EVENT REPORT

Using ICT for Effective DISASTER MANAGEMENT Caribbean Forum 2006

Commonwealth Telecommunications Organisation

International Telecommunication Union

**Held at the Sunset Grande Resort
Ocho Rios, Jamaica
26th – 28th September 2006**

Hosted by:

OUR

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Executive Summary

This report details a multi-stakeholder Forum, "The Using ICT for Effective Disaster Management Caribbean 2006 (ICT4DM Caribbean 06)", which was held at The Sunset Jamaica Grande Resort, Ocha Rios, Jamaica from the 26th – 28th September, 2006. Hosted by Jamaica's Office of Utilities Regulation (OUR), the Forum was organised by the Commonwealth Telecommunications Organisations (CTO) with assistance from the International Telecommunications Union (ITU) and the Caribbean Association of National Telecoms Operators (CANTO).

The Caribbean Forum was the second in a series of four fora on Using ICT for Effective Disaster Management, being delivered between June 2006 and June 2007 as part of the CTO's ICT for Disaster Management Programme (ICT4DM). The overarching objective of the (ICT4DM) programme is to increase and improve stakeholders' use of Information and Communication Technologies (ICTs) in all four stages of the Disaster Management Life Cycle: Preparedness, Mitigation, Relief and Reconstruction.

Section One of this report briefly explains the reasons why the "Using ICT for Effective Disaster Management Programme" is so important and why the Caribbean Forum was so timely. It also details the broad aims and objectives of all four Fora. **Section Two** presents the final agenda for the Caribbean forum and briefly explains the rationale for it.

Section Three provides summaries of the expert presentations that were delivered during the first two days of the Forum. It also highlights the main themes and issues raised in the interactive panel discussions that followed each of the Forum's six sessions. The summaries of presentations are detailed and can be read in conjunction with the presentations that were made at the event. This will enable stakeholders who did not attend the event to gain a full comprehensive understanding of the presentations. All the presentations from the Forum can be downloaded from the CTO website: www.events.cto.int/dmcaribbean

On the third day of the Forum, participants took part in a group exercise in which they produced *Using ICT for Disaster Management Logical Frameworks (Log Frames)*. The completed Log Frames are found in **Section Four** of this report, alongside an explanation of the exercise and some analysis of the Log Frames. Amongst other things, the Log Frames contain actions that stakeholders from the region believe they must take in order to increase and improve their use of ICT in disaster management.

Section Five is the final section of this report and provides recommendations for how stakeholders in the Caribbean region can improve general disaster management, as well as increase and improve their use of ICT to mitigate the effects of natural disasters. The recommendations were developed following analysis of the presentations and panel discussions at the Caribbean Forum, as well as the consultation with numerous stakeholders in the post-event phase. In summary, the main recommendations stemming from the Forum are as follows:

1. Governments Must Catalyse The Development of National Disaster Management Plans

2. National Disaster Management Plans Should Be Developed Through Broad-Based Consultations

3. Countries Must Implement a Culture of Preparedness.

4. Enhance Knowledge Management Practices

5. Improve Understanding of the Tampere Convention to Increase Ratification and Ensure that Ratification is Followed by Practice

6. Improve the Protection of Critical Infrastructure

7. Improve Collaboration between Stakeholders

8. Undertake Continuous Monitoring and Annual Assessment of Progress

# 1. Background to the Using ICT for Effective Disaster Management Forum

The CTO's ICT for Effective Disaster Management Programme is being rolled out at a time when there is a justifiable focus on the negative impact of natural disasters. Recent events, such as hurricane Katrina, have shown how the world's most developed countries can struggle to manage disasters. However, it was the Asian Tsunami that highlighted the devastating impact of natural disasters to a worldwide audience and also showed the world that developing countries feel the brunt of natural disasters.

The events of 26th December 2004 are etched in the minds of people all over the world. Most people will remember where they were and what they were doing when they first heard about the devastating effects of the Tsunami that swept through the Bay of Bengal. Although the worst affected countries were those near the Tsunami's epicentre, such as Indonesia and Sri Lanka, the physical effects of the Tsunami were felt as far as away as East Africa. In Somalia, for example, the official death toll for the Tsunami was recorded at 300 and the number of displaced people was said to be 54,000.

The huge death toll and widespread destruction of infrastructure caused by the Tsunami were rightfully given the media attention they deserved, but the media attention also helped to highlight a worrying global trend. Indeed, the Tsunami occurred exactly one year to the day after the Bam earthquake struck Iran, killing 40,000 people. When examined alongside more common disasters, such as the annual bout of hurricanes in the Central American and Caribbean region, it is evident that the number and frequency of natural disasters is increasing.

Between 1994, the year in which stakeholders who agreed upon the Yokohama Strategy and Plan of Action for a Safer World, and 2003, the number of natural and technological disasters per year has almost doubled, increasing from 428 a year to 707. The bar chart below indicates how the number of natural disasters has increased in the last 25 years and indicates that the number of natural disasters almost doubled between 1995 and 2005
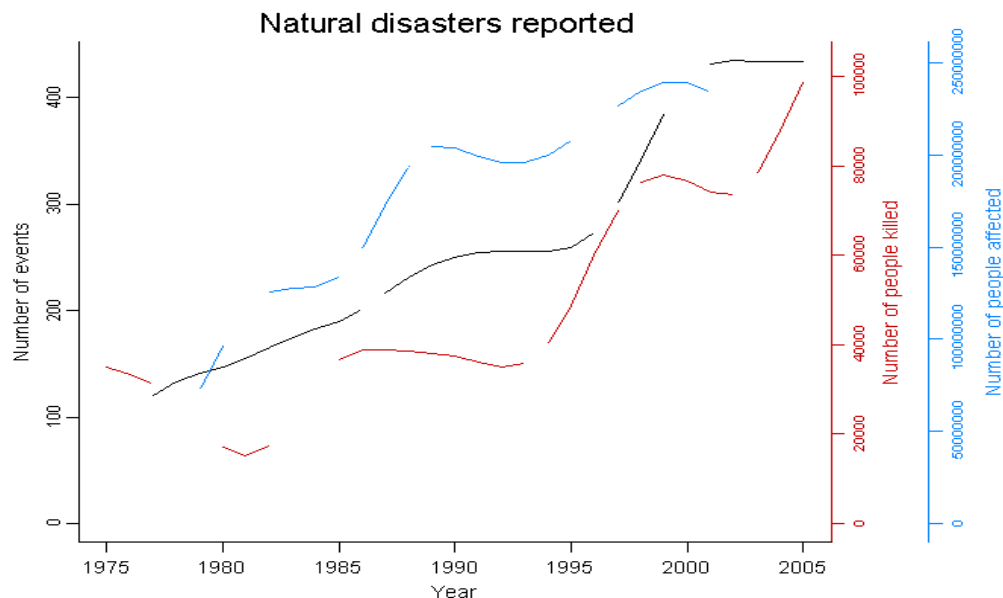
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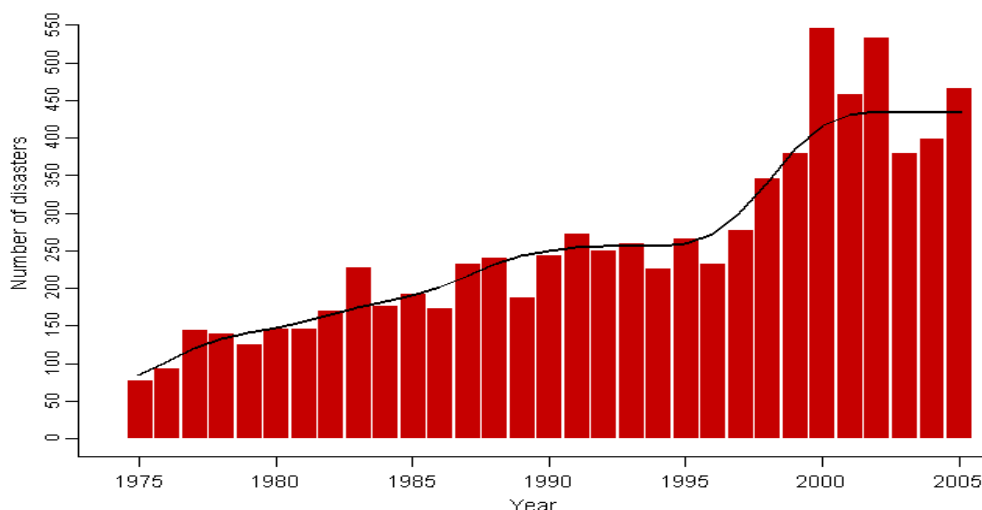
EM-DAT: The OFDA/CRED International Disaster Database - www.em-dat.net - Université Catholique de Louvain, Brussels - Belgium

For those countries focused on achieving the Millennium Development Goals (MDGs), the loss of life, escalating economic costs and consequent debt, require them to act urgently on the lessons provided by recent natural disasters. Indeed, the 2002 Disaster Report published by the Red Cross, notes that "Disasters are first and foremost a major threat to development and specifically to the development of the poorest and most marginalised people in the world and ensure they stay poor".

Natural disasters can wipe out years of work towards improving socio-economic development. For example, Hurricane Mitch, which ripped through the Caribbean and Central America in October of 1998, is believed to have destroyed 10 years of socio-economic developmental gains in Honduras and Nicaragua. More recently, the economic cost of the Tsunami upon the Maldives has been measured at US$470 million, or 62% of GDP. Although humanitarian aid for such disasters often covers the cost of immediate relief efforts, much of the work needed to reconstruct devastated countries is undertaken using loans from the World Bank Group.   Since 1980, the World Bank Group has provided US$12.5 Billion towards the worldwide financing of reconstruction in disaster affected areas. Clearly, for those affected countries in which debt is already a major impediment to development, the economic impact of natural disasters are felt well after reconstruction projects have been completed.

EM-DAT: The OFDA/CRED International Disaster Database - www.em-dat.net - Université Catholique de Louvain, Brussels - Belgium

Despite the unprecedented socio-economic costs of natural disasters, it is widely felt that actions taken during the 1990's--the International Decade of Natural Disaster Reduction (IDNDR)-- have helped mitigate the socio-economic impact of many disasters. At the end of the IDNDR, the UN, in an attempt to maintain momentum, implemented the International Strategy for Disaster Relief (ISDR). This resulted in the increased implementation of disaster management polices and the establishment of a number of organisations that are dedicated to facilitating the multi-stakeholder cooperation needed to mitigate the effects of natural disasters.   The UN's continued focus on disaster management has enhanced efforts made during IDNDR , but more

work must be done in respect of developing national disaster management plans so that stakeholders are prepared for when natural hazards strike.

Natural disasters are the result of natural hazards that stakeholders have not adequately prepared for. In light of the unpredictable threat natural hazards pose to achieving the Millennium Development Goals (MDGs), the United Nations has rightfully placed great emphasis on the need for preparedness. Although the costs of natural disasters during the last decade were massive, the number of casualties would have been considerably higher if stakeholders had not implemented measures aimed at achieving the objectives of the Yokohama Strategy. There are many benefits in investing in the tools of preparedness, such as early warning systems and community awareness projects. Indeed, the World Bank notes that the $3.15 billion spent by China during the 1990's averted losses of $12 billion.

The development and establishment of the Hyogo Framework at UN World Conference on Disaster Relief in January 2005 has provided stakeholders with a basis for creating the necessary culture of preparedness. The Hyogo Framework, which acknowledges gaps in the implementation of the Yokohama Strategy, outlines five 'Priority Actions' that countries must undertake if they are to create a culture of preparedness and effectively mitigate the effects of disasters. They are:

1. Ensure that disaster risk reductions become national and local priorities with a strong institutional basis for implementation.

2. Identify, assess and monitor disaster risk and enhance early warning.

3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels.

4. Reduce the underlying risk factors.

5. Strengthened disaster preparedness for effective response at all levels.

For institutions like the CTO, that believe information and communication are the most important elements of effective disaster management, ICTs have a critical role to play in meeting all five broad 'Priority Actions' and creating the culture of preparedness. Successful disaster mitigation through effective preparedness, mitigation, relief and reconstruction undoubtedly depends upon the gathering of accurate information and the dissemination of that information through effective and timely communication. ICTs such as early warning systems, televisions, radios, web portals, video conferencing, geographical information systems (GIS) and remote sensing (RS), to name but a few, all have a pivotal role to play in disaster management.

The CTO is intent on increasing and improving stakeholders' use of ICT in every phase of the Disaster Management Life Cycle by delivering regional fora on Using ICT for Effective Disaster Management in Asia, The Caribbean, The Pacific and Africa. The idea for the regional fora was conceived at CTO headquarters in October of 2004. In the same month, the CTO began desk-based research on the

role of ICTs in disaster management and consulted a number of stakeholders from all four regions about the issues surrounding the use of ICT in disaster management in their respective regions.

On the 26th of December 2004, the Asian Tsunami galvanised staff at the CTO and converted the need to deliver four regional "Using ICT for Disaster Management Fora" into a priority programme. With the ethos of collaboration and coordination underpinning the programme, it was designed to fit in with global initiatives being undertaken by the UNISDR, and many of the initiatives being delivered by organisations in each region. Indeed, to ensure relevant regional content in each workshop, each Forum is developed and delivered in collaboration with the respective region's pre-eminent disaster management organisation.

2. The Caribbean ICT4DM Forum

The Caribbean Forum came at a time when there was a growing appreciation of the potentially vital role ICT can play in disaster management. This can be attributed to a number of recent examples of how, if used effectively, ICTs could have saved lives. For example, the International Federation of the Red Cross (IFRC) acknowledges that scientists in the Pacific had a huge amount of information about the Tsunami some hours before it struck in December 2006, but they were unable to disseminate it quickly enough to those who could use it to save lives. The IFRC has understandably called for stakeholders to work towards eradicating such information failures. Its 2005 World Disaster Report is dedicated to *Information in Disasters* and recognises that quality information, and providing stakeholders with the means to deliver it during each stage of the Disaster Management Life Cycle, is critical to mitigating disasters.

It is no surprise that the Caribbean Forum attracted a critical mass of stakeholders, including government ministers, ICT regulators, representatives of regional and international organisations, representatives of civil society and the private sector. Like other parts of the world, disasters in the Caribbean have become more frequent during the last decade and resulted in greater socio-economic costs. Recently, the Caribbean has been plagued by devastating hurricanes, including hurricane Ivan, the most powerful storm to hit the Caribbean in 50 years.

The table below indicates how disasters in the Caribbean region have increased during the last century.
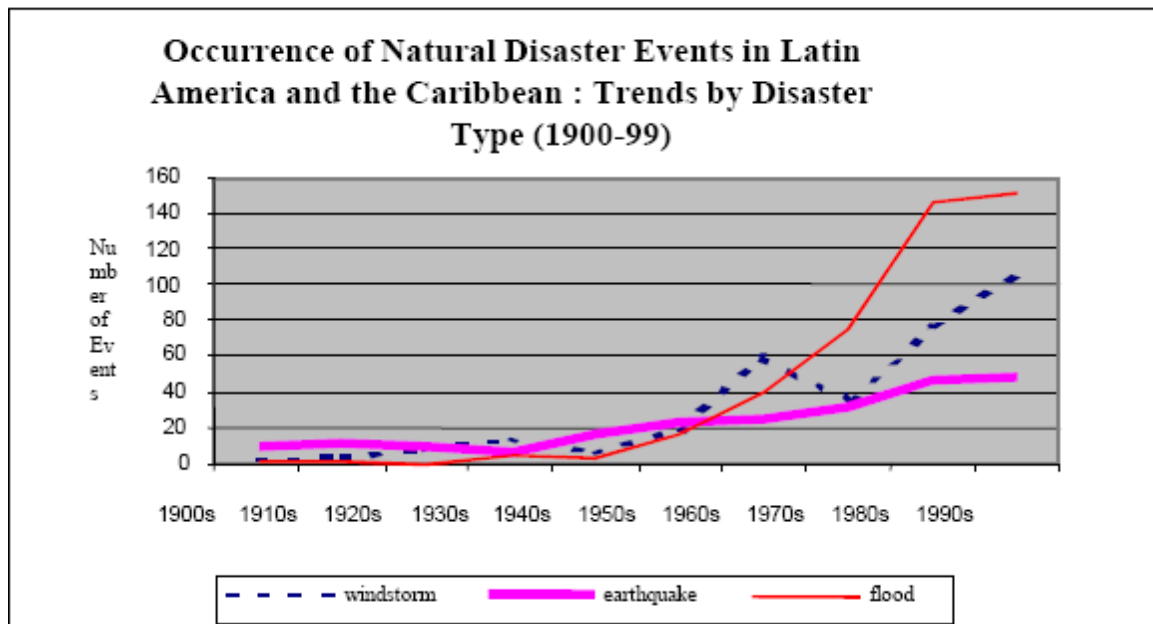
Between August and November 2005, nine hurricanes ravaged the Caribbean, killing at least 2,000 people and resulting in an estimated U$60 Billion of damage. While Haiti was the worst affected country, the IFRC notes that countries like Jamaica, Cuba and the Dominican Republic suffered relatively low death tolls

because knowledge about disaster management and the use of ICT for disaster management enabled stakeholders to send early warnings. Whatever gains may have been made in the region, the CTO believes that the gains made by some countries in the region should be built upon and shared. The Caribbean Forum aimed to facilitate this process and its objectives are listed below.

The Broad Objectives of the Forum

1. To improve and increase the use of ICT in each stage of the Disaster Management Life Cycle; Preparedness, Mitigation, Relief and Reconstruction.

2. To mitigate the effects of natural disasters by helping to creating a culture of preparedness and ensuring the free flow of appropriate information.

3. To facilitate knowledge and information sharing on experiences, best practices and technological solutions.

4. To improve collaboration between all stakeholders within the Caribbean, in the understanding that effective disaster management response at the local, national, regional and global levels requires good coordination between all stakeholders.

5. To undertake SWOT analysis of disaster management practices in the region.

2.2. The Caribbean Agenda

The programme for the Using ICT for Effective Disaster Management Forum Caribbean 2006 was adapted from a generic programme that is being used as the basis for the development of context-specific programmes for all four fora. In order to make the Caribbean forum context specific and highly relevant to Caribbean Stakeholders, the CTO worked in collaboration with the International Telecommunications Union (ITU), the Caribbean Disaster Emergency Response Agency (CDERA) and the Caribbean Association of National Telecommunications Operators (CANTO).

The effective use of ICT is largely dependent upon policy makers and regulators creating an enabling environment for the use of ICT, and operating companies taking specific measures.   Therefore, the first day of the Forum focused on policy and regulatory matters and the role of governments and ICT regulators in disaster management. Importantly, presentations on the status of disaster management policy and practice in the region were also delivered.

The second day of the Forum focused on how ICTs are used during each phase of the Disaster Management Life Cycle; Preparedness, Mitigation, Relief and Reconstruction. Representatives from each category of stakeholder - government, regulators, operators, civil society and other private sector stakeholders – were given the opportunity to make a presentation on how they use ICT during particular phases of the disaster management life cycle.

Each of the six sessions during the first two days of the forum were followed by panel discussions that provided stakeholders with the chance to question the expert presenters, share experiences and build collaborative relationships based on the potential to create synergies.

The final day of the Forum provided participants with the opportunity to undertake group exercises, which called on them to form four stakeholder groups – government and regulators, civil society, infrastructure providers and regional and international organisations. Participants in each group then worked together to produce *Using ICT for Effective Disaster Management Logical Frameworks*. Amongst other things, the completed Log Frames were intended to detail what actions participants in each group felt they needed to take in order to improve the use of ICTs in disaster management.

The final version of the programme for the Caribbean Forum is detailed on the following pages of this report. The advertised version of the programme was actually amended in the days leading up to the Forum because some speakers who had confirmed their attendance were unable to attend. In particular, two ministers from the Cayman Islands and Antigua & Barbados, both had to send their apologies for their non-attendance due to conflicting official duties.

Day One: Tuesday 26th September 2006

08.00	**Registration and coffee**
08.50	**Chairperson's Opening Address:** **Mr J. P. Morgan, Director General, The Office of Utilities Regulation, Jamaica** **& Chairman, CTO**
09.00	**Opening Ceremony** • **Hon. Dr. Renee Webb, Caribbean Associate, CTO** • **Mr Philip Cross, Area Representative for the Caribbean, International Telecommunication Union** • **Mr Jeremy Collymore, Coordinator, CDERA** • **The Hon. Philip Paulwell, Minister of Industry, Technology, Energy & Commerce, Government of Jamaica**
	GLOBAL AND REGIONAL DISASTER MANAGEMENT TODAY
09.15	**Keynote Address:** **A regional overview of current disaster management preparations:** **What is currently being worked upon in regard meteorology information, early warning systems and information sharing?** **Mr Jeremy Collymore, Coordinator, CDERA**
09.45	**Opening Address:** **Using ICT for effective disaster management in the Caribbean** **The Hon. Philip Paulwell, Minister of Industry, Technology, Energy & Commerce, Government of Jamaica**
10.00	**Morning Coffee**
10.30	**Comprehending the damage that natural disasters create:** **An examination of the socio-economic costs** • **An overview of the disaster life cycle**

	• **On a global, regional and national level, what are the socio-economic costs of natural disasters?** • **The Millennium Development Goals: what are the threats posed to them by natural disasters?** **Ms Sandra E John, Chief of the Caribbean Knowledge Management Centre, UN ECLAC**
11.00	**Current disaster management strategy and policy, the role of ICT:** **An explanation, focusing on best practice, of the existing global, regional and national approaches** • **Global perspectives from the ITU** • **The current regional and national approaches** • **Policy framework, is their potential for standardisation in the region?** **Dr. Cosmas Zavazava, Head of Least Developed Countries Unit and ITU focal point for Emergency Telecommunications, International Telecommunication Union**
11.30	**Panel Discussion:** **The future of maximising ICT for effective disaster management:** **How can the regional organisations work interdependently towards a fixed disaster management goal?** **CDERA, ITU, & UN ECLAC**
12.15	**Chairperson's Closing Address**
12.20	**Networking Lunch**
ICT AND DISASTER MANAGEMENT: GOVERNMENT AND REGULATOR PERSPECTIVES	
13.50	**An examination of the role governments play in effective disaster management and capturing the benefits of ICT** • **Utilizing information and knowledge in disaster management** **Dr Barbara Carby, Director, NEMA, Cayman Islands** • **Producing a disaster management plan** **Mr Bill Humphrey, Managing Partner and CEO, Prometheus Group**
14.50	**Afternoon Tea**
15.20	**An assessment of the telecommunications/ICT regulatory environment for disaster management:** **What can be done to assist strategy implementation? ITU Perspectives** • **The Tampere Convention: what it is, its importance, and challenges related to its ratification and implementation** **Dr Cosmas Zavazava, Head of Least Developed Countries Unit and ITU focal point for Emergency Telecommunications, International Telecommunication Union**

	• The potential for a regional emergency backbone infrastructure **Mr Courtney Jackson, Regulatory Consultant, The Office of Utilities of Regulation, Jamaica** • With so many parties involved in disaster response, why is interoperability fundamental to success? **Mr Mark Hanvey, Chief Security Officer, Cable and Wireless**
16.40	**Panel discussion:** • **Best practice in ICT deployment for disaster mitigation** • **ICT legislation – Where are we and what needs to be done at the national, regional and international levels?** • **The regulator's responsibility in disaster management** • **Practical experiences in the application of the Tampere Convention by humanitarian actors during disasters. Tampere Convention; can it work in practice?** **Featuring:** **The morning presenters and** **Mr Lester Blackett, Director, Nevis Disaster Management Office, Premier's Ministry-Nevis Island Administration**
17.20	**Chairperson's closing remarks**
17.30	**Close of Day One**
17.40	**Cocktail Reception**
20.00	**Entertainment**

Day Two: Wednesday 27th September 2006

08.20	**Re-registration and coffee**
08.50	**Chairman's Opening Address:** **Hon. Dr. Renee Webb, Caribbean Associate, Commonwealth Telecommunications Organisation**
	PREPAREDNESS
09.00	**Protecting the citizens through disaster preparedness: Strategy and bench mark examples of creating community awareness** • **Connecting and preparing the community for limiting the effect of a Disaster preparedness**

	Dr Barbara Carby, Director, NEMA, Cayman Islands
	• **Drills and exercises: preparations, developing trust and creating a feedback loop in the community**
	Ms Dorienne Rowan-Campbell, Consultant and Associate, Networked Intelligence for Development (NID)
10.00	**Panel discussion:**
	• **Examples of best practice in engaging the community for disaster preparation**
	• **Information sharing and knowledge management, with so many potential parties involved how can this be organised?**
	• **What can be done to increase interoperability now and in the future?**
	• **What can we do to ensure that telecommunication operators understand their role in disaster management?**
10.30	**Morning Coffee**
	MITIGATION
11.00	**Integrating ICT into the mitigation phase to realise the potential of projects such as early warning systems:**
	• **The importance of continued satellite communications during a natural disaster**
	Mr Keith Clark, Sr. Regional Marketing Manager, Americas, INTELSAT
	• **The importance of mobile telephones when planning, reacting and relieving disasters**
	• **The potential of cell broadcasting**
	Mr Mark Wood, Secretary General, The International Cellular Emergency Alert Services Association (CEASA)
	Coordinating the disaster response:
	The benefits that sensors can bring to disaster mitigation
	• **The availability of sensor technology, information gathering and the problem of poor information management**
	• **The importance of detailed situational awareness to enhance disaster mitigation**
	Mr Ronald Jackson, Director General (Actg.), ODPEM
	Effective Communications and information Management for Disaster Operations Centers and Vulnerable Communities
	• **What's required – timely and accurate information, situational analyses and relevant status reporting**
	• **ICT components:**
	▪ **Collecting information from vulnerable areas using technologies such as – voice, data, graphic and video**

	· Building operation center capabilities with – databases, websites, analytical tools, and map-based representation
	· Integrating the entire information spectrum – anecdotal, trend, observational, simulated, remote sensing and digital
	Mr George Richards, Principal, Teknethix Inc
12.20	**Panel discussion:** • **The progress of the International Early Warning Programme (IEWP)** • **The importance of balancing data gathering with good knowledge management** • **What more can operators do to restrict the damage done by natural disasters?**
12.50	**Chairperson's Closing Address**
13.00	**Networking Lunch**
14.00	**Chairperson's Opening Address**
	RELIEF
14.10	**The importance of ICT in relief efforts:** **Examples of best practice in the use of ICT in the relief phase** • **Sharing post disaster satellite imagery and capacity building In Grenada in the post Ivan & Emily scenario** **Mr Ian King, Project Manager, Caribbean Risk Management Initiative, UNDP, Barbados and OECS** • **Case Study - Ericsson Volunteers and their use of ICT in the relief phase** **Mr Dag Nielson, Director, Ericsson Response** • **Utilising ICT in the relief phase, how has past history demonstrated its value and what is the potential in the future?** **Mr Brad Mitchell, Executive Vice President, Sales & Distribution , Cable & Wireless**
15.00	**Panel discussion:** • **What key steps can be taken in the short term to remove the impediments to using ICTs in relief efforts?** • **Best practice examples of ICT use in relief**
15.30	**Afternoon Tea**
	RECONSTRUCTION
16.00	**The importance of the internet, particularly in the post disaster phase** • **What are the critical steps that must be taken when reconstructing devastated ICT infrastructure after disaster strikes?** **Mr Edward Laughton, NOC & Business Continuity Manager, Digicel**

16.30	RECONSTRUCTION GROUP EXERCISE
	• **Funding reconstruction efforts**
	• **What are the recent technological changes that could be added to legacy telecommunications networks to reduce vulnerability?**
	• **What action must be taken to enhance the coordination needed for reconstruction?**
17.15	**Chairman's closing remarks**
17.25	**Close of Day Two**
17.30	**Drinks Reception**
20.00	**Entertainment**

Day Three: Thursday 28th September 2006

08.30	**Re-registration and Coffee**
08.55	**Chairperson's opening comments**
	Mr Philip Cross, Area Representative for the Caribbean, International Telecommunication Union
09.00	**Logistical Framework Explanation**
	Mr Kojo Boakye, Deputy Programme Manager, Commonwealth Telecommunications Organisation
09.30	**Logistical Framework Exercise**
10.30	**Working Break**
12.00	**Logistical Framework Working Group Feedback**
13.00	**Closing comments:**
	Charting The Way Forward
	Mr J. Paul Morgan, Director General, The Office of Utilities Regulation, Jamaica & Chairman, CTO
	Mr Jeremy Collymore, Coordinator, CDERA
	Mr Philip Cross, Area Representative for the Caribbean, International Telecommunication Union
	Mr Matthew Dawes, Deputy Manager, International Events and Business Development, Commonwealth Telecommunications Organisation
13.30	**End of Forum**

3. Presentations and Panel Discussions

The following section provides summaries of each of the presentations made by various experts and highlights the main issues raised during each panel discussion. As expected, the panel discussions were invariably driven by the themes and issues raised in the preceding presentations. Amongst other things, this resulted in a number of frank debates and the tentative establishment of collaborative relationships between stakeholders who believed they could create synergies.

The section below has been organised according to the programme, i.e. presentations are summarised in the order they were delivered and correspond with the programme above. The summaries of the presentations in each session are followed by the summaries of each panel discussion. All the presentations from the Forum can be downloaded from: www.events.cto.int/dmcaribbean

Day One – September 26th 2006

Opening Address
Mr J.P Morgan Director General, the Office of Utilities Regulation, Jamaica and Chairman CTO

In addition to welcoming the participants, Mr Morgan's opening address focused on how important ICTs are for effective disaster management. Setting the tone for the event, he told participants that, although the timing and arrival of natural hazards cannot be managed, stakeholders, preparation, mitigation, relief and reconstruction, after they strike, can be. According to Mr Morgan, ICTs help us to manage the impact of disasters, by enabling the flow of knowledge, information and communication during all phases of the Disaster Management Life Cycle.

3.1. Session 1: Global and Regional Disaster Management Today

The opening session of the Forum focused on the socio-economic impact of disasters. As most of the speakers were from the region, the presentations centred on the impact of disasters in the Caribbean and what stakeholders are doing to mitigate them. The first presentation was delivered by Mr Jeremy Collymore, Director of the Caribbean Disaster Emergency Response Agency (CDERA) and focused on disaster management in the Caribbean, the work of CDERA and the way some ICTs are used in disaster management.

The second presentation, given by the Honourable Phillip Paulwell, Jamaica's Minster for Industry, Technology, Energy and Commerce, highlighted some of the problems with disaster management in the Caribbean. It drew on points from a recent evaluation of Caribbean disaster management undertaken, by the Organisation of Eastern Caribbean States (OECS). The third presentation was delivered by Mrs Sandra E. John of the UN Economic Commission for Latin American and the Caribbean (ECLAC) and focused on the work of ECLAC in respect

of disaster management and the needs of Small Island Developing States (SIDS). The fourth and final presentation was given by Dr Cosmos Zavazava of the International Telecommunications Union (ITU) and focused on the use of emergency telecoms when disaster strikes.

Presentation 1. (Keynote Presentation)
A regional overview of current disaster management preparations: What is currently being worked upon in regard to meteorology information, early warning systems and information sharing?
Mr Jeremy Collymore, Coordinator, Caribbean Disaster Emergency Reduction Agency, CDERA

Mr Collymore started his presentation by telling participants that there had been a rise in the number of disasters in the Caribbean and, consequently their socio-economic impact had risen dramatically. He noted that the Caribbean now has more than 40 disaster events a year, which cause losses estimated at US$3 Billion. In light of these losses, stakeholders must do more to mitigate the effect of natural disasters, if they are to reduce their impact and cost on the region.

Mr Collymore then explained the work of the organisation he works for, the Caribbean Disaster Emergency Response Agency (CDERA). CDERA's overarching goal is to assist the region mitigate natural disasters. As part of its work, CDERA has to:

1. Respond quickly to reports of any disasters in its participating member States

2. Provide inter-governmental and non-governmental organisations with comprehensive information on disasters affecting its participating states

3. Mobilize and coordinate disaster response of intergovernmental and non-governmental orgs

4. Establish, enhance and maintain participating States disaster response capabilities

Moving on to focus on the role of ICT in disaster management, Mr Collymore said that CDERA's activities are information centred and, as a result, ICT driven. He added that the organisation places emphasis on the use of ICT in disaster management predominantly because of the way it:

- Enhances the coordinating unit's capacity to effectively manage and disseminate information

- Supports the establishment and maintenance of disaster management practitioners through communication networks

Mr Collymore then raised issues that many presenters would touch upon during the Forum. First, he called on disaster management to be integrated into development planning and emphasised the fact that policy makers must have access to appropriate information in order to do this. Secondly, he called for greater participatory disaster management, in which the focus is on community engagement.

He added that the involvement of the community is an essential requirement for Comprehensive Disaster Management (CDM), an ongoing CDERA initiative aimed at mitigating disasters.

According to Mr Collymore, ICTs are increasingly used in CDM. For example, he told the audience, they are being used for hazard mapping, vulnerability assessment and recording information on disaster management. However, he reiterated that they must increasingly play an important role in preparing Caribbean stakeholders for mitigating disasters.

Mr Collymore then detailed one of CDERA's ongoing initiatives in which ICT is being used, the Coastal Planning Project. The first component of the project places an emphasis on risk assessment and institutional analysis, while the second involves the development of a toolkit that will be used by stakeholders, including Emergency Managers, the Private Sector, town planners and community groups. The third and final component of the project will focus on the dissemination of the toolkit through workshops and the CDERA website.

During the final part of his presentation, Mr Collymore highlighted some of the impediments that face the region as it tries to increase the use of ICT in disaster management, as well as some recommendations for removing the identified impediments. The impediments include:

- Limited or weak infrastructure within most National Disaster Offices

- Embryonic common standards for use of ICT in disaster management

- Inadequate collection, use and classification of hazards data

- Limited investment in infrastructure maintenance and updating

- Incipient ICT divides within, and among, organisation/institutions

- Misalignment between ICT systems and decision-making infrastructure

- Infrastructure incompatibility

In order to improve the region's use of ICT in disaster management, Mr Collymore told participants that the region must:

- Have greater interaction between systems developers and users

- Have more investment in harvesting and utilisations of existing ICT products in key sectors

- Build commitment to ICT use through strategic application

- Structure intervention as a medium and not the solution

- Build capacity for business continuity planning

- Build capacity for data analysis

Presentation 2.
Using ICT for Effective Disaster Management in the Caribbean
The Hon. Phillip Paulwell, Minister of Industry, Technology, Energy and Commerce, Government of Jamaica.

The Hon. Phillip Paulwell, Jamaica's Minister of Industry, Technology, Energy and Commerce gave a highly informed presentation that critically examined disaster management in the region and the way in which stakeholders currently use ICT.

He started his presentation by telling participants that the ICT4DM Caribbean Forum 2006 was extremely important because an increasing number of disasters plagued the Caribbean region. According to Minster Paulwell, the impact of recent natural disasters in the Caribbean has helped highlight the many inadequacies in Caribbean disaster management. These inadequacies include incomplete regional and national disaster management plans, a lack of early warning systems and poor analysis of how disaster warnings are given to those in the community.

After telling participants about the increasing potential for collaboration amongst the growing number of stakeholders who believe in the efficacy of ICT for effective disaster management, Minister Paulwell continued to outline some of the deficiencies in Caribbean disaster management. He noted that a recent evaluation of the region's response to Hurricane Ivan, undertaken by the Organisation of Eastern Caribbean States (OECS), had three significant findings. They were:

1. Inter-Agency communication, as well as communication and information for the public, could be improved

2. There needs to be an increased focus on engaging with the community, so that responsibility and understanding can be shared.

3. The media was a tool for disseminating information about disasters, but the mechanisms it used for doing so were inadequate.

After being rather critical of current disaster management in the region, Minister Paulwell was quick to point out that some initiatives in the Caribbean had meant the region was moving in the right direction. He highlighted the Pan-Caribbean Disaster Preparedness Project and the establishment of the Caribbean Disaster Emergency Response Agency (CDERA) in 2001 as key achievements.

Nearing the end of his presentation, Mr Paulwell stressed the need for the greater use of ICT for disaster management. He added that the region needs to create effective processes for the development of early warning information using ICT and media broadcast technologies, develop a publicly accessible website containing real-time information and implement a regional database of survey results on selected disasters that could be used to better inform policy makers.

Presentation 3
The Socio-Economic Impact of Natural Disasters in the Caribbean
Mrs Sandra E. John, Chief of the Caribbean Knowledge Management Centre, United Nations Economic Commission for Latin America and the Caribbean (ECLAC)

Mrs John told the audience that ECLAC was involved in disaster management because its work involves monitoring those issues that impact upon socio-economic development and providing policy advice. While ECLAC's work in ICT anchored upon the WSIS Action Plan, its work is guided by four of the Millennium Development Goals (MDGs), and the organisation is taking active steps to make sure these goals are achieved in the Caribbean region. The four goals are as follows:

- **MDG 1:** Eradicate extreme poverty and hunger

- **MDG 2:** Achieve universal primary education

- **MDG 7:** Ensure environmental sustainability

- **MDG 8:** Develop a global partnership for development

During the latter half of the 1990's, Mrs John told participants, the work of the ECLAC was shaped by the Barbados Plan of Action for Small Island Developing States (SIDS). Today, it is working towards the Mauritius Strategy, which was introduced in 2005 following a review of the Barbados strategy. She stressed that strategies aimed at improving the resilience of small nations like those found in the Caribbean were critically important because shocks such as natural disasters have a disproportionate effect on SIDS.

In order to provide participants with a relevant example of how SIDS are disproportionately affected by disasters, Mrs John told participants about Guyana's experience with floods during January – February 2005. According to Mrs John, in Guyana the economic cost of flooding amounted to 37% of Gross Domestic Product (GDP) and that most of the losses were found in the housing sector; having a devastating impact on social welfare.

The final part of Mrs John's presentation detailed the work ECLAC undertakes during the disaster life cycle. When disaster strikes ECLAC responds by putting together a team that, when requested by a country, is sent to assess the socio-economic impact when disaster strikes. As part of its preparedness work, ECLAC provides training to stakeholders and collects comprehensive data, which is used to inform all stakeholders in disaster mitigation.

Presentation 4.
**The Critical Role of Emergency Telecommunications in Disaster Risk
Reduction**
*Dr Cosmos L. Zavazava, Head of Special Programme for Least Developed
Countries and ITU Focal Point, Emergency Telecommunications, International
Telecommunications Union*

In the knowledge that some participants were not aware of the ITU's work, Dr
Zavazava took the opportunity to tell the audience what the ITU does in respect of
setting standards, frequency management and telecommunications development.
He then highlighted the devastating effects of natural disasters and told participants
that the increasing number of natural disasters has made the effective use of
emergency telecommunications critically important for disaster mitigation. According
to Mr Zavazava, the ITU's work in emergency telecoms calls on it to respond in a
number of ways when disaster strikes. These include:

- Deployment of satellite equipment and provision of operational and technical
  training, which the ITU funds and delivers

- Network damage assessment

- Network rehabilitation planning

- Resource mobilization

Participants were told that although emergency telecommunications have a critical
role to play in mitigating the effects of natural disaster, there are a number of threats
to their effective use. Dr Zavazava stressed that each threat called for specific
actions to thwart them. These threats included a lack of access to ICT, problematic
legal and regulatory issues, the financing of emergency telecoms and issues
regarding coordination between stakeholders.

Although the presentation was focused on how emergency telecoms are used when
disaster strikes, it emphasised the fact that telecoms and other ICTs have a role to
play in every stage of the disaster management life cycle i.e. Preparedness,
Mitigation, Relief and Reconstruction.

In the knowledge that different types of natural hazards have different effects, Dr
Zavazava stressed that emergency telecoms must be multi-hazard so that they can
be used to mitigate the effects of every type of natural disaster. In addition, they
must be multimode because radio, television, the Internet and the telephones all
have an important role to fulfil.

Dr Zavazava concluded his presentation by stating that if stakeholders are to truly
gain the benefits of ICT, they must have greater access, which he said could be
improved by:

- Putting appropriate policies in place

- Having dynamic regulation that moved in tandem with technological
  advancements

- Placing an emphasis on Universal Access

- Having secure and reliable ICTs

Panel Discussion Session 1: The Global and Regional Disaster Management Today
Panellist, Mr Jeremy Collymore, The Hon. Phillip Paul, Mrs Sarah E. John, Dr Cosmos Zavazava

The first panel discussion of the Forum began with a focus on the use of ICT in disaster management. Like their counterparts in the Asian Disaster Management Forum, Caribbean stakeholders quickly came to a consensus on how important ICTs are for effective disaster management. Indeed, it was clear that the objective of the Forum would not be to convince participants about the efficacy of ICTs in disaster management, but to highlight how stakeholders could improve their existing use of them. Despite the belief in the power of ICT, the Chair for the first session, Mr J.P. Morgan, rightly sounded a note of caution when he told participants that ICTs are just one part of a holistic solution to improving disaster management and not the final solution.

It is important that those espousing the virtues of ICTs for disaster management ensure that all stakeholders understand that ICTs are an enabler of more effective disaster management and not a holistic solution. This understanding is particularly important for stakeholders in developing countries, where relatively poor ICT infrastructure can put them at a disadvantage. The key to the use of ICT in disaster management is to ensure that, when necessary, ICT solutions complement existing tools for creating disaster resilient societies. Traditional warning systems like horns and bells can play an important part in effective disaster management. In many societies, these traditional warnings are the most tried, tested and trusted way of alerting communities. They should be used as much as possible, especially because of the levels of trust that communities have in them. The need for a high level of trust amongst stakeholders is extremely important because, as some presentations during the Forum showed, a lack of trust in early warnings can lead to stakeholders ignoring them when disaster is about to strike.

The panel discussion then focussed on the organisational structures in place for disaster management at both regional and national levels. In particular, participants discussed the role of CDERA in the region and the progress that has been made since its creation in September of 1991. Although participants acknowledged that ICT are a key ingredient in regional and national responses to natural hazards, they rightfully stressed how important it was that regional and national organisations are established which take advantage of them. It is clear that with the development of CDERA and the various National Emergency Management Agencies (NEMA's), the Caribbean has made strides in establishing and developing the capacity of regional and national organisations for effective disaster management. However, as the presenters in the first session pointed out, there is a need for more capacity building within the organisations and improved collaboration amongst them. The networking of offices would be a step in the right direction and would facilitate the harmonisation of policies and practices which enhance a regional response.

3.2. Session 2: ICT and Disaster Management - Government and Regulator Perspectives

The second session of the Forum focused on the role that governments and ICT regulators play in increasing the use of ICT for disaster management. The first presentation was delivered by Dr Barbara Carby, the Director of the Cayman Island's National Emergency Management Agency (NEMA). It focused on the role of national risk managers and how they use information and knowledge. The second presentation, which was delivered by Mr Bill Humphrey, the CEO of the Promethesus Group, stressed the importance of developing a disaster management plan.

The third presentation in the session was delivered by Dr Cosmo Zavazava, Head of the ITU's Programme for Least Developed Countries (LDCs). It focused on the important role the Tampere Convention could play in providing an enabling environment for use of emergency telecoms in disaster management. The fourth and final presentation was delivered by Mr Mark Hanvey, Chief Security Officer for Cable and Wireless, and it focused on the protection of critical infrastructure and what exactly is being done to protect it from natural hazards.

Presentation 5.
Information and Knowledge Management: A Risk Manager's Perspective
Dr Barbara Carby, Director, Hazard Management Cayman Islands

Dr Carby began her presentation by asking a key question: *what is knowledge management?* She told participants that knowledge management was a confusing and often misunderstood concept. She cited a study by Professor T.D. Wilson, who noted that the terms Knowledge Management and Information Management were often used interchangeably. Dr Carby explained that this was not surprising because knowledge is built through familiarity, understanding and experience, and it is developed through human beings processing information.

In examining her second question: *whether knowledge can be managed?* She explained that knowledge management involved applying knowledge in the appropriate context. According to Dr Carby, knowledge enabled disaster management professionals to turn information, which invariably comes in the form of data, into useful information such as *effective* warnings. She stressed that the application of knowledge to data and information by the risk/emergency manager that was most important for vulnerable populations.

Moving on to a subject that would be touched upon throughout the Forum, community involvement, Dr Carby told the audience that communities have a huge amount of knowledge that must be captured by disaster management officials and integrated into official systems. She added that engaging with the community would also help disaster management professional continually improve their work.

In the next part of her presentation, Dr Carby said that all disaster management professionals should seek to enhance their knowledge. She detailed a number of ways in which they could ensure that the process of continual improvement takes place.

These important actions include:

1. **Communicate:**
   Disaster management professionals must communicate with various sectors more, through the use of workshops, e-discussion groups, scholarly and non-scholarly writing and popular media.

2. **Research:**
   Disaster management professionals should support an increase and improvement in risk-related research, in order to improve knowledge. Data should be gathered from a number of sources using a range of appropriate research techniques.

3. **Analysis:**
   Disaster management professionals must critically analyse events, interventions, projects and programmes in order to bring about continual improvement.

4. **Information and Communications:**
   The disaster management professional must use ICTs more because it facilitates the knowledge sharing that is so important for disaster management.

Presentation 6
Producing a disaster Management Plan
Mr Bill Humphrey, Managing Partner and CEO, Prometheus Group

Bill Humphrey's presentation focused on the need for each individual island in the region to properly plan for all disaster eventualities. Mr Humphrey's presentation contained graphic images from the flooding in New Orleans, and these were presented to covey the sense of urgency that stakeholders must have in respect of preparing national disaster management plans.

Mr Humphrey stressed that, with the effects of global warming no longer in doubt, and the increased number of tropical storms, the threat posed to Caribbean stakeholders by natural hazards are real. As such, he told participants, great sense of urgency must underpin efforts to, engage stakeholders and obtain senior level buy in. He suggested that a comprehensive disaster management plan can be a useful tool for meeting this important objective. He finished his talk by again referring back to Hurricane Katrina, and requested that the delegation learn lessons from 'the most developed country in the world'.

Presentation 7
The Tampere Convention
Dr Cosmos L. Zavazava, Head of Special Programme for Least Developed Countries, ITU and ITU Focal Point, Emergency Telecommunications.

Dr Zavazava began his presentation by reiterating the fact that ICTs have a critical role to play in disaster management. However, he noted that, while they present a

lifeline to stakeholders, there are a number of regulatory challenges at the international, regional and national level that must be overcome if stakeholders are to reap their many benefits. According to Dr Zavazava, the key regulatory challenges were licensing, frequency management, interconnection agreements and, importantly, the cross border movements of telecommunications.   He stressed that the Tampere Convention was one of a number of tools that could be used to reduce the recognised impediments to the effective use of ICT, such as telecoms, in disaster management.

After being told what the Tampere Convention was, participants were told that, despite its potential to mitigate some of the regulatory problems, ratification of the Tampere Convention has been slow. Although it was introduced in 1998, by June 2003 the treaty had not come into effect because it was not ratified by the required thirty countries. Indeed, the Convention did not come into effect until January 2005, when 32 countries had ratified the convention. Today, 35 out of the 69 signatories have ratified the convention.

In order to pre-empt questions about which countries in the Caribbean had ratified the treaty, Dr. Zavazava chose to inform participants that only three Caribbean countries had signed and ratified the Convention. These countries are The Dominican Republic, St Vincent and Grenadines, and Barbados.

Dr Zavazava told the audience that, although more countries are beginning to ratify the Convention, ratification does not mean that Tampere is being put into practice. Indeed, despite ratifying the convention, observers note that key officials in government or regulatory bodies of some countries often become bottlenecks to the use of ICT when disaster strikes. According to Dr Zavazava, these key officials often know little about the Convention and, in many cases, are not aware that their country has ratified it. In such cases, the movement of emergency telecoms is impeded because those officials are unwilling to authorise emergency telecoms entering a country at the right time, if at all.

Dr Zavazava stressed that once a country ratifies the Convention, it must ensure that its relevant stakeholders are informed. Indeed, he told participants that a Tampere sensitisation programme must be undertaken with a number of stakeholders following ratification. These stakeholders would include immigration and customs officials, civil society organisations, the private sector and, of course, the ministry and regulator which are the focal points of ICT.

In addition to the lack of awareness amongst key stakeholders within ratifying countries, Dr Zavazava cited high government turnover as a problem. He told the delegation that the introduction of new governments in many countries often called for the re-education of officials because the champions of the Tampere Convention are often individuals within the previous regime.

Dr Zavazava concluded his presentation by calling on governments to find champions of the Tampere Convention. He told participants that the Convention needed champions to take ownership of it and drive it through all relevant arms of the state so that it is mainstreamed into government.

Presentation 8
Using ICT for Effective Disaster Management
Mark Hanvey, Chief Security Officer, Cable and Wireless.

Mr Hanvey's presentation started with a short video that highlighted the problems of poor communication. He then proceeded to tell participants about the importance of protecting critical infrastructure. Using the U.K. as an example, Mr Hanvey showed participants how governments can take measures to make the protection of physical infrastructure a priority. He told the audience that the U.K. government and private sector work together to ensure that critical infrastructure, including transport networks and ICT infrastructure, are protected against their main threat, which is a loss of power.

The U.K. government takes responsibility for the protection of critical infrastructure by formally defining what critical infrastructure is, placing responsibility for it under the Cabinet Office and giving companies a legal directive to protect their critical infrastructure. He stressed that because of the U.K. government's leadership, the private sector has to implement business continuity plans that are regulated by a number of bodies, including the U.K. Department for Trade and Industry (DTI).

According to Mr Hanvey, there are a number of questions that Caribbean Stakeholders should be asking with regards to protecting critical infrastructure in the region, including what is the government's role in protecting critical infrastructure and whether they were fulfilling it.

He also called on the region's private sector to take a good look at itself and ask whether they and, just as importantly, their suppliers had comprehensive business continuity plans. Mr. Hanvey pointed out that the growth in outsourcing business functions to other organisations had increased the risk for companies. Outsourcing results in the transferring of responsibility at times of disaster, it is vital that the stakeholders understand their individual roles and are prepared to react accordingly.

Towards the end of his presentation, Mr Hanvey acknowledged the role that all stakeholders could play in protecting critical infrastructure. However, he said it was critically important that the governments of the region take charge and drive disaster management initiatives. He concluded by describing some of the work Cable and Wireless does in respect of disaster management, including collaborating with CDERA, which has resulted in Cable and Wireless signing a memorandum of understanding with CDERA and working towards its goals.

Panel Discussion: ICT and Disaster Management: Government and Regulator Perspectives
Pannellists: Dr Barbara Carby, Mr Bill Humphrey, Dr Cosmos Zavazava, Mr Mark Hanvey and Mr Lester Blackett

The presenters for Session Two were joined on the panel by Mr Lester Blackett, the Director of the Nevis Disaster Management Office.

The first intervention was made by Mr Andrew Barber of Cable and Wireless, who told participants that C&W had collected a large amount of information about

facilities and critical infrastructure in the Caribbean and would be happy to share that information with Mr Blackett, who is in the process of mapping the critical infrastructure in Nevis. On hearing the news, Mr Blackett called on all stakeholders to tell each other about relevant information they hold and strive to share that information.

It is clear that organisations, such as Cable and Wireless, have collected a huge amount of information. However, the sharing of such information is not taking place and is resulting in a duplication of efforts and wasting of resources. While the formal process of information sharing could be one way of facilitating the process (this is not always easy when the private sector feel information is commercially sensitive), the need to quickly establish informal relationships for information sharing would bring some rapid benefits.

The panel discussion soon moved on to issues surrounding why, despite its seemingly obvious advantages, the Tampere Convention was not working in practice. When asked why the convention was not working, Dr Zavazava repeated a point made in his presentation and pointed to a lack of ownership. He added that, for the Tampere Convention to work in practice, ICT Ministers must take ownership of the ratification process and champion it throughout their various governments. When participants questioned what is being done to educate people about Tampere, Dr Zavazava told the audience that the ITU was embarking on a programme that would see it deliver a number of regional workshops in which there would be focus on it.

The CTO Asian and Caribbean disaster management fora have made the Tampere Convention a key subject because of its importance to the effective use of ICT in disaster management. However, it was also because research showed that very few stakeholders know what the Tampere Convention actually is. The ITU has played an important part in both disaster management fora by sending experts to provide excellent presentations on the Convention. However, there are few examples of how the Convention has successfully worked in practice and this could be one of the main impediments to the greater application of its provisions in practice. Most literature about the Tampere Convention details how it should work in theory. This lack of information on how theory is turned into practice means there may be an impediment to it doing exactly that. Unfortunately, we are left with a chicken and egg situation, and unless countries that have ratified the Convention actually practice it, we will be left with few "real life" examples.

When asked for her views on why Tampere may not be working in practice, Dr Carby, Director of the National Emergency Management Agency for the Cayman Islands, told participants that the lack of a "shock" experience meant some countries had not been compelled to turn Tampere from theory to practice. She added that most stakeholders in the region are reactive instead of being proactive and that this had to change if Tampere was to be utilised in the event of disaster.

The panel discussion ended with a call from Lester Blackett for the technology providers in the region to help disaster management agencies in the region coordinate more effectively. He told participants that, at present, the information sharing that took place between islands had to be improved for national disaster management to work more effectively. Participants in the Asian region also called for more collaboration between technology providers and disaster management

professionals in order to develop affordable and reliable technologies that will be effective in disaster management situations. This call has led to positive action in much of Asia, where some ICT operators are working closely with disaster management experts to develop various early warning systems. For example, Dialog of Sri Lanka (http://www.dialog.lk/en/index.html), have teamed up with LirneAsia (www.lirneasia.net/) to produce an innovative early warning system that they hope to mass produce. These types of public-private partnership should be replicated elsewhere, so that many more stakeholders can benefit.

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3.3. Session 3: Preparedness

The Preparedness Session gave participants the opportunity to examine how ICT can be used to help create a culture of preparedness. The Rt Hon Dr Renee Webb chaired the session and was joined on the stage by Dr Barbara Carby and Ms Dorienne Rowan-Campbell. Understandably, the need for preparedness was a key feature of the Caribbean Forum and the presentations in this session helped highlight why it was so important to create a culture of preparedness in society. Dr Carby's presentation highlighted how important it is that existing community knowledge about disaster management is used to improve preparedness. The presentation by Dorienne Rowan-Campbell also focused on the need to prepare the community and highlighted how important access to ICT is for doing so.

Presentation 9
Connecting and Preparing the Community for Limiting the Effect of a Disaster
Dr Barbara Carby, Director, Hazard Management Cayman Islands

Dr Carby started her presentation by explaining her interpretation of "community". According to Dr Carby communities exist at different levels - the individual, the family, the regional level (state, parish, district), the national level and global level. Dr. Carby stressed that embedding a preparedness mindset in each community would lead to a much desired "preparedness continuum". As such, National preparedness programmes must reach out to all communities.

The challenge for the risk manager is how to engage such a diverse mix of communities. She suggested that though there was great diversity, there were common approaches which could be used for all communities. These are:

1. Value Community Knowledge

2. Embrace other existing initiatives and nurture them

3. Address their interests in a risk management context, e.g.
If engaging the engineering community – their skills would be important for mitigation – e.g. building codes

4. Give the community responsibility – value their competence and expertise, provide support for capacity building.

5. Ensure inclusion and that all groups are represented

6. Ensure consensus is reached on important matters

7. See any community as part of the disaster management community and help develop its capacity.

Dr Carby stressed that all risk management interventions should build capacity and reduce vulnerability, and gave the following examples of what interventions with various communities could achieve:

> Political community - Better policy decisions – no conflict with accepted best practice
> Engineering community - Better codes, stronger buildings – reduction in damage
> Medical community - Safer hospitals, better care – functionality retained
> Business community - Faster recovery – reduction in downtime from event
> Public Sector – continuity of government operations assured
> International donor community – assistance compatible with national goals and objectives

Dr Carby added that, although it is very difficult to meet the needs of a diverse community whilst also recognising combined needs, disaster management professionals must strive to do so. Echoing the calls of Mr Jeremy Collymore and Dr Cosmos Zavazava, Dr Carby concluded her presentation with a call for risk management planning to be incorporated in National Development Planning.
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Presentation 10
Drills and Exercises: Preparations, Developing Trust and Creating A Feedback Loop In The Community
Ms Dorienne Rowan-Campbell, Consultant and Associate, Networked Intelligence for Development (NID)

Ms Rowan Campbell gave an enlightening and informative presentation detailing her experiences of preparing communities for limiting the damage that disasters can create. At the heart of her presentation were two core messages: First, the need to connect and engage all stakeholders in society, including those in rural communities. Second, the need to use women and children to educate the family and wider community in disaster management.

In respect of rural and farming communities, Ms Rowan-Campbell spoke about her experiences educating them about disaster management issues. She stressed that her work has led to her finding a huge amount of existing knowledge in the community. For example, she told participants that many farmers in Jamaica were able to successfully protect their banana crops from the effects of recent hurricanes by planting hedgerows to protect trees from the wind and by constructing drainage systems to limit flooding. Like Dr Carby, Ms Rowan Campbell stressed how important it is that this type of existing community knowledge is captured.

Bringing her presentation back to the use of ICT, Ms Rowan-Campbell informed the participants that the need to connect these rural communities is essential. This is not just to prepare for the threat of a forthcoming natural hazard, but also to provide information for disaster experts; the two-way flow of information that so many stakeholders and the Forum in the Caribbean were concerned with. The challenge of not only connecting, but also educating these members of community to the use of ICT equipment, was also discussed.

Most participants were of the opinion that training communities may not be as arduous a task as some anticipate. For example, one of the most basic ICTs

available, HF radio, has proved to be a vital resource for many communities, and comprehensive education on how to use the equipment can be given very quickly.

Ms Rowan-Campbell finished her presentation by again emphasising the need to provide ICT to those in rural areas and the need to utilise women and children when preparing communities for mitigating the effects of a disaster. Education in schools has proven to be very successful with children going home and explaining disaster plans and drills to their parents. Similarly, the position of women as heads of families means they can be an extremely effective way of disseminating of information.

Panel discussion 3: Information sharing and knowledge management and engaging the community for disaster preparation
Panellists: Rt. Hon. Dr Renee Webb, Dr Barbara Carby, Ms Dorienne Rowan-Campbell.

Like the concluding points of Ms Rowan-Campbell's presentation, the first part of the panel discussion focused on issues concerning the provision of ICT access to communities in rural areas. Poor access to ICTs is one of the main impediments to communities using ICT for effective disaster management, and participants were all of the opinion that any initiatives to improve disaster management must aim to improve access to ICTs. Indeed, the benefits of some life-saving ICTs like the mobile telephone will only be fully realised when access to ICT is improved. While giving all stakeholders their own personal telephone may be difficult, participants called for all rural villages to have some form of access to ICT that will enable them to participate in the two-way flow of information that is so important for disaster management.

The challenge of not only connecting, but also educating members of community to use of ICT equipment was also discussed. Stakeholders rightfully concluded that training communities may not be as arduous a task as some believe because many ICTs, such as radios, are now so simple that they cannot be considered as anything but user friendly. In addition, some participants were quick to point out that knowledge of how to use those ICTs that may be considered technical and difficult to use, were quickly picked up by those members of the community that were entrusted to manage them.

How we go about creating a culture of preparedness was the subject of great discussion. Participants argued that despite existing knowledge within the community, creating a culture of preparedness called for disaster management professionals to provide basic forms of disaster management education to all stakeholders in society. This would help to ensure that everyone in society has a basic understanding of the key elements of a disaster management programme. It was reported that such public awareness and preparedness had brought many benefits to countries like Cuba which have placed a huge emphasis on educating school children and the community about disaster management. This emphasis on

education has helped Cuba to reap many dividends it terms of mitigating the impact of hurricanes which it faces each year.

It was fitting that the panel of experts for this discussion was an all-female one because the discussion soon focused on the use of women and children as community educators in respect of disaster management. The audience acknowledged that most families in the Caribbean are matriarchal and as a result women hold important positions in the community. This should be taken into account when developing education programmes that require community champions to ensure stakeholder participation and buy-in. At the same time, Ms Rowan-Campbell's argument about the use of children as community educators was quickly accepted. Many participants were aware of the precedents set in Cuba and how catalysing the trickle down of information from children to adult by ensuring that children were well educated in disaster relief has brought many benefits.

The use of women and children as educators of the community maybe something that is peculiar to the Caribbean, but it creates food for thought for all stakeholders. Those who wish to deliver large-scale community education programmes must ensure they find out who the community leaders are so that they obtain their buy-in and participation. If possible, it is important that community education programmes about disaster management are delivered partly by trusted community figures. A recent CTO study, The Impact of ICT on Rural Livelihoods and Poverty Reduction, concluded, amongst other things, that people's main reason for using a mobile telephone was in emergencies such as natural disasters and that the information they trusted most came from those in the community. The findings of this study, which are based on responses from the largest survey sample of its kind, should be acted upon by all; to improve the lives of all stakeholders, including the poorest. Stakeholders must be given the ICT to use in emergencies and community leaders must be identified and utilised in community education and information sharing programmes.

3.4. Session 4: Mitigation

As the title suggests, Session Four focused on the mitigation phase of the Disaster Management Life Cycle. In addition to examining key actions that should be taken in the mitigation phase, the presenters explained how various ICTs are used to mitigate the effect of disasters when they strike. The presenters in this session were Mr Keith Clarke, who looked at the role of satellites, Mr Ronald Jackson, who examined the role that sensors play in disaster management, Mr George Richards, who told participants about the need for people centred disaster management and Mr Mark Wood, who gave a presentation on the potential of Cell Broadcasting.

Presentation 11
The Importance of Satellite Communication for Disaster Mitigation
Mr Keith Clarke, Senior Regional Marketing Manager, Americas, Intelsat

The first part of Mr Clark's presentation centred on the development of satellite communications since the formation of the International Telecommunications Satellite Consortium in 1964.

The second part of Mr Clark's presentation focused on some of the products his organisation, Intelsat, provides and how they have been used in disasters such as

Hurricane Katrina and the Asian Tsunami. In accordance with a point made by Dr Barbara Carby in the previous session, Mr Clark pointed out that, rather than being proactive, stakeholders were catalysed into focusing on the use of ICT in disaster management by shocks. He told the audience that the current focus on ICT in disaster management was a direct result of the Asian Tsunami. According to Mr Clark, the Tsunami compelled stakeholders to focus on preparedness and improved coordination.

Ending his presentation with a focus on particular projects that Intelsat manages in respect of disaster management, Mr Clark explained that, in light of the current focus on the role of ICT in disaster management, Intelsat had been working with a number of organisations, including the UN and IBM on a number of projects.

Presentation 12
Coordinating the Disaster Response: The benefits that sensors can bring to disaster mitigation
Ronald Jackson, Director General (Actg), Office of Disaster Preparedness and Emergency Management ODPEM, Barbados

Mr Jackson started his presentation by telling participants that stakeholders in the Caribbean must improve their disaster management practices because of the increasing frequency and cost of natural disasters. He confidently told participants that sensors had the potential to provide the information that would improve the region's disaster management efforts.

Believing that it was important to tell the audience what sensors actually were, Mr Jackson explained that sensors were a physical device that detect changes in the natural state. He added that data captured by the sensors was fed into computers, interpreted and then turned into a usable and understandable format. According to Mr Richards, sensors are used in disaster management for a number of reasons, including:

1. To take preventative measures to avert disasters

2. To allow integration and analysis of spatial and temporal disaster data

3. Aids the modelling and simulation of disasters more precisely

4. Allows for real-time decision making and enhance emergency response capabilities

After giving the audience various examples of how sensors are currently used in Jamaica, Mr Jackson began to highlight some of the current challenges to using sensors, including those relating to maintenance and training, cost, reliability and performance. He also told the audience about some of the challenges to using the information which is generated by sensors. Those particular challenges relate to, amongst other things, the credibility of data, the poor availability of data, standardising data and interoperability.

In the next part of his presentation, Mr Jackson spoke about the need for situational awareness to support mitigation efforts. He told participants that situational awareness was the process of monitoring vulnerabilities and comparing them with possible threats. He stressed that doing this enabled stakeholders to take critical decisions at all stages of the disaster life cycle. Importantly, situational awareness also enabled stakeholders to understand what the risks are to infrastructure, critical infrastructure and human settlements. The information collected through situational awareness support programmes, and activities within the mitigation phase, provided planners with in-depth understanding of vulnerable populations and vulnerable areas.

Participants were then shown a PowerPoint slide that detailed some of the technologies that are being used to undertake situational awareness. The technologies included telecommunications equipment, remote sensors, weather radars and Geographical Information Systems (GIS), a technology that was mentioned during many presentations at the Forum.

After explaining the importance of undertaking damage assessment when disaster strikes, Mr Jackson told participants about some of the ongoing developments within OPDEM. This included the development of real time information exchange amongst partners before, during and after a disaster strikes. Like many of the other presenters, Mr Jackson concluded his presentation with a call for greater collaboration between stakeholders in the region.

Presentation 13
Effective Communications and Information Management for Disaster
Operation Centre and Vulnerable Communities
Mr George Richards, Principal, Teknethix Inc

Mr Richards told the audience that disaster managers have many responsibilities, but they must ensure that, above all, disaster management is people centred. He told participants that operational entities during the emergency should focus on the community because it should be stakeholders in the community who provide information to operation managers. Indeed, Jackson told participants, the ability of a National Operations Manager to do his or her job effectively is dependent on their receiving information from the community.

Mr Richards explained that, at present, much of the information is sent to the community from disaster managers and the two-way flow of information that is necessary for effective disaster management does not take place. This asymmetric flow of information can be attributed to the fact that the current technologies used when disaster strikes only facilitate a one-way flow of information. He stressed that if the Caribbean is to effectively mitigate the effect of disasters it must increase the use of technologies that can be used by those in the community to provide real time data/information to operations managers.

Mr Richards then showed participants a slide that summarised what requirements must be in place if operations managers are to collaborate effectively with the community in order to do their job. These are:

- Managed - Consistent two–way information exchange

- Time relevant and accurate information

- Rugged affordable and easy to use ICT

- Standards based hardware, software and communications

Mr Richards then showed participants a slide which detailed what the required ICT environment for people-centred disaster management should look like. This slide showed the two-way flow of information and how the information should be disseminated in a number of formats that could be accessed by all stakeholders.

Moving on to the various technologies that could be used to facilitate community-centred mitigating strategies and the two-way flow of information, he mentioned that many ICTs, such as remote sensing and GIS, were currently being used to provide very useful data. However, he stressed the use of technologies that could be adapted, put into the hands of community stakeholders and used to provide context specific real-time data must be extended. For example, he told participants, the adaptation of a PDA's functionality with software that would enable those in the community, even those who are illiterate, to capture data was possible. The data on the palm top could be sent back to the operations manager using a number of new technologies such as Inmarsat's BGAN.

Mr Richards concluded his presentation by emphasising that community-centred disaster management in the mitigation phase using real time data collected by the community was technologically possible and relatively easy. This is because today's technologies and software lend themselves to various types of disaster management applications.

Presentation 14
Government to Citizen Mass Scale Authorised Alerting, by 'Cell Broadcasting'
"Its about time"
Mark Wood, Secretary General, The international Cellular Emergency Alert Services Association (CEASA).

Mr Wood began by explaining that Cell Broadcasting is a technology that enables the authorities to send information and warnings to mass audiences through a GSM mobile network. He told participants that the technology is in inherent in GSM mobile phones and was incorporated during the early day of their development.

Mr Wood explained that the value of Cell Broadcasting is now becoming widely accepted because the evidence about how useful it could be when, and before disaster strikes, is now unequivocal. He highlighted a number of reasons why there is a growing belief in the benefits of Cell Broadcasting, including:

- Information is sent down a link, only so a cell broadcast does not crash the network and can work on a jammed network

- It is geographically specific because individual cells, rather than networks, are used to send messages.

- It is safe from hackers who may wish to send false, or potentially dangerous messages, because a Cell Broadcast cannot be originated from outside the system.

Mr Wood pointed out that the ubiquitous use of Cell Broadcasting would have an impact on regulation and would require countries to harmonise their channels for the broadcast in order to make it practical for travellers.

Despite its benefits, Mr Wood pointed out that there were still obstacles to the widespread use of Cell Broadcasting that are yet to be removed. These include issues to do with regulation and the harmonisations of channels for cell broadcasting, improving standards to ensure that phones give a priority to emergency messages and political issues which would require diplomacy. Mr Wood called on all those who can remove the obstacles to Cell Broadcasting to do their utmost to do so because it had great potential to save lives.

Panel Discussion for Mitigation Session
Panellists: Mr Keith Clarke, Mr Ronald Jackson, Mr George Richards and Mr Mark Wood

The panel discussion for the mitigation session centred on Cell Broadcasting and why this technology has not been used more widely. Most participants were surprised that, despite the fact it had been known about and discussed in some circles for 10 years, they had never heard of Cell Broadcasting.

Mr Wood explained that although they had been working hard to realise the potential of Cell Broadcasting, they had faced various impediments from some governments and, indeed, the private sector. They faced scepticism from both camps concerning whether users actually wanted to access and use the function which enables cell broadcasting and whether there was a business development potential.

Mr Dag Nielsen of Ericsson made the point that now much of the scepticism had been removed, it was just a matter of time before Cell Broadcasting became a reality. Adding to Mr Nielsen's point, Mr Wood told participants that his organisation, CEASA, has been doing a lot of work on re-educating people – even GSM experts who had no knowledge about the technology. Partly as a result of CEASA's efforts, the EU is keen to explore how it could get the idea implemented and that the testing of the technology in countries such as Holland and South Korea was at a highly advanced stage.

The mitigation session highlighted the fact that there are a number of technologies that could revolutionise the way in which we undertake disaster management. However, information about them and ways in which they could improve disaster management must be disseminated to stakeholders more effectively Knowledge-sharing events like the "Using ICT for Effective Disaster Management Forum" help facilitate information sharing, but the means for knowledge sharing must be increased and enhanced. The fact that participants, many of whom were disaster management professional and ICT operators, knew little about Cell Broadcasting should provide the impetus for improved knowledge sharing.

3.5. Session 5: The Importance of ICTs in Relief Efforts

Session Five focused on how various types of ICTs are used in relief efforts. Representatives of ICT operating companies, civil society and the private sector were given the opportunity to tell participants about the types of technology they used when disaster strikes, their experience during various disasters and the impediments they face when trying to help those whose lives have been turned upside down by a natural disaster.

The session began with a presentation by Mr Ian King, who told participants about a Caribbean-focused project entitled Comprehensive Disaster Management (CDM) which is focused on the relief phase of the disaster lifecycle. The second presentation was given by Mr Dag Nielsen, Director of Ericsson Response. He told participants about his work and some of the obstacles that volunteers from Ericsson Response face when they respond to calls for assistance. The final presentation was made by Mr Brad Mitchell of Cable and Wireless who, like some of the presenters before him, told participants that the key to successful disaster management in the relief phase was preparedness.

Presentation 15
Opportunities and Challenges of ICT in Disaster Management: The Case for GIS and RS in Disaster Recovery
Mr Ian King, Project Manager, Caribbean Risk Management Initiative, UNDP, Barbados and OECS

Mr King started his presentation by elaborating on the regional context for Comprehensive Disaster Management (CDM). He told participants it was imperative that CDM is incorporated into the development processes of CDERA member countries. The aim is to obtain five intermediate results:

1. Stronger regional and national institutions support in promoting CDM

2. Research, education and training support for CDM

3. Regional institutions and donors to incorporate CDM in their own programs

4. Preparedness, response and mitigation capability is enhanced and integrated

5. Hazard information is incorporated into development planning and decision-making

Like many other presenters who had called for greater government involvement in disaster management, Mr King called for CDM to be accepted and endorsed by governments and development institutions. He added that CDM is results driven and will be reviewed after five years in order to assess priorities, outcomes and evaluate effectiveness.

Mr King stressed that, although CDM was focused on the relief phase of the disaster management life cycle, preparedness still played a huge part because effective recovery is dependent upon good preparedness. Focusing on specific ICTs, he added that technologies such as geographical information systems (GIS) and remote sensing support the actions taken in the recovery phase of the disaster lifecycle

because of the way they help stakeholders prepare. For example, GIS mapping is important for the development of risk mapping, which can be used immediately when the recovery phase begins.

Mr King used a number of pictures to show participants how GIS is enabling risk mapping in Grenada. Yet, despite its many benefits, Mr King told participants there are a number of challenges to the application of GIS in the Caribbean.   These include:

- The existing capacity for the application of GIS is weak, as there is a lack of base line data.
- The limited use and demand for data by decision makers
- The limited access and sharing of data
- The need for custom made solutions in order to fit the requirements of small developing countries

After highlighting the challenges to the use of GIS in the Caribbean, Mr King told participants about the UNDP's focus on ICT for disaster management. He told delegates about one of the ICT projects implemented by the UNDP; the Community Resource and Internet Centre Initiative (CORICS), which was one of the first ICT projects implemented by the UNDP as part of its poverty reduction program for the Eastern Caribbean. The project aims to help eliminate poverty in the region by increasing access to ICTs and the training for ICT at the community level.

Like Barbara Carby, Mr King emphasised the need for community engagement and in conclusion, gave some recommendations on how stakeholders should approach the future. These include:

- Understanding the context for support
- Mapping and understanding of livelihoods
- Clearly identify end-users and their needs
- Establish arrangements with data providers
- Build on broader initiatives

Presentation 16
Ericsson Response: A Corporate Social Responsibility
Dag Nielsen, Director, Ericsson Response

Mr Nielsen started his presentation by telling participants about the importance of telecommunications to disaster relief professionals.   He stressed that Ericsson Response was an Ericsson corporate social responsibility initiative and then presented an Ericsson Response video, which detailed the work that Ericsson Response undertakes.

Following the video, he told participants that Ericsson Response are often the first on the ground when disaster strikes and this means they collaborate with organisations such as the Red Cross and the UN in order to provide the emergency telecoms that help such organisations to coordinate when disaster strikes.

In analysing some of the impediments to the use of emergency telecoms in relief efforts, Mr Nielsen called on policy makers to play more of a role in facilitating the work of organisations, such as Ericsson Response, when disaster strikes. He told

participants that, although they arrive in a country to save the lives of its citizens, they are often prevented from doing so by policy makers. The presentation concluded with an explanation of the work the organisation did during a number of major natural disasters, including the Bam Earthquake, the Pakistan Earthquake and the Asian Tsunami.

Presentation 17
Disaster Preparedness: Hurricane Preparedness
Mr Brad Mitchell, Executive Vice President, Sales and Distribution, Cable and Wireless

Although the session was concerned with how to use ICTs for effective disaster relief, Brad Mitchell's presentation focused on preparedness. He told participants that successful relief efforts required excellent preparation. According to Mr Mitchell, the region could do more in terms of preparedness and that this would then greatly benefit the relief effort. For example, he said, the region required greater hurricane preparedness because of how susceptible it is to that type of natural hazard.

Mr Mitchell stressed that he and his colleagues at Cable and Wireless, are well qualified to speak about the need for hurricane preparedness because of their experiences in the Cayman Islands and Grenada. In addition, he told the audience that Cable and Wireless have taken active steps to prepare for hurricanes by, amongst other things, implementing "Hurricane proof switches".

According to Mr Mitchell, Cables and Wireless' work on preparedness has also involved the establishment of relationships with stakeholders in the region. To that end, Cable and Wireless are now working with many regional stakeholders that will lead to the improvement in coordination that will enhance disaster management in the region. For example, he said, Cable and Wireless have already signed a memorandum of understanding with CDERA, and would like to provide further support in the region.

Toward the end of his presentation, Mr Mitchell stressed that the private sector must take responsibility for their preparedness and ask itself a number of questions including:

1. What business processes, applications and services are most critical?

2. What is the potential impact of disruption caused by a natural disaster?

3. Has the business got a strategy for mitigating risk?

4. Are key facilities hardened and facilities conditioned?

With regard to regulatory requirements, Mr Mitchell said there were two key questions:

1. Have customers or business partners mandated performance or availability service levels?

2. Has the business complied with all current or emerging regulatory requirements?

With regard to investment, he said the key questions were:

1. Has the business quantified cost of downtime or total business failure?

2. Has the business developed sound business cases to optimally invest in risk mitigation?

Finally, he pointed out the key questions that a company must ask about its supplier. These are:

1. Is the supplier prepared for when disaster strikes?

2. Will they be there when you need them and how can you be sure?

Panel Discussion for Session 5: The Importance of ICTs in Relief Efforts
Panellists: Mr. Ian King, Mr. Mark Wood, Mr. Brad Mitchell and Mr. Dag Nielsen

The panel discussion began with one participant thanking the presenters for their presentations. He then told all stakeholders that the importance of being prepared for disaster should not be underestimated. Echoing the words of his fellow delegates, another participant stressed that National Disaster Management Agencies (NEMA) must ensure they make preparedness a priority. Like Dr Carby, he argued that most were reactive instead of being proactive and that this had to change.

The panel discussion then moved on to examine which ICT was the most important for disaster management. Unsurprisingly, the panel reached a consensus on the mobile phone being the most important and widely used tool in relief efforts. Mr Dag Nielsen stressed that the mobile phone had replaced the once ubiquitous walkie-talkie as the main tool of the relief professional.

The panel discussion ended with a call for governments to take the lead in respect of preparedness and disaster management. The call for political leadership was a key theme during preceding sessions and panel discussions and proved to be a key issue over the two days and was touched upon by all category of stakeholder. Despite the fact that all stakeholders are interlinked and, as a result, interdependent of each other in disaster management efforts, there is an obvious demand amongst all stakeholders for government to champion good disaster management practices.

The calls for government to drive the improvement of disaster management in the region is completely justified, but it is imperative that the direction they take is decided upon following a broad-based consultative process which gathers the views of all stakeholders. It is not surprising that the call for increased community engagement is being made at the same time for increased government leadership, especially in light of the fact that the community holds so much knowledge about disaster management. In the Caribbean, the need for greater community involvement is not lost on the disaster management professionals, but government must focus on leveraging more community knowledge. Disaster management must be both top down and bottom up to be truly comprehensive.

3.6. Session 6: Reconstruction

The final presentation of the forum was given by Mr Edward Laughton of Digicel. It focused on the importance of business continuity plans and how to reconstruct ICT infrastructure. Mr Laughton hoped that by focusing on this area of reconstruction both private and public sector entities would be in a better position to cope after a natural hazard strikes. This presentation was followed by a reconstruction group exercise led by Dr Cosmas Zavazava from the ITU, which was designed to help stakeholders highlight the main challenges to reconstructing ICT infrastructure.

Presentation 18
The Challenges of reconstruction/rehabilitating ICT infrastructure, financing and coordination
Mr Edward Laughton, NOC and Business Continuity Manager, Digicel

Mr Laughton started his presentation by telling participants about the importance of information sharing for reconstruction. He continued by explaining that ICTs such as the internet have helped to improve information sharing. However, he added, stakeholders, including government and the private sector must improve their use of ICT, if their full benefits are to be realised, especially when it comes to disseminating information.

Mr Laughton then told participants about universal procedures that should be followed when reconstructing critical infrastructure. Like the experts who made presentations on behalf of Cable and Wireless, Mr Laughton stressed that successful recovery from the damage done to critical infrastructure is dependent on robust business continuity plans.   Mr Laughton continued, telling participants that companies must take the following steps.

1. **Secure Area.**
    In order to secure the area, organisations must isolate the incident scene and protect undamaged property.

2. **Assess damage:**
    Organisations must assess the damage to infrastructure by taking an inventory and conducting an investigation. At the same time, the risk management department must be notified and the organisations must coordinate its actions with appropriate government agencies.

3. **Salvage and Restoration:**
    The organisation must ensure that its damaged property is separated from undamaged property. However, it is important that the damaged infrastructure is kept until the insurance adjuster visits the scene.

Mr Laughton's presentation ended with a summary of the main points, which were the importance of ICTs, such as the Internet, for information sharing and the need to establish and use a business continuity plan.

3.7. Group Exercise: The Challenges of Reconstructing /rehabilitating ICT - Infrastructure, Financing and Coordination

Unlike the preceding sessions, the presentations in the reconstruction session were followed by a group exercise and not a panel discussion. Participants split into groups in which they discussed the limitations and challenges that are faced when reconstructing damaged ICT infrastructure during disasters. In particular, they examined what needs to be done and by whom, so that the region is in a better position to quickly rehabilitate damaged ICT networks after disaster strikes. Following time for discussion, each group nominated a speaker who then fed back their groups findings.

There were surprising similarities in the conclusion of all the groups, and these focused on three core areas:

1) **Financing Reconstruction –**

   Most participants questioned who should pay for the reconstruction of the network? It is in everyone's best interests to get as much of the network up and running again. However, despite often being viewed as a public good, ICT networks are usually privately owned, and this ambiguity can create grey areas that must be clarified. Indeed, all stakeholder groups called for grey areas over the financing of reconstruction to be eliminated, so that reconstruction efforts were not delayed at a time when they would be most needed.

2) **Coordination** –

   For the efficient and quick re-establishment of the ICT network there needs to be a great deal of emphasis placed on the coordination of the different stakeholders at all levels. Stakeholders were mainly concerned with how the network can be mapped, so that the damage can be assessed quickly. Effectively mapping the network would help those reconstructing it establish which sections most need repair, which essential elements of the network can be re-established quickly and with most ease, who is best placed to carry out repair work and who is best placed to make these decisions.

   An example of lack of coordination that can characterise reconstruction efforts was provided by Cable & Wireless, which cited a past experience of intact, yet felled, telegraph poles and their wires being destroyed when a government road clearing unit bulldozed everything, essentially destroying

undamaged parts of the network and hugely increasing the time and cost of restoring the communication links.

3)   Business Continuity –

Limiting the effects of lost business is an essential part of the reconstruction phase of the Disaster Life Cycle and there must be a focus on ensuring that all businesses begin operating as soon as it is safe to do so after disaster strikes. ICT operating companies must have their business continuity plans in place because being able to communicate is a vital element of any successful reconstruction.

In particular, the feedback from the groups focused on the possibility of improving the coordination of the work that is done to re-establish damaged networks and limit the duplication of work.   Organising ICT companies so that they can coordinate their repair work would be an excellent achievement.

In the concluding discussion of the exercise, participants and the chairperson of the session, Dr Cosmas Zavazava, concentrated on the crux of the reconstruction phase; ensuring that stakeholders were prepared for when disaster strikes.

Essentially this means that:

- the rapid reconstruction and repair of the ICT network is a key element of any disaster management plan because it will enable the private and public sectors to communicate with each other and ensure that information can be disseminated to the public.
- all relevant stakeholders are primed and ready to assist in the re-establishment of the network to minimise its downtime, through effective disaster planning.
- through proper preparation, funds will have been secured and made ready for the reconstruction of the ICT network, so that a lack of funding does not prove to be an impediment at the crucial time.

4. Using ICT for Effective Disaster Management Logical Frameworks

The presentations and panel discussions during the first two days of the Forum were the prelude to an important group exercise on the third day. The presentations provided participants with the information to undertake the situational analysis, alternative analysis, stakeholder analysis and cause and effect analysis that should underpin the construction of any Logical Framework. The completed Log Frames detail actions that stakeholders feel they must undertake in order to increase and improve the use of ICTs in effective disaster management. Importantly, they also identify what resources stakeholders believe are required to meet their objectives,

what the risks are to achieving their objectives and what contingencies must be put in place to limit the identified risks.

To undertake that exercise, the participants joined one of four groups depending on what type of stakeholder they considered themselves to be - government and regulator, civil society, infrastructure provider or regional and international Organisation. The members of each group then worked with each other in order to produce Using ICT for Effective Disaster Management Log Frames. During the planning phase of the Caribbean Forum, the intention was for four separate groups to be formed; Policy makers, Regulators, Civil Society and the Private Sector. However, as regulatory authorities in many part of the Caribbean are not independent from government, policy makers and regulators formed one group. Also, because regional and international organisations were so well represented, and many felt that they needed to coordinate better, they formed one group.

The first part of the morning session was used to discuss and develop the Log Frames and during the latter part of the morning, a representative from each stakeholder group presented their Log Frame to the audience and explained the reasoning behinds its contents. The time devoted to the Log Frame exercise was less than planned because some participants were scheduled to leave the Forum to catch planes home. Unfortunately, the reduced amount of time, and the fact that some participants were not familiar or comfortable with developing Log Frames, meant that some Log Frames were not as complete as the organisers would have liked, further demonstrating the need for the region to continue the initiative. However, they still provide an excellent insight into what Caribbean stakeholders believe they should do in order to increase the use of ICT for effective disaster management, and vital areas that need to be resolved with regard to responsibilities and coordination.

The Log Frames developed by each group can be found below and have not been amended in any way since the end of the Forum. Interestingly, the group for Civil Society Organisations provided some recommendations in addition to their Log Frame, and these can be found below their Log Frame. The Infrastructure providers also wrote about issues that were important to them and these can be found below their particular Log Frame. The Group Log Frames are clearly labelled and can be found in the following order:

1. Government and Regulatory Authorities

2. Civil Society Organisations

3. Infrastructure Providers

4. Regional and Regulatory

4.1. Logical Framework Analysis

The Log Frames contained a great deal of information about how participants felt they would work towards improving their use of ICT for disaster management and disaster management in general. While many of the groups identified objectives and inputs that appeared to be particular to them, there were a number of themes that were identified in two or more of the four Log Frames. These seemed to indicate

that many of the observations detailed during the first two days of the Forum, concerning deficiencies in the region's current disaster management practices, had been carefully considered by stakeholders.

The need for greater planning was just one issue at the forefront of a number of stakeholders' minds. The government and regulators Log Frame indicates that its members were aware of the need for governments to drive the improvement of disaster management in the region by developing national disaster management plans. Importantly, it suggests that a key objective of any government wishing to improve the use of ICT in disaster management is the development of a national disaster management plan. The ICT infrastructure providers also see this as a key objective and believe that one of their objectives is to help governments in the region create a plan that takes into account the protection of the critical infrastructure they provide.

While there are few in the region who would question the need for government to drive the development of national disaster management plans, all would call for improved collaboration between stakeholders if plans are to be fully implemented. Stakeholders' inter-dependency on each other was discussed amongst all the groups during the exercise and all the log frames contain suggestions for greater collaboration. The groups envisaged that improved collaboration would produce benefits, including the greater understanding of stakeholders' responsibility and a decrease in the duplication of efforts and wasting of resources.

All the groups, apart from the government and regulators group, called for an annual assessment of progress towards improving the use of ICT for Disaster Management. During discussions, all acknowledged that there are currently no mechanisms in place to assess the region's progress towards improved disaster management. While the civil society group and regional and international organisations group felt an annual meeting would be of immense benefit, the group representing ICT infrastructure providers believed that continuous assessment of efforts to protect critical infrastructure was necessary, if improvements are to be realised.

As well as highlighting a number of objectives that two or more groups identified, the Log frames also highlighted a number things that many of the groups felt were risks to achieving the goal of increasing and improving the use of ICT in disaster management and improving disaster management in general. A lack of funding, time and limited human capacity were identified by at least two of the four groups. Yet, it was a lack of commitment that stood out as the main risk factor. Both the government and regulators group and civil society group, acknowledged that the biggest risk to increasing and improving the use of ICT in disaster management is a lack of commitment; the civil society group described this as apathy. There is no doubt that stakeholders in the Caribbean want to improve their disaster management practices and their use of ICT for Disaster Management. However, this desire must be coupled with financial backing, increased human resources and improved coordination between all governments and ICT regulators in the region.

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Government and Regulators' Using ICT4DM Logical Framework				
Design Summary	Performance Target – Tangible Result	Monitoring and Oversight	Risks	Contingencies
Goal				
Using ICT for Effective Disaster Management	Uninterrupted ICT Services during the life cycle of the disaster.	Country and Regional Reports Reporting of Key Stakeholders, Disaster Simulation Exercises		
Objectives				
Appropriate understanding and implementation of the Tampere Convention	Signatory of the Convention Increased understanding of the Tampere Convention	Relevant Government Ministries	Lack of government commitment	
Harmonization of Regulatory Frameworks	Standardized Disaster Management ICT Resources	National Regulatory Authorities	Lack of regulatory commitment.	
Development of National Disaster Plan	Completion of Plans	National Disaster Management Agency	Lack of capacity within ministry responsible Limited public consultation	Comprehensive assessment of implanting ministries capacity Place emphasise on public consultation
Outputs				
Awareness and education regarding Tampere	Stakeholders Consultations	Government Ministries		
All member states being Signatories to the Tampere Convention	Majority of Member States being Signatories	Government Ministries		
Harmonization of the use ICT resources such as spectrum allocations for disaster management	Established Collaborative Framework	National Regulatory Authorities		

Completion of National Disaster Strategic Plan	The Majority having developed and implemented the plan	National Disaster Management Agency		
Inputs				
Time, effort and Knowledge	Number of Day and Hours required to prepare consultations and collaborations			
Funding	Financial reporting and amount committed by donors		Lack of funding	Increase avenues for funding
Commitment of Governments	Number of Signatories to Convention & Number of States collaborating for development of harmonized framework	Civil society	Lack of commitment by government	
Commitment of regional and International organizations	Number of Agreements Signed	Reports from regional and International organisations	Lack of coordination among relevant entites .	

Civil Society Organisations' Using ICT4DM Logical Framework				
Design Summary	**Performance Target – Tangible Result**	**Monitoring and Oversight**	**Risks**	**Contingencies**
Goal				
Using ICT for Effective Disaster Management				
Objectives				
1. Facilitate stakeholder dialogue	Trust protocol MOU, Cell broadcast enabled	Rapportuer to inform stakeholders of progress	Lack of commitment to TCB process	Networks take their own initiatives
2. Recommendations to our member organisations to upgrade ICT capabilities/compatibilities	Achieve convergences of resources through MOU with the major regional management agencies	Reports and follow-up from member organisations on progress	Apathy of the stakeholders. Absence of harmonisation of the regulations	Continue developing the existing resources to prepare for convergence
3. Increase and have more effective dialogue (CIVIC)	Establish a Sub-group focused on developing ICT for Disaster Management (DM)	Develop and publish advocacy proposals within the 4 main phases of DM	Focus diverted due to current emphasis on defining the groups mandate	Obtain a commitment from the group at large to allow the sub-group members to talk on their behalf
Outputs				
1. Annual meeting stakeholders plus email discussion list	All stakeholders have at least one person on the discussion list	Chair of Trust Protocol Board moderates the list	Churn of people (constant changing of posts)	Moderator to make periodic personal contacts
2. Implement strategies to have entities that are ready to get on board	Obtain MOU's with the entities. Appoint person to drive convergence	Report and provide feedback by designated persons	Technical problems with compatibility and political will to implement	To ensure that you a technical team to work on problems of compatibility
3. Advocacy proposals (for each disaster management areas)	Finalized and approved advocacy proposal by the group at large	Delivery of the approved reports to Disaster Management stakeholders	Lack of members time	Delegate to a sub-group of committed members
Inputs				
1. Meetings attended	People read the list	Trust Protocol Board looks for comment	Comments stop	Consensus
2. Team leader and support staff	Establishment of clear guidelines and timeframe	Continue monitoring	Apathy and non performance	
3. Members time and efforts				

Civil Society Recommendations

The Civil Society group came up with a number of recommendations for the future, which they also presented to participants at the Forum. The recommendations are:

1. Follow-up forum to include National Disaster/Emergency Agencies
2. Listing of all entities that should participate in ICT (nationally and regionally). Contact lists to be created
3. Standardizing of messaging format
4. Identify the sources of information. Could be listed on a website.
5. Clarify the ambiguity of the ICT term
6. Inform and advise the political directorate on the importance of the development of ICT re Disaster Management
7. Develop partnerships and linkages with the National and Regional ICT entities
8. Establish MOU's with National and Regional organisations re Disaster Management
9. Encourage the ratification of the Tampere Convention by Governments
10. Planning and conducting of local and regional exercises and simulations
11. Inclusion of UWI Seismic as a critical player in the process
12. Re-establishment of Caribbean-wide communication links (National organisations and Amateur radio clubs)

ICT Infrastructure Providers' Using ICT4DM Logical Framework

Design Summary	Performance Target – Tangible Result	Monitoring and Oversight	Risks	Contingencies
Goal				
1 Advanced planning and reduction of vulnerabilities. 2 Expedite Restoration of Services to the Island				
Objectives				
A pre-defined national plan covering all utilities & government departments On-going engagement & update of the national plans & component plans Vulnerabilities known & understood Clear Command & Control structure – from 'Meta' perspective down into each organisation Resilient communications Emergency communication	Integrated Planning Tool used by Government & Critical Infrastructure providers GIS system – but covering what Emergency communications capability to the community Emergency communications capability for the community Equipping National Emergency Rooms Pre-defined plan has lists of departments & organisations for restoration Risk assessments conducted & information shared Monitoring tools Modelling tools Call centres for reporting Off Island systems & data Listing of all standards, construction, build, etc. Central document register repository available to all, e.g. flood data/maps	Who within Government in each island? Who from the Critical Infrastructure Providers? Need an agreed plan.	$$$'s – who pays for it. No plan to implement this & no sign up. Skills – not the right skills. Lack of commitment	Engagement ????
Outputs				
Inputs				

Priority lists for recovery
- Personal safety – comes first
- What are the critical services
- Health services
- Airport & seaport
- Customs
- Immigration
- Police
- Military
- Water
- Power

Critical Government Agencies & Departments

True interoperability means governments & organisations working together to a pre-defined and rehearsed plan.

Need a dedicated Government Command & Control Centre

Chair of Infrastructure: they are part of National Disaster/Contingency Committee. Infrastructure covers Power, Water & Communications.

Things We Need

1 – A CENTRAL DOCUMENT REPOSITORY AVAILABLE TO ALL AND CONTRIBUTED TO BY ALL
Eg: FLOOD DATA / MAPS

Opportunities & Benefits:

What are the opportunities for collaboration and sharing? What benefits could that bring?
- Confidence that your plans will actually work
- Quicker recovery
- Lower costs of planning & arrangements
- Lower losses when (not if) something happens

- Less work during and after a disaster

CLARITY OF RESPONSIBILITIES – far too many groups, departments & organisations doing whatever they do. Either influence & cajole all to buy in or change it!

Regional and International Organisations' Using ICT4DM Logical Framework				
Design Summary	**Performance Target**	**Monitoring and Oversight**	**Risks**	**Contingencies**
Goal				
Using ICT for Effective Disaster Management within the context of Comprehensive Disaster Management				
Objectives				
1. Increased collaboration and coordination amongst stakeholders	Increased Joint initiatives	Project/periodical reports on joint initiative Project committee comprising of representatives of all stakeholder groups	Lack commitment to collaboration and coordination. Lack of trust	
2. Supporting capacity building at national level to bring about effective support to national governments/processes for use of ICT in DM	Incorporating ICT elements into National DM Plans	Plan Review	Lack of government commitment Weak institutions Lack of finance	Establish relationships with proponents of ICT Comprehensive analysis of requirements
3. Improved development planning through the application ICT				
Activities/Outputs				
1. Establishment of protocols and procedures for information management at national and regional levels MoU and Technical Cooperation Agreements Harmonisation of practices and procedures Development of strategic partnerships				
2. Improved systems for decision making				

Effective data collection and application			
Development of relevant training			
Development of relevant training projects and programmes			
Integrating ICTs in EWS			
Improved forecasting			
Improving linkages with governments			
Development of templates & guidelines			
Capturing, documenting and disseminating best practices and lessons learned			
Annual reviews			
3. Integration of HM, VA & RM in planning processes • Monitoring and modelling Spatial models developed			
Inputs			
Knowledge and Expertise			
Time			

5. Key Recommendations

The following section provides detailed recommendations on how the Caribbean region can improve its general disaster management and its use of ICT for Disaster Management.

1. **Governments Must Catalyse The Development of National Disaster Management Plans**

    Caribbean governments must take ownership and drive the development of National Disaster Management Plans, as well as ensure they are integrated into National Development Plans or Poverty Reduction Strategy Papers (PRSPs). They should initiate in-depth analysis of the main threats to their countries and the region in order to ensure plans for disaster management are as effective and robust as possible. This recommendation is in keeping with the current focus on the "National/Country Ownership" of poverty reduction strategies and national development plans. It recognises that the requirements of a country, in terms of its disaster management plan, are best understood and articulated by a government which undertakes comprehensive analysis of the main risks facing its citizens.

2. **National Disaster Management Plans Should Be Developed Through Broad-Based Consultation**

    If National Disaster Management Plans are to be comprehensive and country owned, they must be developed through a process of broad-based consultation with all stakeholders. The private sector in the Caribbean is building up a large amount of knowledge that is relevant to disaster management and there is a huge amount of existing knowledge at the community level. This knowledge must be leveraged by governments in order to develop comprehensive national disaster management plans in which stakeholders recognise their inputs.

3. **Countries Must Implement a Culture of Preparedness.**

    Success in the last three phases of the disaster Life Cycle, Mitigation Relief and Reconstruction, is dependent on successful preparation. Therefore, like other regions, the Caribbean must work towards implementing a culture of preparedness, so that actions taken when disaster strikes, are as successful as possible. A number of participants, including some from Caribbean National Emergency Agencies (NEMA's), highlighted the fact that Caribbean countries tend to be reactive, rather than proactive when it came to disaster management. This must change if the Caribbean is to improve its disaster management.

    Creating a culture of preparedness within society will depend on a number of factors, but delivering programmes to educate stakeholders about disaster management and how to prepare for when disaster strikes is the most important. Comprehensive education programmes must be developed and delivered through a number of channels, including

radio, television, video/dvd and the internet. They must need to be coordinated at a national level and delivered to all groups in society.

Those managing the delivery of education programmes must utilise trusted members of communities, or recognised community heads, as much as possible. In the Caribbean, women play an important role in many communities, and it is important that they are utilised as much as possible to disseminate the message of preparedness and ensure community buy-in.

In addition to women, children should be used to disseminate the message of preparedness. In some parts of the Caribbean, incorporating disaster management education in the school curriculum has ensured education about disaster management, especially the need to be prepared, is passed from school children to their families. This is a positive by-product of educating children on disaster management and it must be replicated so the region, and not just a few selected countries, reaps the benefits.

Evidence from the Caribbean shows that disaster management education programmes must be designed in order to embed the understanding that warnings are not predictions, but informed forecasts. This will help ensure that if natural hazards do not strike as forecasted, disaster "warning fatigue" does not affect the community and those disseminating warnings retain their credibility in the community. It is recognised that, at present, when early warnings are given and the disaster does not strike, the credibility of subsequent warnings is questioned and stakeholders do not react quickly in real disasters, until it is too late.

4   Enhance Knowledge Management Practices

Some stakeholders in the region have collected a huge amount of data/information relative to disaster management. However, there are issues concerning how useful some data is and how effectively stakeholders are using the data that could potentially be useful. To improve the situation, stakeholders must improve knowledge management practices which, amongst other things, involve the collection and interpretation of information and the dissemination of that information in an appropriate and useful format for stakeholders.

First, there is a need for organisations involved in knowledge management, to develop their internal capacity. A number of participants at the Forum called for an improvement in the knowledge management policies and practice used by national and regional organisations. The development of guidelines and capacity building activities at a regional level would help ensure a harmonised approach to disaster management that would have many benefits. At a very minimum, it would enable the region to harmonise policies for data collection and sharing, as well as improve the sharing of best practice; something that would be of immense benefit to the region.

Organisations must also ensure that data collected is demand driven because the majority of stakeholders who have access to it at present, do not consider much of what is collected very useful. Above all, the collection and interpretation of demand driven information will produce many benefits, including more effective disaster management and the improved use of scarce resources.

In respect of data collection, it is important that organisations place more emphasise on finding ways to engage with the community and establish mechanisms for the two way flow of information, that is so important for effective disaster management. There are a number of innovative technologies that can be put in the hands of those in the community, so that they can provide real time information when disaster strikes, but those in charge of knowledge management must do more to ensure this two-way flow of information takes place.

5 Improve Understanding of the Tampere Convention to Increase Ratification and Ensure that Ratification is Followed by Practice

Telephones, especially the mobile telephone, are acknowledged as the most useful and, therefore, important ICT when disaster strikes. However, impediments to the use of emergency telecommunications prevent them being used effectively. The Tampere Convention has the potential to remove some of the impediments and facilitate that effective use of emergency telecoms when disaster strikes. However, despite its benefits and the fact that many countries have signed and ratified the Convention, few countries have put its provisions into practice.

It is important that countries in the Caribbean identify National Champions of the Tampere Convention in order to ensure that it is signed, ratified and put into practice during times of disaster. National Champions must ensure the Convention is embedded in the relevant organisations and state ministries. This will help ensure that a change of government or key personnel within government, does not lead to the understanding of the Convention, and how it works in practice, being lost. Importantly for sustainability, National Champions should be a key government department and not an individual.

6. Improve Protection of Critical Infrastructure

Small Island Developing States (SIDS) of the type that characterise much of the Caribbean are adversely affected economically, and their economic recovery after disaster strikes is largely dependent on how quickly the private sector can recover after disaster strikes. In recognising that when disaster strikes, the economy of a country must recover as quickly as possible, governments must do more to ensure that they and the private sector organisations do their utmost to protect critical infrastructure. Defining what critical infrastructure is, mapping where it is and making the development of business continuity plans a legal requirement for key organisations, would be important steps in the right direction.

7. Improve Collaboration between all Stakeholders

Poor collaboration between all stakeholders in the Caribbean is one of the key impediments to effective disaster management and the effective use of ICTs in disaster management. During the Forum, participants made it clear that collaboration between certain stakeholders needs to be improved as quickly as possible. In particular, there must be:

A. Improved Collaboration between Regional and International Agencies

International and regional organisations have an important role to play in disaster management and increasing the use of ICT for disaster management. To maximise the impact of their efforts, they must increase and improve their collaboration in the region. This improved collaboration should include, amongst other things, the pooling of resources, the increased coordination over the delivery activities, such as workshops and projects, and the sharing of information. This should reduce duplication of efforts and greatly increase the effective use of resources for disaster management.

B. Enhanced Collaboration between Disaster Management Professionals and the Media

Formal processes must be introduced to ensure that media organisations obtain advice from disaster management professionals on when and how to omit disaster management messages. Ideally, officials from National Disaster Management Agencies (NEMA) in their respective countries should be points of contact to assist media professionals. At present, the news editors of media organisations have a high degree of autonomy over the dissemination of information about natural hazards.

News management practices have led to a situation in which radio and television reports on disaster management, often the main and most trusted sources of news for the majority of stakeholders, are based on the interpretation of the news editors rather than disaster management professionals. When disaster does not strike as the news readers have predicted, it undermines the validity of subsequent disaster warnings in the eyes of some stakeholders, an issue which needs to be resolved.

C. Improved Collaboration between Technology Providers and Disaster Management Professionals

Those who manufacture and supply ICT equipment should work more closely with disaster management professionals, in order to fully understand what is required from the various ICTs that are used in disaster management. This should enable them to produce low cost ICTs that can be used before, during and after disaster strikes to facilitate the two-way flow of information between the community and disaster management agencies.

8. Undertake Continuous Monitoring and Annual Progress Assessments

Progress with regard to the development and implementation of national disaster management plans must be effectively monitored by National Emergency Management Agencies (NEMAs). In turn, NEMAs must ensure that regional disaster management agencies are fully informed about their plans and activities. In addition to doing so, through constant information sharing, annual evaluations of progress should be undertaken and the results shared with all stakeholders.

In addition to the dissemination of reports, the sharing of results should take place at annual meetings of key national and regional disaster management officials. Annual meetings will also enhance the collaboration required to deliver a regional response to disaster management, if required. It would also facilitate the sharing of best practices in respect of monitoring and evaluation, something which is not sufficiently taking place at present. Indeed, at present, there are a number of stand alone projects and programmes in which continual monitoring and annual assessments are taking place. These practices must be improved, where necessary, scaled up and transferred to the national and regional level. The importance of this cannot be underestimated, especially because it will increase accountability and ensure that the buck stops somewhere.