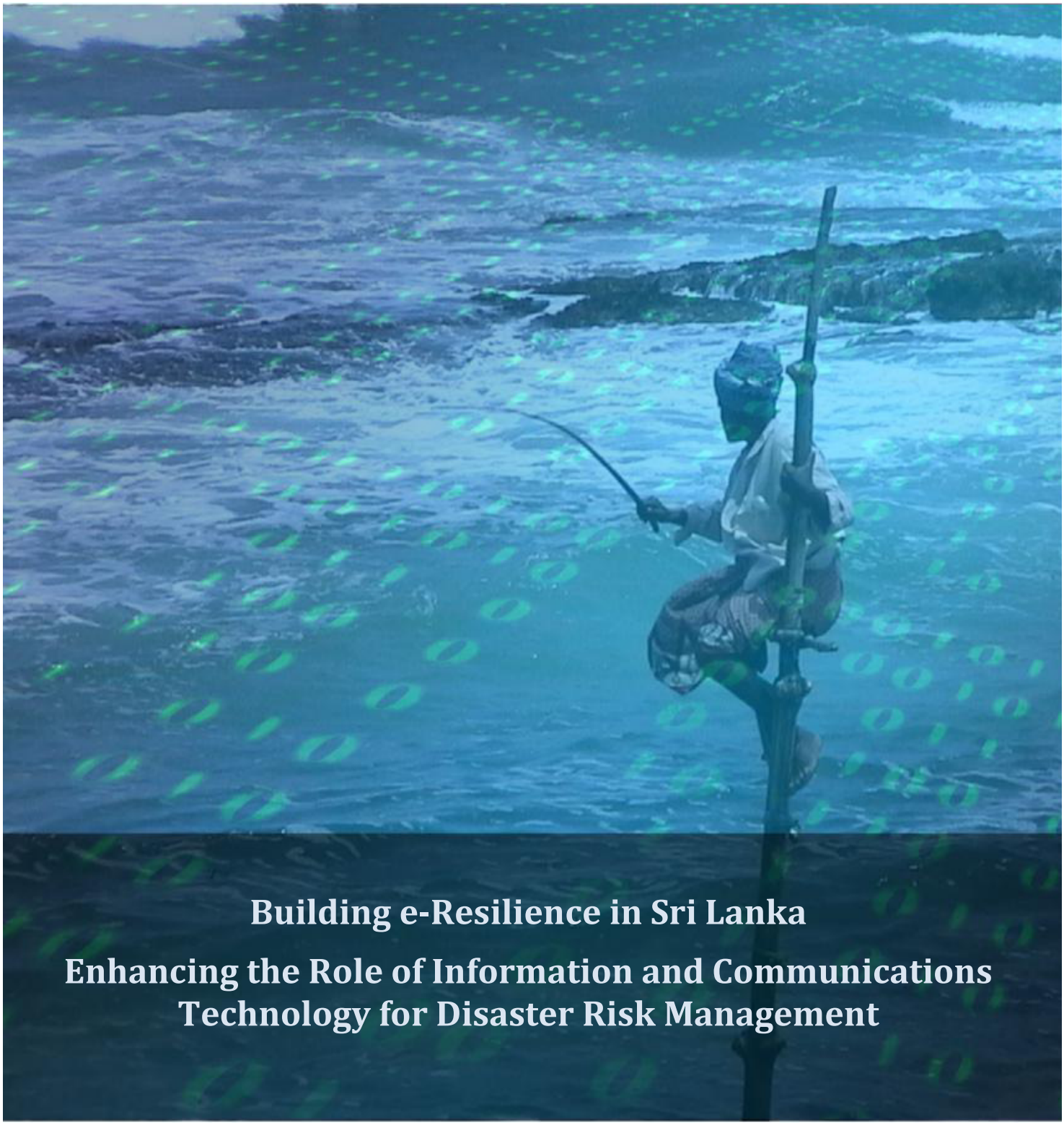


Building e-Resilience in Sri Lanka

Enhancing the Role of Information and Communications Technology for Disaster Risk Management

UNITED NATIONS
ESCAP
Economic and Social Commission for Asia and the Pacific

The secretariat of the Economic and Social Commission for Asia and the Pacific (ESCAP) is the regional development arm of the United Nations and serves as the main economic and social development centre for the United Nations in Asia and the Pacific. Its mandate is to foster cooperation among its 53 members and 9 associate members. It provides the strategic link between global and country-level programmes and issues. It supports Governments of countries in the region in consolidating regional positions and advocates regional approaches to meeting the region's unique socioeconomic challenges in a globalizing world. The ESCAP secretariat is in Bangkok. Please visit the ESCAP website at http://www.unescap.org for further information.

The shaded areas of the map indicate ESCAP members and associate members.

Building e-Resilience in Sri Lanka: Enhancing the Role of Information and Communications Technology for Disaster Risk Management

This study has been prepared by Rohan Samarajiva, Shazna Zuhyle and Ransimala Weerasooriya.

The views expressed herein are those of the authors, and do not necessarily reflect the views of the United Nations. The information contained is based primarily on interviews, published and unpublished data, and presentations by members of the industry.

The designations employed and material presented do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries. References and maps obtained from external sources might not conform to the United Nations editorial guidelines. Mention of firm names and commercial products does not imply the endorsement of the United Nations.

The authors are grateful to Mrs. Marina Mohamed, Secretary to the Ministry of Disaster Management, Sri Lanka, the Directors General of the agencies under the Ministry, Mr. Clarence Perera of the National Building Research Organisation, Mr. Nuwan Waidyanatha and the officials of telecom service providers without whom this study could not have been conducted.

For more information contact:

Information and Communications Technology and Disaster Risk Reduction Division
United Nations Economic and Social Commission for Asia and the Pacific

The United Nations Building
Rajadamnern Nok Avenue
Bangkok 10200
Thailand

Telephone: +66 2 288 1234
Fax: +66 2 288 1000
Email: escap-idd@un.org
Website: http://www.unescap.org/idd

Contents

List of Figures

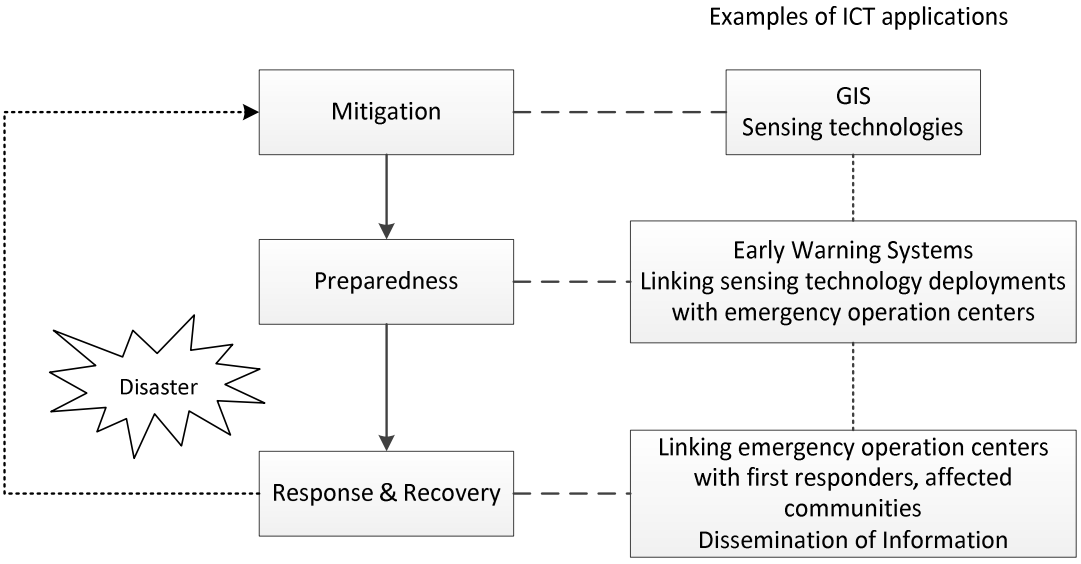
Abbreviations and Acronyms

CCTV	Closed-circuit Television
CPP	Cyclone Preparedness Programme (Bangladesh)
DEWN	Disaster and Emergency Warning Network
DMC	Disaster Management Centre
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EOC	Emergency Operations Centre
ESCAP	Economic and Social Commission for Asia and the Pacific (United Nations)
GIS	Geographic Information System
GPRS	General Packet Radio Service
HF	High Frequency
HFA	Hyogo Framework for Action
ICT	Information and Communications Technology
IP	Internet Protocol
MNO	Mobile Network Operator
MSC	Mobile Switching Centre
NBRO	National Building Research Organisation
NCDM	National Council for Disaster Management
SMS	Short Message Service
SPEEDI	System for Prediction of Environmental Emergency Dose Information
TDM	Time-division Multiplexing
TETRA	Terrestrial Trunked Radio (formerly known as Trans-European Trunked Radio)
UAV	Unmanned Aerial Vehicles
UHF	Ultra High Frequency
UNISDR	United Nations Office for Disaster Risk Reduction
VHF	Very High Frequency

1 Introduction

Disasters affect multiple facets of human life. Therefore, disaster risk management (DRM) requires multiple mechanisms across different silos in order to prepare for and deal with all types of disasters. The multiple mechanisms will most definitely require collaboration at the international or regional level, and coordination with government at the national and local levels, with community organizations and with individuals. In all these instances, effective communication is critical. As a result, information and communication technologies (ICTs) are vital for dealing with calamities, and functioning ICT infrastructures are essential both pre- and post-disaster. Services provided over ICT infrastructures can play a decisive role in the early warning of natural disasters, and there is much research documenting the role of ICTs in early warning.[1] The role that can be played by resilient ICT infrastructures in the immediate aftermath of a disaster has been documented in a previous ESCAP report.[2]

Figure 1: Examples of ICT applications at key stages of the DRM cycle



The sophistication and the interoperability of ICTs available today provide for greater use in all aspects of DRM (see Figure 1).[3] Remote sensing and geographic information system (GIS) modelling can be used to create hazard maps of vulnerable areas. If policies are in place, these can be used to minimize the effects of hazards in high-risk areas. Security-oriented systems such as closed-circuit

[1] Rohan Samarajiva and Nuwan Waidyanatha, "Two complementary mobile technologies for disaster warning", *Info*, vol. 11, no. 2 (2009), pp. 58-65; Rohan Samarajiva, "Mobilizing information and communications technologies for effective disaster warning: Lessons from the 2004 tsunami", *New Media and Society*, vol. 7, no. 6 (2005), pp. 731-47; Juan Carlos Villagran de León and others, "Early warning systems in the context of disaster risk management", *Entwicklung & Ländlicher Raum*, vol. 2 (2006), pp. 23-25.

[2] Rohan Samarajiva and Shazna Zuhyle, *The resilience of ICT infrastructure and its role during disasters* (Bangkok, ESCAP, 2014). Available from http://www.unescap.org/sites/default/files/The%20resilience%20of%20ICT%20Infrastructures.pdf.

[3] Suvit Yodimani and David Hollister, "Disasters and Communication Technology: Perspectives from Asia", paper presented at the Second Tampere Conference on Disaster Communications, 28-30 May 2001.

television (CCTV) footage are also increasingly being used as a disaster mitigation technique by observing changes of localities over time.[4] The resilience of ICTs is perhaps most critical at the moment of disaster occurrence, when emergency operations centres (EOCs), first responders, early warning systems and other key stakeholders need to be reliably connected. Building in redundancy at this stage is a key consideration. It is often addressed by the use of multiple modes of communication (e.g. TETRA, satellite, UHF and VHF). There are many examples of ICT applications that have been deployed for DRM (see Section 3). However, the effectiveness of the systems depends largely on the policies and guidance from the national level, social responsibility and willingness to adapt.

Resilience is defined by ESCAP as the capacity to withstand, adapt to, and recover from natural disasters—so that people can continue to lead the kind of lives that they value. This is in line with other programmatic definitions.[5] Resilience has long been an important concept in psychology and has recently crossed over to the development field via ecology, perhaps in recognition of the increasing significance of shocks of various kinds, including disasters. It is also used in a sense that is aligned with the programmatic definitions in the computing field, which is perhaps the most similar to discussions of ICT infrastructure.[6]

Resilient infrastructure is an essential precondition of a resilient society. As various shocks, natural and otherwise, batter societies, it is understandable that attention is focused on resilience, though there are some who argue that resilience, or the coming back to where things were prior to the shock, is too weak an objective; that the desirable objective is that of anti-fragility wherein the system that has been subjected to the shock comes back even stronger.[7]

The objective of this report is to highlight the critical role of ICTs in DRM. It also assesses the e-resilience of the ICT infrastructure in Sri Lanka and emphasizes the importance of building in resilience. Although technological advances have provided many sophisticated systems, it is also important to recognize the social and economic context before applying and implementing different technological measures.

1.1 The Role of the United Nations in Disaster Risk Reduction

The work on the post-2015 Framework for Disaster Risk Reduction (now the Sendai Framework for Disaster Risk Reduction 2015-2030)[8] was prompted by the General Assembly Resolution 66/199 that requested the United Nations Office for Disaster Risk Reduction (UNISDR) to facilitate the development of a framework to succeed the Hyogo Framework for Action (HFA) that expired in