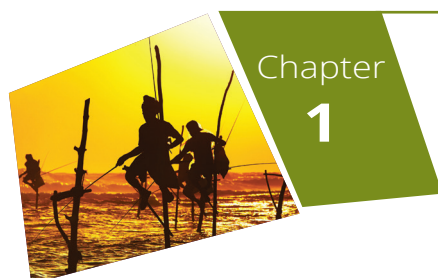


CONTENTS

FOREWORD	iv
EXECUTIVE SUMMARY	vi
ACKNOWLEDGEMENTS	xvi
FIGURES	xx
TABLES	xxiv
BOXES	xxv
EXPLANATORY NOTES	xxvi
ABBREVIATIONS	xxviii



A REGION AT RISK	1
THE HUMAN AND ECONOMIC COST	4
DISRUPTION TO LIVELIHOODS OF THE VULNERABLE	6
SUBREGIONAL DISASTER RISKS	8
UNDERSTANDING FUTURE DISASTER RISKS	19
RETHINKING DISASTER RESILIENCE	22



IMPACTS ON POVERTY AND INEQUALITY	27
CONVERGENCE OF DISASTERS AND POVERTY	29
WELL-BEING LOSSES TO THE POOR	32
EXTENSIVE DISASTERS	34
INTERGENERATIONAL TRANSMISSION	35
DISASTERS WIDEN INEQUALITY	36
REDUCING DISASTER RISK IN CITIES	39
REDUCING POVERTY, INEQUALITY AND DISASTER RISKS – TOGETHER	44



Chapter 3

ACTION FOR RESILIENCE IN AGRICULTURE

	47
IMPACT OF DISASTERS ON AGRICULTURE	51
IMPACT OF THE 2015–2016 EL NIÑO	55
LONG-TERM IMPACTS OF DISASTERS ON FOOD PRODUCTION	58
DISASTER RISK REDUCTION AND AGRICULTURE	59
BUILDING CLIMATE-RESILIENT AGRICULTURE	60
NATIONAL STRATEGIES	62
REGIONAL STRATEGIES	65
STEPPING STONES OUT OF POVERTY	66



Chapter 4

RESILIENCE AND CLIMATE CHANGE

	69
RISK SCENARIOS	71
CLIMATE CHANGE AND INCREASING DISASTER RISK	73
ADAPTIVE CAPACITY FOR CLIMATE RESILIENCE	79
COHERENCE BETWEEN CLIMATE CHANGE ADAPTATION AND DISASTER RISK REDUCTION	80
POLICY DECISIONS AND DEEP UNCERTAINTY	83
OPPORTUNITIES FOR LOW-COST ADAPTATION	85



Chapter 5

PATHWAYS TO PREVENTION

	89
THE DISASTER-CONFLICT INTERFACE	93
AFGHANISTAN	94
MYANMAR	95
PAPUA NEW GUINEA	95
BUILDING DISASTER RESILIENCE CAN HELP REDUCE CONFLICT	97



Chapter 6

LEAVE NO ONE BEHIND : POLICIES, ACTIONS AND TOOLS

	103
THE THREAD OF RESILIENCE	105
NATIONAL LEVEL – ACTION POINTS FOR BUILDING RESILIENCE	107
ACTION FOR REGIONAL COOPERATION	125
REINFORCING THE FUTURE	132

FIGURES

Figure 1-1	Selected major disasters in Asia and the Pacific, 1970-2016	4
Figure 1-2	Fatalities from natural disasters, 1970-2016	5
Figure 1-3	People affected by natural disasters, millions, 1970-2016	5
Figure 1-4	Estimated damage, Asia and the Pacific and the rest of the World, percentage of GDP, 1970-2016	6
Figure 1-5	New displacements associated with natural disasters, 2013-2015	7
Figure 1-6	Mortality distribution, by sex, selected disasters	7
Figure 1-7	Average estimated damage in countries with special needs, 2000-2016 (percentage of GDP)	8
Figure 1-8	Disaster impacts by subregion, 2000-2016	9
Figure 1-9	Disaster impacts in East and North-East Asia, 2000-2016	9
Figure 1-10	Damage and future estimates in East and North-East Asia	10
Figure 1-11	Disaster impacts in South-East Asia, 2000-2016	13
Figure 1-12	Damage and future estimates in South-East Asia	13
Figure 1-13	Disaster impacts in South and South-West Asia, 2000-2016	14
Figure 1-14	Damage and future estimates in South and South-West Asian countries	14
Figure 1-15	Disaster impacts in North and Central Asia, 2000-2016	15
Figure 1-16	Damage and future estimates in North and Central Asia	15
Figure 1-17	Disaster impacts in the Pacific, 2000-2016	19
Figure 1-18	Damage and future loss estimates for Pacific countries	19
Figure 1-19	Estimated annual average future losses	21
Figure 1-20	Average annual loss in countries with special needs, by 2030	21
Figure 1-21	Risk from natural and man-made disasters, INFORM index, by subregion	23
Figure 1-22	Risk from natural and man-made disasters, INFORM index, by countries	24
Figure 2-1	Extreme poverty in Asia and the Pacific	28
Figure 2-2	Deaths from natural hazards, by country income group, 2000-2015	29
Figure 2-3	Deaths per disaster event and per 100,000 inhabitants, by country income group, 2000-2015	29

Figure 2-4	Deaths from disasters and poverty, by province, Nepal and Pakistan, 2000-2015	30
Figure 2-5	Vulnerable populations, living between \$1.90 per day and \$3.10 per day	31
Figure 2-6	Estimated percentage of people falling into poverty from selected disasters	32
Figure 2-7	Percentage of asset or income loss by the poor and non-poor in floods	33
Figure 2-8	Household income level and food availability, changes in eating behaviour, and selling of assets during and after floods, Bangladesh	33
Figure 2-9	Child wasting and underweight in Jagatsinghpur District, Odisha, India	33
Figure 2-10	Pakistan primary school enrolment drops following disasters	34
Figure 2-11	Distribution of damage between extensive and intensive disasters, 18 Asia-Pacific countries, 2000–2013	34
Figure 2-12	Damage to agriculture, health, and education from extensive and intensive disasters, Indonesia 2000-2012	35
Figure 2-13	Intergenerational poverty: a conceptual map	36
Figure 2-14	Intergenerational transmission of poverty	38
Figure 2-15	Relationship between number of disaster occurrences and Gini coefficient in 19 selected countries in Asia and the Pacific	39
Figure 2-16	Multi-hazard disaster risks of cities in Asia and the Pacific	40
Figure 2-17	Coastal cities and economic zones in China	40
Figure 2-18	Classification of populations in mega and large cities in Asia-Pacific according to disaster risk and inequality	41
Figure 2-19	Classification of populations in medium-sized and small cities in Asia-Pacific, according to disaster risk and inequality	41
Figure 2-20	Ten essentials for making cities resilient	43
Figure 3-1	Major agriculture systems in Asia and the Pacific	49
Figure 3-2	Major crops in Asia and the Pacific	49
Figure 3-3	Water stress in Asia and the Pacific	50
Figure 3-4	Cascading disruption from disaster damage to agriculture	52

Figure 3-5	Agricultural value added and GDP in Pakistan, 2006–2012	53
Figure 3-6	Marshall Islands, costs of 2015-2016 drought cascading from agriculture, \$ '000s	53
Figure 3-7	Disruptions of agricultural trade due to natural disasters	54
Figure 3-8	El Niño-related droughts in Asia and the Pacific, 2015/16	57
Figure 3-9	Land and water scarcity in Asia and the Pacific	60
Figure 3-10	Hunger and Climate Vulnerability Index for Asia and the Pacific	62
Figure 3-11	Asia-pacific countries with highest percentages of GDP, and the number of people affected by floods	63
Figure 3-12	Adaptive capacity for climate risk, by country	63
Figure 3-13	Projected 2050 Climate Vulnerability Index for Asia and the Pacific	64
Figure 3-14	Projected vulnerability changes for Asia and the Pacific	64
Figure 4-1	Projected temperature changes by the 2030s, RCP 4.5	71
Figure 4-2	Projected temperature changes by the 2030s, RCP 8.5	72
Figure 4-3	Projected rainfall changes by the 2030s, RCP 4.5	72
Figure 4-4	Projected rainfall changes by the 2030s, RCP 8.5	73
Figure 4-5	Estimated flood risk in 2030	74
Figure 4-6	Projected GDP losses due to floods for the year 2030	75
Figure 4-7	Transboundary flooding costs in major river basins, 2010 and 2030	76
Figure 4-8	Regional tropical cyclones, wind and storm surge hazards	77
Figure 4-9	Drought severity by 2030	78
Figure 4-10	Climate change hotspots	79
Figure 4-11	Coherence of climate change adaptation and disaster risk reduction	81
Figure 4-12	Uncertainties associated with climate change scenarios, outlooks, and forecasts	83
Figure 4-13	Seamless integration of climate scenarios, seasonal forecasts and medium/short term forecasts for a range	85
Figure 5-1	Localized conflict incidents, 1991–2015	92
Figure 5-2	INFORM risk index for Asia and the Pacific	93
Figure 5-3	Afghanistan, 2007 and 2008 winter snow packs	94
Figure 5-4	Tipping the balance: higher disaster resilience for lower conflict risk	98
Figure 5-5	Climate adaptation and DRR are entry points to help reduce conflicts	99
Figure 6-1	Global development frameworks embracing disaster risk reduction	105

Figure 6-2	The Sendai Framework: Seven targets and four priority actions	106
Figure 6-3	Regional and national climate outlook forums	115
Figure 6-4	The climate outlook forum process	115
Figure 6-5	Process of producing impact-based forecasts for extreme weather events	118
Figure 6-6	Benefit-cost ratios of earthquake risk mitigation measures in Colombia, Mexico and Nepal	119
Figure 6-7	Percentage of disaster losses insured, 2004–2015	122
Figure 6-8	Alignment between the Sendai Framework and SDG indicators	124
Figure 6-9	Deaths from tropical cyclones hitting Bangladesh (1970-2017)	127
Figure 6-10	Deaths due to typhoons in Hong Kong, China, 1970s to 2000s	128
Figure 6-11	Outcome (SDG 1.5) to input indicators (Sendai target G)	129
Figure 6-12	Pillars of the RESAP Plan of Action for Space Applications, 2018- 2030	129
Figure 6-13	Schematic diagram of Asia-Pacific Disaster Resilience Network	132

TABLES

Table 1-1	Disaster impacts in Asia and the Pacific, 2016	3
Table 1-2	Exposure and coping capacity, Asia-Pacific countries at greatest risk	8
Table 1-3	Mortality rate and affected population rate, 2005-2015 and estimate for 2020-2030	20
Table 1-4	Probable maximum loss over a 100-year period, by disaster, selected countries, percentage of GDP	21
Table 1-5	Socio-economic resilience	23
Table 3-1	El Niño-related disasters, severity of impact, 2015-2016	56
Table 4-1	State of science and models for different event types	84
Table 4-2	Selected sectors that require long-term planning for climate change	84
Table 4-3	Key areas of climate risk and potential for adaptation	86

BOXES

Box 1-1	Floods and landslides in South Asia, June 2017	3
Box 1-2	The 2016-2017 dzud in Mongolia	11
Box 1-3	Impacts of El Niño in South-East Asia and the Pacific	12
Box 1-4	Sand and dust storms	16
Box 1-5	Wildfires and extreme temperatures in the Russian Federation	17
Box 1-6	Disaster losses in Fiji	18
Box 1-7	INFORM – index for risk management	24
Box 2-1	Urban expansion and increased flood risk in Ho Chi Minh City, Viet Nam	37
Box 2-2	Disasters and poverty in the Ganga, Brahmaputra and Meghna basin	42
Box 3-1	FAO report on disaster impacts on agriculture	55
Box 3-2	Impact of 2015-2016 El Niño on phytoplankton in the Pacific	59
Box 3-3	Sendai Framework priorities for agriculture	61
Box 3-4	ESCAP Regional Drought Mechanism	67
Box 4-1	Climate Risk and Early Warning Systems Initiative	82
Box 4-2	Regional Integrated Multi-Hazard Early Warning System	82
Box 5-1	The vision of the United Nations Secretary General on prevention	91
Box 5-2	El Niño and conflict in Papua New Guinea	96
Box 5-3	River basin cooperation to reduce international tensions	97
Box 5-4	ESCAP's contribution to DRR and conflict resolution	100
Box 6-1	Disaster risk reduction in the SDG targets	108
Box 6-2	Science-based tools for improving understanding of disaster risks	111
Box 6-3	Historical risk knowledge – a global assessment of tsunami hazards over the last 400 years	113
Box 6-4	Averting disaster through weather and climate forecasting in Sri Lanka	114
Box 6-5	Impact-based forecasting	117
Box 6-6	Retrofitted school buildings survived the 2015 Nepal earthquake	121
Box 6-7	Cross-border tracking improves typhoon monitoring and forecasting	126