BOXES

Вох	I-1	Disaster statistics in Asia and the Pacific
Вох	I-2	Cyclone Pam in Vanuatu
Вох	I-3	Nepal earthquakes, 2015
Вох	1-4	Impact of 2011 Japan earthquake on global markets and prices
Вох	I-5	Risks to transboundary transport networks
Вох	I-6	Vulnerability of small cities: the case of Tacloban, Philippines
Вох	I-7	Towards disability-inclusive disaster risk reduction
Вох	I-8	Typhoon Haiyan (Yolanda)
Вох	I-9	Mangrove ecosystems reduce loss of life and damage from cyclones
Вох	I-10	Ecosystem degradation and the accumulation of risk in Dhaka, Bangladesh
Вох	I-11	Building resilience in Gujarat, India
Вох	II-1	Weather disturbances during El Niño
Вох	II-2	Watershed management in Karnataka, India
Вох	II-3	Watershed development for drought mitigation
Вох	11-4	Land cover mapping
Вох	II-5	Weather-based parametric crop insurance
Вох	III-1	Improved early warning and preparedness reduces cyclone impact in Bangladesh
Вох	III-2	Why do people respond - or not - to warnings?
Вох	III-3	Common Alerting Protocol
Вох	111-4	ESCAP Multi-donor Trust Fund for Tsunami, Disaster and Climate Preparedness
Вох	III-5	Main unmet needs in risk knowledge
Вох	III-6	Main unmet needs in monitoring and warning services
Вох	III-7	Main unmet needs in communication and dissemination
Вох	III-8	Main unmet needs in response capability
Вох	III-9	Testing warning systems, end to end
Вох	III-10	Main unmet needs regarding cross-cutting issues
Вох	IV-1	Indonesia disaster risk index
Вох	IV-2	India's National Database for Emergency Management
Roy	1\/_3	The Regional Space Applications Programme for Sustainable Development

Box IV-4	Rapid assessment for resilient recovery
Box IV-5	Climate risk assessment for resilient development planning – Tamil Nadu, India
Box IV-6	Open-source geo-referenced information systems
Box IV-7	Open-source risk assessment tools
Box IV-8	Databases and resources for understanding risk
Box IV-9	The International Charter on Space and Major Disasters
Box V-1	Disaster risk reduction in the global development agenda
Box V-2	Laws and regulations for disaster risk reduction
Box V-3	Disaster risk management: the divorce between discourse and practice
Box V-4	Tracking public investment on disaster risk reduction in India
Box V-5	Initiatives for integrating disaster reduction in development planning
Box V-6	A paradigm shift for business
Box V-7	A dual-purpose project: storm water management in Malaysia

FIGURES

Figure I-1	Disaster occurrence and impacts in Asia and the Pacific, total 2005-2014
Figure I-2	Mortality and numbers of people affected, 2005-2014
Figure I-3	Occurrence and impacts by subregion, total 2005-2014
Figure I-4	World's worst natural disasters occur in Asia and the Pacific, 2005-2015
Figure I-5	Cumulative impacts of smaller, recurrent disasters, 1970-2014
Figure I-6	Countries with special needs, damage as a per cent of GDP
Figure I-7	Damage from natural disasters as a per cent of GDP
Figure I-8	Seismic risk in Asia and the Pacific
Figure I-9	Asia-Pacific ocean basins, and the tracks of tropical cyclones 2005-2014
Figure I-10	Transboundary flood risk in Asia and the Pacific
Figure I-11	Transboundary drought risk in Asia and the Pacific
Figure I-12	Damage from natural disasters rising, 1970-2014
Figure I-13	Sectoral damage and losses in disaster-hit countries, per cent of total
Figure I-14	Annual average damage from natural disasters by subregion, 1970-2014
Figure I-15	SMEs in the Philippines located in areas of high typhoon frequency
Figure I-16	A drought in New Zealand in 2013 led to higher world prices for milk powder
Figure I-17	10 countries with the highest predicted annual average losses from disasters
Figure I-18	Breakdown of predicted annual average losses by type of hazard and subregion
Figure I-19	Asia-Pacific city dwellers exposed to multiple hazards, 2014
Figure I-20	Asia-Pacific cities exposed to multiple hazards
Figure I-21	Displacement by natural disasters by region, 2008-2013
Figure I-22	Displacement in Asia and the Pacific by subregion, 2008-2013
Figure I-23	Allocation of international aid for disasters in Asia and the Pacific, 2004-2013
Figure I-24	Asia-Pacific performance in the five HFA priorities for action, 2011-2013
Figure I-25	Exposure and coping capacities in Asia and the Pacific
Figure II-1	Economic losses from drought
Figure II-2	Income loss due to a drought year in eastern India
Figure II-3	Water resources by source
Figure II-4	Percentage of cultivated area equipped for irrigation
Figure II-5	ESCAP Regional Drought Mechanism - Global Framework for Climate Services

Figure	II-6	Climate outlook reported for the summer monsoon in South Asia, 2014
Figure	II-7	Vegetation index-based drought assessment, Sri Lanka, 2014
Figure	II-8	NDVI anomaly (vegetation stress) of Sri Lanka
Figure	II-9	Drought in Mongolia
Figure	II-10	Satellite-based drought vulnerability map for China
Figure	II-11	Snow water equivalent monitoring in Kyrgyzstan and Tajikistan, 2010 and 2011
Figure	II-12	Agricultural insurance models
Figure	III-1	Disaster forecasting – the current and likely future state of science
Figure	III-2	Lead times and applications of early warning information
Figure	III-3	Evolution of the Indian Ocean Regional Tsunami Observation System 2004-2014
Figure	111-4	Potential integration of tsunami and hydrometeorological warning systems
Figure	IV-1	Information management practices for understanding disaster risk
Figure	IV-2	Conceptual framework for disaster information management
Figure	IV-3	A multi-hazard risk map in Vanuatu
Figure	IV-4	Multi-hazard risk mapping in the Philippines
Figure	IV-5	National seismic map for Japan
Figure	IV-6	Qinghai-Tibet Railway seismic hazard map and 3D elevation, highlighting the risk scenarios
Figure	IV-7	Before and after images of Kathmandu for 2015 Nepal Earthquakes
Figure	IV-8	Economic losses from disasters
Figure	IV-9	Rapid assessment of post-disaster damage and losses
Figure	IV-10	Modelled and actual earthquake damage in Nepal, 2015
Figure	IV-11	Estimated average annual losses from disasters, selected countries
Figure	IV-12	The Mekong river profile from headwaters to mouth
Figure	IV-13	Views of the value of geospatial information
Figure	IV-14	Right information, right people and right time
Figure	IV-15	Disaster information products in China
Figure	IV-16	Central disaster management radio communications system in Japan
Figure	IV-17	A roadmap to disaster information management
Figure	V-1	Capacity building framework for disaster risk management
Figure	V-2	Interconnected processes for integrating disaster risk reduction into sustainable development
Figure	V-3	Synergies between disaster risk management and climate change adaptation
Figure	V-4	Japan: process for project evaluation of Ministry of Land, Infrastructure, Transport and Tourism

TABLES

Table I-1	Human impact of disasters in Asia and the Pacific, total 2005-2014
Table I-2	Asia-Pacific countries with high exposure to, and risk from, natural disasters
Table I-3	Recent investments in disaster-resilient infrastructure
Table I-4	Multi-hazard hotspots
Table I-5	Ecosystems help mitigate disaster hazards
Table I-6	Land degradation classes in Asia and the Pacific, by country
Table II-1	Major drought coping mechanisms of farm households – China, India, Thailand
Table II-2	Multisectoral drought management in Thailand
Table III-1	Evacuations and casualties in the Philippines
Table III-2	The four elements of an end-to-end early warning system
Table III-3	Development of IOTWS networks, 2004-2014
Table III-4	Cost effectiveness of early warning
Table IV-1	Information needs of different stakeholders
Table IV-2	Risk information scale for policy planning and project implementation
Table IV-3	Network reliability, selected Asia-Pacific countries
Table V-1	Resilience to disasters as a cross-cutting issue in the Sustainable Development Goals
Table V-2	Principles for integrating disaster risk reduction into development

ABBREVIATIONS

AADMER ASEAN Agreement on Disaster Management and Emergency Response

AAL annual average loss

ABU Asia-Pacific Broadcasting Union

ADB Asian Development Bank

ADBI Asian Development Bank Institute

ADPC Asian Disaster Preparedness Center

APDR Asia-Pacific Disaster Report

APIS Asia-Pacific Information Superhighway

ASEAN Association of Southeast Asian Nations

BNPB Badan Nasional Penanggulangan Bencana (National Agency for Disaster Management)

CAP Common Alerting Protocol

CAPRA Central American Probabilistic Risk Assessment
CBDRM community-based disaster risk management

CBR cost-benefit ratio

CCA climate change adaptation

CERN European Organization for Nuclear Research

CNES Centre national d'études spatiales

COP Conference of the Parties

CPP Cyclone Preparedness Programme

CRED Centre for Research on the Epidemiology of Disasters

DRG disaster risk governance
DRM disaster risk management
DRR disaster risk reduction

DPNet Disaster Preparedness Network
EM-DAT Emergency Events Database

ENISA European Network and Information Security Agency

ESA European Space Agency

ESCAP Economic and Social Commission for Asia and the Pacific

EWS early warning systems

FAO Food and Agriculture Organization of the United Nations

FEMA Federal Emergency Management Agency

G20 Group of Twenty

GAATES Global Alliance on Accessible Technologies and Environments

GDACS Global Disaster Alert and Coordination System

GDP gross domestic product

GDT Global Dairy Trade

GEOGLAM Group on Earth Observations for Global Agricultural Monitoring

GFDRR Global Facility for Disaster Reduction and Recovery

GIS geographic information systems

GIZ Deutsche Gesellschaft für Internationale Zusammenarbeit

GLC Global Land Cover

GLOF glacial lake outburst floods
GPS Global Positioning System

UNEP/GRID United Nations Environment Programme Global Resource Information Database

GSDP gross state domestic product

GSDMA Gujarat State Disaster Management Authority

GSMA Groupe Speciale Mobile Association
HAZUS Hazards US risk assessment tool

HFA Hyogo Framework of Action
HKH Hindu Kush-Himalayan region

ICIMOD International Centre for Integrated Mountain Development

ICT information and communications technology
IDMC Internal Displacement Monitoring Centre

IFAD International Fund for Agricultural Development

IFRC International Federation of Red Cross

IGBP-DIS International Geosphere-Biosphere Programme Data and Information Systems

IOC Intergovernmental Oceanographic Commission

IOTWS Indian Ocean Tsunami Warning System

IPCC Intergovernmental Panel on Climate Change

IRBI Indonesia disaster risk index

ISO International Organization for Standardization

ITU International Telecommunication Union

IUCN International Union for Conservation of Nature

KNMI Royal Netherlands Meteorological Institute

LDCs least developed countries

LLDCs landlocked developing countries

MDGs Millennium Development Goals

MODIS Moderate Resolution Imaging Spectroradiometer

MIRA multi-cluster initial rapid assessment

MRB Mekong river basin

NDDI Normalized difference drought index

NDMI National Disaster Management Institute

NDVI Normalized difference vegetation index

NDRRMC National Disaster Risk Reduction and Management Council

NGO non-governmental organization

NMHS national meteorological and hydrological service

NRWP Natural Water Resources Policy

NTT DoCoMo Nippon Telegraph and Telephone DoCoMo Mobile Phone Operator

OECD Organization for Economic Co-operation and Development

ODA Official Development Assistance
ODI Overseas Development Institute

OFDA Office of United States Foreign Disaster Assistance

PAP programmes, activities and projects

PEDRR Partnership for Environment and Disaster Risk Reduction

PDNA post-disaster needs assessment

PPP public-private partnership

PTC WMO/ESCAP Panel on Tropical Cyclones

RADIUS Risk Assessment Tools for Diagnosis of Urban Areas against Seismic Disasters

RESAP Regional Space Applications Programme for Sustainable Development

RIMES Regional Integrated Multi-Hazard Early Warning System for Africa and Asia

RSMC Regional Specialized Metrological Centre

SAARC South Asian Association for Regional Cooperation

SASCOF South Asian Climate Outlook Forum
SCADA supervisory control and data acquisition

SDGs Sustainable Development Goals
SELENA Seismic Loss Estimation model

SDI spatial data infrastructure

SFDRR Sendai Framework for Disaster Risk Reduction 2015-2030

SIDS small island developing States

SMEs small and medium-sized enterprises

SMS short message service

SOPAC Secretariat of the Pacific Community Applied Geoscience and Technology Division

SOPs standard operating procedures

TC ESCAP/WMO Typhoon Committee

TCI thermal condition index

TCP/IP Transmission Control Protocol / Internet Protocol)

UAV unmanned aerial vehicles

UN United Nations

UN ASIGN United Nations Adaptive System for Image Communication over Global Networks

UN HABITAT United Nations Human Settlements Programme

UN OCHA United Nations Office for the Coordination of Humanitarian Affairs

UNCCD United Nations Convention to Combat Desertification

UN-DESA United Nations Department of Economic and Social Affairs

UNDP United Nations Development Programme
UNEP United Nations Environment Programme

UNESCO United Nations Educational, Scientific and Cultural Organization

UNFCCC United Nations Framework Convention on Climate Change

UNISDR United Nations Office for Disaster Risk Reduction
UNITAR United Nations Institute for Training and Research

UNOOSA United Nations Office for Outer Space Affairs

UNOSAT United Nations Operational Satellite Applications Programme

UNSDI United Nations Spatial Data Infrastructure

UNU United Nations University

UNU-EHS United Nations University Institute for Environment and Human Security

USGS United States Geological Survey

USAID United States Agency for International Development

VSWI vegetation supply water index

WFP World Food Programme

WMO World Meteorological Organization

WRI World Resources Institute