategies and simulation exercises with integrated mobile components to cooperate with NGOs and MNOs.

6 ANALYSIS: COLLABORATION

Obstacle: The use of mobiles in emergency response is hampered by a lack of collaboration and knowledge sharing between humanitarian agencies, MNOs and governments. There has been suspicion between sectors and a lack of understanding regarding the strengths that each offers, leading to a lack of coordination and ineffective responses.

Solution: There is a high degree of willingness to explore collaboration from all stakeholders. Investing time and resources in building partnership and shared understanding before an emergency can enable efficient and integrated responses, maximising strengths and mitigating the risk of isolated action.

Summary: This analysis of the potential for collaboration focuses on the importance of multi-stakeholder and interagency interaction and the ways in which this can be promoted in a variety of forms, alongside the potential benefits of adopting integrated mobile responses in emergencies.

ENGAGING EFFECTIVELY WITH MULTIPLE STAKEHOLDERS

A major challenge in utilising mobiles in emergency response is the time taken to set up systems, establish relationships with private sector actors, negotiate contracts and navigate the regulatory environment (Smith *et al*, 2012). While these barriers have proved disincentives to cross-sectoral engagement, collaboration remains vital. The interviewees demonstrated the need for partnership across all sectors. In Afghanistan it was noted that *"if using mobiles for cash transfer is going to happen it needs collaboration from the government, the private sector and Save the Children – all together."* The interviewee went on to note that collaboration with the government

could help to improve coverage and reduce the prohibitive cost of using mobile phones in an emergency context.

Alongside the benefits of collaboration with government, there is significant potential for collaboration between different MNOs, each playing to their particular strengths at different stages of an emergency response. As explained by the interviewee from Vodafone, *"following the deployment of the Vodafone Instant Network by the Vodafone Foundation in Kaikor, a remote part of northern Kenya, one of the local residents said 'now we are part of Kenya', thanking the Foundation for bringing mobile coverage to their region."* However, it was stressed that the Vodafone Instant Network should be viewed as a temporary solution for emergencies, requiring collaboration with other actors. In Kaikor, Vodafone *"needed Safaricom to agree to build a permanent site in Kaikor to cover long-term needs. Beyond covering emergency needs during the drought our objective was to help in future emergencies and also help develop Kaikor."* This support was provided, demonstrating the potential for collaboration between MNOs. As Vodafone went on to explain, *"Safaricom needed time to deploy the permanent site, build the tower and satellite connectivity for backhaul… the Instant Network was therefore deployed for six weeks until the permanent site was operational."* Now that the MNO collaboration between Safaricom and Vodafone has facilitated the introduction of connectivity in Kaikor, Vodafone hopes that the region will develop, noting that: *"if people can communicate they'll be able to do business more easily, new people will be less afraid to move into the area and invest into it, creating a need for roads and power, and ultimately the people of Kaikor having better infrastructure and a better life."*

In Bangladesh it was highlighted that there is a long-standing relationship between Save the Children and GrameenPhone. Here, the positive role of competition was recognised, with Grameen reducing their costs as the competition increased. In contrast, in Pakistan the interviewee talked of the challenge of building effective bridges with MNOs. In Niger similar frustrations were expressed, as the interviewee stated:

"we have made the networks aware of the situations of upcoming drought and its effects, we say to them there is a food crisis coming, we ask them to extend the network to the areas that will be affected worst, but these areas are very remote, so there is not much the network operators can do because it is too costly for them."

The lack of coverage and the financial cost of extending network range into remote areas will continue to provide a challenge. However, significant progress is being made with efforts to extend coverage. In Niger it is reported that a regulator is offering 0% loans to operators in order to extend their networks. In Kenya, Safaricom are reported to be willing to share costs with NGOs to bring access to remote regions. In the DRC, USAID have recently funded Vodacom to extend its network in areas where the Lord's Revolution Army is operating in order to increase security (USAID, 2012).

The interviewees from Vodafone Turkey emphasised how effective collaboration is dependent upon each sector understanding the validity of the others' priorities, and upon being able to play to their particular strengths. For example, in an emergency situation, Vodafone Turkey explain that, *"our responsibility during emergency situations is to maintain the best possible network service for both NGOs and Vodafone subscribers, to communicate in areas where cellular coverage either was never present or was compromised by the disaster. To do this we utilise mobile base stations, cell on wheels (COWs) various enhancements for current stations or other technical solutions."* When asked what systems or services they have that could assist NGOs in their emergency response, Vodafone Turkey explained that

they first establish whether there is a fixed base station giving service for that area. If there is not, then they ask: *"is it possible to install a temporary one? What is the cellular traffic trend? Are we in need of additional cellular capacity? We have temporary base stations (COWs) that can work either on radio or satellite transmission (in areas where radio transmission is not possible). When there is an emergency situation, when additional coverage or capacity is needed, they are the fastest and biggest help for NGOs to keep them communicating."*

THE POTENTIAL FOR INTER-AGENCY COLLABORATION

The challenge of collaboration does not only refer to that of the relationship between a humanitarian organisation and a private sector organisation. There is also a need for more effective partnership with government, and within and between different humanitarian organisations. Throughout the interviews, respondents emphasised the importance of working in partnership and sharing information with other agencies. A positive example of this is that Save the Children in Pakistan in working on a mobile programme as part of a consortium of six NGOs, in order to engage with a larger number of beneficiaries than would be possible when operating alone.

Nonetheless, multi-agency procedures take a long time to establish. The rapidly changing environment around use of mobiles in emergency response efforts means that there is a lack of established procedures to support the timely and large-scale roll-out of such programmes across different sectors (Austin & Frize,

CASE STUDY: THE POTENTIAL OF USING MOBILE PHONE NETWORK DATA TO TRACK POPULATION MOVEMENTS AND TARGET AID

Recent experience in Haiti suggests that in areas with high mobile phone ownership and usage, population movements following disasters can be quickly and accurately tracked with mobile phone network data. A study used position data of SIM cards from the largest mobile network operator (Digicel) in Haiti to estimate the magnitude and direction of population movements following the 2010 earthquake. The researchers obtained anonymous data on the position of 1.9 million SIM cards from 42 days before the earthquake till 158 days afterwards. Nearly 200,000 SIM cards that

were present in the capital Port-au-Prince when the earthquake struck had left 19 days later. Estimated net outflows of people (outflows minus inflows) are equivalent to 20% of the Port-au-Prince pre-earthquake population. The geographic distribution of population movements from Port-au-Prince according to the study corresponded well with results from a large retrospective, population-based UN survey (Bengtsson *et al*, 2011). This information, provided through the effective use of mobile technologies, enabled aid agencies to provide assistance where it was most needed.

2011; Kauffmann & Collins, 2012; Help Age, 2012). This is one aspect within the larger issue of effective co-ordination between sectors, between agencies within the UN humanitarian system, and with MNOs (Austin & Frize, 2011; FrontlineSMS, 2012a). The IASC cluster approach to coordination, which aims to provide stronger, predictable leadership and accountability across all sectors in humanitarian response, has both positive and negative elements in regard to effective mobile communications. The BBC (2012) argues that "communication is a cross cutting issue [which] needs to be considered at cluster level across such sectors as health, education and water, sanitation and hygiene (WASH)." They highlight that the structure for integrating communications and their use across sectors has not been fully realised, and future funding remains uncertain, especially within the current structure of viewing communication as a sub-sector or working group of other clusters. Specifically, the structure of the cluster system has left mobile communications as an area that should integrate with all of the clusters in different ways, and yet is not able to access the cluster-oriented funding streams.

INTEGRATED SERVICES THROUGH MOBILE

The majority of humanitarian engagement with mobiles in emergencies to date has been focused on single-function services. This should not be viewed as the desired end point, as there is increasing potential for integrated, multi-function services through system-wide mobile platforms that enable new levels of linkages and efficient data management. There is a significant role for MNOs in helping the humanitarian sector recognise the potential for multi-functionality. Many research programmes and pilot initiatives are already underway, and knowledge sharing across sectors is a key priority.

INTEGRATING MULTIPLE TECHNOLOGIES

Alongside integrated mobile services, it is also important to think collaboratively regarding the role that different technologies can play together in effective emergency response. Traditional mass media, including radio and television, prove to be highly effective

CASE STUDY: MEZZANINE

Among the various platforms that have been used in emergency contexts, Mezzanine (www. mezzanineware.com), developed in South Africa and majority owned by Vodafone, has proved useful in several sub-Saharan African contexts because of its bespoke end-to-end data management solutions. An example of this is their work with the Department of Health in South Africa, where paramedics use Mezzanine services for a wide range of tasks on their mobile phones, including receiving their job cards, doing their reporting and capturing and transmitting photos of accidents. The interviewee from Mezzanine explained the benefits of their platform for emergency response environments: *"what we allow is intelligent work flow, intelligent payments… so our system could help emergency workers to distribute electronic coupons and vouchers, monitoring what is happening and creating and publishing accounts."*

The Mezzanine platform enables health management through mobile phones, with special functionality for community-based health workers. The major emphasis of the system is the integration of a wide range of different services that can be created and linked from the platform – working with mobile developers in each different country of operation, *"providing the agility to service emergency situations in a very short amount of time."* This means the platform can be implemented without significant infrastructure in the place of use, making it well-suited for emergency response, when there is little time or capacity to set up infrastructure in affected areas. The platform is also designed for low resource settings and can be accessed through a range of technologies, whether smartphone and web capabilities are available or only SMS.

Although Mezzanine was developed for the health context, it is essentially a data collection and management tool that can be used for any type of data, and can be extended, adapted and customised to meet a variety of complex needs. The interviewee also explained the benefits of working with MNOs in emergencies, and that companies such as Safaricom are introducing new innovative services and are open to providing temporary mobile towers to facilitate improved coverage in emergency contexts.

CASE STUDY: MESHING LOCAL AND ONLINE RADIO BROADCASTING WITH FEEDBACK VIA SMS, FACEBOOK AND TWITTER IN HAITI

Following the earthquake in Haiti, radio presenter Carel Pedre set up an informal family reunification system by meshing local and online radio broadcasting with feedback via SMS, Facebook and Twitter. This created a responsive, local Kreyol-speaking service that supported affected communities across Haiti and the diaspora to reconnect with family and friends (Wall & Robinson, 2012). Pedre was one of many Haitians who innovated with available technologies to generate spontaneous disaster response solutions, highlighting the importance of recognising and treating affected communities as communication experts and practitioners, not just audiences (Wall, 2011b).

Local radio stations in Haiti played a vital role in the disaster response efforts by sharing information, identifying needs and reuniting people (Wall, 2011a). Call-ins and 'open mics' were central aspects of making radio an interactive communication tool, providing significant psychosocial support to survivors through communicating their stories.

communication tools in most contexts, are among the most preferred channels by affected communities, and can be particularly important in providing accessible information to populations with low literacy levels. A survey conducted following the 2010 floods in Pakistan (Internews, 2011) found that 35% of people prefer receiving information via television, 12% via radio, 5% via SMS from someone they know, and 2.7% via SMS from an organisation or the government.

The interviewee in Afghanistan talked about the way in which the mobile phone should be introduced as one additional component within their emergency response programme, rather than replacing what is already there. He explained this in regard to the potential for mobile-based psychosocial messaging: *"An example on this is that we are working to provide child-protection and raise awareness of this in the midst of the emergencies – we are developing posters and radio messages for the illiterate communities so that they can understand child rights better during the emergencies. We are doing these things already and if we could use the MNOs to distribute messages that would be good – it would enable us to reach more of our target beneficiaries and achieve the end goal of protecting the rights of the child. Bringing in the MNOs to do this could also potentially improve the problem of coverage."*

Similarly, Internews (2011) found through a study in Dadaab that the refugees considered radio to be the most trustworthy source of information. Radio was once again considered to be very important in Haiti where, despite the widespread use of mobile phone technology in the aftermath of the earthquake, radio was still the most effective tool for serving the needs of the public, and restoring the radio service was the first priority of the media (Nelson & Sigal, 2010).

COLLABORATION RECOMMENDATIONS

For INGOs: Work with other agencies within the cluster system to move towards mainstreaming mobile-enhanced responses to emergencies – recognising that the lack of coordination and collaboration in the current humanitarian system can act as a barrier to effective response. Recognise that there is a lot to be learned from the MNOs in terms of innovative use of mobiles.

For MNOs: Work pre-emptively at a national level to ensure that strategic, top-level stakeholders are ready to cooperate in an emergency so that a national rapid response through mobiles becomes a realistic possibility (signing MoUs between MNOs, government ministry and humanitarian organisations, engaging with legislation and associated data protection issues). Work with INGOs to transition from single-function to multi-function services through mobiles.

For government: Recognise that the use of mobiles in emergencies is currently constrained by the lack of shared learning and cross-sector collaboration, and work to change the national regulatory environments to facilitate effective national mobile-based interventions. Allow exceptions to the stringent 'know your customer' requirements that governments make of MNOs (Donovan, 2012), allowing data sharing for humanitarian purposes.

7 SPECIAL FOCUS: MOBILE-BASED CASH TRANSFER

Obstacle: Providing secure access to cash is recognised as a strategic challenge and priority within emergency response situations. Physical displacement and lack of infrastructure means that this is complex, and the use of mobile phones may be hampered by lack of security, limited coverage and lack of agents in the midst of an emergency.

Solution: Using mobile cash transfer in emergencies can lead to increased efficiency, improved reach into previously inaccessible areas, ability to operate at a large scale with limited costs and the chance to respond more quickly than was previously possible. This in turn facilitates the opportunity for increased accountability to beneficiaries.

Summary: This discussion addresses the reasons why cash is important in emergencies, the opportunity presented through mobile cash transfer, the potential for future use and, more broadly, the lessons that can be learned for the use of mobiles in emergencies.

ESTABLISHING CASH TRANSFER WITHIN MOBILE RESPONSES

Over the past few years, cash transfer has become a leading approach for piloting and developing the use of mobile phones in emergency responses, through electronic payment systems such as mobile money, electronic vouchers and electronic cash for work payments. Significant work is being undertaken by CaLP and others to scale up cash transfer so that it becomes a normal and established part of emergency response (Ferguson, 2012; Kauffman & Collins, 2012; Ridsdel, 2012; Maunder, 2012). This is a growing and important field in which many lessons can be learned

and more opportunities to use mobile phones in emergencies can be developed. Using cash-based responses is a current strategic priority for Save the Children's emergency work, and therefore constitutes a focal point for this research.

Significant issues include early warning; needs assessment; planning, designing and implementing cash interventions; determining objectives; deciding how much to give and when; selecting delivery methods; and targeting and registering beneficiaries (Harvey, 2010; Kauffmann & Collins, 2012). Indeed, many of the benefits of using mobile phones in emergencies are closely aligned with the benefits of using cash transfer in emergencies, such as increased efficiency, reach, scale and timeliness. Similarly, lessons learned here in relation to mobile cash transfer are applicable for other sectors also beginning to explore the role of mobiles in emergencies.

Many of the concerns and debates around using mobile phones for cash transfer in emergency response are similar to those often heard in contexts where cash is not common. Many concerns about the use of cash, as opposed to in-kind distributions, have been overcome by experience. However, the delivery of cash using mobile phones still causes significant concern among many decision-makers. Concerns around the use of mobile phones include risk of corruption, low literacy amongst beneficiaries, donor hesitancy, the need for effective, transparent, accountable systems and approaches, and how best to collaborate with the private sector.

CHALLENGES FOR MOBILE CASH

Although mobile cash transfer systems benefit from recurring cost efficiencies, initial costs may be high both in terms of hardware and software investments. This is especially true in communities with low levels of phone ownership (Smith *et al*, 2012). For example, the cost of Concern's mobile

cash transfer programme in Kenya was increased because it required the distribution of handsets and solar chargers to some beneficiaries (Coyle & Meier, 2009). Similarly, when the WFP chose to issue food e-vouchers to Iraqi refugees in Syria via SMS, they incurred high initial costs by investing in a computer, modem and printer for each participating government department (Harvey & Bailey, 2011). High initial costs can prove prohibitive for trialling or implementing mobile cash transfer programmes in emergency situations where short-term humanitarian funding cycles and cost-benefit analyses may fail to capture important recurring cost efficiencies. These factors can lead to a tendency to favour the sustained use of traditional cash transfer methods (Smith *et al*, 2012). The interviewee working in Somalia noted that in their context, mobile cash transfer *"hasn't caught on yet in what donors are prioritising… it never becomes the priority because of the constant crisis."* She went on to explain that in order to move forward with mobile cash transfer it would also be necessary to have funds explicitly allocated to this from a donor, rather than just maintain a general aspiration. However, it is important to remember that the high initial costs around mobile cash should be balanced with the potential savings as a result of increased security and reduced corruption, when compared to hand-delivery mechanisms.

There are multiple ways in which mobile cash transfer programmes may fail to be user-friendly for the most marginalised, and an awareness of this is vital for effective operation. Beneficiaries that are unfamiliar with the technology may be vulnerable to extortion if they share their PIN code, or ask 'cash out' agents or other community members for assistance (Smith *et al*, 2012; Mountfield, 2012). Low literacy levels

and exposure to technology therefore present significant barriers to the full uptake of mobile cash transfer programmes, particularly among the most marginalised, necessitating training and on-the-ground assistance (Smith *et al*, 2012).

BENEFITS OF MOBILE CASH

The key benefits of using mobile money platforms for CTP have already been documented extensively (Austin & Frize, 2011; Harvey *et al*, 2010; Poisson, 2011; Smith *et al*, 2011; Taylor *et al*, 2011; Vincent and Cull, 2011). Benefits include transparency through reduced leakage and PIN protection, accountability through clear audit trails, convenience of reduced transaction costs and flexibility in collecting cash, and penetration into areas without banks. However, not every emergency context has the necessary infrastructure to implement a mobile CTP; thus, their suitability must be assessed on a case-by-case basis. Where the underlying enabling conditions are present, mobile money can have significant benefits over physical cash distribution. This is especially true in places where security is fragile or liquidity is challenging, and can enable documentation systems to be more transparent and less administratively burdensome.

The interviewee in Kenya gave the well-known example of how mobile cash is enabling people, especially in remote areas, to save money and gain previously impossible access to the banking system: *"it is a big thing for people to actually own a mobile… it improves communication with the outside world… it gives them technology they have not been used to and it improves security. It can also get money to areas where*

CASE STUDY: BENEFICIARY APPRECIATION OF MOBILE CASH TRANSFERS FOLLOWING POST-ELECTION VIOLENCE IN KENYA

Safaricom's M-Pesa mobile money service was utilised by Concern in the Kerio Valley, following Kenya's post-election violence, for a cash-transfer programme. Coyle and Meier (2009) note that the programme was appreciated by its beneficiaries for the greater choice, empowerment and dignity it gave them, alongside the security afforded by

the directness and confidentiality of the mobile money system (Harvey & Bailey, 2011). Concern considered the use of mobile money to be the most appropriate option, as the service was already established and local food markets in which the cash could be spent were still functioning reasonably well (Coyle & Meier, 2009).

there are no banks. *It also helps promote a culture of saving."* It can go beyond this, contributing towards economic resilience and strengthening food security: *"this is a big step for the agriculturalists – it gives them an alternative from keeping their wealth in animals as livestock."*

Cash transfer is dependent on effective coordination, and this also links to the use of mobile phones. Kauffmann and Collins (2012 p.35) assert that negotiating good terms with service-providers has been a tangible achievement of cash coordination mechanisms: "the sharing of terms negotiated with service providers (banks, mobile phone companies, money agents, micro-finance institutions) has enabled smaller aid organizations to benefit from the negotiating power of larger organizations." In addition, mobile money services can provide the option for vulnerable communities to receive remittances from abroad. An example of this was seen when Afghan mobile network operator Roshan launched the M-Paisa mobile money transfer service in 2009, in partnership with Vodafone, allowing diaspora Afghan communities to transfer money to their friends and families in difficulty at home (Coyle & Meier, 2009).

PHOTO: COLIN CROWLEY/SAVE THE CHILDREN

A man gives his thumbprint as a means of identification during a cash distribution in north-eastern Kenya. Save the Children is running a hunger safety net programme to help families here who are affected by drought.

CASE STUDY: PLANNING FOR MOBILE CASH TRANSFERS IN THE PHILIPPINES

In response to Typhoon Ketsana in 2009, the WFP piloted a mobile cash transfer programme in the Philippines through Globe's G-cash service, as part of a cash-for-work intervention. The initiative proved to be cost-efficient, and recipients reported that they felt empowered by the technology. However, the programme was initially hampered by delays as the systems took over a month to set up. In future, the development of pre-agreements with mobile cash transfer service providers in disaster-prone countries such as the Philippines will be an important means by which to minimise set up times (Poisson, 2011).

FUTURE POTENTIAL

The interviews provided valuable insight regarding the future potential of mobile phones in emergencies. The idea of exploring a different approach through the use of *Hawalas* as mobile cash transfer agents was identified by the interviewees in Somalia and Afghanistan. *Hawalas* are the main means by which cash transfer happens in these countries; they are well established and pre-finance all transactions. People are accustomed to this approach, both for receiving money from within the country and remittances from abroad.

Save the Children in Pakistan has a large and well-established cash-transfer programme. To date, it has not involved mobile phones because of the challenges of engaging with MNOs and the high associated service charges: *"Cash transfer has been a major part of our programme over the last few years – $37 million – but not through mobile. If we had got this deal to work with the MNO then… we would have been reaching thousands of people within an hour, at the push of a button. It would have been very good."*

Kenya is widely regarded as a flagship country for the use of mobile phones in development. However, the Save the Children programme has chosen to use smart cards rather than mobiles for the existing cash-transfer programme. Although this was the current choice, there was clear willingness to explore more use of mobile phones and recognition of the benefits that this would bring: *"it provides a quick response, much quicker than smart cards… mobile is cheaper, requires less software and is understood by the community."*

MOBILE CASH TRANSFER RECOMMENDATIONS

For INGOs: Develop a good practice guide and case studies of current experience to share amongst country offices (as part of the Universal Resource Pack, outlined in the report recommendations). Develop training tools and consider organising skill-sharing workshops between relevant staff to enable capacity building, mentoring and learning opportunities for using mobile phones emergencies based on different experiences. Research further into options of using *hawalas* and mobile phones in countries such as Somalia and Afghanistan, as a means to empower local community mechanisms for better acceptance of INGOS in insecure environments.

For MNOs: Work to facilitate temporary reductions in service charges to allow more partnerships with INGOs for mobile cash transfer in emergency contexts. Build partnerships between global and national MNOs to launch a wider range of mobile money services.

For government: Ensure an appropriate regulatory environment that allows for the efficient and timely distribution of cash through mobiles, considering preferential rates for MNOs that have programmes designed to benefit the most marginalised. Make efforts to be informed and educated about the different types of mobile phone responses in emergencies, including challenges, benefits and appropriateness of different tools.

8 RECOMMENDATIONS: A CALL TO ACTION

The explosive growth in access to mobile phones across the developing world provides a unique opportunity for the humanitarian sector to improve its ability to respond effectively in emergency situations. However, this improvement is not automatic and requires bold, collaborative action from all stakeholders.

Key sector-specific recommendations for INGOs, MNOs and governments have been identified throughout the analysis in relation to accountability, preparedness, collaboration and mobile cash transfer. It is clear that mobile technology can no longer be viewed as an add-on through specialist response units (such as TSF), but should be integrated into the core of emergency response efforts. This requires closer collaboration than ever before between all different sectors. Based on the analysis from the research, this report now identifies the two overarching priorities for action that need to be taken if the transformative potential of mobiles in emergencies is to be more fully realised.

EQUIP STAFF: DEVELOP A RESOURCE PACK

Preparation and training are vital in order to ensure that mobile phones can be used effectively in an emergency. Save the Children staff and those of other humanitarian organisations need to be confident and competent regarding the capability, potential and limitations of mobile phones. In an emergency setting, especially rapid onset, it is not possible or appropriate for staff to spend valuable time and resources in learning how to use a new tool. Therefore, preparing in advance is vital to ensure that all relevant staff members have the capacity to utilise the technology in an appropriate way when necessary.

A 'Mobiles in Emergencies: Universal resource pack' should be produced collaboratively by humanitarian agencies and MNOs, to help equip staff for effective mobile-based responses in future emergencies. It should not be an isolated resource, but should be integrated within standard organisational preparedness planning processes. This would build on the pre-existing work of Infoasaid (http://infoasaid. org/), with their country guides, and diagnostic and e-learning tools. It would provide unique benefits, as there is currently no integrated, regularly updated, non-technical resource that is designed for humanitarian workers using mobiles in emergency response situations.

The proposed pack would include the following elements:

1. A technical guide for programme-level mobile interventions: how to choose a provider, how to negotiate regulatory environments, and the range of tools and software options currently available.

2. A content guide for programme-level mobile interventions, detailing required operational support, advice regarding required human and financial resources, case studies on specific issues, and guidance on common challenges and major risks.

3. A practical guide regarding how to approach MNOs, and how to collaborate effectively with the private sector on improved services and infrastructure, both prior to and during an emergency.

4. An illustrative guide that highlights what each sector is currently doing regarding mobile-based innovations, sharing knowledge to facilitate more effective collaboration between humanitarian organisations and the private sector.

5. Country-specific briefings for the priority 'at risk' countries, including information regarding national regulatory environments, mobile coverage and usage statistics, specific opportunities and challenges.

6. A 'mobile phone decision tree': how to make appropriate decisions regarding when, how, and what to implement with mobile phones in emergencies.

7. Guidance on how to use mobiles in such a way that ensures the most marginalised are reached.

BEGIN FIELD TESTING

Field testing is a vital next step in order to understand the practical potential of the suggested approaches for Save the Children, integrating the sector-specific recommendations and assessing how effective they are. Central to this process is conducting further work on accountability, and engaging directly with beneficiaries in shaping any intervention.

The following list illustrates the required process for field testing:

1. Identify an appropriate country (or, ideally, three countries with different contexts and capabilities, to explore a range of opportunities and constraints) for testing the proposed interventions (consider the illustrative scenario below as guidance in this process), and begin a feasibility study as context for field testing.

2. Undertake research with beneficiaries in the proposed location, engage in a participatory design process, understand their priority needs and define an appropriate response accordingly.

Specifically engage with children, focusing on learning how mobile phones can be useful for their communication needs.

3. Engage with other humanitarian agencies and MNOs in-country and beyond, invest time and resources to build strong partnerships into the test phase, and learn lessons from the experience of others.

4. Refine the proposed approach and begin field testing.

5. Prioritise comprehensive training to maximise preparedness, using the proposed 'Mobiles in Emergencies: Universal resource pack' as a foundation, and using mobile technology to assist with delivery where appropriate.

6. Ensure monitoring and evaluation is integrated from the outset, allowing an iterative cycle of reflection, adjustment and improvement, using mobile technology to gather data where appropriate.

7. Prioritise learning regarding impact, access to the most vulnerable and overall cost savings when compared with alternative approaches.

8. Consider strategies for taking to scale (local, regional, national) and lessons learned for related implementations in other countries.

9. Share findings across the sector regarding strengths, weaknesses, opportunities and threats to facilitate knowledge-sharing and collaboration.

Vodafone Instant Network deployment, Kaikor, Kenya

ILLUSTRATIVE SCENARIO: A POTENTIAL APPROACH FOR FIELD TESTING

The initial location for field testing should be selected on the basis of a relatively predictable emergency such as annual flooding or recurring seasonal drought and displacement. It should initially be trialled in a local context, with an established beneficiary group that already engages with Save the Children. This means that there will be the capacity to spend time engaging beneficiaries, training staff and building connections with MNOs. Within this context, the illustrative scenario below is given in order to provide an example of a potential approach.

In a country affected by cyclical drought, where Save the Children has an established presence within affected communities, initial mobile preparedness measures should include:

* Begin to build a partnership with MNOs in order to develop shared understanding. Aim to negotiate optimal bulk SMS rates or free concessions where possible (based on pre-agreed benchmarks for emergencies), agree to the use of geographically targeting unsolicited messaging where necessary, and consider instant network options in case of network failures.

* Conduct basic one-day training for all relevant Save the Children staff in-country regarding the effective use of mobiles in emergencies – based on the core elements of the proposed 'Mobiles in Emergencies: Universal resource pack'.

* Conduct in-depth two-week training for a core team of Save the Children staff (technical and programmatic) on how to use and process the information from bulk SMS messaging and information monitoring in each target site (these trainees should be supplied with a web-enabled phone).

* Implement an interactive group-messaging platform with existing beneficiaries, so that this is familiar to both staff and beneficiaries for times of emergency.

* Build a database of mobile contact information for all beneficiaries likely to be affected by the drought, prioritising key community leaders in crisis-prone areas.

These preparedness measures will then allow Save the Children to respond rapidly when an emergency unfolds.

In a more rapid-onset emergency, rapid assessments will be a key early-stage response in communicating with the affected population and in building an accurate picture of priority needs. The staff trained in bulk messaging will operate this, sending a survey by SMS to pre-established beneficiary lists or local community leaders. If this proves impossible, then geographically targeted bulk messages will target as many beneficiaries as possible.

A feedback and complaints system can be quickly established with both voice and text capabilities. The information from this would be categorised efficiently through an appropriate software tool and sent for response to the member of staff trained in information management, through a secure mobile web interface.

The bulk messaging platform will have mobile money integration capabilities, allowing those who have been trained to automate sending mobile money cash transfers without time-consuming data-entry, or any other information or training. This system would also allow more complete records and greater accountability, with less administrative burden.

Each of these activities would be undertaken using an integrated platform so that all the data can be stored and utilised for effective evaluation and demonstration of impact on beneficiaries and cost effectiveness.

9 ANNEXES

ANNEX A: INTERVIEW QUESTIONS

EXPLANATION OF CONTEXT

This research is being conducted by Save the Children and Vodafone in order to understand more fully the role that mobile phones can play in emergency response. We are talking with six Save the Children staff in different countries in order to learn from you regarding how technology can be used in the contexts you work in. We have designed three scenarios in order to guide our discussion. Please read these and think about them before we conduct the interview. We are keen for you to critique the scenarios and would like your honest feedback regarding how they would work in your context. We have listed below all the different questions that we plan to ask you. If you have any additional questions you would like to be asked, or comments, then please do let us know. The interviews are a part of a wider strategic research programme being undertaken by Save the Children – your assistance is very much appreciated.

Stage 1: General questions
[10 minutes at beginning of interview]
- Please explain your role within the organisation and the context you are working in (including any programme responsibilities, sector expertise, etc).
- What are the main emergency contexts that you are working in (or potential emergency contexts in the country you are working in)?
- Please explain any way in which mobile phones have previously been used in your country in an emergency context (by Save the Children, other agencies or government).
- Please explain any way in which mobile phones have previously been used in your country in a development context (by Save the Children, other agencies or government).

- Please explain the nature of any working relationship you already have with the mobile network operator in your country.
- What do you see as the most significant opportunity from using mobile phones in emergency response in your country and/or programme?
- What do you see as the most significant challenge from using mobile phones in emergency response in your country and/or programme? (Include how these challenges have been overcome.)
- What do you think programme beneficiaries will consider the most significant opportunity from using mobile phones in emergency response?
- What do you think programme beneficiaries will consider the most significant challenge from using mobile phones in emergency response?

Stage 2: Scenario questions
[3 x 10 minutes of interview time]

Interviewer to interviewee: *You will have read the three scenarios that we have developed. These scenarios should help you to think about the various different ways in which mobiles might be useful and the different challenges and opportunities of working at local, regional and national levels. Please talk through your response to the different scenarios, on the basis of your country experience. If one or two of them are not relevant to your context then please feel free to focus on the one that is, or adapt the context as you wish. These scenarios are only meant to be guiding tools to help and they should not limit your feedback.*

[Interviewer then goes through the questions below three times, for each of the scenarios – with some flexibility if the interviewee wants to focus in depth on one of the scenarios that is of most relevance to their context.]

- Do you anticipate challenges with this approach? What are the challenges you anticipate and why?
- What do you think might be the solutions to the challenges you have identified?
- What do you think the unintended consequences might be (both negative and positive)?
- What alternatives/changes would you suggest in order to make this appropriate for your context?
- What would be the sector-specific implications of such an approach/initiative?
- What specifically do you think could be put in place when there is a predictable emergency (ie, building preparedness before rapid onset)?
- What do you think are the overall risks in taking such a scenario forward? How should a provider be chosen? How does this work with national legislation? What are the reputational risks involved?

Stage 3: Building block questions
[10 minutes of interview time]

Interviewer to interviewee: *You will have seen the sheet with all the different building blocks that can be used as part of a mobile-based response in an emergency. Please consider how these might work in your context.*

- From the list of building blocks which three do you think would be the most useful in your context, and why?
- From the list of building blocks which three do you think would be the least useful in your context, and why?
- How do you anticipate that these different building blocks could work well in combination?
- How do you anticipate that these different building blocks could be damaging in combination?

Safir, 10, his dad Ablaye and mum Aminata live in a rural area of Mali, where a long period of drought has been followed by flash floods. Their house is destroyed and Ablaye becomes separated from his wife and son in the chaos of escaping the floodwaters. Aminata was a beneficiary of a pre-existing Save the Children food security and livelihoods programme in the area, and had given their shared phone number to Save the Children staff for their database.

Ablaye receives an SMS from Save the Children within two hours of the flood subsiding, asking him to text the words 'Food', 'Shelter' or 'Both' if he has an urgent health or shelter need. He responds 'Both' and receives a message thanking him for his response and informing him that a temporary camp 2km north-east of the mosque is being constructed. He also hears a radio broadcast in which the local imam encourages people to remain calm and head to one of the camps.

Ablaye sets out for the camp and finds several thousand people from nearby villages. The next day he receives an SMS survey from Save the Children consisting of several multiple choice questions about his greatest needs. He also notices focus groups and face-to face interviews taking place across the camp. Following initial market assessment, Save the Children decides that it would be feasible to do a cash-based programme. Food is available in the local markets but one of the roads out of town is blocked. The following day Ablaye receives an SMS inviting him to come and register for a cash-for-work programme. Posters are also displayed, radio broadcasts are made and information tents are set up around the camp for people who do not have mobile phones.

Ever since arriving at the camp, Ablaye has been separated from his wife and son. He asks everyone he meets, but they do not know them. During the first day, Ablaye receives a blast SMS message from the Save the Children Protection team urging people who have become separated from their children to text their details to a set number. He sends his information. They are reunited shortly after.

During the following weeks, Ablaye is one of 1,000 vulnerable men and women who take part in a Save the Children cash-for-work programme clearing the road, to provide emergency income support for six weeks. At the end of every week, Ablaye receives his weekly payment of $30 as mobile money on his phone. An SMS message tells him which local payment points or traders he can go to 'cash in' his payment and spend on food or whatever his family needs most. He recognises the points as previous traders who participated in the Save the Children food security and livelihoods programme from before the floods. Some physically weak community members receive weekly mobile money payments as unconditional cash, instead of cash-for-work. They are also able to cash it in at designated points. A few others without phones receive a direct cash payment through a physical distribution in the camp. Ablaye is glad he does not receive his payment this way as he feels it is much safer stored on his mobile.

Whenever Ablaye has any concerns or questions he calls a Save the Children Feedback and Complaints Hotline, free of charge. Depending on his question, he selects an option and hears a pre-recorded voice message. Otherwise, he leaves a voice message on the answer machine and he is called back within 24 hours by Save the Children. Ablaye often helps out his neighbours to understand how the mobile money works. He notices lots of similar community support taking place.

CONTEXT

This is a small-scale response that is geographically specific, working within an established Save the Children programme, where the mobile-based response can be implemented without major infrastructural investment. It may be helpful to think of it as part of a rapid onset crisis that isolates a rural community where Save the Children has a programme established and already has contact (mobile phone

numbers) with community members. As a result of the isolated nature of the community, the people there cannot be reached with the necessary services and emergency relief.

A potential mobile-enhanced response could consist of the following elements:

*   *Timely rapid needs assessment* – As soon as the mobile network is functioning, conduct a quick response survey and a rapid needs assessment through FrontlineSMS with the existing beneficiary database from within the isolated community. This enables identification of priority needs.
*   *Psychosocial* – Targeted psychosocial voice messages can be sent through the mobile from a local trusted voice (eg, an *imam)* for encouragement and support.
*   *Mobile money* – cash for work payments can be delivered through mobile money, to minimise time spent organising weekly payment distributions.

*   *Financial literacy* – If mobile money is appropriate, then send accompanying messages regarding financial literacy and effective use of cash in an emergency.
*   *Feedback and complaints hotline* – Continue the process for two-way communication as appropriate throughout the entire emergency phase. A hotline can be a combination of recorded messages or personal response, depending on needs of the community and the capacity of the NGO. It can be used for the cash intervention as well as other two-way communications.
*   *Family tracing and reunification* – Child Protection teams can link with existing services (such as the inter-agency child protection information management system) and platforms (such as RefUnite or Google's person finder) to facilitate family tracing and reunification across several local camps.

ANNEX C: SCENARIO 2, REGIONAL INTERVENTION

Indira is a 12-year-old girl in Pakistan whose family has fled conflict and fighting. She is with her family and many others fleeing the situation, but in an unfamiliar, remote and unpopulated area. They are unable to contact extended family members or gain any information because of the lack of initial mobile network coverage. They settle in an informal camp, but there are few services and little infrastructure. Save the Children arrives and sets up an emergency GSM service in a backpack, from which they send out a blast message to the community about the current situation, including camp orientation information and news about resources that will become available. Indira's mother shows her the phone messages about using camp latrines, and reviews with her what she should do to remain safe. Indira also tells this to her younger sisters, and they go together to remain safe.

Within a week, mobile network coverage is re-established. Based on market assessment and focus group discussions, Save the Children decides to provide unconditional cash grants to 4,000 vulnerable families for their basic needs. To reach such a large number of people across multiple locations in a changing, insecure environment, it opts to use mobile phones to ensure speed and security of staff and recipients.

Indira's mother is selected as a beneficiary for the mobile money programme. She is a single mother whose husband was killed during fighting the previous year. As she has fled the conflict she does not have any ID or official documents, and fears she will not be allowed to register or receive the cash. Fortunately, the Gates Foundation and USAID have had a long-term presence in country and have advocated to the mobile network provider to allow relaxed measures for vulnerable members of the community.

Once a fortnight, Indira's mother receives a 'mini-wallet' of cash on her mobile phone for $100, which she can bank at payment points and participating traders, which have been set up across the area, in co-operation with the mobile provider. Other beneficiaries receive $200 a month, the amount of a monthly food basket and basic needs.

A Save the Children Feedback and Complaints hotline is set up, which Indira's mother uses regularly. In particular, she did not understand why she was receiving a smaller package of money than some of her neighbours, and she wanted to complain. She sends SMS messages informing of any safety concerns or general questions and receives SMS answers within four hours. She also receives weekly SMS messages from the Save the Children Protection team, giving advice on minimising risk of gender-based violence, what to do if she experiences an incident and advice on other protection issues.

CONTEXT

This is a medium-sized, regional, cross-sector intervention that therefore works with a large population, outside of pre-existing Save the Children programmes, and requires significant budget, training and collaboration. It may be helpful to think of it as a large scale, rapid onset internal displacement of a sizable population to a rural area. There has been limited opportunity to prepare for the arrival of the large number of IDPs, they have come to an isolated area, and there is very limited infrastructure.

A potential mobile-enhanced response could consist of the following elements:
* *Blast Messaging* – As soon as a mobile network is functioning, use a Broadcast and blast SMS service to get all affected people to sign up for the mobile service and engage with Save the Children. This would include collaborating with mobile network operators (MNOs) to get location-related data, and could also be enhanced through use of a temporary GSM service in a backpack in the first-phase response. This would mean that all the mobile-using affected population could be

mapped and contacted with emergency messaging. Also, utilise local radio stations to raise awareness regarding the mobile service, broadcasting the number that people need to sign up to in order to receive free information.

- *Rapid needs assessment* – Follow this with a rapid needs assessment, focused on the IDP camp priorities, alongside camp orientation messaging (how to live well and safely in the camp).

- *'Mini wallet' mobile money* – In some situations, mobile money is still a viable option if formal registration is an issue. This could be particularly relevant in situations of displacement.

- *Feedback and complaints hotline* – As well as for two-way communication, this can be used to resolve complaints or receive feedback needed to improve the response.

- *Surveys for continuous feedback* – Continue a cycle of mobile-survey, intervention and feedback to help meet the evolving needs of the camp (this would probably require alternated sampling to avoid information overload and survey fatigue).

- If security risks are high, consider deploying a pay-point cashless system for purchase of goods (such as Google's Beba in Kenya), so that the risk of cash management can be reduced in the camp.

ANNEX D: SCENARIO 3, NATIONAL INTERVENTION

Jen, a field manager for Save the Children, is in a new position in Kenya when the food security crisis caused by ongoing drought hits catastrophic levels. Though she does not have extensive experience in cash and food aid, she will have to take the lead on this because other staff are not available. As soon as she hears the news in Nairobi, she orders a survey online from Jana with micro-rewards for all SIM cards registered in the drought-affected region. By the time Jen has arrived there by plane a few hours later, Jana has received 20,000 responses, which summarise the initial needs. With this initial information, which Jen can analyse through software on a web-enabled phone, rapid response decisions can be made.

The drought has occurred in many parts of the country, and people have displaced to a range of locations, so further data is needed about their movements. A pre-arranged agreement with the local mobile network operators means that anonymised data around mobile usage patterns in the 24 hours since the crisis peaked are able to show what areas the people have fled to, which Jen can visualise on her mobile phone.

Jen is able to consult supervisors and other staff through her mobile phone to keep an up-to-date picture of the situation and seek advice for any difficult decisions she must make, in order to respond optimally to the changing situation.

Due to several droughts over the past few years and a close monitoring of the crisis and seasonal trends, Save the Children has been able to build preparedness measures into its planning, in particular around cash transfer programming. Using Frontline SMS surveys, Jen is immediately able to analyse market assessment data that has already been captured through the year on availability and price of food in markets, both locally and nationally. These SMS surveys have also been capturing nutritional information and food security levels within households, showing rising child malnutrition rates across the country.

Due to Save the Children prioritising cash transfer preparedness, and strong government buy-in, agreements between Save the Children and a range of mobile providers across Kenya are already in place for cash transfer programming. Jen is able to respond immediately and plan an electronic (e-voucher) food programme for 8,000 families across the whole country, using three different mobile providers.

As Frontline SMS surveys have already been conducted with a range of traders across the countries, appropriate traders for the food e-voucher programme are quickly selected by Jen, according to Save the Children CTP guidelines.

The main mobile provider covering most of the country agrees to provide mobile phone literacy training across a selection of locations for Save the Children beneficiaries who may need this. They agree to provide training modules for the other two providers to roll out in their different areas.

Due to the scale of the response, and the good coordination through the inter-agency Cash Working Group, Save the Children decides to partner with two other NGOs with strong FSL and new technologies experience to deliver the food e-voucher programme.

Close monitoring of market prices and cash transactions throughout the whole emergency via traders and Save the Children continues to be done through FrontlineSMS surveys. Beneficiary feedback and expenditures are also captured through individual monitoring surveys.

A feedback and complaints hotline is set up, and is managed by the main mobile phone provider, who take calls in person. Data from the hotline is used to make continual improvements to the Save the Children programme and to adjust to beneficiary needs.

CONTEXT

This is a national level, cross-sector intervention that is highly ambitious and requires national government buy-in, substantial investment and coordination. It may be helpful to think of it as a slow onset national drought with ongoing conflict, affecting millions over a large area with limited infrastructure, and over a long period of time. The challenge is the difficulty of identifying the most acute needs across such a wide area, combined with the challenge of sustaining food security and livelihoods. An additional complexity is in maintaining effective communication with the population as they move location in response to the ongoing crisis.

A potential mobile-enhanced response could consist of the following elements:

- *Buy-in* – Get national buy-in (from regulators, broadcasters, government, operators) to work across all existing communications platforms, including SMS, social media and radio, to understand where the greatest needs lie as quickly as possible.

- Then use the appropriate software to aggregate as many data streams as possible and filter them for keywords according to sector. Software can then be used to analyse the data for patterns in order to respond immediately to, or even anticipate, disease outbreaks (such as cholera and brucellosis).

- *Crowdsourcing* – The data collected through the mobile crowdsourcing can then be used to identify the greatest needs, and cash transfer can be considered through the use of mobile money (recognising the challenge of data analysis, confidentiality, etc).

- *Trusted voices* – Recruit trusted voices to distribute information through accepted traditional media channels (radio alongside SMS), to enhance the scale and value of crowdsourcing.

- *Electronic voucher* – This works in the same way as mobile money, except the cash is designated for specific items across selected traders, at set prices.

ANNEX E: EXAMPLES OF MOBILE TOOLS – BUILDING BLOCKS

These examples of mobile tools are linked to the scenarios and adapted from those used as 'building blocks' with the interviewees. They provide an illustrative example of the range of ways in which mobile phones and the associated software may be effective tools within an emergency setting.

FEEDBACK AND INFORMATION GATHERING RESOURCES

- Quick response survey: This type of survey should be designed to reach as many of the beneficiaries as possible. Existing beneficiary lists will be a significant input (and point for preparedness) here, though where this does not exist Jana may work as a platform to understand the initial scope of a disaster or crisis immediately after it occurs.
- Rapid needs assessment: Drawing on a more limited number of respondents from the previous Quick Response Survey, a more in-depth assessment can be made within days and incorporated into ongoing feedback for continuous monitoring and evaluation.
- Feedback and complaints hotline: Text based or voice based, increasing levels of accountability to beneficiaries and enabling interaction with larger volume of feedback, allowing efficient processing and providing information for monitoring and ongoing programme adjustments.

MOBILE CASH TRANSFER

- Mobile money: Electronic currency stored in an electronic wallet on a mobile phone. It can be converted back into cash with designated agents at any time and the value or part of the value used to purchase commodities directly in local shops.
- Electronic vouchers: Operates in a similar way to mobile money, except the cash provides access to a basket of goods, with automatic reimbursement to vendors through the service provider's mobile payment system.
- Cash-for-work payments: An additional form of mobile money, which can be used to provide regular cash-for-work payments through mobile phones.

DECISION-MAKING RESOURCES

- Decision tree for mobile cash transfer: Practical guide for how to decide when mobile cash transfer is the most appropriate option, outlining anticipated challenges and opportunities.
- Decision tree for messaging medium: Practical guide for how to decide what is the appropriate way to engage with beneficiaries via mass SMS messaging.

CONTENT AND COMMUNICATION RESOURCES

- Blast SMS messaging: Communicating with all affected population in a given area to provide basic, initial information.
- Educational advice messaging: Providing relevant information to beneficiaries that will assist them in the midst of the emergency.
- Psychosocial messaging: Sending reassuring messages by mobile phone for those who cannot be physically reached in the emergency.
- Displacement orientation messaging: Targeted messages for new arrivals to a camp for displaced persons to orientate them towards relevant resources.

'BIG DATA' MANAGEMENT

- Data stream aggregation: Using software tools (such as SwiftRiver) to pull together information from numerous sources, identifying key words and filtering in order to make maximum use of it.
- Crowd-sourcing: A more qualitative form of information gathering which relies on a wide network of contributors.
- Displacement mapping: Mapping the movement of a population in the wake of a crisis or disaster through mobile data information or GPS.

ANNEX F: MOBILE DATA COLLECTION TOOLS

Ushahidi is an open source platform that crowdsources crisis information from multiple sources (including SMS, Twitter, Facebook and RSS feeds), and allows geospatial visualisation of this data by plotting reports on interactive maps – developed by Kenyan bloggers in the aftermath of the 2008 election violence; deployed in Gaza with Al-Jazeera and Souktel; deployed in Haiti with Mission 4636.

www.ushahidi.com/

SwiftRiver is an open source platform from Ushahidi that enables the filtering and verification of real-time data from multiple sources (including SMS, Twitter, Facebook and RSS feeds), by applying semantic analysis and verification algorithms to different types of information.

ushahidi.com/products/swiftriver-platform

Sahana is an open source information management system for emergency situations that includes online bulletin boards for missing persons, registries of relief organisations and civil society groups, registries of shelters (location, basic facilities, capacity), central online repositories that match aid requests with pledges for support, volunteer coordination systems, and updatable situation awareness modules – developed by volunteers from the ICT community in Sri Lanka in response to the 2004 Indian Ocean tsunami.

sahanafoundation.org/

Humanitarian OpenStreetMap is an open source wiki platform for processing spatial data derived from existing maps and satellite images to build up highly detailed, freely available maps that can be used in disaster response situations – eg, used in Haiti to build up a far better map than had previously existed and to reflect the changed reality on the ground due to earthquake damage.

hot.openstreetmap.org

CrisisCommons is a global community of tech volunteers, including programmers and coders, who come together through **CrisisCamp** events to offer their expertise in assisting with disaster response efforts – they conducted a variety of tasks for the 2010 Pakistan floods, from data processing to providing support for the PakReport version of Ushahidi, with groups of volunteers participating from locations around the world including London, Montreal, Sydney, Bangkok and Silicon Valley.

crisiscommons.org

Freedom Fone is an open source software with a simple interface for creating and sharing audio content using interactive voice response (IVR), voicemail and SMS – audio content can be organised in multiple voice menus that callers can navigate using their phone keypads, and there is an option to allow callers to leave voice messages to share their opinions or needs – it was used in Egypt during the 2010 elections to monitor reports of violations and issues within the electoral process.

freedomfone.org/page/how-it-works

FrontlineSMS is an open source platform that provides for data collection (text only) using basic phones – software downloaded to user's computer provides for offline management of SMS-based surveys, while FrontlineForms can be used leverage more advanced Java functions – eg, using SMS reports to get information about attacks, abductions and atrocities committed in hard-to-reach areas of eastern DRC.

www.frontlinesms.com/

Last Mile Mobile Solutions is a technology project from World Vision that improves aid efficiency at the 'last mile', putting the recipient of the aid at the heart of the system, and bypassing the traditional challenges that remote data collection have encountered. The system is based on scanning photo ID cards. (This is a multi-technology approach of which mobiles are a part.)

www.lastmilemobilesolutions.com/

OpenDataKit (**ODK**) is a set of open source mobile data collection tools that provides out-of-the-box solutions for users to build forms (using ODK Build), collect data (text, images, audio, video and GPS) on a mobile device (running ODK Collect) and send it to a server, aggregate the collected data (using ODK Aggregate running locally or on the internet) and extract it in useful formats – eg, **KoBo Toolbox** built from ODK used to monitor human rights abuses in Central African Republic and Liberia.

opendatakit.org/ and www.kobotoolbox.org/

RapidSMS is an open source framework for data collection (text only) and developing customised SMS-based applications – browser-based application resides on server and communicates with basic phones, can be used by third parties to create SMS-based applications – eg, used by UNICEF to develop a monitoring system for the distribution of PlumpyNut to malnourished children in Ethiopia during droughts.

www.rapidsms.org/

EpiSurveyor by **DataDyne** is a cloud-based mobile data collection tool (text and GPS) for use with a variety of mid-range handsets – software resides on EpiSurveyor servers and interfaces with client software on handsets, with a web console used for form development and data management – eg, used by Internews to do surveys of refugees in the Dadaab camps of northern Kenya, in order to understand their information needs.

www.datadyne.org/episurveyor/

InSTEDD GeoChat is an open source tool for group communications (SMS, Twitter and email) – key feature is its ability to display messages with associated geographic location – eg, used in Cambodia by the Ministry of Health to simplify reporting diseases, to send staff alerts and to escalate response to potential outbreaks.

instedd.org/technologies/geochat/

openXdata is an open source platform for data collection (text, audio, video, images and GPS) via Java-based phones – server software resides on a local PC and communicates with client software on mobile phones, with forms downloaded from server to handsets and data returned from handsets to server – it is used to implement the WHO disease early-warning systems.

www.openxdata.org/

Nokia Data Gathering is an open source tool that allows for mobile data collection (text and GPS) via all Nokia Java-enabled handsets – server software resides on a local PC and communicates with client software on mobile phones; can be used to develop customisable forms – eg, used by the FAO in east Africa to conduct water and livestock surveys that reduce the vulnerability of communities to drought.

projects.developer.nokia.com/ndg

Global Emergency Overview (**GEO**) – mobile application providing a global overview of existing humanitarian crises in order to facilitate decision-making. Increases access to information, needs and gaps in response – and creates a 'shared situation awareness at the early stage of a disaster'. The GEO provides an agile tool for analysis sharing and getting feedback from the field.

www.acaps.org/en/news/global-emergency-overview-geo/1

Jana – Airtime payment platform with surveying capacity built in that currently has capacity to reach 2 billion people across many different countries.

www.jana.com

ANNEX G: LIST OF INTERVIEWS CONDUCTED

Tadicha Chachu, Food Security & Livelihoods Advisor, Save the Children Kenya

Holly Radice, Head of Food Security & Livelihoods, Save the Children Somalia

Muzaffar Ahmed, Programme Director-Shiree, Food Security & Livelihoods Advisor, Save the Children International Bangladesh

Anwar Hossain, OFDA Program Manager, Emergency Food Security, Save the Children Afghanistan

Aqeel Nawaz Khan, Director-Food Security & Livelihoods, Save the Children Pakistan

Abdou Malam Dodo, Food Security & Livelihoods Coordinator, Save the Children Niger

Jacques de Vos, Managing Director, Mezzanine, South Africa

Barkan Ersoy and Mehmet Mollaoglu, Vodafone Turkey

Oisin Walton, Instant Network Programme Manager, Vodafone Foundation

ANNEX H: CURRENT USE OF MOBILES IN EMERGENCIES IN EACH RESEARCH COUNTRY

(Note: this should be read as an illustrative summary rather than an exhaustive list)

PAKISTAN

Context (type of emergencies and current level of mobile use)	Challenges (most significant obstacles)	Opportunities (most significant routes forward)
Emergencies: IDPs, floods, displacements. **Save the Children**: Complaints line only. **Other**: Pre-paid debit card cash transfer programming (Oxfam; government), Mobile cash transfer 'Easypaisa' (Telnor).	High costs by mobile phone service providers. False messages sent out to beneficiaries. People (in Save the Children) unaware of technical options.	Most people have a mobile and know how to use it. Consortium approach to cash transfer with focus on use of mobile phones. Piloting mobile CTP outside of first-phase emergency response for preparedness. Mobile early warning system and information-gathering during emergencies. Mobile data collection for quick assessment – eg, feedback regarding damage to buildings, livestock.

BANGLADESH

Context (type of emergencies and current level of mobile use)	Challenges (most significant obstacles)	Opportunities (most significant routes forward)
Emergencies: Floods, tidal surges, cyclones, rain devastations. **Save the Children**: Disaster messaging. **Other**: Mobile financial services.	Lack of electricity in remote areas, and during monsoon and hot periods.	Sharing experience with less developed countries. Health, Nutrition, FSL. Off-grid power sources (solar). Transferring experiences from development into emergency response.

SOMALIA

Context (type of emergencies and current level of mobile use)	Challenges (most significant obstacles)	Opportunities (most significant routes forward)
Emergencies: Chronic food insecurity, seasonal issues, slow-onset drought, sudden onset flooding, displacement and conflict. **Save the Children**: Complaints line, 'Digital pen' for CTP M&E. **Other**: Mobile cash transfer (Oxfam).	Very low levels of literacy. Limited network coverage. One size does not fit all – currently a very complex crisis with many components at once.	Using *hawalas* as distribution agents – culturally acceptable and wide access to insecure areas. Piloting mobile use outside of emergencies (FSL Puntland could pilot). Priority messaging for displaced people; group communication for early warning systems; market information; disease surveillance.

KENYA

Context (type of emergencies and current level of mobile use)	Challenges (most significant obstacles)	Opportunities (most significant routes forward)
Emergencies: Drought (northern Kenya), cyclical and recurrent – livestock issues, conflict across border and within clans, floods. **Save the Children**: Smart cards for cash transfer; complaints line. **Others**: Mobile cash transfer 'MPesa' (Concern), mobile cash transfer (government), emergency vaccination (FAO).	Limited network coverage in remote areas. Some low levels of literacy. Nomadic populations.	MPesa more cost-effective and familiar to users than smartcards. Using 'clusters' to overcome literacy issues (Concern, 2011). Partnerships with humanitarian actors and private sector. Mobile cash could bring greater changes in intra-household decision-making for women. Early warning (drought); disease outbreak; for behaviour change.

AFGHANISTAN

Context (type of emergencies and current level of mobile use)	Challenges (most significant obstacles)	Opportunities (most significant routes forward)
Emergencies: Drought and floods, extreme winters, food security, conflict. **Save the Children**: Complaints line. **Others**: Mobile CTP (USAID).	Limited network coverage. Very low levels of literacy. Unregistered phones pose security threats. Government does not recognise mobile phones as official mechanism for data collection. People culturally prefer talking than SMS messaging.	Could use mobile messaging in FSL, and to distribute messages on child rights and child protection in emergencies (building on existing poster/radio messages). *Hawala* system – uses social and religious trust. Used by NGOs and UN agencies.

NIGER

Context (type of emergencies and current level of mobile use)	Challenges (most significant obstacles)	Opportunities (most significant routes forward)
Emergencies: Cyclical food crisis, floods, conflict. **Save the Children**: Complaints line. **Others**: Mobile cash (Concern's 'zap' delivery mechanism).	Limited network coverage. Relatively low mobile phone ownership. Very low levels of literacy.	Using community animators to overcome literacy issues (Concern, 2011). Information gathering and dissemination through community leaders. Cash for work has been effective in addressing resilience, but could be more effectively done through mobile phones. Messaging about agriculture and health to support resilience and prevent food crisis.

USING MOBILES FOR CASH TRANSFERS IN EMERGENCY SITUATIONS

Strengths	Weaknesses	Opportunities	Threats
Transparency (reduced leakages) Accountability (clear audit trails) Convenience (flexibility in where and when cash can be collected) Security (discretion) Penetration (to remote areas if there are cash out agents) Cost efficiency and scale up potential (simultaneous and repeated payments to multiple beneficiaries possible)	Mobile money services still undeveloped in some countries Time taken to set up systems, negotiate contracts with mobile network operators, etc. High initial costs (hardware and software), especially in areas with low levels of phone ownership Registration requirements (ID documents) may exclude the most marginalised Cash outs may be delayed or restricted if there are a limited number of agents and/or agent liquidity Lack of established procedures for cash transfer programmes, basic toolkits, etc. means that many agencies start piloting from scratch Limited user-friendliness for those with low literacy levels and exposure to technology	Increasing phone ownership throughout the world Mobile money services being rolled out in many disaster-prone countries Potential to explore partnerships with global players – banks, card associations, remittance agencies, etc – to facilitate replication in different countries Registration requirements may be relaxed for small mobile wallets Potential for lots of experimentation, innovation and learning as mobile cash transfers are still being piloted by humanitarian agencies for disaster response CaLP is aiming to establish an inter-cluster CTP coordination mechanism by 2015 which should help harmonise approaches, negotiate with service providers, monitor and evaluate, etc. and secure access to OCHA-based resources Current lack of established policies and data protection standards might make it difficult for agencies to navigate different regulatory environments	Current lack of coordination mechanism could be limiting the legitimacy and visibility of cash transfer programmes Could inadvertently serve to marginalise still further those who are most in need (ie, those without access to mobile phones)

USING MOBILES FOR TWO-WAY COMMUNICATION IN EMERGENCY SITUATIONS

Strengths	Weaknesses	Opportunities	Threats
Quick communication method	Unreliable if there are power cuts or network outages due to infrastructure damage	Can be combined with other communication tools, eg, radio, to deliver information and receive feedback	Mobile data collection tools could be promising more than they can deliver – eg, limited usefulness of crowdsourced information for humanitarian agencies
Relatively inexpensive	Ineffective in areas with limited mobile penetration and/or low levels of phone ownership	Promising pilots using voice-based technologies to receive feedback from affected communities	Could inadvertently serve to marginalise still further those who are most in need (ie, those without access to mobile phones)
Broad reach	Susceptible to congestion and delays, particularly blast SMS, if network capacity is insufficient, and uncertainty about whether SMS are getting through	Mobile data collection tools are increasing the opportunity for affected communities to provide information about their needs to disaster responders	
Potential for voice-based information delivery and feedback to meet the needs of populations with low literacy levels	Limited receptiveness of recipients to mass messages that may be perceived as 'spam'		
Potential to deepen engagement by communicating directly and discreetly with affected communities	Difficult to target SMS where there are high numbers of unregistered SIM cards		
Wide range of free, open source, user-friendly software available – eg, FrontlineSMS and Freedom Fone, to set up mobile communication systems	SMS inappropriate for delivering information to populations with low literacy levels		
	Can be difficult to manage and process voice-based feedback		

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MOBILE TECHNOLOGY IN EMERGENCIES

Efficient cash transfer mechanisms and effective two-way communication with disaster-affected communities using mobile phone technology

The explosive growth in access to mobile phones across the developing world provides a unique opportunity for the humanitarian sector. Mobile technology can play a strategic role in the delivery of rapid, cost-effective, scalable humanitarian assistance.

But the full potential of mobile phones to work as transformative tools in emergency response has not yet been realised.

Mobile Technology in Emergencies draws on interviews with emergency response staff in six countries to identify three key themes that should be addressed in order to change this situation: increasing accountability, building preparedness and prioritising collaboration.

In addition, the report looks in more detail at mobile cash transfers, which have been a leading context for the use of mobiles in emergencies and have important lessons for the wider use of mobile technology.

The report makes a series of recommendations – to international non-governmental organisations, mobile network operators and governments. By working together we can harness the power of mobile technology to help save lives and support devastated communities.

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