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ICT for disaster management in least developed countries and small islands in the Asia Pacific Region

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ICT for peace foundation

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Introduction

As noted by UNESCAP, the Asia-Pacific is among the most disaster prone regions in the world. The most frequent natural hazards in the region include geological hazards (earthquakes, tsunami, landslides and volcanoes), hydro-meteorological hazards (floods, cyclones and droughts) and other hazards such as epidemics and insect infestations. Major natural disasters in the world were found in the Asia-Pacific region. During the past 10 years, the region suffered exceptional losses from a number of major calamities. To name a few, the 1995 Kobe earthquake killed more than 6,400 people plus 85 billion US$ worth of destructions. In 1997, floods alone caused US$ 7.23 billion worth of damages in seven countries. In 1998, the most extreme floods in several decades devastated several countries in the region, particularly Bangladesh, China and Vietnam, while the El Niño Southern Oscillation droughts caused water shortages and forest fires in Indonesia and the Philippines. In 1998, the tsunami triggered by earthquakes hit Papua New Guinea and killed more than 2,000 people in several coastal villages. In 2003, the Bam earthquake in Iran killed at least 40,000 people and destroyed 85 percent of the buildings and infrastructures in that area. In December 2004, the tsunami that occurred in the Indian Ocean has killed more than 300,000 people.[1]

Disaster management is an imperfect science. It is impossible to accurately predict when and where a disaster will occur. Yet efforts towards drawing up national and regional disaster risk management strategies have encountered significant challenges. Studies show that the problem lies not with the use and adoption of technology *per se*, but with the more entrenched culture of institutional and individual resistance to information sharing in an open, timely and sustainable manner. Governments as well as local and transnational non-governmental institutions are both victims to and perpetrators of this culture of secrecy. In controlling the flow of information – what gets out where, to whom, how and when – these stakeholders directly influence disaster management planning and action. With little or no incentive to change their ham-fisted approach to information sharing and its twin corollaries - collaboration and coordination - key stakeholders including non-governmental agencies are culpable for significant lapses in information flows. Lessons identified have not been learnt. These gaps have cost lives.

This brief paper is an attempt to map how ICTs can and have helped in disaster management even in least developed countries in the Asia Pacific region and suggests that though key stakeholders may (today) be averse to the accountability and transparency that ICTs bring to disaster management frameworks, their increasing use by citizens are a compelling argument to fully integrate them into all aspects of disaster early warning, management, mitigation and response.

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[1] *ICT enabled Disaster Management in the Asia and Pacific Region*, UNESCAP, 2005, http://stdev.unctad.org/unsystem/cstd/escap8.doc

Disaster Management in Least Developed Countries

Disaster risk management is a significant challenge for developed countries and even more so for countries that are at a lower level of socio-economic and human development. As noted by the UN, LDCs represent the poorest and weakest segment of the international community and are characterized, *inter alia*, by their acute susceptibility to external economic shocks, natural and man-made disasters and communicable diseases.[2] In the Asia Pacific region, one counts Afghanistan, Bhutan, Bangladesh, Cambodia, East Timor, Myanmar, Nepal and Maldives among the 15 other countries classified by the UN as LDCs[3]. It's evident that most of these countries are prone to large-scale disasters in including floods, earthquakes, tsunamis, landslides and mudslides. The social, economic and political realities of life of the peoples in these countries[4] suggest large communities at high risk of being severely affected by a large-scale disaster.

Of significance here is the low penetration levels of Information and Communications Technologies in these countries. Traditional markers of ICT penetration such as the number of phone lines, TVs, radios or PCs in these countries suggest a very small segment of the population able to avail themselves of information dissemination through these media. At the national level, a low level of economic development, poor infrastructure, illiteracy, governmental control of media and political unrest are, *inter alia*, inhibitors of public sector ICT progress.[5] Added to these is the challenge of State monopolies on telecoms infrastructure that without any significant competition and the resulting lack of meaningful investment and incentive, offer levels of service and access far below industry standards. As noted in a recent APDIP report, According to the UNDP Human Development Report of 2005, in 2003, the tele-densities of Cambodia, Nepal and Bangladesh were 38, 18 and 15 per 1,000 people, respectively. The situation is the same for radio and television. The irony is that while a small selection of households might have all of these media, the majority does not have any of them. With such low penetration levels, it is extremely difficult to establish any effective ICT-based disaster warning system[6]. Yet it is also the case that ownership and more significantly the *use* of mobile phones in these countries show an exponential year on year growth. As noted in *Teleuse at the bottom of the pyramid: Findings from a five country study*[7],

> *The Asia-Pacific region is one of the world's fastest growing telecom markets. It is widely accepted that the 'next billion subscribers' will come from emerging markets, particularly India, China and other emerging Asian countries. Given that South Asia contains the largest number of poor people, it is therefore implicit that many of these new subscribers will come*

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[2] http://www.unohrlls.org/en/ldc/25/

[3] http://www.unohrlls.org/en/ldc/related/62

[4] http://www.unohrlls.org/UserFiles/File/Publications/Factsheet.pdf

[5] *Strategies for ICT Use in the Public Sector in the Least Developed Countries: A Cross-Country Analysis*, Ahmed Imran and Professor Shirley Gregor, AO, http://unpan1.un.org/intradoc/groups/public/documents/UNPAN/UNPAN023847.pdf, 2005

[6] *ICT for Disaster Management/Disaster Management*, Chanuka Wattegama (Foreword by Prof. Krasae Chanawongse), http://en.wikibooks.org/wiki/ICT_for_Disaster_Management, 2007

[7] *Teleuse at the bottom of the pyramid: Findings from a five country study*, Background paper prepared for '3rd Global Knowledge Conference', Kuala Lumpur, 11-13 December 2007, http://www.gkpcms.com/GK3/documents/07.12.12-GK3-ET8-Ayesha%20Zainudeen.doc

> *from the BOP in Asia, especially South Asia… The biggest and most widespread impact of access to telephones at the BOP is in creating a sense of security, due to the ability to act in an emergency. Benefits can also be seen in disaster management, through all stages from warning to response to recovery.*

Even though there are important gender dimensions to this growth that need to be urgently addressed and transformed[8], even LDCs and economically impoverished communities in other developing countries demonstrate through their use of mobile phones a rich potential for disaster risk management frameworks that leverage these devices.

ICTs in Disaster Management

Conventional wisdom suggests that Least Developed Countries (LDCs) have little or no place for Information and Communication Technologies (ICTs) to play a role in disaster risk management. It is vital to challenge this shibboleth. A recent APDIP primer on *ICT and Disaster Management*[9] suggests 6 symbiotic phases of the disaster risk management cycle:

> **Mitigation**: any activity that reduces either the chance of a hazard taking place or a hazard turning into disaster.
>
> **Risk reduction**: anticipatory measures and actions that seek to avoid future risks as a result of a disaster.
>
> **Prevention**: avoiding a disaster even at the eleventh hour.
>
> **Preparedness**: plans or preparations made to save lives or property, and help the response and rescue service operations. This phase covers implementation/operation, early warning systems and capacity building so the population will react appropriately when an early warning is issued.
>
> **Response**: includes actions taken to save lives and prevent property damage, and to preserve the environment during emergencies or disasters. The response phase is the implementation of action plans.
>
> **Recovery**: includes actions that assist a community to return to a sense of normalcy after a disaster.

The APDIP primer goes on to identify a number of means through which ICTs significantly aid every one of these broadly defined categories of disaster management. Worth quoting at length here is an article by Sanjana Hattotuwa written immediately after the significant havoc caused by Asian Tsunami on Boxing Day, December 2004 as an example of how ICTs can help in disaster mitigation and recovery[10]:

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[8] http://www.i4donline.net/articles/current-article.asp?articleid=1497&typ=Features

[9] *ICT for Disaster Management/Disaster Management* (ibid)

[10] *Thoughts on Technology in the Wake of a Tragedy*, http://www.digitaldivide.net/articles/view.php?ArticleID=105

The sensitive and creative use of technology can help nurture change processes that can lead to more peaceful and sustainable futures and avoid the pitfalls of partisan aid and relief operations. Providing for mobile telephony that give remote communities access to constantly updated weather and geological information and helping create endogenous early warning systems using local knowledge, using tele-centres to serve as repositories of information on emergency procedures and evacuation guidelines, coordinating the work of aid agencies on the ground ensuring the delivery of aid and relief to all communities, monitoring aid flows and evaluating delivery, creating effective mechanisms for the coordination of reconstruction and relief efforts, creating avenues for effective communication between field operations and warehouses based in urban centres, creating secure virtual collaboration workspaces that bring in individuals and organisations sans ethnic, geographic or religious boundaries, enabling centralised data collection centres that collect information from the field and distribute it to relevant stakeholders are just some of the immediate uses for technology.

In the longer term, it is imperative to use trust relationships nurtured in virtual domains at present (for example, in state and non-state actors coming together in virtual spaces for aid and relief coordination… Technology can help knowledge flows from the diaspora to directly influence developmental processes on the ground, by-passing, if necessary, third parties to directly empower communities. Tele-centres can be repositories of alternative livelihoods in areas that it is now impossible to carry on traditional modes of living. Using cheaply available self-powered digital radios with broadband downlinks, it is possible to empower even the remotest communities with information that they can translate into knowledge to help them rebuild lives and create connections with others who have suffered the same plight. Online dispute resolution can use organic and local knowledge frameworks with creative and modern dispute resolution mechanisms to effectively address the problems that individuals and communities will face on the ground with limited access to resources.

Radio and television, mobile and fixed line telephones, technologies such as SMS and cell broadcasting, addressable satellite radios, Internet and the web as well as community radio have been identified as complementary mechanisms and media that can aid in disaster management in any country[11]. Software such as Microsoft Groove Virtual Office® have also been used in disaster management and point to the growing potential of collaboration tools able to direct urgent needs in the field to logistics hubs that are then able to route supplies accordingly.[12] Further, applied research and best practice in the region strongly suggests a range of technologies and media can be effectively used to create disaster management frameworks that are scalable, sustainable, redundant and resilient. For example, at a presentation held in 2007, researchers at the Sri Lanka based research organisation Lirneasia flagged technologies such as SMS, remote sensing, satellite radio and Common Alerting Protocols that significantly aided (village level) community disaster planning and response[13].

As noted in the ICT4Peace Foundation's 2005 report *Information and Communication Technology for Peace - The Role of ICT in Preventing, Responding to and Recovering from Conflict*[14], initiatives such as

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[11] *ICT in Disaster Management*, APDIP e-Note 16 / 2007, Chanuka Wattegama, http://www.apdip.net/apdipenote/16.pdf

[12] *After the deluge: Info Share's response to the tsunami*, Sanjana Hattotuwa, Pages 14 – 20, http://sanjanah.googlepages.com/IS_post_tsunami_thoughts.pdf.zip

[13] http://www.lirneasia.net/2007/12/making-communities-disaster-resilient-at-gk3/#more-2016

[14] http://www.unicttaskforce.org/perl/documents.pl?id=1571

the Center of Excellence in Disaster Management and Humanitarian Assistance (http://www.coe-dmha.org), a project mandated by the US Congress to improve the coordination and integration of the world's response to natural disasters, humanitarian crises and peace operations and FedNet (https://fednet.ifrc.org) by the International Federation of Red Cross and Red Crescent Societies are two examples of significant mechanisms that use ICTs in all aspects of disaster management, mitigation and response.

It is true that the potential of ICTs must never blind us to the practical realities of disaster risk management in countries with volatile socio-political and economic conditions. ICTs alone are no panacea. However, with the necessary political will and strategic foresight, they can be indispensible tools that strengthen disaster management. Fundamental amongst these is the need to meaningfully engender institutional and political leadership by public and private policy makers and local community leaders to further disaster management at all levels of polity and society. As Chanuka Wattegama avers[15], "many governments do not see investment in ICT or even building up ICT-enabling infrastructure as priorities. The result invariably will be that ICT and technology in general take a backseat to presumed priorities such as ensuring good governance practices, providing healthcare facilities and addressing gender barriers… It should therefore be the responsibility of all concerned stakeholders, from governments to donor organizations, to give the right priority to ICT development and adoption. Only that will ultimately guarantee disaster risk reduction for all." We concur. As Daniel Stauffacher notes[16], while there are many humanitarian relief efforts underway around the world, in most cases ICTs are not used effectively. The problem is more often one of leadership than of a lack of technology itself. The most significant challenge is making relief and peace groups want to leverage ICTs to better collaborate amongst themselves first and then with wider groups of stakeholders including most importantly the affected communities and grassroots.

We can no longer say that the potential of ICTs to meaningfully strengthen disaster risk management even in LDCs and developing countries exists only on paper. Numerous examples, case studies and research programmes have demonstrated that ICT saves lives. It is incumbent upon policy makers to look at ways in which their fullest support is lent to efforts to strengthen disaster management frameworks that leverage technologies that are sustainable, easily deployed, adaptable and function with the least disruption to existing early warning and disaster response mechanisms at the community, regional or national levels. It is useful to keep in mind the words of Sir John Holmes, UN Emergency Relief Coordinator and Under-Secretary-General for Humanitarian Affairs said at the UN OCHA +5 Symposium held in October 2007 in Geneva[17],

> *"… information itself is very directly about saving lives. If we take the wrong decisions, make the wrong choices about where we put our money and our effort because our knowledge is poor, we are condemning some of the most deserving to death or destitution, and helping the relatively less needy when they do not require our relief so desperately... For humanitarians, good communication is absolutely critical because without it we cannot mobilize the resources and the attention as we have to do, to address the needs we have identified. And while good communication is a skill in its own right, it is also highly dependent on good information and analysis to convince and to be credible. Moreover, as I have suggested*

[15] *ICT for Disaster Management/Disaster Management* (ibid)

[16] http://money.cnn.com/2008/01/04/technology/kirkpatrick_peace.fortune/index.htm?section=money_latest

[17] Download the speech in full here - http://ict4peace.org/view_files-1-v-104.html

already, communicating better with those we are trying to help strikes me as a major gap in our armoury, and yet another key challenge for us in the future."

About the authors

Daniel Stauffacher is a former Ambassador of Switzerland and the former Special Representative of the Swiss Government for the World Summit on Social Development (UNGASS) 2000 in Geneva and of the World Summit on the Information Society (WSIS) in Geneva 2003 and Tunis 2005. On behalf of the Swiss Government he launched the ICT4Peace process in 2003, which lead to the approval of Paragraph 36 of the WSIS Tunis Commitment in 2005. He is the founder and Chairman of the ICT4Peace Foundation and an advisor to the UN DESA Global Alliance for ICT for Development and to several international public interest foundations and organisations. He is also a co-founder and President of the Geneva Security Forum. He lives in Switzerland and is married with a son.

Sanjana Hattotuwa is a Special Advisor to the ICT4Peace Foundation. Sanjana has over 8 years of field experience in the design, implementation, monitoring and evaluation of peace and media support programmes. He is an internationally recognised thought-leader in Information and Communications Technology for Peacebuilding (ICT4Peace), Online Dispute Resolution (ODR) and the Editor of the award winning and renowned citizen journalism website in Sri Lanka focussing on human rights and democratic governance, *Groundviews* (www.groundviews.org). He is married with a son, loves travelling, a good read and Sri Lanka.

About the ICT4Peace Foundation

The ICT4Peace Foundation (http://www.ict4peace.org) was established in 2006 and is based in Geneva, Switzerland. Serving as a hub for research, advocacy and networking on the topic of ICT used to prevent, respond to and recover from conflict, its genesis and *raison d'être* lies with Paragraph 36 of the WSIS Tunis commitment:

> *"We value the potential of ICTs to promote peace and to prevent conflict which, inter alia, negatively affects achieving development goals. ICTs can be used for identifying conflict situations through early warning systems preventing conflicts, promoting their peaceful resolution, supporting humanitarian action, including protection of civilians in armed conflicts, facilitating peacekeeping missions, and assisting post conflict peace-building and reconstruction."*

For more examples of the use of ICTs in line with the Tunis Commitment, visit the Foundation's ICT4Peace wiki here - http://inventory.ict4peace.org/