Contents

List	ot Illu	estrations	Х
Pref	ace		X۷
Ackı	nowle	dgments	xi
1.	Abo	ut this book	1
	1.1	Objectives	
	1.2	Target audiences]
	1.3	Organization of the chapters	2
	1.4	•	2
		Approach	3
	1.6	Glossary of terms	Z
Par	t I. G	eneral aspects	
2.	The	nature of emergencies and disasters	ç
	2.1	Environmental health and disasters	
	2.2	Disasters and emergencies	ç
		2.2.1 Hazards and extreme events	ç
		2.2.2 Disasters	10
		2.2.3 Conflict	10
		2.2.4 The effects of disasters on environmental health facilities	
		and services	11
	2.3	2.2.5 Emergencies	12
	2.5	Vulnerability to disasters and emergencies 2.3.1 The concept of vulnerability	13
		2.3.2 High susceptibility	13 13
		2.3.3 Low resilience	14
		2.3.4 The impact of disasters at national level	14
	2.4	Human actions that increase vulnerability to disasters	15
		2.4.1 Improper resource management	15
		2.4.2 Urbanization and vulnerability to disasters	15
		2.4.3 Rural/urban connections	16
		2.4.4 Global environmental change	17
	2.5	The disaster-management cycle	17

		2.5.2	Disaster management—a developmental approach Sustainable livelihoods and disaster management	17 18
	2.6		Limitations in complex emergencies in disaster management	18
	2.0		Vulnerability assessment	20
			Prevention and mitigation	20 20
			Emergency preparedness	20
			Planning, policy and capacity building	21
		2.6.5		21
			Rehabilitation, reconstruction and recovery	22
	2.7		r information	22
3.	Pred	lisasteı	r activities	24
	3.1	Introdu	uction	24
	3.2	Institut	tional arrangements	24
			Policy development	24
		3.2.2		24
	3.3	Vulner	ability and capacity assessment	25
		3.3.1	The purpose and process of vulnerability and capacity assessment	25
		332	Hazard mapping	27
			Vulnerability analysis of water-supply systems	28
			Assessment of environmental health vulnerability	28
			Describing communities, their environment and the	
		226	effects of hazards	28
			Ongoing monitoring of vulnerability	30
		3.3.7	Environmental health review of development policies	20
	3.4	Provor	and projects Ition and mitigation	30
	J. 4	3.4.1	-	30
		5.4.1	Reducing community vulnerability through long-term environmental health improvements	20
		312	Environmental safety regulations	30
			Reducing the vulnerability of environmental health	31
		5.4.5	infrastructure	31
		3.4.4	Protecting other facilities	32
	3.5		redness and planning	32
	0.0		The national emergency planning process	32
			A general model for disaster-preparedness planning	33
			Strategic plans and operational plans	36
			Participatory methods in planning	36
	3.6		ional learning and memory	37
			Evaluation of emergencies and disasters	37
			Vulnerability analysis of major projects	37
		3.6.3	Using rules and regulations concerning environmental	57
			health and hazards	38
	3.7	Warnin	g indicators	38
			Early warnings	38
			Slow-onset hazards	38

		3.7.3 Hazards with moderate warning time	39
		3.7.4 Warning of industrial accidents	40
		3.7.5 Warning of refugee movements	40
	3.8	Further information	40
4	. Em	ergency response	42
	4.1	Assessments	42
		4.1.1 Purpose of emergency assessments	42
		4.1.2 Process of assessments	43
		4.1.3 Field assessment techniques	43
		4.1.4 Organizing an emergency assessment	44
	4.2	Evacuation	44
		4.2.1 Disaster warnings and emergency instructions	45
		4.2.2 Organized evacuation	45
		4.2.3 Spontaneous evacuation	45
		4.2.4 Environmental health services on evacuation routes	45
		4.2.5 Environmental health problems associated with	
		evacuations	46
		4.2.6 Influencing settlement in evacuations	46
		4.2.7 Strengthening services in host communities	47
		4.2.8 Problems with temporary emergency settlements	47
	4.3	phase	48
		4.3.1 General objective and activities	48
		4.3.2 Priorities for emergency response	49
		4.3.3 Hospitals and relief centres	49
		4.3.4 Environmental health in search and rescue operations	50
	4.4	Organization of environmental health activities during	
		emergencies	51
		4.4.1 The place of environmental health in the organization of	
		emergency activities	51
		4.4.2 Emergency field teams for assessment and initial	
		response	53
		4.4.3 Other specialized emergency environmental health	
		functions	53
	15	4.4.4 Coordination of emergency response activities	53
	4.5	Personnel management in emergencies 4.5.1 Professional functions	54
			54
		4.5.2 Flexibility in the use of human resources	55
		4.5.3 Cooperation with the private sector 4.5.4 Working with volunteers	55
		4.5.5 Facilities for emergency personnel	55
		4.5.6 Support for specialist activities	55 56
		4.5.7 Subsistence needs of personnel	56 56
		4.5.8 Security and safety needs of personnel	56
		4.5.9 Psychological needs of personnel	56 57
		4.5.10 Administrative support for personnel	57 57
	4.6		58
		4.6.1 Types of equipment needed	58
		····	

		4.6.3	Procurement Specifications Storage and distribution	58 59 59
	4.7		ortation and logistics	59
		•	Types of vehicle required	60
			Sources and numbers of vehicles required	60
			Repairs and maintenance	61
		4.7.4	Road operations: transportation logistics in field	
			operations	61
		4.7.5	Air operations	61
		4.7.6	Other modes of transportation	62
		4.7.7	Pooling of transportation services	62
		4.7.8	Vehicle priorities	62
			Field logistics systems	62
	4.8	Telecor	mmunications	63
		4.8.1	Types of telecommunications equipment	63
		4.8.2	Sources of radio communications	64
		4.8.3	Developments in telecommunications	64
	4.9		al procedures	65
	4.10	•	standards and guidelines in disaster response	65
			Importance of rules and guidelines in emergencies	66
			Basic principles for creating rules for emergencies	66
			Special rules in areas of high potential public-health risk	67
			Rules concerning foreign relief workers	67
		4.10.5	International standards and codes of conduct for	
			humanitarian response	67
	4.11		tional assistance	68
			In-country coordination	68
			Forms and functions of international assistance	69
			Integrating international staff and local specialists	69
		4.11.4	Guidelines on employment of international assistance	
			teams	69
	4.12	Further	r information	70
5.		-	nd sustainable development	71
	5.1		disasters to development	71
			The transition from relief to recovery	71
			Sustainable development	71
	- 2		Increasing individual and institutional capacity	72
	5.2		Sment for recovery	72
			Reconstruction of housing	73
			Reconstruction of water-supply and sanitation systems	75 75
			Secondary damage assessment	75 76
	E 2		Secondary vulnerability assessment	76
	5.3		ery planning	77 79
	5.4		ery in different contexts	78 79
			Self-sheltering or short-term evacuees	78 78
		5.4.∠	Resettlement	70

			CONTENTS VII
	5.4.3 Rehabilitation and reconstruction for	or long-term camp	
	residents		80
	5.4.4 Chronic conflict situations		80
5.5	The state of the s	s and sustainable	
	development		81
	5.5.1 Vulnerability reduction		81
	5.5.2 Specific implications of sustainable	development in	
5.6	environmental health planning 6 Further information		81
5.0	o Furtiler information		82
Part II.	Technical aspects		
6. Sh	elter and emergency settlements		85
6.1	l Introduction		85
6.2	2 Assistance to self-sheltering populations		85
6.3			86
6.4	4 Site selection and arrangement of emerge	ncy settlements	87
6.5			89
6.6	5	ealth management	90
6.7	7 Further information		91
	ater supply		92
7.1	the property of the procession		92
	7.1.1 Establishing and protecting small-so	cale decentralized	
	supplies		92
	7.1.2 Establishing and protecting large-so	aie, centralized	00
	supplies 7.1.3 Preparation for displacement emerg	Tanciac	93
7.2		zencies	94 94
,.2	7.2.1 Situations demanding an emergence	v water-sunnly	94
	response	y water supply	94
	7.2.2 Emergency response strategy		95
	7.2.3 Rural emergencies		96
	7.2.4 Emergency water-supply measures	in urban areas	97
	7.2.5 Supplies for affected periurban are	as	98
	7.2.6 Short-term displacement and temporary		99
	7.2.7 Long-term emergency settlements	<u>, </u>	99
7.3			99
	7.3.1 Assessment of damage and availab	le water resources	100
	7.3.2 Needs assessment		100
- 4	7.3.3 Needs and standards		101
7.4	Same and the same		103
	7.4.1 Water sources		103
	7.4.2 Water quality and water testing in e	mergencies	113
	7.4.3 Treatment of emergency water support 7.4.4 Water movement, storage and distributed from the following sto		117
	7.4.5 Prepackaged water kits	เมนแบบ	121 124
	Topaonaboa mator nito		144

		7.4.6 Facilities for personal hygiene	124
	7.5	Operation and maintenance	126
	7.6	Further information	126
8.	Sani	tation	127
	8.1	Human waste and health	127
	0.1	8.1.1 Faeces	127
		8.1.2 Urine	127
		8.1.3 Sullage	127
		8.1.4 Solid waste	128
		8.1.5 The importance of hygiene behaviour	128
	8.2		128
	_	8.2.1 Situations demanding an emergency excreta-disposal	
		response	128
		8.2.2 Gradual improvement	130
		8.2.3 Technology choice	130
		8.2.4 Assessment	132
		8.2.5 Standards	132
	8.3	Techniques for excreta disposal in emergencies	132
		8.3.1 Defecation fields	133
		8.3.2 Shallow trench latrines	134
		8.3.3 Deep trench latrines	134
		8.3.4 Simple pit latrines	136
		8.3.5 Other types of latrine	136
		8.3.6 Site selection for latrines	138 138
		8.3.7 Management of excreta disposal facilities	139
	8.4	Disposal of wastewater (sullage)	139
		8.4.1 Assessment of the problem and design of the response	139
	۰.	8.4.2 Wastewater disposal techniques	142
	8.5	Management of refuse 8.5.1 Assessment of the problem and design of the response	142
			142
		8.5.2 Refuse storage	143
		8.5.3 Refuse collection and transport 8.5.4 Treatment and disposal	143
		8.5.5 Disposal of rubble	144
		8.5.6 Medical wastes	145
	8.6		147
9	Foo	od safety	148
9	9.1		148
	9.2	·	149
	٦.٢	9.2.1 Food control measures	149
		9.2.2 Salvageable and unsalvageable foods	149
		9.2.3 Inspection of food businesses	151
		9.2.4 Control of donated or imported food	151
	9.3		151
	5.0	9.3.1 General considerations	151
		9.3.2 Providing dry rations for household cooking	151

		9.3.3 Mass-feeding centres		153
		9.3.4 Therapeutic-feeding centres		154
		9.3.5 Breastfeeding and breast-milk substitutes		154
	9.4	Public education and information		156
		Safe and hygienic warehouse management		157
		Further information		157
10.		tor and pest control		
	10.1	The importance of vector and pest control in disast	ers and	150
		emergencies		158
		10.1.1 Assessment		159
	10.2	2 Disease control and nuisance control		159
		10.2.1 Disease control		159
		10.2.2 Nuisance control		159
	10.3	3 Available control measures		160
		10.3.1 Density reduction		160
		10.3.2 Longevity reduction with pesticides		160
	10.4	4 Environmental management for vector and pest cor	ntrol	163
		10.4.1 The benefits of environmental management		163
		10.4.2 Environmental management measures for	vector and	
		pest control		163
	10.5	5 Hygiene and personal protection		164
		10.5.1 The importance of hygiene and personal p	orotection	164
		10.5.2 Repellents		164
		10.5.3 Impregnated materials for malaria control		166
		10.5.4 Disinfection and disinfestation		166
	10.6	6 Further information		166
11	Con	ntrol of communicable diseases and prevention (of enidemics	168
11.				100
	11.1	1 The importance of communicable diseases in emer	gencies	168
		and disasters	nd anidomics	169
	11.2	2 Measures for controlling communicable diseases at	na epiaemics	169
		11.2.1 Preparedness and prevention		171
		11.2.2 Public-health surveillance		172
		11.2.3 Outbreak control		173
		3 The control of cholera: an example		173
	11.4	4 Further information		1/4
12	. Che	emical incidents		17 5
	121	1 Types of chemical incident		175
		2 The health effects of chemical incidents		175
	1 4.2	12.2.1 Toxic effects of chemicals		175
		12.2.2 Public-health effects of chemicals		175
	123	3 Operational planning and preparedness		176
	14.5	12.3.1 Multidisciplinary public-health working ar	rangements	177
		12.3.2 Vulnerability assessment		177
		12.3.3 Local incident surveillance and environm	nental	- 1
		monitoring	Millian	
		Montoling		

		12.3.4 12.3.5 12.3.6 12.3.7 12.3.8 12.3.9 12.3.10 12.3.11 12.3.12 12.3.13	Databases Reducing the probability of incidents Reducing the health risks of incidents Establishing routine procedures Conducting exercises and training	178 179 179 180 180 181 181 181 183
	12/	Dealing v	with chemical incidents	185
	12.4		Alerting the health-care services	185
		12.4.2	Best outcome assessment/estimation	185
		12.4.3	Information and public warnings—communication	
		12.1.0	skills	186
		12.4.4	Advice on protection	186
		12.4.5	Sheltering or evacuation/removal	186
			Other restrictions to protect health	186
		12.4.7	Organizing registers and samples	187
		12.4.8	Collection of samples—biomarkers of chemicals	
			and their effects	187
			Environmental monitoring	188
	12.5		ng the impact on public health	188
			Health impact assessment	189
	12.6	Further i	nformation	190
12	Dad:	ation on	nergencies	191
13.				191
			onsequences of radiation	191
			n from nuclear incidents onal and local response to a major nuclear accident	131
	15.5		liance with the Convention on Early Notification and	
		-	ice Convention	191
	134		of WHO in a radiation emergency	193
			on of effects	193
		_	ent exposure to radioactive material	196
			information	197
14.	Mor	tuary se	rvice and handling of the dead	198
	14.1	Recover	y of the dead	198
			ation of the mortuary	198
	14.3	3 Identific	ation of the dead	199
	14.4	l Handling	g the dead	199
			nial aspects	200
	14.6	5 Further	information	201

			'Xi
15.	Heal	th promotion and community participation	202
	15.1	Definitions	202
	15.2	Hygiene promotion and community participation in the	
	15.0	disaster-management cycle	203
	15.3	Community participation	204
		15.3.1 Principles of community participation	206
		15.3.2 Obstacles to community participation15.3.3 Overcoming obstacles and reaching the community	207 207
		15.3.4 Community organization in urban and rural areas	207
	15.4	Hygiene promotion and hygiene education	210
	1011	15.4.1 Perception of risk and predisaster awareness raising	210
		15.4.2 The need for hygiene promotion in emergencies 15.4.3 Setting up a hygiene promotion programme in an	211
		emergency	211
		15.4.4 Participatory approach to hygiene promotion	212
		15.4.5 Environmental health messages in emergencies	213
		15.4.6 Communication methods	213
		15.4.7 Choosing an approach	214
	15.5	Further information	214
16.	Hum	an resources	216
	16.1	Professional staff	216
	16.2	Volunteer staff and employed labour	217
	16.3	Training	217
		16.3.1 Training professionals	217
		16.3.2 Training volunteers	218
		16.3.3 Integrated training exercises	218
	16.4	Further information	220
Rofe	erence		221
		.s	
wer	sites		235
Ann	ex 1	WHO model of country-level emergency planning	
Ann	ex 2	Equipment and supplies for environmental health activities in disasters and emergencies	240
Ann	ех 3	Accidental pesticide poisoning	
Ann	ex 4	International and national actions in response to a radiation emergency	245
Ann	ex 5	Selected information from the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources	
Ann	ex 6	Checklist of hygiene practices that protect health in emergencies and disasters	