



HANDBOOK OF DISASTER AND EMERGENCY MANAGEMENT

Amir
Khorram-Manesh
(Ed.)

UNIT OF SECURITY AND
PREPAREDNESS

**REGION VÄSTRA
GÖTALAND**

INSTITUTE OF CLINICAL
SCIENCES

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GOTHENBURG, SWEDEN**

Handbook of Disaster and Emergency Management

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Handbook of Disaster and Emergency Management

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*Adam's sons are body limbs, to say;
For they're created of the same clay
Should one organ be troubled by pain
Others would suffer severe strain
Thou, careless of people's suffering
Deserve not the name, "human being"*

*From Saadi Shirazi
Translated by H. Vahid Dastjerdi*

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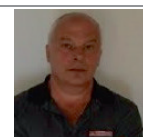
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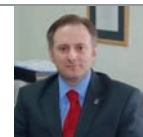
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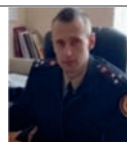
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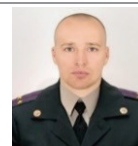
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Preface

Editor

Although disasters and major incidents are rare events, international statistics show an increasing number of such events in the last decades. Transportation incidents, increasing numbers of mass gatherings, chemical and technical incidents, increasing number of armed conflicts and terrorism are some of the major reasons for this increasing pattern. Any of these events may result in severe casualties, destruction of infrastructures and create a situation in which the number of victims may exceed available resources.

Much of the knowledge in disaster medicine has been based on the “lessons learned”. However, it has been proven that no lessons learned theoretically can actively be used in practice if the knowledge is not tested in a practical environment. In this perspective, the major clinical excellence and testing laboratories for disaster response are the scenes where disasters happen. Yet, most of the research and reports in the field are produced in high-income countries, while most of the disasters happen in middle- or low-income countries. There is thus a need to bring these two environments together in order to use the theoretical knowledge in practice and among people who are highly exposed and involved in the multidisciplinary management of a disaster or major incident.

In this project, we have initiated an academic program in which the theoretical knowledge is mixed with practical exercises in an environment that allows mistakes and repetitive learning. The blended learning model used in the program enables the use of this educational model in different countries with different resources. This program consists of theoretical lectures, seminars, internet-based learning, table-top exercises and simulation exercises. In order to standardize the knowledge and enable an easier access to the literature, this handbook was created. Many internationally known academics and field workers have contributed to produce the 30 chapters of this book. The topics included are based on research published in the literature (see introduction).

Our goal is to offer an easy and accessible book for all professionals involved in the management of disasters and major incidents. This book is no substitute for reference books in disaster medicine but should be seen as a primary introduction to the subject. I would like to thank all my co-authors for their excellent and voluntary work and the time they put into this book. My thanks also go to the EU and DG-ECHO, for their valuable contribution to the entire project

Amir Khorram-Manesh

30 April 2017
Gothenburg, Sweden

European Union

DGECHO Project coordinator

“...the idea of the future being different from the present is so repugnant to our conventional modes of thought and behavior that we, most of us, offer a great resistance to acting on it in practice.” John Maynard Keynes, 1937 (quote from “Global Trends 2030”).

The project “Standardization of Ukrainian Disaster and Crisis Management” (SUDCM) is funded by DG ECHO under the call for contribution to prevention and preparedness projects in civil protection and marine pollution in 2015.

The general objective of the project is to establish a joint academy in which different types of validated training and exercise methods can be taught as well as introducing a new master’s education in disaster and crisis management. These efforts are aiming at giving Ukraine new tools for fostering coordination and cooperation between authorities involved in disaster and crisis management coherent with international and European principles.

This guiding textbook aims at giving you an overview, outlining the various topics, of the masters in crisis and disaster management at the National University of Civil Protection on Kharkiv. It is our hope and belief it will serve as a gateway to current thoughts, ideas, and practices supporting the Ukrainian development within the field of crisis and disaster management. Bearing in mind the initial words of Mr. Maynard Keynes we sincerely hope that this booklet will aid you in challenging existing thoughts, ideas, and practices.

We would like to specifically thank the authors for their valuable contribution to our project in general and this handbook in particular.

Mikael Wilhelmsson
Coordinator SUDCM

Abbreviations

| | |
|---------|---|
| CAP | Computer Assisted Publishing |
| CBRNe | Chemical Biological Radiological Nuclear Explosive |
| CCA | Climate Change Adaptation |
| CECIS | Common Emergency Communication and Information System |
| CPM | Civil Protection Mechanism |
| DG | Dangerous Goods |
| DIPECHO | Disaster Preparedness ECHO) |
| DR | Disaster Response |
| DRM | Disaster Risk Management |
| DRR | Disaster Risk Reduction |
| EAS | European Astronomical Society |
| ECHO | European Civil Protection and Humanitarian aid Operations |
| EMS | Emergency Medicine System (services) |
| EQF | European Qualification Framework |
| ERC | European Response Center |
| ESO | Emergency Service Organizations |
| EU | European Union |
| EWS | Early Warning Systems |
| FAO | Food and Agriculture Organization |
| GDACS | Global disaster alert and coordination system |
| GIS | Geographical Information System |
| GNSS | Global Navigation satellite System |
| GO | Governmental |
| GPS | Geographical Positioning System |
| HAZMAT | Hazard Material |
| ICRC | The International Committee of the Red Cross and Red Crescent Societies |
| IDRL | International Disaster Response Laws |
| IFRC | International Federation of Red Cross and Red Crescent Societies |
| IHL | International Humanitarian Law |
| INSARG | International Search and Rescue Advisory Group |
| IOM | International Organization for Migration |
| ISDR | International Strategy for Disaster Reduction |
| JEU | Joint European Unit |
| MI | Major Incident |
| MIC | Monitoring and Information Centre |
| MMRS | Metropolitan Medical Response System |
| MRO | Mass Rescue Operation |
| MSF | Médecins sans Frontières |

| | |
|--------|--|
| NATO | North Atlantic treaty organization |
| NGO | Non-governmental |
| NIMS | National Incident Management System |
| NRP | National Response Plan |
| OCHA | Office for the Coordination of Humanitarian Affairs |
| OHCHR | Office of United Nations High Commissioner for Human Rights |
| OSOCC | On-site operations coordination centers |
| PPE | Personal Protective Equipment |
| PTSD | Post Traumatic Stress Disorder |
| SAR | Search and Rescue |
| UAS | Unmanned Aerial System |
| UAV | Unmanned Aerial Vehicles |
| UN | United Nations |
| UNDAC | UN Disaster Assessment and Coordination |
| UNDP | United Nations Development Program |
| UNEP | United Nations Environment Program |
| UNHCR | United Nations High Commission for Refugees |
| UNICEF | United Nations Children's Emergency Fund |
| UNISDR | United Nations International Strategy for Disaster Reduction |
| USAR | Urban Search & Rescue |
| VSAT | Very Small Aperture Terminal |
| WFP | World Food Program |
| WHO | World Health Organization |

Introduction

Amir Khorram-Manesh

Disaster management aims to minimize the broad consequences of a disaster and demands full preparedness with regard to organizational readiness, communication, and coordination among all partners; resource availability; and professional engagement. Preparedness may be achieved by either being exposed to many disasters or to proper educational programs. An “acceptable preparedness” is somewhat subjective and what is acceptable may differ due to the geographical and educational background of the countries and their resources, expectations, and quality demands. Furthermore, since disasters occur infrequently, opportunities for frequent exposure to disasters are rare. This necessitates educational initiatives for learning as part of a comprehensive and standardized management plan and a competency-based educational program.

The European Union (EU) is actively working to improve its preparedness by offering various educational programs and taking part in global events. Nevertheless, published data indicate that the level of preparedness within the EU is barely acceptable, especially in areas such as hospital preparedness and educational programs. A standardized management plan may be used as an educational opportunity and consequently, can be taught and evaluated. Although standardization may lead to inflexibility due to organizational differences and national legislations, it may ensure quality and uniformity of a syllabus, facilitate international cooperation, and enable evaluation and continual improvement. A set of minimal standards and evaluation metrics can be achieved through consensus, through education/training, and by using procedures and protocols concerning such key issues as communication, information, and plans.

Although there is no consensus-based definition of competency in the literature, a competency-based educational program should allow individuals or organizations to use their acquired knowledge and skill and convert them to proper actions and management in real situations. Each organization has its own requirements for educational background, the length of time to earn the degree, and type of diploma for different positions; however, managerial positions are based on people’s professional experience and related education for the specific level they work with. Thus, for educational purposes, there are different target learning audiences, and each educational initiative targets somewhat different groups.

There are 140 identified educational initiatives within the EU, most of which are multidisciplinary and competency based and encompass various subject matter experts and professions. We use the abbreviation “EIT” as most of these educational approaches are short and do not represent a national or European program or known standard. These EITs are specifically for disaster managers at different levels. However, only 3% of the programs target 2 managerial levels simultaneously (tactical + operational), while 39%, 29%, and 22% aim at tactical, strategic, and operational levels, respectively. These initiatives offer a range of diplomas (e.g., 52% offer a master’s degree and 19% postgraduate diplomas) and varying lengths of programs and attract special groups within the DM system.

We propose here a comprehensive educational program, based on the best available evidence to date drawn from recent publications intended to impart the knowledge, skills, and abilities necessary for the role of crisis manager. We expect this program to enhance the intercultural and interagency performance across the Disaster Management (DM) cycle. Here “Intercultural” does not refer to different nations and cultural background but rather to working cultures within diverse agencies. Since communication and information shortcomings are the most common reason for failed DM, this educational program focuses heavily on collaboration and interoperability between trained professionals involved in disaster response to ensure that they understand the need for collaboration and are aware of each other’s limitations and possibilities. The aim of programs such as this is not to re-educate people in respect to their profession/area of expertise, but rather to train them in elements specific to DM and ways in which they can apply their existing knowledge and professional expertise in the disaster context. Such multidisciplinary programs cover all disaster phases, accommodate the needs of each organization, and offer a safe environment where participants are able to learn by doing in an interactive environment--vertically within their own organization and horizontally together with other organizations--by focusing on shared training, cooperation, and intercultural understanding. Such programs bring some degree of standardization and offer a thorough evaluation of participants and the program by using evidence-based scientific methods. One important part of the program is to offer a standardized handbook in which all necessary information is gathered. This is not intended as a substitute for reference books, but it is intended to make the information accessible and easy to learn so that the information can be combined with the practical parts of the education.

Further readings

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Chapter One

1 Definition and general principles of disasters

Stanislav Skliarov, Kubilay Kaptan, Amir Khorram-Manesh

1.1 Summary

Disasters are inevitable, but their impact can be minimized. The management of a disaster is multidisciplinary and follows organized rules and international law. To successfully manage disasters there is a need for mutual understanding based on good communication and agreed on definitions.

1.2 Aim

The aims of this chapter are to point out the general principles of Humanitarian action, to distinguish disasters from other humanitarian actions, to describe Disaster Management terminology and to define the Prepared Community, disaster risks identification, management, and evaluation. These include the need to:

- Understand the nature and context of natural disasters and of effective ways to manage them.
- Understand natural and man-made, technological disaster types.
- Recognize linkages between natural disasters and the development process.
- Become familiar with humanitarian principles, laws, and standards in Disaster Management.
- Grasp some of the social, economic, political and technological trends and the implications for natural disaster management.
- Analyze and explain the nature of a given disaster situation.
- Understand the principles and challenges of disaster triage.
- Become familiar with intended skills and other attributes for disaster management.

1.3 Introduction

Disaster, also called “calamity” and “catastrophe” is a sudden, devastating event that causes serious disruption of the functioning of a community or a society with widespread human, material, economic and/or environmental losses which exceed the ability of the affected community or society to cope using its own level of resources. (Source: UN/ISDR 2004 and ECHO). It is a multifaceted event, open to a range of different interpretations and though often caused by nature, may also have human origins. The combination of hazards, vulnerability, and inability to reduce the potential negative consequences of risk results in disaster. Traditionally, natural disasters have been seen as situations that create challenges and problems mainly of a humanitarian nature. However, increasingly, it has come to be recognized, that human rights protection also needs to be provided in these

contexts. For a disaster to be entered into the database of the UN's International Strategy for Disaster Reduction (ISDR), at least one of the following criteria must be met: 1) a report of 10 or more people killed, 2) a report of 100 people affected, 3) a declaration of a state of emergency by the relevant government, 4) a request by the national government for international assistance.

A crisis may have numerous definitions, but can simply be defined as a turning point at which the trend of all future events, especially for better or worse is determined. It presents a cause of instability or danger, in social, economic, political, or international affairs leading to a decisive change. Disasters and crises are not connected with certain time or place, but both can happen suddenly and lead to catastrophic situations. Disasters are urgent events that have different impacts according to type and size. A disaster might not affect the vital interest of the state. A disaster cannot be prevented, but its impact might be mitigated e.g., floods, fires, etc. Crises, on the other hand, are progressive urgencies that represent a major threat to the interests of the state, are accompanied by high pressures and tensions, and can possibly be ameliorated by negotiations e.g., airplane hijacking, hostage taking, etc.

Disasters can be classified into natural or man-made disasters. Natural disasters can be divided into three specific groups: *hydrometeorological* disasters, *geophysical* disasters, and *biological* disasters. Hydrometeorological disasters are natural processes or phenomena of atmospheric, hydrological or oceanographic nature that may cause loss of life or injury, property damage, social and economic disruption or environmental degradation. These include floods and wave surges, storms, avalanches, and droughts and related disasters (extreme temperatures and forest/scrub fires). Geophysical disasters are natural Earth processes or phenomena that may cause loss of life or injury, property damage, social and economic disruption or environmental degradation. These include earthquakes, landslides, and volcanic eruptions. Biological disasters are processes of organic origin or those conveyed by biological vectors, including exposure to pathogenic microorganisms, toxins, and bioactive substances, which may cause loss of life or injury, property damage, social and economic disruption or environmental degradation. These include epidemics and insect/animal plagues. The economic impact of a disaster usually consists of direct (e.g. damage to infrastructure, crops, housing) and indirect (e.g. loss of revenues, unemployment, market destabilization) consequences on the local economy.

Technological or man-made disasters (complex emergencies/conflicts, famine, displaced populations, industrial accidents and transport accidents) are caused by humans intentionally or unintentionally or due to negligence or lack of concentration, as well as variability of interest or feeling of distress. There is also an emerging third type of disasters, which is represented in a complex from the previous two main types. This type starts with human action, then nature plays its role in increasing the magnitude of the disaster e.g., negligence in controlling agricultural pests which leads to damage of agricultural production resulting in severe consequences for the community, or negligence in reviewing

electricity connections which leads to fires in towns and electricity stations which consequently lead to human and material losses.

The United Nations Office for Disaster Risk Reduction classifies disaster and crisis in a different way. Disasters are divided into three types; **First:** *Major* disasters such as earthquakes, volcanoes, floods and tremors. **Second:** *Visible* disasters such as famine and epidemics. **Third:** *Sudden* disasters such as industrial or nuclear disasters or in general those resulting from technological development. Crises are divided into; **Intentional** (is planned such as terrorism) crises or **Unintentional** (is unplanned such as flooding) crises. Other classification might be **Internal** (caused within the organization) and **External** (caused due to external threats) crises. Another classification of crises is one based on the causal factor of the crisis. These are: 1) Crises resulting from administrative and technical hazards. 2) Crises resulting from general and external trends. 3) Crises resulting from the external surrounding environment and not due to human organization. 4) Crises resulting from natural disasters. Kippenberger lists seven types of crisis that face managers: natural disasters; technological disasters; crises of confrontation between human interests; acts of malevolence; crises due to misplaced management values; acts of deception; and management misconduct.

During the past decades, over 10,000 disasters have been reported, billions of people have been affected, and millions have been killed, all accompanied by high economic costs. According to UNISDR (UN International Strategy for Disaster Reduction), in 2015 alone, there were 346 reported disasters, with 22,773 people dead, 98.6 million people affected and US\$66.5 billion in economic damages. The objectives of humanitarian action e.g., to save lives, alleviate suffering and maintain human dignity during and in the aftermath of man-made crises and natural disasters, as well as to prevent and strengthen preparedness for the occurrence of such situations, are all documented and signed globally. The documents also describes how humanitarian action should be guided e.g., by the humanitarian principles of humanity (the centrality of saving human lives and alleviating suffering wherever it is found), by impartiality (the implementation of actions solely on the basis of need, without discrimination between or within affected populations), by neutrality (humanitarian action must not favour any side in an armed conflict or other dispute where such action is carried out), and by independency (the autonomy of humanitarian objectives from the political, economic, military or other objectives that any actor may hold with regard to areas where humanitarian action is being implemented).

General principles of Humanitarian Action are:

1. Respect and promote the implementation of the international humanitarian law, refugee law, and human rights.
2. While reaffirming the primary responsibility of states for the victims of humanitarian emergencies within their own borders, strive to ensure flexible and timely funding, on the basis of the collective obligation of striving to meet humanitarian needs.

3. Allocate humanitarian funding in proportion to needs and on the basis of needs assessments.
4. Request implementing humanitarian organizations to ensure, to the greatest possible extent, the adequate involvement of beneficiaries in the design, implementation, monitoring and evaluation of humanitarian response.
5. Strengthen the capacity of affected countries and local communities to prevent, prepare for, mitigate and respond to humanitarian crises, with the goal of ensuring that governments and local communities are better able to meet their responsibilities and coordinate effectively with humanitarian partners.
6. Provide humanitarian assistance in ways that are supportive of recovery and long-term development, striving to ensure support, where appropriate, to the maintenance and return of sustainable livelihoods and transitions from humanitarian relief to recovery and development activities.
7. Support and promote the central and unique role of the United Nations in providing leadership and coordination of international humanitarian action, the special role of the International Committee of the Red Cross, and the vital role of the United Nations, the International Red Cross and Red Crescent Movement and non-governmental organizations in implementing humanitarian action.

1.4 Knowledge needed at different management levels

Basic level,

- Definitions of elements of Disaster Management.
- Disaster Management principles.
- Information roles in Disaster Management.
- Response Management Framework (Command, Control, Coordination, Communication, Clinical Management, Containment, Continuity, Capability).
- Public Health.
- Natural disasters: earthquake, volcanic eruption, tsunami, celestial collision, climatic, high winds (gale, storm, cyclones, tornado), precipitation (rain, snow, ice), lightning (fire), temperature extremes (hot and cold), erosion, drought, desertification, floods, avalanches.
- Mixed natural + human caused: drought, desertification, floods, erosion, landslides/mudslides, fire, and infectious disease, genetic, other.
- Man-made disasters.
- Technological disasters: Release of substances (Chemical, Biological, Nuclear), transport, structural failure, explosions, fire, environmental interference.
- Conflict: Conventional war, civil armed conflict, unarmed conflict (sanctions, or embargos), terrorism, complex human emergencies.
- Mitigation, Preparedness, Recovery, and Post-Disaster management.

Advanced level,

- History and epidemiology.
- Issues, myths, and problems.
- Comprehensive Risk assessment and management.
- Political strategic planning.
- Trauma Management.
- Training and test exercises.
- Disaster plans.
- Evacuation plans.

Master level:

- Community awareness and education.
- Disaster communications.
- Management of media relations.
- Mutual aid agreements.
- Warning systems.
- Resource inventories.
- Provision of special resources.
- Ethnic and Cultural Conduct.
- Environmental risk and impact assessment.

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Chapter Two

2 Disaster cycle and management

Sobyna Vitalii, Amir Khorram-Manesh, and Lars Nyberg

2.1 Summary

There is a direct relationship between disasters and crises. While disasters can create crises due to the recurrent losses they inflict, a crisis can also create other disasters. There are different types of disasters and crises that consequently demand diverse methods and strategies to be confronted and prevented. These strategies require scientific administrative approaches, including planned and coordinated structure to confront disasters and mitigate their impacts. Strategic planning requires improvement and development of organizational structures of disaster management to become more efficient by using for example early warning systems. The best approach to diagnosing crisis and disasters is the integrated study method.

2.2 Aim

This chapter aims:

- To review the general basis of disasters and crisis management and determination of the strategies needed for defence and confrontation.
- To identify effective strategies and actions for prevention and management of different phases of a crisis.

2.3 Introduction

There are different phases in a disaster. Each phase has its own characteristics and challenges. Many books and reports describe these phases as Mitigation, Preparation, Response, and Recovery. Attention should be given particularly to the phases Response and Recovery, which may occur simultaneously in the same entity. One such example is hospitals in which the emergency department may be finished with its response and start recovery, while at operation theaters response just starts and recovery may take a long time after the end of the disaster. The speed of effect of disasters also differs. There are rapid effect and slow-effect disasters. Rapid effect disasters are made up of the following phases, which are not necessarily applicable in all cases:

Damage-mitigation phase: Includes all procedures conducted before the occurrence of the disaster, as well as preparations that aim to reduce the rate of threats.

Preparations phase: Includes steps taken to reduce the expected damage, mortality and organizing transportation operations for individuals from threatened positions to other

positions.

Relief phase: Comes directly after the occurrence of the disaster and includes rescue works, looking for survivors and meeting victims' basic needs.

Rehabilitation phase: Includes decisions that are made after the occurrence of the disaster and intended to return the population to the pre-disaster state.

Reconstruction phase: Includes procedures that are implemented after the rehabilitation phase to reintegrate affected persons from a disaster into a settlement or complete return for pre-disaster phase.

Slow disasters include, in addition to the phases of rapid disasters, an early warning phase. Early warning is an important strategy to save lives and reduce damage. However, the magnitude of the task of designing, implementing, and sustaining early warning systems in communities is challenging.

There are numerous suggestions for the various phases of crisis management. One such classification is;

- **Pre-crisis** - warning stage of an impending crisis, prevention, and preparation.
- **Crisis response** – responding to the acute crisis.
- **Post-crisis** - recovery or clean-up, lessons learned etc.

Disaster management can simply be defined as taking immediate and proper measures to cope with disasters and their components and consequences under time pressure and threat due to looming danger and the lack of adequate and accurate information and other resources. Such actions need to be planned. Lack of proper attention and failure to draft strategic plans for managing disasters in a scientific way might lead to a crisis that can lead to the destruction of institutions and systems.

Disaster management and prevention differ according to the type and size of the disaster as well as degree of its severity. Planning should include strategic planning, defining specific objectives, strategic analysis of the environment, using prediction tools related to the type of crisis and hazard analysis, coordination of efforts and effective design of organizational structures. Disaster risk can be managed by taking steps that reduce the potential impacts of disasters, such as building dikes and preventing the construction of housing and infrastructure in flood-prone areas.

There are **many basic approaches for diagnosing disasters and crises** which can be reviewed as follows:

Descriptive and analytical approach: The phases of a disaster are studied to determine, describe and analyze its features, general characteristics, and consequences.

Historical approach: Uses information about any disaster or crisis in a historic perspective to identify the causal factors of the crisis or disaster.

Systems approach: Looks into the components of the disaster or crisis as a system and it is based on a set of integrated systems each of which has a role in the occurrence of crisis or disaster.

Environmental approach: Considers the crisis or disaster as a result of its own environment where there are factors that create the climate of crisis or disaster and studies its surrounding environment.

Case study approach: Studies each crisis or disaster individually or as an independent case considering that each case is unique in terms of time, place and the subject of the crisis.

Comparative studies approach: Compare various disasters and crises to determine the differences among them in a form that allows progress and activity to manage them.

Integrated studies approach: Integrates all the above-mentioned approaches in studying crises and disasters. This approach is based on three perspectives upon handling of crises which are either within the crisis or at its margin or away from it even though the study area is affected by the crisis. These are: 1) Deep vision that explores the root causes of the crisis, its reasons, and motives through the phases of its development, 2) Wide encompassing vision of the crisis and its extent and supporting and neutral elements and forces, 3) Forecasting vision that looks forward and is based on forecasting and expectation of what can take place in terms of subsequent developments besides their risks, size of losses, costs, etc.

There are **two types of methods for handling crises and disasters, traditional and non-traditional methods.**

Situation-based methods:

1. **Ostrich style (the escape):** Elimination of stress and confusion that is created due to the intensity of the crisis or when the decision-maker feels unable to confront it. The style of escape takes many forms such as direct escape, indirect escape, avoiding responsibility, focusing on another dimension, and projection.
2. **Jumping over the crisis style:** Pretending that the crisis has been contained through concentrating on the familiar parts in which there was previously experienced in handling. It leads to leaving issues unaddressed until they emerge more severely and sometimes violently.
3. **Submissive style:** The use of force to make an agency in charge retreat from its position and not responding to demands whatever the extent of the threat.
4. **Concessional style:** Submission and surrender to the demands of an opposite party in order to end the crisis.
5. **Bargaining style:** Negotiation with the opposite party in order to reach a settlement of the crisis. It requires some concessions in return for mutual concessions from the opponent. The bilateral demands should be equal and do not exceed the limit needed to provide a concession.

Evidence-based methods: These methods are based on the use of scientific and administrative systematics and use of basic management functions:

- 1. Planning:** Planning is the general framework for dealing with the crisis or disaster. It refers to the identification of what the problem is, what can be done, and how it should be done. Then it can be related to the facts of the crisis, the changes, prediction of future events, preparation for emergencies and drafting scenarios for effective treatment. Planning as a scientific tool determines handling methods, time, efforts, material and human resources needed for managing crises and disasters before their occurrence. Strategic planning is based on internal and external analysis processes, determination of mission, future vision and strategic policies.
- 2. Organizing:** Is needed for effective management of disasters and crisis; coordination that lead to the unification of efforts and integration for handling crisis. It must have a proper structure that defines individual activities and works tasks and responsibilities for managing disasters. In addition, it spreads organizational culture and provides suitable and efficient communication.
- 3. Directing:** Official orders (written instruction and approved) are needed to confront the incident directly, rapidly and properly. This process needs knowledge of the available internal capability of the systems including human and material resources. Proper directing utilizes available scientific methods, charts, pictures and diagrams to define tasks as well as explaining their nature, distribution, and interrelationships through meeting involved stakeholders. Success is culture-dependent and not all participants may be familiar with such procedures.
- 4. Controlling:** The process of following up directions to ensure the effective, prompt and complete execution of work tasks. This requires prior control of available resources and their effectiveness, tight control of the activity of crisis teams, determination of limitations, and handling each aspect of deviation from the plan in prior- and post-control.

Strategies for confronting disasters are:

- Developing early warning, information and communication systems.
- Developing confrontation plans according to priorities in the sources of threat.
- Assembling and storing stocks of medical and food supplies, rescue tools, etc.
- Preparing plans for mobilization of emergency forces, engineering equipment, logistic and communication, volunteers, accommodation centers and disasters management teams.
- Deciding the role of all governmental authorities and relevant ministries concerned with disasters and related to their responsibilities and coordinating their efforts.
- Deciding priorities of confronting disaster in case they are multiple in one area.
- Handling phobic situations related to the disaster via enhancing morale, awareness and proper management of the incident and preventing social unrest.

- Leading and control, and taking rapid and proper decisions without hesitation or discrepancy in instructions for participating authorities.

The strategy of preventing and confronting disasters requires a step-by-step approach.

First: Studying and recognizing the nature, type, size, potential, and consequences of anticipated disasters and the relevant authorities for confrontation.

Second: Determining the prerequisites of confrontation for all types of disasters e.g. skills, facilities and needed resources, drafting relevant legislation, establishing regional and international cooperation to control disasters.

Third: Defining the priorities for confronting various disasters and estimation of costs.

Fourth: Developing relevant programs for confronting disasters while taking their suitability to the needs and capabilities of the local population into consideration.

Fifth: Execution of scheduled plans and program that are translated into estimated balances, staff and specific organizations, and the follow-up, control and evaluating the roles of expert teams in the activity.

2.4 Knowledge needed at different management levels

For basic, advanced and master levels

- **Prevention and mitigation:** To minimize the impact of a disaster with proper planning and actions using:
 - 1) Scientific hazards analysis (natural and man-made).
 - 2) Vulnerability analysis (elderly, children, pregnant, etc).
 - 3) Risk assessment and mapping.
 - 4) Simulation and modeling.
 - 5) Structural mitigation; buildings, stock assessment, etc.
 - 6) Non-structural mitigation; awareness campaign, training, and capacity building.
- **Prediction and warning:** This part can be included in the prevention and mitigation phase or as a part of preparedness and planning. In this phase, we should use all our technological know-how to predict/diagnose a disaster and obtain necessary measures to prevent and or mitigate. These technologies include any one or all of:
 - 1) Monitoring.
 - 2) Forecasting.
 - 3) Early warning.
 - 4) Scenario identification.
- **Preparedness:** Preparedness will minimize the negative impacts of structural and non-structural damages where prevention and mitigation fail. In order to be prepared, we

need to have good plans for every part of the society, based on a risk and vulnerability analysis. The plans are:

- 1) Resource inventory planning.
 - 2) Stockpiling planning.
 - 3) Logistical planning.
 - 4) Evacuation planning.
 - 5) Communication planning.
 - 6) Needs assessment planning.
-
- **Response:** In this phase, we use all knowledge collected from earlier phases to cope with a disaster. Available plans built upon risk and vulnerability analysis and resource assessment etc. will now be brought into play. The immediate or delayed reaction which depends on the type of event will start a chain of reaction in the society concerned and among all authorities involved in disaster management. This phase may consist of activities that may blend into one another:
 - 1) Situation analysis.
 - 2) Early damage assessment.
 - 3) Crisis mapping.
 - 4) Information, communication with stakeholders.
 - 5) Evacuation and shelters.
 - 6) Dispatching of resources.
-
- **Relief:** This phase may start early or late due to the sustainability of the infrastructure and logistics, but is basically about prioritizing actions to save lives, and thus may start during the response stage. Special consideration should be made for vulnerable groups and those at home with the high need for medical instruments. It includes:
 - 1) Search and rescue.
 - 2) Rubble and debris removal.
 - 3) Logistics.
 - 4) Delivery of relief supplies.
 - 5) Prioritizing actions.
-
- **Recovery, Reconstruction, and Rehabilitation:** This is the most challenging phase of the disaster cycle and covers a wide range of actions. Perhaps the most demanding element is to review and evaluate the disaster management process to see whether it could have been managed better in preparation for possible future disasters. This phase may include:
 - 1) Spatial planning.
 - 2) Infrastructure.
 - 3) Communication.

- 4) Water, hygiene, sanitation.
- 5) Housing.
- 6) Livelihoods.
- 7) Social security.
- 8) Transport.
- 9) Agriculture.
- 10) Evaluation

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Chapter Three

3 Functions needed in disaster management

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3.1 Summary

A variety of functions is needed in mass disasters. They are interdependent in a “house of cards” fashion composed of algorithms, papers, and concepts. Removing or disabling even only one of the above functions can lead to disastrous effects. Only if all function in a proper manner can human casualties, and material damage caused by a mass disaster be attenuated or minimized.

3.2 Aim

The aim of this chapter is to describe some needed functions for disaster management. Resources and availabilities are different in various countries, thus these functions might be reduced or expanded in different situations.

3.3 Introduction

Disaster Management means to organize and manage the available resources and responsibilities for dealing with all humanitarian aspects of emergencies. Specifically, this is divided as a process conceptually into preparedness, response and recovery phases in order to lessen the impact of disasters. Earlier reports and lesson learned have identified necessary functions for good and successful disaster management.

- **Hazard Identification and Risk Assessment:** This is a broad area that includes the expertise of local, as well as national/international expert teams. Their role is to identify the potential risks and hazards with the greatest influence on human lives. Furthermore, these teams need to assess the potential magnitude and consequences of the hazard, as well as the preparedness of the endangered region and the secondary effects/impacts of the incident.
- **Hazard Management:** Is defined as a process to eliminate, reduce or mitigate the effect of hazards.
- **Authorities and Law:** In the case of mass disasters, common laws are often insufficient and/or not applicable. A legislative basis for disaster management activities across all levels of government must be formed. Among others these legislative acts define:

1. A strategic policy framework for disaster management.
 2. Each individual's responsibility and operative conduct in disaster operations.
 3. Priorities in the case of extreme disasters.
 4. Translation of the prepared disaster plans into legislative instruments including consideration and actions for the request, receipt, and management of international assistance into the host nation's disaster response structures and operations.
- **Resources Management:** Resource management is one of the most important features in disaster management. Human, as well as material resources, are almost always scarce in mass disaster incidents.
 - **Planning:** Effective planning in mass disasters includes several steps:
 1. Hazard identification.
 2. Risk analysis and hazard prevention.
 3. Resource identification and allocation in weak spots.
 4. Detailed disaster operation plan.
 5. Strategies for implementation of such a plan.

These plans can be nationally, regionally or locally specific due to a large variety of possible scenarios. Furthermore, detailed disaster records are to be maintained in order to develop a good scientific base for later evaluation and re-analysis.

- **Coordination, Command, and Control - Incident Command System:** This function defines the oversight of mass disasters. Primary monitoring and magnitude assessment, directing the emergency services, coordination between different services. It also serves to establish a primary command center and lower levels regional centers. This function is also necessary for the monitoring of recovery after a mass disaster.
- **Communications:** In mass disasters function in both vertical and horizontal directions. It is extremely important for each rescue service to know their communication direction. In practice, lower levels communicate primarily vertically, and only higher command levels communicate both vertically and horizontally. The main reason for this is to avoid the so-called "over-communication" and disorganization that may arise, especially if communication starts horizontally in lower rescue levels (near the scene, rescue services etc).
- **Warnings:** This is the general warning/alerting system. It serves to alert rescue services, important organizations, and government officials as well as the general public of the threatening disaster and the correct conduct.
- **Public Information Management:** Is connected with the warning function, informing and educating the public in order to minimize mortality as well as the loss of property and general resources.
- **Logistics and Facilities:** Includes the necessary facilities and services needed in immediate disaster response and recovery operations.

- **Education and Training of Emergency Personnel:** One of the most important functions. It merges all available medical, fire-fighting, police etc. training algorithms. It also includes public official, as well as, mitigation personnel training. It begins with the assessment of the available training programs, followed by their improvement and development through training models and simulations and of courses on their implementation in specific disasters. After the disaster is resolved, the training programs are reassessed using disaster data to evaluate the outcome and if possible improve the weak points.
- **Education and Training of the Population:** This function is related to the public information function. It serves to develop and implement public education and information programs in order to minimize casualty numbers and property loss.
- **Administration and Finance:** Regulates administrative and financial procedures before, during and after a disaster.
- **Interoperability Service:** An infrastructure with common service functions that enables different automated information systems to “talk to each other.” Disasters are often not linked with only one town/region. Lack of communication channels between them (if they are not defined and regulated) can lead to regional over/under service. One town/region can suffer little with massive resources and others can suffer much more because of scarce resources. Interoperability service can serve to mitigate these differences.
- **Mutual Aid:** This is a vital segment of disaster planning. It represents pre-incident plans developed and agreed between different jurisdictions (regions, states, and nations) for mutual aid in case of overwhelming disasters. It regulates legal aspects, and procedural resources including licensing, liability and compensational issues, manpower, and technology in disaster management. It serves to enable multiple jurisdictional centers maximum quality service with limited individual resources. These concepts vary from only humanitarian (food, drugs, water, and technical resources) to full medical, as well as military and other human resources help.
- **Managing Volunteers and Donations:** In many mass disasters, volunteers have been inadequately used and medical/financial donations have been misplaced and even stolen. This function is needed to regulate the recruitment of volunteers, their organization and education, and their correct field deployment in order to maximize the positive effects and minimize negative effects. Donations are directed to a single account/storage facility and then deployed from a central command center in order to ensure correct utilization and keep records.
- **Surge capacity:** Different mass disasters present different challenges for surge capacity. In infectious diseases outbreaks, we often have a gradual influx of patients. In terrorist bombings, on the other hand, a massive surge of victims can block emergency departments within minutes, arriving by their own or mass transport resources. Many of these patients are not seriously physically injured but rather suffer

from psychological shock. They can, nevertheless, block emergency departments for severely injured victims arriving later. Finally, the possibility of injuries to rescue workers arriving later during mass disaster management process must also be taken into account when preparing surge capacities.

- **Tactical Emergency Medical Service:** This is a specific function. Conventional emergency medical services are often not prepared for specific mass disaster setting, especially if their own lives are threatened. Good medicine can be bad tactics in the field, and emergency services involved in mass disasters must have the specific tactical training to ensure best medical care with minimal rescue casualties. Special training courses are already being developed teaching EMS how to perform in for example terrorist bombings and similar events.
- **Medical Intelligence: Coordination of emergency management** is essential in case of mass disasters. A medical intelligence center gathers information through cooperation with other services. This provides a centralized coordination facility which then improves field coordination between medical and other services. Some towns/regions already have their own centers that can be modified if necessary, but a mobile center can be established in a case of a mass disaster in the area without a center of their own.

3.4 Knowledge needed at different management levels

Basic level:

- Basic knowledge of the functions needed in disaster management.
- General information on different services involved.
- Understanding horizontal and vertical communication.

Advanced level:

Basic level+

- Definition of each of the above functions.
- Analysis and planning of surge capacities.
- Knowledge and usage of the interoperability service.

Master level:

Advanced level+

- The possibility of coordinating emergency medical services.
- Creating and improving algorithms for public population training.
- Analysis of information gathered through medical intelligence centers.
- Analysis and development of documents for mutual aid.

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Chapter Four

4 Risk and vulnerability analysis

Amir Khorram-Manesh, Lars Nyberg

4.1 Summary

The purpose of this chapter is to offer an overview of the knowledge in the application of risk management theory, by covering following subjects:

- 1) Risk analysis methodology, the fundamental theory of risk.
- 2) Development of information security policy and programs based on a risk analysis approach.
- 3) Application of risk analysis methodologies as they apply to the information systems field, and the relationship between the risk management process and business objectives and/or organization mission and the maintenance of information systems.

Participants should be able to demonstrate knowledge in risk management and risk analysis, in vulnerability assessment techniques, and hazard analysis techniques. They should also be able to plan vulnerability assessment, hazard assessment and risk analysis projects, to prepare and present business-based recommendations for expenditure of security funds, and be able to apply risk management principles throughout the software and systems development lifecycles to include continuity.

4.2 Aim

The aim of this chapter is to give the participant knowledge/ability of:

- 1) A proper Risk Management and Risk Analysis techniques and methods.
- 2) Vulnerability Assessment techniques.
- 3) Hazard Analysis techniques.
- 4) How to plan Vulnerability Assessment, Hazard Assessment, and Risk Analysis projects as they relate to Physical Security.
- 5) How to prepare and present business-based recommendations for expenditure of security funds.
- 6) How to develop administrative policies and procedures required to administer a Physical Security requirement in a secure environment.
- 7) How to develop plans for Business Continuity/Disaster Recovery and Incident Response.
- 8) How to develop plans that address facility access and the protection of structures and components that contain the automated information system and network equipment.
- 9) How to develop a Physical Security awareness program.

- 10) How to facilitate physical safeguards that meet established requirements for data storage, and to understand the requirements for a Site Physical Security Analysis.

4.3 Introduction

Risk analysis is based on the recognition that risk is the result of the link between hazard and vulnerability of elements affected by the hazard. The goal of risk analysis is to use this link to estimate and evaluate the possible consequences and impacts of extreme natural events on a population group and their basis for life. This involves impacts at the social, economic and environmental levels. Hazard and vulnerability analyses are parts of risk analysis, and are inseparable activities; vulnerability analysis is not possible without hazard analysis, and vice versa. Hazard analysis investigates, identifies and documents natural hazards (drought, floods, landslides, earthquakes, etc.), their causes and impact chains. Knowledge of the types of hazard is essential for analyzing and assessing risks. The resources required for an analysis depend on the situation. A simple analysis with modest data input may be sufficient, or comprehensive investigations and elaborate studies may be required to document hazard potentials.

To be able to estimate and evaluate the degree of risk and the characteristics and scale of possible loss from extreme natural events, it is necessary not only to estimate the probability of occurrence but also to investigate the force and duration of the event. However, before this detailed study, it is necessary to establish how far population groups and their bases for life are potentially affected by the event, i.e. how susceptible they are to the event and how vulnerable they are to this hazard. If there are no vulnerable populations or elements at the site of the hazard, no hazard analysis is required, as in this case, the extreme natural event does not constitute a hazard.

A new area, which should be subjected to hazard and vulnerability analysis is the internet and digital information technology. Information security policy and programs are a set of policies and programs issued by an organization to ensure that all information technology users within the domain of the organization or its networks, comply with rules and guidelines related to the security of the information stored digitally at any point in the network or within the organization's boundaries of authority. One area of concern is the healthcare system's daily registration of vast amount of very private patients' information. There is thus quite rightly a requirement on those that handle data to have in place security supporting policies and programs that are in turn subject to an annual audit. Another area concerns the information stored and distributed by satellites, which should also be considered a risk area, especially in the field of geospatial support during a disaster.

4.4 Knowledge needed in different management levels

Basic level:

- Introduction to Risk Management, Risk Management, and major emergency management discipline.

- Hazards Risk Management at the national level.
- Risk Management lessons for the international level.
- A Hazards Risk Management approach.
- The mitigation plan: building support, forming partnerships, and involving the public.
- Establishing a context for Risk Management. Identifying hazards, scope vulnerability, and understanding capacity.

Advanced and Master levels:

Basic +

- Risk Management lessons from the private sector.
- Assess risk, identify and assess risk reduction measures, financing risk reduction.
- The mitigation plan: implementing, marketing, and supporting risk reduction efforts.

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Chapter Five

5 Ethical aspects of disasters

Kubilay Kaptan, Amir Khorram-Manesh

5.1 Summary

The challenge of working morally and ethically means that learners will inevitably encounter situations where there are competing obligations. In such situations, it is tempting to retreat from all moral and ethical analysis in order to escape a sense of what may appear to be irreconcilable ethical tension. This chapter is intended to be of assistance in such circumstances by directing attention to the variety of ethical factors that may need to be taken into consideration and to alternative ways of approaching ethics.

The field of disaster management and the practice of crisis management are rife with ethical dilemmas which can impede and severely affect the ability of international crisis response teams to act. Civil disaster response teams may, at any time, be faced with on-the-spot ethical dilemmas that must be dealt with, for the sake of the affected population as well as the response teams own mental and psychological health. Such dilemmas come about because of limited resources, the need to choose between difficult options and inconsistencies between the aims and backgrounds of relief teams and of actors in the host country.

Ethical problems and dilemmas will face the disaster relief team and its managers at every step of the process.

5.2 Aim

The aim of this chapter is to prepare the individual member of a disaster relief mission to incorporate ethical considerations into relevant activities. Specifically, the following objectives are to be attained:

- Sensitize the trainee to ethical dilemmas in disaster relief work.
- Insofar as possible, provide the trainee with examples of ethical dilemmas and solutions to such dilemmas.
- Alert managers of teams and projects to the presence of ethical dilemmas and the limits ethical issues can place on disaster relief work.
- Demonstrate an awareness of the professional and ethical responsibility necessary within the fields of disaster management and sustainable development.
- Address ethical issues, including social justice, gendered interventions and environmental responsibility in project design discussion for both rehabilitation and development projects.
- Humanitarian Principles, Laws, and Standards in Disaster Management.

- Analyze the ethical dimensions of project design.

5.3 Introduction

Disasters pose a major threat not only to the survival of populations and societies as a whole but also to the dignity and safety of individuals and to the preservation of the natural, cultural and environmental heritage. The chaos and disorganization in the society caused by disasters result in a serious violation of the entire range of human rights. Although all populations may be affected by various human right infringements, the outcome is more evident in vulnerable societies; risk exposure limits resilience and affects individuals, communities and the environment based on their vulnerability. Thus, more vulnerable groups and societies are more strongly affected by disasters and have less resilience, yet, they are often not given priority in prevention strategies or operational manuals. Considering the impact of disasters on human rights, in the absence of a specific universal binding legal instrument, it seems imperative to formulate essential ethical principles as part of a minimum set of ethical standards for the various parties concerned in prevention, action and reconstruction strategies. Increased resilience is dependent on reducing vulnerability as a whole, whether it is linked to poverty, gender, health, insecurity, family break-up, fear or panic; that reduction requires ethically responsible practice.

The international community, local, regional and national authorities, international organizations, non-governmental organizations, and companies have a duty to adopt prevention, assistance and reconstruction measures to protect individuals, natural, historical and cultural heritage, property and means of development and subsistence from disasters, while taking account at all times, in all places and without discrimination, of the need to protect the fundamental rights of those concerned.

Healthcare providers, in particular, have an obligation to deliver care and services consistent with professional ethical standards. In the event of a catastrophic natural or human-caused disaster, these obligations can become complicated under crisis standards of care when difficult decisions may need to be made about the allocation of resources. In medical disaster planning, consistency, fairness, effectiveness, and transparency are best achieved by engagement with stakeholder communities so that planning is informed by the values, norms, and moral traditions of that community.

The cross-border impact of disasters should not be forgotten and requires preventive measures, a common, concerted response, co-operation between governments and local and regional authorities, and the involvement of civil society. At all events, only better anticipation and improved prevention will be able to reduce the risk of deliberate or unintentional breaches of the human rights liable to affect both direct and indirect disaster victims.

Good governance in disaster management requires the straightforward participation of the population in the planning and decision-making processes regarding the reduction of risks linked to natural and technological eventualities concerning them.

Good governance also forces people to account for their actions and hence reduces the risk of corruption in government, in civil services and in society. Finally, it should be emphasized that the human rights of indigenous communities and local populations require special protection, taking account of their customs, cultures and particular relations with the environment, which make them more vulnerable to the risks of disaster, while emphasizing the importance of their knowledge of the locality and its history to risk prevention and reconstruction.

There are some general ethical principles on disaster risk reduction and people's resilience, which can be briefly listed:

Solidarity: Between nations and people to strengthen disaster resilience and help victims, especially vulnerable groups. The costs and burdens of disasters, as well as the benefits of risk reduction measures, should be shared equitably.

Joint responsibility: All stakeholders have a joint responsibility in disaster risk reduction and efficient contribution in the face of emergency situations.

Non-discrimination: All steps in the management of a disaster's various phases, including fundamental human rights should be secured and implemented without any discrimination of any kind.

Humanity: All individuals, including vulnerable groups, should be treated based on humanity and with respect, tolerance, and compassion, regardless of the nature, origin, duration and place of the disaster.

Impartiality: Disaster prevention, preparedness, relief and recovery measures should be implemented and provided on the basis of genuine needs alone, without any favoritism between or within the population groups concerned.

Prevention: All authorities from national to the local, have a responsibility to implement preventive measures with the most active involvement possible, more than all other stakeholders. Various variables such as geography, demography and climate change, should be taken into consideration.

The role of the media: The media plays an essential role in informing the public and raising awareness through reporting, and forecasting disasters and the way they evolve. They must treat disaster victims with dignity and with full respect for their privacy.

Neutrality: Measures for the management of all phases of disasters should be taken without political, racial, religious or ideological debate, and with the sole aim of protecting individuals and their rights, the environment, property and heritage, and thereby strengthening resilience to this type of event.

Co-operation: States should co-operate, regardless of political, economic, social and cultural differences and according to their capacities, to strengthen disaster resilience and to secure respect for human rights, showing particular regard for the possible cross-border impact of disasters and the need for joint action.

Territorial sovereignty: States should guarantee human rights not only for their nationals but also for foreigners on their territory including humanitarian assistance teams from abroad at the time of disaster.

Autonomy: Respect for other persons' right to be self-governing.

Beneficence: A commitment to promoting other's wellbeing.

Non-maleficence: A commitment to avoiding harm to others.

Self-respect: Fostering the learner's self-knowledge and care for self.

Since a disaster's various phases consist of different risks, events, and measures, diverse ethical principles may be applicable to the period before, during or after a disaster.

Ethical principles applied before disasters

- The introduction of prevention measures to the entire population.
- The right to a healthy environment.
- Education, training, and awareness-raising about resilience to disasters.
- Prior information.
- The right of participation in all phases without any restrictions.
- Freedom of expression.
- Access to justice.
- Disaster prevention at the workplace.
- Disaster prevention in recreation and tourist areas.
- Disaster prevention in public places, particularly schools and hospitals.
- Special prevention measures for the most vulnerable groups.
- Organization of and participation in emergency drills.
- Preventive evacuation of populations.

The ethical principles applied during disasters

- Humanitarian assistance for all.
- Information and participation during disasters.
- Compulsory evacuation of populations.
- Respect for personal dignity.
- Respect of personal rights.
- Emergency assistance for the most vulnerable persons.
- The importance of rescue workers respects for human rights, dignity, humanity, solidarity, hope, and impartiality.
- Measures to safeguard and rehabilitate the environment.
- Necessary measures to safeguard and restore social ties (meeting places, places of worship and places for leisure activities).

The ethical principles applied after disasters

- Strengthening resilience to the effects of disasters (getting back to normalcy).

- Necessary measures to adopt the requisite measures to ensure that human rights are protected and promoted during all reconstruction and rehabilitation work, and to investigate infringements of those rights.
- Protection of economic, social and cultural rights.
- Protection of civil and political rights.

5.4 Knowledge needed at different management levels

Basic level:

- Awareness of ethical dimension in general.
- Ethical theories and ethical principles.
- Knowledge of main ethical principles regarding medical care.
- Introduction to main ethical dilemmas for disaster workers.
- Ethical Principles applied during and after disasters.

Advanced level:

- History of Ethics in medicine and healthcare.
- Global Ethics.
- Practice in dealing with main ethical dilemmas for disaster managers.
- Medical ethics (patient-doctor relationship) vs. public health ethics (greater good).
- Requirements and demands of host governments vs. population needs.
- Ethical issues during a pandemic.
- Interests of donor governments vs. interests of the host country.
- International cultural standards of religious, ethnic, and gender equivalence versus local cultural, religious, social, political, and other preferences.
- Awareness of ethical responsibility towards rescue workers.
- Ability to conduct operations with due transparency.

Master level:

- Refresh knowledge of Advanced level.
- The guiding principles on internal displacement.
- Code of Conduct for International Red Cross.
- Crisis standards of care.
- Deepen knowledge of and practice in dealing with ethical dilemmas which concern a disaster manager's interaction with national and international institutions, local institutions, and the public.

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Chapter Six

6 Legal aspects in disasters

Michael Ashkenazi, Denys Liebidiev

6.1 Summary

Nearly all actions during disaster response will have legal implications. Each country will have its own legal considerations, limitations, and possibilities that will affect activities and outcomes. It is important to get acquainted with potential legal issues that may affect the outcome of any incident, and with the legal framework of the affected nation. International and national legal perspectives of all incidents should be respected and well-studied at all managerial levels.

6.2 Aim

The aim of this chapter is to give participants, at their respective levels, the required awareness of the multitude of legal issues inherent in decisions and actions in disaster response. For all levels, it should become clear that awareness and knowledge of legal consequences and requirements apply to nearly all actions in disaster response. Not everybody will or should have a lawyer by their side, but all actions and decisions should be conducted in accordance with European and International Humanitarian Law as well as being subject to local legal frameworks. This applies to general managerial responsibilities, as well as specific situations in a disaster response. This chapter is intended to familiarize the student with legal issues that can affect disaster response teams, but does not replace any legal references and is not intended to denote any legal documentation.

6.3 Introduction

For volunteers at a disaster scene, the main goal is to help, to prevent the worst, to do well; legal documents or considerations of liabilities seem out of place. Yet legal considerations are becoming more of a factor in disasters. For example, a decade ago emergency service organizations (“ESOs”) were rarely sued, rarely questioned and rarely thought to be affected by legislation such as Occupational Health and Safety acts. This is no longer the case, and ESOs and their employees and volunteers need to be aware of legal aspects of what they do. All actions in a disaster response will take place within some legal context and some activities will require legal consideration. Some of the most prominent issues include:

- Who can declare a situation to be a disaster and what changes will that bring to the legal framework under which the disaster relief team is working?

- What are the legal procedures and consequences in a multinational disaster response?
- To what degree can professional considerations override individual rights (For example, if an area needs to be evacuated – can you force residents to leave? What if they refuse)?
- Who is legally responsible for a response team on the foreign nation (For example, what happens if a volunteer makes bad choices or turns out to be incompetent)?
- What is the liability of personal decision-making in a disaster in another country (For example, what the local legal parameters are of “best choice in a bad situation?” How is this to be proven in court?)
- How can a response team access state funding or resources (For example, how does one account for funds acquired locally)?
- What are the legal obligations for cross-border personnel and materiel movement (For example, visas, work permits, import licenses, customs duties for emergency equipment, supplies, and personal medical luggage)?
- What is the legal frame for the involvement or partnership with military forces (For example, requests for transportation, for security assistance, demands by armed forces for priority treatment of soldiers)?
- Who is legally responsible for coordination of international response?

One major problem is that there is no single all-inclusive international law for disaster response. The International Red Cross has published studies for many individual countries over the past three decades, trying to improve their awareness of the need for disaster preparedness and attempting to establish legal frameworks to make international work easier. Nevertheless, to date, the attempt to establish standard International Disaster Response Laws (IDRL, called simply “Disaster Law“ since 2011) has been hampered by the dispersed nature of these laws, lack of awareness, significant gaps in scope and coverage and non-implementation of relevant instruments among the key stakeholders. The gaps are particularly evident in the areas of quality and accountability, which benefit mainly from “soft” legal regimes emphasizing voluntary compliance.

DRM (Disaster Risk Management) laws should define the priorities, institutional mandates and other aspects of a national DRM system. In practice, DRM laws vary cross-nationally, in the extent to which they include themes such as national DRM policy and planning, local government responsibilities, resource allocation, community and civil society participation, early warning systems (EWS), and education and public awareness. In some cases, these themes are part of a dedicated DRM law, and in others, they are included in separate or companion laws that form part of the legal framework.

Although Disaster Risk Reduction (DRR) is highly prioritized and integrated into DRM laws in some countries, in others, there is still considerable potential to make DRR a higher priority in the respective legal frameworks and in their implementation. DRR is often a more distinct priority in policies, plans and strategies, which can be used both to

set the agenda for the law reform process and as a key tool to guide the implementation of laws. A single agency, such as a national disaster management agency or a civil defence office, is often established as the national focal point for cultivating a whole-of-society approach to DRR and providing national leadership and policy direction. However, these offices often need to strengthen their legal coordination with other sectors and stakeholders, especially those related to development planning and climate change adaptation (CCA). They also need to be given clear legal mandates and authority for DRR, matched with mandated resources and capacity. Funding for DRR from the national to the local level has been a challenge that has hampered implementation in many countries.

DRM laws in some countries make special provision for the participation of civil society and communities, including women and vulnerable groups, such as the socially excluded, the elderly, people with disabilities, children and the poorest people. However, in practice, there is often less participation in the advisory and implementing institutions than the law may intend. The input of civil society organizations, communities, women and vulnerable groups is a key part of DRR strategies because it recognizes communities' rights to be involved in their own risk management and takes special account of the needs of vulnerable groups.

Early Warning Systems (EWS) have been developed in a variety of ways. Some are regulated by law, and others are governed by policy and administrative practice. Many EWS are designed only for specific major hazards so that not all relevant risks in a country are necessarily covered by their mandates. Some DRM laws include specific provisions on risk mapping, an essential underpinning of effective EWS. Some of the countries' legal frameworks feature provisions on education and public awareness on DRR, such as requiring public authorities to conduct community education on DRR and disaster preparedness drills in schools, as well as to include the subject in school curricula. Some laws also mandate the establishment of special training facilities or curricula aimed at adult professionals as a long-term strategy to build national capacity in DRR and DRM.

6.4 Knowledge needed at different management levels

Basic level:

- To understand the legal obligations and regulations at the disaster response site.
- To ensure that staff conduct is in agreement with International Humanitarian Law.
- To ensure that the legal requirements and situation of the community are familiar to all personnel.
- To practice and ensure the skill to document relevant procedures and disaster-related decisions for legal proof.
- To have the ability to identify and preserve evidence.

Advanced level:

- To have knowledge of the overall legal framework in place.

- To provide sufficient knowledge to ensure a seamless, interagency understanding of the legal framework that is operational, and that is understood by all staff.
- To have knowledge of the legal mandates of agencies, and the possibility to incorporate agencies into a legal framework.
- To be able to manage needed contracts.
- To manage legal requirements for needed supplies (customs, transport, personnel, etc.).
- To have knowledge of legal aspects of staff management.
- To have the ability to supervise and document all relevant procedures and decisions for legal proof.
- To ensure evidence of activities is retrieved and stored as legal proof.

Master level:

- To ensure that high-level management in disaster response has an in-depth understanding of the many levels of legal issues that might occur in a disaster scenario, and to deploy and utilize qualified legal services where necessary.
- To establish a common legal framework among all agencies involved.
- To have an in-depth knowledge of the revised European Framework for disaster response.
- To be aware of possible legal issues (national/international law, inter-agency agreements, staff, contracts).
- To have an in-depth knowledge of the legal requirements of general management responsibilities (diligence, planning, organization).
- To be aware of the importance of evidence and evidence retention and to be responsible for managing the handling, storage, and safety of evidence according to the standards of the European common requirement for personal data protection.
- To have the ability to continuously assess the legal vulnerability of team and personnel.
- To have an in-depth knowledge of legal aspects of contracting and logistics, and personnel responsibilities.
- To have an in-depth knowledge of Human Rights and IHL as guidelines.

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Chapter Seven

7 Political considerations

Michael Ashkenazi, Nicki Khorram-Manesh

7.1 Summary

The necessity of dealing with political realities in the host country will come up in any disaster relief project. Senior members of the team will have to deal with donor countries and EU institutions as well. This chapter is intended to prepare team members to identify the political realities they face, overcome political problems, and establish positive relations with political actors.

7.2 Aim

The aim of this chapter is to enable disaster relief personnel to safely navigate the various political influences they will interact with in order to ensure optimal functioning of the disaster-relief effort.

This chapter has the following objectives:

- To train team members to identify and understand the influence of politics on their work.
- To train managers to effectively manage the disaster relief team within the limits of political action.
- To train managers to develop and implement plans for effectively interacting with the political echelon at national and local levels in the disaster-hit country and in the home country and EU.
- To train team members to identify and effectively interact with local political/government agencies that could enhance disaster relief work.
- To train team members to effectively debate and overcome internal differences of opinion.

7.3 Introduction

Disaster relief takes place within a complex political environment (international, national, and local), and can never be free of political considerations, which are a significant factor in the preparation for, response to, recovery from and mitigation of disaster events. Politics is the process of establishing and carrying out public policy. The outcomes of all phases of disaster management are directly related to how well emergency/disaster policy is created, maintained and implemented. Failure in the development of disaster management policy will not only rebound on the policymakers, but also have consequences in the social, economic, and development realms. And, in the era of mass communications, disasters are

dramatic, newsworthy events which compel intense public interest. Politicians have to account for and respond to that kind of interest and scrutiny.

One of the difficulties for emergency managers at all levels of government is to get policy support from senior elected officials before a disaster event occurs. Disaster policy issues are often monumental and very complicated and involve conflicting interests at every level of government. Therefore, elected officials are reluctant to initiate controversy and debate about Disaster Response until the need is immediate and unavoidable. Even when the need to establish policy in advance of disasters is accepted and understood, the process of establishing and maintaining such policy is a challenging undertaking. However, the needs are constantly changing and the public expectations in response to a disaster are invariably unreasonably high. This calls for a better collaboration at all political levels since disasters and their aftermath have significant potential to affect people at all levels. All political leaders are subject to the impact of disasters. A disaster can alter the public's perceptions of the ability and concern of political players. It also causes politicians to be more sensitive to criticism of response/relief efforts.

Disaster response and recovery actions are almost inevitably driven, in part, by political considerations. Sometimes these political considerations can produce very negative consequences, which can range from mere inconveniences (tours by elected officials of disaster sites) to major interference in the accomplishment of response and recovery objectives (lack of funds, refusal to grant necessary authority, demands for newsworthy but unnecessary actions, etc). On some occasions, these consequences can result in illegal or unethical actions (for example, use of disaster powers for personal gain or influence).

It is important for local emergency managers to become aware of the potential for such political consideration to get out of hand and be able to devise tactful strategies for dealing with them. Well-established emergency operating plans and processes, frequent orientation, training, and exercising will help elected officials understand the importance of pre-established roles, responsibilities and relationships and the necessity of operating as a team with a plan when disaster strikes. While in a minority of cases, there may be unwanted and excessive political interference in disaster operations, political operatives are usually content to play by the rules, as long as things are under control and there is a cogent, integrated effort during the response and recovery. When there is a real or perceived lack of control or coordination and things either are or appear to be in chaos, that political leaders tend to "take charge". Disaster relief managers need to be as professional as possible, understand the emergency management process and principles and be able to communicate them before, during and after the disaster strikes. They need to make a sound, complete, and flexible plans and establish good relationships with politicians and media before, during, and after the event.

The degree to which a disaster situation is politicized varies. Greater political intervention may occur when:

- Violence or other human actions initiate rapidly developing events, as for example, in cases of mass terror attacks.
- The disaster is affected by public policies. This can be influenced by such things as the level of response required, or the need to deal with difficult or uncharacteristic issues which have a negative impact on the public (e.g., evacuations, seizure of private property) or events or potential events which could have been prevented or lessened by mitigation actions (e.g. flooding, earthquakes).
- The quality of decisions and response actions by the political echelon or others are questioned.
- If the nature of the political environment in the community is competitive. For example, if partisan politics interfered with the development or implementation of disaster public policy.

National or local political actors are needed as part of disaster relief management since they have *power and the special authority* required during disaster management. Most states have disaster legislation, which allows for special authority to be exercised by duly elected officials. In a democratic society, any extraordinary measures during a disaster which will limit the ordinary rights and privileges of the citizens should only be authorized by a duly elected representative. Elected officials are also potentially effective in *expediting assistance*. The process of requesting, justifying and acquiring such assistance is one of the most “political” of all disaster actions. Finally, politicians represent the people and in a democracy, they hold the ultimate authority and are the most appropriate spokespersons when it comes to providing guidance to the public and obtaining public support for disaster-related actions.

7.4 Knowledge needed at different management levels

Basic level:

1. Understanding the defining characteristics of politics.
2. Understanding political levels and their limitations: national government structures and dynamics; local government structures and dynamics; political activities and their effects.
3. Understanding principles of non-intervention, non-interference, and proper political boundaries.
4. Identifying significant political actors, their interests, and limits.

Advanced level:

1. Situational mapping of disaster political space.
2. Establishing enduring relationships and structures with political actors.
3. Identifying and incorporating local legal regulations in disaster relief work.

Master level:

1. Understanding relevant EU, donor, and host country political structures.
2. Understanding the landscape of other private, national, and international donors.
3. Establishing relationships with senior political echelon members of the host country.

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Chapter Eight

8 Cultural aspects in disasters

Denys Liebig, Eric Carlström

8.1 Summary

Lack of understanding of cultural facts and dynamics can be detrimental to the successful work of a disaster team. Learning to use some simple analytical tools and clarifying concepts can reduce the likelihood of communication and work difficulties within a team, and between disaster reduction teams and hosts. At lower levels, the emphasis is on cultural awareness and some basic skills to allow the actor to understand cultural issues. At higher levels, the emphasis is on training the individual to identify and deal with cultural interactions for the benefit of the team or project.

8.2 Aim

The aim of this chapter is to help disaster relief practitioners analyze all cultural issues to ensure they are able to perform their tasks with as little cross-cultural friction as possible. It also aims to ensure trainees understand the importance of culture in disaster relief work, and to provide trainees with tools to analyze both the internal culture of the team and the host culture within which they must work on the disaster, and finally to provide a pathway to deal with cultural friction and inconsistencies when they arise.

8.3 Introduction

Cultural factors influence the behavior of people when facing to a hazard. During a hazardous situation, people not only consider the danger they may face but also give a priority to other factors such as social values, religious beliefs, tradition and attachment to a location. "Culture" is a rather amorphous and polysemic word which implies habits, practices, behaviors and mental constructs that are learned from others in one's environment. Organizations have various kinds of cultural symbols including metaphors, rituals, anecdotes and artifacts that manifest values and guide individual actions. When a team meets, confidence-boosting artifacts and behaviors can function as a substitute for a personal acquaintance. Artifacts and behaviors play an important role for new members both socially and for acceptance into the team. Such artifacts can consist of equipment and clothing that signal competence and team solidarity. If newer members display confidence-boosting artifacts to their more experienced colleagues, it increases their chance of acceptance.

For the purposes of this handbook, culture can be divided into two components: material and nonmaterial. Material culture consists of physical or tangible creations that

members of society make, use or share e.g., houses, historical artifacts, and locations. It can also indicate one's personality, for example, the clothes we wear. Nonmaterial culture consists of the abstracts and intangible human creations of a society that influence people's behavior. Major components of nonmaterial culture are comprised of metaphors, rituals, anecdotes and myths, artifacts, symbols, language, values, and norms.

Rituals: Rituals are sets of often-repeated, non-instrumental, complex behaviors often repeated with little variation within a social group or organization. Behaviors can be routine, but may not be directly instrumental (that is, they don't physically 'do' anything). Among other things, rituals serve as a signal of belonging and seeking for legitimacy.

Anecdotes and Myths: Stories explaining who we are and why we are in a certain way are circulating within social groups. The stories do not necessarily have to be true, but they tighten the bonds between members of the group.

Artifacts: Artifacts—human-made items that members of a group or organization feel are characteristic or explanatory of the collective—can serve as important cultural items. Artifacts include buildings, rooms, vehicles, uniforms, visual signs and message boards. These can be associated with rank, landmarks, particularly technical skills and abilities and help in 'mapping' and defining the conceptual world.

Symbols and metaphors: Communicate abstract concepts by the presentation and manipulation of visible objects and provide shared meanings to a culture. They can generate strong emotional feelings.

Language: Facilitates expression of ideas and enables communication with others.

Values: Are ideas of right and wrong, good or bad and desirable and undesirable. Values help us to evaluate people, objects, and events and serve as guidelines for behavior.

Norms: Behavioral expectations that are established in the form of rules or standards of conducts. Norms can be further classified into informal (folkways and mores) and formal (law). Folkways and mores create group patterns and behavior within a society which because of group pressure, are expected to be followed by community members.

Culture provides an identity to a community based on common language, values, norms, and symbols. Generational transmission of cultural components (knowledge, beliefs, values and norms) helps to preserve society's values for the future and also helps to further strengthen the sustainability and identity of the society/community. The close link between culture and group, can either make culture an enormously stabilizing aspect for a society, or creator of conflicts and violence, when group members act differently than the set cultural values of the group, or when acts of violence are normative within the group. Culture's linkage to livelihood patterns of a community is also strong and thus cultural factors can be useful in supporting resilience under economic, social and environmental challenges. In particular, traditional knowledge that has been transferred down the generations can sometimes serve as useful survival guidelines.

Culture is the glue that makes up a common identity between different individuals. This means that there are good reasons for determining which cultural phenomena

influence teams, and how it is done. Cultural phenomena take on specific values which make people act in a different way than expected by outsiders. Crucially, most individuals feel that their culture is the norm: the right and proper way of doing things. The belief that one's culture is the only valid one is deeply embedded in human feelings and emotions. Individuals from different cultures may well interpret events in completely different ways, which can cause anything from mild disagreement to major clashes with members of other cultures.

A disaster relief group will often enter a society that is composed of individuals who hold very different cultural standards and viewpoints among themselves and from the disaster relief teams. This means that something that might be 'right' or obvious to one party, may be incomprehensible to the other. The climate created by collaborating organizations is, therefore, of great importance. An organization whose members bear a collective self-image to always be in the first ranks, act decisively and have a high level of competency can find it difficult to stand aside and leave room for others. Such groups may feel that a show of superior skill and courage to impress their colleagues, members of other organizations and bypassing spectators is absolutely necessary. Such behavior can lead to capacity constraints and a situation where different action options are not examined, risk assessments are not carried out, and difficulties arise in interacting across organizational boundaries and can result in a distorted selectivity in the handling of incidents.

Crucially, even professional standards of disaster relief workers which are considered central to good practice may conflict with local practices and beliefs, putting the professional into a situation of conflicting values. Going against local cultural practices can create conflict and major difficulties for disaster relief teams. To add to the difficulty, different professions in different countries also evolve mini or sub-cultures of their own. Thus there are cultures of doctors, of nurses, of firefighters that will differ from one another, and could affect the ability of team members from different cultures and sub-cultures to work with one another.

Cultural components such as beliefs, traditional knowledge, values, the behavior of a community/group, livelihood patterns etc., can influence the risk perception of and the impact of disasters on community and individuals and thus can act as a both positive and negative aspect for disaster risk reduction. It is, therefore, important to make strategies compatible with cultural aspects of the community in further strengthening community's coping capacity towards disasters. Furthermore, the integration of local knowledge with appropriate scientific knowledge, in an effective way, to make the disaster affected communities' resilience against natural disasters and their impacts, should also be emphasized.

8.4 Knowledge needed at different management levels

Basic level:

- The concept of 'culture' and its implications for working in different countries.

- Fundamental cultural institutions.
- Intra-group dynamics.
- Intercultural dynamics.
- What to do when it's broke: Reducing conflict and tension.

Advanced level:

- Managing complex cultural interactions.
- Culture and interaction mapping.

Master level:

- Organizational social analysis.

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Chapter Nine

9 The EU organizational response to disaster and crisis management

Denys Liebig, Mikael Wilhelmsson

9.1 Summary

Organizations, especially, at national levels work either top-down or down-up. There are pros and cons to both models. The top-down organization of the EU may have a better possibility to survive crisis since it seems to be more straightforward in terms of decision-making.

9.2 Aim

The aim of this chapter is to clarify the current organizational structure of the EU, its sub-organizational units and to identify the characteristics of the existing EU model.

9.3 Introduction

Organizational perspectives

The EU has a top-down organizational model, which is basically built upon multi-agency competency. The European Qualification Framework (EQF) defines competency as; “the proven ability to use knowledge, skills and personal, social and/or methodological abilities in work or study situations, and in professional and personal development.” In this context, competence is described in terms of responsibility and autonomy and is a concept composed of different elements in a hierarchy; the competency itself, learning objectives, and activities. Competence within this professional and personal knowledge and skills must be developed incrementally and include training that achieves flexibility and adaptability usually demanded by a continually changing disaster environment.

EU civil protection activities support Member State efforts at national, regional and local level by providing tools for preventing, preparing for, and responding to natural or man-made disasters. The EU Civil Protection Mechanism (CPM) was established on 23 October 2001 and has developed rapidly since then. Initially developed as a cooperation mechanism for facilitating a rapid and efficient European response to disasters, it soon became a tool for increasing the capability and preparedness of civil protection actors to deal with disasters both inside and outside Europe. The Mechanism also contributes to developing measures for the prevention of disasters and the reduction of risks, with a view to making sure that all components of the disaster management cycle are addressed. Requests for assistance have been constantly increasing.

EU Civil Protection Mechanism interventions cover all types of major emergencies: natural and man-made disasters, including acts of terrorism and

technological, radiological and environmental accidents, accidental marine pollution, both inside the EU and in third countries. The ultimate aim of EU interventions is to ensure better protection, primarily of people, but also of the natural and cultural environment, and property, with the support of the civil protection capabilities of all Participating States. Whenever the Mechanism is requested to support the response to disasters outside the territory of the Participating States, the delivery of European assistance is closely coordinated with the United Nations' Office for the Coordination of Humanitarian Affairs (OCHA), which provides the overall coordination platform for international relief efforts. In addition, when it comes to environmental emergencies, strong cooperation has been developed over the last six years between the European Commission and the Joint UNEP/OCHA Environment Unit (JEU). JEU and the Commission regularly share requests for assistance and several important joint missions have taken place in recent years, followed by joint reporting and lessons learned exercises.

The management of natural and man-made disasters is a clear example of the value of action at EU level. The actions taken by the national authorities of disaster affected countries can be facilitated and assisted by concerted collective European effort.

There is added value to EU-level Civil Protection cooperation, which is obtained by pooling the resources of different Member States. It is a well-coordinated response that prevents duplication of effort and ensures that the assistance meets the real needs of the affected region. No additional burden is placed on the disaster-hit country and Member States can save human and financial resources. EU-level cooperation helps to prepare for and avoid disasters through awareness raising, organizing training, simulation exercises and exchange of experts. Such cooperation also promotes coherence in international civil protection work.

Disaster Prevention and Preparedness

The European Commission supports and complements the prevention and preparedness of Participating States in the EU Civil Protection Mechanism, focusing on areas where a common European approach is more effective than separate national approaches. There are, however, differences between European nations. For example, in contrast to the other Scandinavian countries, Norway has, as a response to the evaluation from the terrorist attacks in Oslo and Utøya on July 22, 2011, legislated collaboration to its emergency preparedness regulations. The collaboration principle states that authorities, enterprises, and agencies have an independent responsibility to ensure collaboration related to crisis management. A number of EU-wide elements are in operation, as can be seen from the list below.

Prevention measures: Improving the quality and accessibility of disaster information, implementing prevention measures, raising public awareness on disaster management, developing guidelines on risk assessment and hazard mapping, encouraging research to promote disaster resilience, and reinforcing early warning tools are just some

of the EU-level activities aimed at preventing disasters from happening or minimizing their impact.

Modules: Participating States' assets composed of experts and equipment for a specific task are provided on a voluntary basis by one or more Participating State and can be mobilized at very short notice. The choice of the module depends on the type and particular needs of the tasks to be fulfilled. More than 125 modules have been registered since 2008. They provide expertise and technical capacity for forest firefighting, urban search and rescue, high-capacity pumping, water purification and emergency temporary shelter, among other things. Civil protection modules are capable of working self-sufficiently for a given period of time. This means that they can be deployed in harsh conditions following a disaster. Technical assistance and support teams are also deployed when needed, to provide logistical support for other teams and modules and ensure that they remain self-sufficient. The modules are being strengthened by their involvement in training exercises, with the first six module exercises starting in 2010. The module exercises are specific field exercises for training in cooperation and coordination between different modules and an EU Civil Protection coordination team during an emergency.

EU co-financed modules: To supplement national civil protection modules, additional capabilities have been developed or made available within the framework of the Preparatory Action on an EU Rapid Response Capability and a pilot project on forest fires. The purpose was to test innovative governance arrangements for managing Participating States' assets which are on standby for EU operations. Some of these additional capabilities have been deployed in actual emergencies with encouraging results, indicating that the models tested are viable. The Haitian earthquake led the European Commission to request for the first time the deployment of two modules made available for EU operations under the Preparatory Action for an EU Rapid Response Capability - an advanced medical post with surgery from Italy (PISARTE) and a water purification unit from France. The advanced medical post operated at the Saint Damien pediatric hospital in Port-au-Prince from 16 January to 3 March and treated approximately 50 patients per day, almost all requiring surgery due to extensive injuries. Another example of an EU co-financed module is the heavy search and rescue team able to work in cold conditions, developed by Finland and Sweden.

Training programs: Are financed by the European Commission, by using Civil Protection Financial Instrument funding, in order to improve coordination of civil protection assistance and to increase interoperability among experts and teams. The training is structured so as to improve the skills and update the knowledge of experts involved in civil protection through sharing of best practices. The courses within the programs are composed of theoretical elements, group work sessions, and practical exercises. EU civil protection preparedness policy has developed training and exercise actions over the past ten years.

Exercises are organized at EU level by the Participating States allowing teams to

be drilled in simulated emergencies using equipment from the various Participating States. They enable participants to gain a better understanding of shared methods, working procedures and standards. The exercises encourage a culture of working together within international teams and provide a learning opportunity for everyone involved in the EU Civil Protection Mechanism operations. The Commission has so far co-financed over 30 full-scale exercises that aim to improve the Mechanism's preparedness. The exercises simulate as realistically as possible the deployment of resources of Participating States during an emergency.

The EU Exchange of Experts system offers a wide range of exchange visit opportunities for experts in the EU which benefit both the experts and the host organizations. The exchanges promote the establishment of networks and transfer of knowledge between participants on subjects such as different national systems, techniques, and approaches.

When disaster strikes

Primary responsibility for dealing with the immediate effects of a disaster lies with the country in which the disaster has occurred. Nevertheless, when the scale of the emergency overwhelms national response capabilities, a country can benefit from civil protection resources or teams from other countries. The EU Civil Protection Mechanism can be activated by a request for assistance from a disaster-hit country or upon request from an international organization for emergencies anywhere in the world. The assistance can take the form of in-kind assistance or provision of teams with equipment and experts for assessment and coordination. It relies on government resources and, if assistance is required in third countries, it is usually under the overall coordination of the United Nations. Civil protection teams also coordinate with humanitarian aid partners. Delivery of European civil protection assistance on the basis of confirmed needs is coordinated by the Emergency Response Coordination Center (ERCC), earlier known as Monitoring and Information Centre (MIC), located within the European Commission's Directorate-General for Humanitarian Aid and Civil Protection.

Requesting assistance through the EU Civil Protection Mechanism, step by step:

- a) The affected country assesses the situation and needs on the ground and may decide to ask for help via the EU Civil Protection Mechanism.
- b) The request is sent to the ERCC.
- c) All Participating States in the Civil Protection Mechanism are immediately informed of the request via the Common Emergency Communication and Information System (CECIS).
- d) The national contact points in the Participating States then assess their available resources and inform the ERCC and the other Participating States whether or not they are in a position to help. If they can help, they make an offer via CECIS.

e) Once the affected country has accepted the offers, the assets are transported to the stricken area. This process is coordinated by the ERCC. □

f) If suitable, a coordination and assessment team can be deployed to the affected country to facilitate the delivery of assistance and to help assess needs on the ground. g) Additionally, the Commission can support and co-finance the transport of civil protection assistance to countries affected by a disaster. □

ERCC during emergencies

Being at the center of emergency relief operations, the ERCC acts as a focal point for the exchange of requests and offers of assistance. This helps to cut Participating States' administrative burden which could be incurred by liaising with the affected country. It provides a central forum for the Participating States to access and share information about available resources and assistance offered at any point in time.

The ERCC disseminates information on civil protection preparedness and response to the Participating States and a wider audience of interested parties. It also sends out early warning alerts on natural disasters and circulates latest updates on on-going emergencies and Mechanism interventions.

The ERCC facilitates the provision of European assistance through the Mechanism. This takes place on two levels: at the headquarters level, by matching offers to needs, identifying gaps in aid and searching for solutions, and facilitating pooling of common resources where possible; and on the ground by appointing EU field experts, when needed.

The transport of assistance is often a major stumbling block in providing assistance to affected countries, due to high costs or the lack of availability of suitable transport assets. Therefore, the ERCC facilitates access to transport resources by pooling of transport assets, co-financing transport costs and hiring transport assets on the commercial market.

9.4 Knowledge needed at different management levels

Basic level:

- Able to give an overview of the management of European civil protection systems.

Advanced level:

- Being able to put the EU civil protection system in different disaster contexts, i.e. alerting, management and action.

Master level:

- Being able to make a plan for international collaboration during a national cross-border crisis.

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Chapter Ten

10 Governmental and Non-Governmental organizations

Denys Liebig, Roberto Faccincani

10.1 Summary

Non-governmental (NGO) and voluntary organizations play an increasing role in the process of disaster management and humanitarian aid. Their organizational and personnel skills and expertise in a number of fields ranges through creating temporary shelter and housing; search and rescue operations; collecting food and non-food items; intervention in floods; water and sanitation; etc. Flexibility and speed in mobilizing resources, both in terms of personnel and funding make NGOs very efficient in humanitarian interventions and are strong factors in their successful management of the various crisis. Collaboration between these organizations and governmental institutes is recommended.

10.2 Aim

The aim of this chapter is to give trainees a basic understanding of Governmental and Non-Governmental Organizations role in the field of Disaster Relief and Humanitarian Interventions. It also deals with the following: ECHO as the main EU donor for emergency operations and an introduction to minimal standards in humanitarian interventions and to issues related to human rights and protection, particularly protection of minors and other vulnerable groups in emergency situations.

10.3 Introduction

The field of the Disaster Relief and Humanitarian Intervention sees nowadays many different actors. These can simply be divided into two large categories: Governmental (GO) and Non-Governmental Organizations (NGO). Both of them are usually not for profit organizations but while the GO are financed by public funds, usually made available by national or international governments, NGOs depend on private finance, usually donations by private institutions, government grants, and individuals. NGOs can access public money in order to implement their field activities but not to run the organization itself. This keeps them independent to some degree from national or international governments

Governmental Organizations (GO)

Classic examples of GO are the United Nations Agencies (UN), The International Committee of the Red Cross and Red Crescent Societies (ICRC), the European Commission's Humanitarian Aid and Civil Protection department (ECHO).

United Nation Agencies (UN)

The Office for the Coordination of Humanitarian Affairs (OCHA) in collaboration with the Inter-Agency Standing Committee (IASC) is the arm of the United Nations responsible for bringing together national and international humanitarian providers to ensure a coherent response to emergencies. OCHA also ensures that a framework is in place within which each provider can contribute to the overall response effort. It also advocates for people in need, promotes preparedness and prevention and facilitates sustainable solutions.

The *United Nations High Commission for Refugees* (UNHCR) provides international protection and assistance for refugees, stateless persons and internally displaced persons, particularly in conflict-related emergencies.

The *Office of United Nations High Commissioner for Human Rights* (OHCHR) provides assistance and advice to governments and other actors on human rights issues, sets standards and monitors rights violations.

The *International Organization for Migration* (IOM) is an intergovernmental agency which helps transfer refugees, internally displaced persons and others in need of internal or international migration services.

The *World Food Program* (WFP) is the principle supplier of relief food aid.

The *United Nations Development Program* (UNDP) assists disaster-prone countries in contingency planning and with disaster mitigation, prevention, and preparedness measures.

The *World Health Organization* (WHO) provides global public health leadership by setting standards, monitoring health trends, and providing direction on emergency health issues. Its role is to reduce avoidable loss of life and the burden of disease and disability.

The *United Nations Children's Emergency Fund* (UNICEF) works to uphold children's rights, survival, development and protection by intervening in health, education, water, sanitation, hygiene, and protection.

The *Food and Agriculture Organization* of the UN (FAO) provides early warning of impending food crises and assesses global food supply problems.

IFRC and ICRC

The International Federation of Red Cross and Red Crescent Societies is the world's largest humanitarian organization made up of 186 member Red Cross and Red Crescent Societies. Its mission is to improve the lives of vulnerable people by mobilizing the power of humanity. The IFRC coordinates and directs international assistance to victims of natural and technological disasters, to refugees and in health emergencies. It combines its relief activities with development work to strengthen the capacities of National Societies and through them the capacity of individual people. The IFRC acts as the official representative of its member societies in the international field. It promotes cooperation

between National Societies and works to strengthen their capacity to carry out effective disaster preparedness, health, and social programs.

The International Committee of the Red Cross is part of the International Red Cross and Red Crescent Movement along with the International Federation of Red Cross and Red Crescent Societies (IFRC) and 190 National Societies. It is the oldest and most respected organization within the Movement and one of the most widely recognized organizations in the world. Its official mission statement says that: "The International Committee of the Red Cross (ICRC) is an impartial, neutral, and independent organization whose independently humanitarian mission is to protect the lives and dignity of victims of war and internal violence and to provide them with assistance." It also conducts and coordinates international relief and works to promote and strengthen humanitarian law and universal humanitarian principles. The core tasks of the Committee, which are derived from the Geneva Conventions and its own statutes are:

- To monitor compliance of warring parties with the Geneva Conventions.
- To organize nursing and care for those who are wounded on the battlefield.
- To supervise the treatment of prisoners of war and make confidential interventions with detaining authorities.
- To help with the search for missing persons in an armed conflict (tracing service).
- To organize protection and care for civil populations.
- To act as a neutral intermediary between warring parties.

ECHO (European Commission's Humanitarian Aid and Civil Protection department)

The European Union is the world's largest donor of humanitarian aid. The *European Commission's Humanitarian Aid and Civil Protection* department (ECHO) is the EU department responsible for coordination and disaster response inside and outside Europe. Over the last five years, ECHO's annual budget has averaged one billion euro. To facilitate swift deployment of funding in emergencies, ECHO has created cooperation with over 200 partners (14 United Nations agencies, 191 non-governmental organizations and 3 international organizations: the International Committee of the Red Cross/Red Crescent, the International Federation of the Red Cross/Red Crescent and the International Organization for Migration), using Framework Partnership Agreements (FPA). The FPA's aim is to facilitate efficient funding of humanitarian efforts in emergency situations and to improve the implementation of humanitarian aid with a focus on results-driven approach.

International Non-Governmental Organizations (NGO)

NGOs are difficult to define, and the term 'NGO' is not always used consistently. In some countries, the term NGO is applied to an organization that in another country would be called an NPO (nonprofit organization), and vice versa. The most common focus is on "orientation" and "level of operation". An NGO's orientation refers to the type of activities it takes on. These activities might include human rights, environmental efforts, improving

health, or development work. An NGO's level of operation indicates the scale at which an organization works, such as local, regional, national, or international. NGOs are highly diverse groups of organizations engaged in a wide range of activities, and take different forms in different parts of the world. Some may have charitable status, while others may be registered for tax exemption based on recognition of social purposes. Others may be fronts for political, religious, or other interests.

Increasingly, NGOs play a critical role in most of the disasters and humanitarian crises. They possess organizational and personnel skills and expertise in a number of fields, ranging from creating temporary shelter and housing; search and rescue operations; collecting food and non-food items; intervention in floods; water and sanitation; setting up warehouse and distribution centres; providing health and psychosocial services, human rights and protection services, family reunification, etc. Often, this is combined with previous experience in similar situations in other parts of the world. Flexibility and speed in mobilizing resources, both in terms of personnel and funding makes NGOs very efficient in humanitarian interventions.

Leading international non-governmental organizations work through volunteers to fight poverty in developing countries. Their strong role in development works side by side with the recovery from a disaster and prevention and preparedness for any future disasters.

For example, CARE is a humanitarian organization fighting global poverty. Women are at the heart of CARE's community-based efforts to improve basic education, prevent the spread of HIV, increase access to clean water and sanitation, expand economic opportunity and protect natural resources. CARE also delivers emergency aid to survivors of war and natural disasters and helps people rebuild their lives. CARE works alongside poor women because, equipped with the proper resources, women have the power to help whole families and entire communities escape poverty.

Another NGO, Handicap International works in partnership with local organizations' and government institutions. It raises awareness of both governments and the general public on disability and landmine issues, mobilizes civil society and implements action in emergency situations.

Health Volunteers Overseas (HVO) is a network of health care professionals, organizations, corporations, and donors united in a common commitment to improving global health through education.

IMA World Health is an inter-church not-for-profit organization based in the United States of America, which partners with USAID, the World Bank and many other organizations to build sustainable health care systems.

The International Rescue Committee (IRC) offers lifesaving care and life-changing assistance to refugees forced to flee from war or disaster and provides an emergency response by experienced personnel for short-term assignments.

Médecins Sans Frontières (MSF) provides medical services in emergency situations. It recruits some physical therapists and other health professionals as well as physicians.

Oxfam is an international confederation of 14 organizations working together and with partners and allies around the world to bring about lasting change. Oxfam works directly with communities and seeks to influence the powerful to ensure that poor people can improve their lives and livelihoods and have a say in decisions that affect them.

Rehabilitation International (RI) is a global network of expert professionals who work to empower people with disabilities and provide sustainable solutions for a more inclusive and accessible society. It advocates for the inclusion of people with disabilities in climate change and disaster management planning.

The Sphere Handbook

Parallel to developing an efficient and result driven approach to funding humanitarian interventions, the international humanitarian community in the final decade of the 20th century started a number of inter-agency initiatives to improve its accountability, quality, and performance. The efforts resulted in developing inter-agency standards of quality of performance and of accountability to their constituents, donors and affected the population. One of the most widely known and internationally recognized sets of common principles and universal minimum standards is The Sphere Handbook: *Humanitarian Charter and Minimum Standards in Humanitarian Response*. It upholds the right of disaster-affected populations to life with dignity, and to protection and assistance, at the center of the humanitarian action. It also promotes the active participation of affected populations, as well as local and national authorities. The minimum standards cover four primary life-saving areas of humanitarian aid: *water supply, sanitation and hygiene promotion; food security and nutrition; shelter, settlement and non-food items; and health*. Further and more inclusive work is currently being undertaken to develop Core Humanitarian Standards, which aims to be easy to understand, simple to use and able to underpin current and future standards that apply to humanitarian assistance. Its ultimate goal is to help humanitarian actors to be more accountable and effective.

Another issue that is relevant to NGO interventions in disasters is applicable to other actors as well. During the times of war or a public emergency, the enjoyment of some human rights may be restricted. Three main conventions concur about four common rights that have been considered so important that they are non-derogable: the right to life, the right to be free from torture and other inhumane or degrading treatment or punishment, the right to be free from slavery or servitude, and the right to be free from retroactive application of penal laws. It is important for emergency responders during any emergency intervention to be aware of human rights and the minimum principles of protection.

During an emergency, material and physical resources are stretched thin and, often, the needs of those who most need help, namely the vulnerable populations, are left unmet.

Vulnerable populations can be defined broadly to include those who are not able to access and use the standard resources offered in disaster preparedness and planning, response, and recovery. Age, class, race, poverty, language and a host of other social, cultural, economic, and psychological factors may be relevant depending on the nature of the emergency. Typically, children, elderly, disabled and women (pregnant women) find themselves in these vulnerable groups.

10.4 Knowledge needed at different management levels

Basic level:

- Role and diversity of GOs and NGOs in disaster situations. Type of NGOs by orientation (charitable, service oriented, participatory and empowering) and by the level of operation (community, city/wide, national, international). Who are ECHO's partners and what is their area of expertise?
- What is the Humanitarian Charter and Minimum Standards? People-centered humanitarian response. Coordination and collaboration. Assessment, Design, and response. Performance, transparency, and learning. Aid worker performance.
- Human Rights and Protection in Disaster Situations: Why is protection important in disasters? Basic Human Rights and impact of the emergency. Vulnerable groups and impact of the emergency. Understanding and applying Protection Principles. Protection Activities: Preventative, Responsive, and Remedial (intervention with local authorities).

Advanced level:

Basic level +

- Role and Diversity of NGOs: What are Framework Partnership Agreements and how do they operate? Principles of EU humanitarian assistance. Roles, key personnel, and contacts of organizations/bodies included in various aspects of disaster response.
- Minimum Standards in Humanitarian Response (principles and application): core standards, key actions, key indicators.
- Advanced Human Rights: Main Human Rights Conventions. Understanding Protection Principles. Identifying vulnerable groups and developing responsive strategies. Basic advocacy and intervention tools on the local and international level.

Master level:

Advanced level +

- Human Rights advocacy and policy interventions: Understanding roles and responsibilities of each player in the disaster response mechanism

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Chapter Eleven

11 Command, control, and coordination. Leadership and decision-making

Oleksandr Sobol, Roberto Faccincani, Amir Khorram-Manesh

11.1 Summary

Major incidents/disasters can be defined differently, but all can successfully be managed through four different steps: prevention, preparedness, response, and recovery. Actions needed include at a minimum *planning* which is a typical activity in the preparedness step, which facilitates readiness for leading, controlling and coordinating an event. Command, control, and coordination are essential functions in multidisciplinary crisis management. Leadership and decision-making are crucial in crisis management. These capacities or qualities may be related to the individual's personality, attitude, and experience but can also be learned by training. Simulation training is an effective instrument in obtaining knowledge and skills in functions needed for a successful crisis management.

11.2 Aim

The aim of this chapter is to describe the need for a chain of command, control, and coordination for the effective management of a crisis.

11.3 Introduction

Disasters/major incidents may occur suddenly or may develop during a longer period. They can have different causes and magnitudes. Whatever the reason and in whatever pace they happen, they must be managed. Disaster management can be represented by four different but integrated steps: prevention, preparedness, response, recovery (see the related chapters). There are some necessary and critical elements in the management of disasters or major incidents, which will be discussed here. The most important elements are:

Planning

To be prepared for a disaster/major incident means to essentially reduce the time and inefficiency in responding to a sudden and unexpected event. Emergency planning is important, complex and must ensure that an entity, an organization, or a community are prepared for emergencies and disasters. Emergency planning is driven by two goals: hazard assessment and risk reduction.

Hazard assessment involves documenting known threats and identifying new threats. A good starting point is to understand/identify the main risks that may have an impact on the specific event that is being dealt with. Consequently, the needed measures to protect

against these hazards are discussed and implemented (see the chapter on hazard and vulnerability analysis). The priorities to address risks by a community may vary according to the time and the available resources. Politics and media often have an important role in directing the sensitivity of the population to a certain risk and consequently have a responsibility in the risk reduction process (see the chapters on information sharing).

Risk reduction is the specification of the actions necessary to decrease the known or projected levels of danger. It also identifies needed resources for effective action. Because no one has enough resources to eliminate all risks, this process defines the level of acceptable risk. Risk reduction also means actions aimed to reduce losses, in terms of human life and damage to property (mitigation). A vulnerability reduction process is a typical activity aimed to mitigate the consequences of a disastrous event and planning represents a consistent action to reduce vulnerability: if we will be prompt to react to an event, we will be less vulnerable. The main requirements for a plan are:

- A unified structure that may be expanded with new functions whenever a new competency is needed.
- All-hazards approach constructed on the basis of adaptability to as many of the possible hazards, with some specifications for particular cases. For example, if we consider the emergency medical management plan in case of a mass influx of patients, we can say we want to be prepared to manage a large number of patients, irrespective of their disease. New specifications may be added according to the particular conditions we will face e.g., traumatic event, intoxication, epidemic, etc.
- All the entities potentially involved in the response must be part of the planning and linked to sub-organizational plans. In a regional perspective, sub-organizational entities are all local units.
- All functions needed should be explained in detail.
- All staff involved should have a written document where their roles and responsibilities are explained clearly and in simple terms (also known as Action Cards).
- The plan must be reviewed periodically: at least once a year, or whenever conditions (risks, resources, etc.) change at a level that suggests the need for a review.
- The plan should be available in paper forms and on the internet.
- The plan should also include a necessary algorithm for alerting, responding, individual responsibilities, limitations, and if possible solutions to various issues.
- Training is the best way to make a plan alive: it communicates the plan to all the people potentially involved, it enables a periodical review of the plan and its adjustment according to changes. Training also helps in testing a plan's effectiveness. Simulation represents the most effective tool for such training.

Planning activity takes place in a variety of contexts, of which the most important are: 1) the emergency management context and 2) the public policy context. The former addresses resource collection and the latter, ways to minimize risk by influencing the behavior of others. Finally, most planners work in a specific jurisdictional context. For each role, the local jurisdictional context defines the emergency management system and the public policy environment.

Emergency planning is a process consisting of consultation, equipping, training, exercises, and critiques. Emergency planning practices vary among communities from formal to informal, written or unwritten and depends on the size of the community. Formalization of the planning process also differs with the frequency of hazard impact (more frequent, more formalized). Formalization is however recommended as it:

- 1) Explicitly defines vulnerability and how it is to be monitored.
- 2) Stabilizes response strategies and tactics.
- 3) Defines responsibilities of internal and external agencies.
- 4) Increases the likelihood that backup safety systems are developed.
- 5) Decreases the likelihood of system breakdowns due to forgetting.
- 6) Ensures important training and exercise functions will be implemented.
- 7) Increases the probability of a successful emergency response.
- 8) Ensures a continuing planning process.

It is important to emphasize that a written plan represents a picture of a process at a specific point in time and does not guarantee the presence of hazard/vulnerability analyses, ongoing monitoring, personnel training, and system exercising that really define preparedness. Being ready results from a process in which weaknesses are identified and changing parameters such as vulnerability, resources, and organizational structures, are recognized. Performance skills may disappear when not trained and exercised.

Leadership in planning

All those involved in the planning process, including specialists, may address different issues e.g., hazard vulnerability analyzers, or specialists in geographic information systems. Specialists are also becoming common in leading the planning process itself: the Disaster Manager or Risk Manager is somebody with special education and experience in the disaster and risk reduction management. Nowadays the disaster or risk management field is moving from a reactive to a proactive perspective. This is why organizations are looking more to the continuity of business than to the mitigation of consequences of a disastrous event. Business Continuity is essentially the ability of organizations to find solutions to prevent the collapse of their business in case of a disastrous event. **Resilience** is the ability of a system to resist disruption, ultimately to continue its business despite the magnitude of the disruption itself.

Leadership in managing

Command, control, and coordination

The management of major incidents/disasters almost always involves the exercise of command-control-coordination functions that constitute a guarantee of effectiveness and efficiency of action. The main feature is not operational technical activity but the exercise of decision-making and coordination: the role of the commander-controller-coordinator is not to operate in the first person, but to allow those who work to do so to the best of their ability, while the controller takes care of the direction and optimization of resources, including cooperation of the different agencies on the ground. The concept of a clear command chain is typical of military settings. If we want to transpose this to the civilian world, we can say that the chain of command-control-coordination always has two lines of action: 1) vertical, which coordinates the activities within a single agency (function), and 2) horizontal, coordinating the activities between the different agencies (functions). The vertical line is divided in turn into three different levels Strategic (Gold), Tactical (Silver) and Operational (Bronze).

Irrespective of function, every entity/agency has a need for leadership. Although such leadership functions based on a written plan and are related to the hierarchical role, there are nevertheless situations in which individual decision-making can be decisive for a successful outcome. This also means that there is a need for tools by which individual leadership can be trained and harmonized with higher leadership.

Decision-making

Right decisions at the right time will save lives and this is even truer during a crisis. The ability to make decisions is one of the most important features of the leader. This depends on personal disposition and experience, but it can also be learned and exercised. Today, there are validated tools that enable training of decision-making. It is extremely important to realize that decisions are based upon information flowing up and down the chain of command as well as between different organizations. Thus, the efficacy of command, control, and coordination (“leadership”) will be highly dependent on reliable means of communicating, as well as the practical skills to utilize these. Communication is always an important and critical issue during crisis management.

11.4 Knowledge needed at different management levels

Basic level:

- To understand your own role in the chain of command in your organization during a crisis.
- To have a basic understanding of how collaboration and coordination between different organizations are requested.

Advanced level:

- Having the skills to assume a command role in your organization during a crisis.

Master level:

- Having the skills to assume the role of a coordinator between different organizations during a crisis.

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Chapter Twelve

12 Information collecting and sharing

Boris Hréckovski, Amir Khorram-Manesh

12.1 Summary

One of the critical functions of the crisis management plan during Major Incidents (MI) and/or disasters, is the process of information sharing. This process is fundamental for proper decision making. During the entire disaster cycle (mitigation, preparedness, response, and recovery), communication, cooperation, and the multi-agency approach need to be harmonized in order for the plan to remain cohesive and deliverable. Information sharing takes place both horizontally and vertically. In a multi-disciplinary perspective, this is a vulnerable system and may lead to possible errors. To avoid these problems, data should be collected, analyzed and disseminated and communicated to the right persons. In this way, not only do all agencies get the same information, but also collaborate in a better way, which in turn, results in better decision-making about actions and resource distribution during disaster response (DR).

12.2 Aim

The aim of this chapter is to prepare the individual member for active work in a multifaceted process in a disaster response team. Specific objectives are:

- To learn about the information sharing process, its importance and meaning in DR.
- To provide examples of information processes which can be expected during DR.
- To educate trainees on the controlled system of information distribution, how to transfer and share information between different emergency services and how to use proper information technology during DR.
- To educate trainees how to use available information systems.

12.3 Introduction

The importance of information sharing was highlighted in the aftermath of the 9/11 Commission Hearings, in which it was clearly pointed out that the US government had poor information sharing between agencies in the pre-event phase of the terrorist attack. During an emergency, timely and transparent production and dissemination of information generate trust and credibility. Information comes from many sources and reflects the multi-disciplinary nature of emergency and disaster response. There is a demand for timely, and relevant information from all stakeholders, including the affected population, in order to guide their work and to plan for concrete action based on the facts and figures presented.

The challenges, however, are to show how communication and information management contribute to more effective and timely response, and consequently to saving lives, and how they can mitigate the impact of disasters and emergencies and improve the quality of life of affected populations. Communication and information must also be recognized as key elements in mobilizing resources, stimulating solidarity and support, increasing visibility, and strengthening the position of humanitarian stakeholders and of the health sector. To do this, all necessary technical and human resources must be made available, as well as political backing from health and disaster management authorities. It is vital for disaster response teams to regularly include specialists in communication and information management. Communication measures and the responsible teams should not be improvised during an emergency; they require ongoing preparation and planning.

Major disasters and emergencies bring chaos and confusion and since all typical government and bureaucratic procedures are upset, it will be difficult to obtain and deliver information. Information in the first hours of a disaster will probably be neither readily available nor very reliable. At this stage, the main challenge is to ensure that information is clear and reflects the most urgent needs of the affected population. The second challenge is to produce and update information regularly. Information management is successful to the extent that measures are planned for collection, production, and dissemination. High efficiency depends on the connection with the most reliable information sources before any disaster or emergency occurs, and understanding the procedures for exchanging information with these sources. To improve understanding of the impacts of a disaster or emergency on the population, communication specialists should have ready access to risk maps and vulnerability studies, population statistics, socio-economic indicators, historical data, and information on previous disasters in order to make the most accurate data available to the international community, national authorities, and other relevant stakeholders, including media. They all need to know the impact of the event and the needs of the population. Many of them send their own personnel to the disaster site to gain first-hand information. Available and trustworthy data may reduce the need for this individual data collection.

As mentioned before a disaster scene is not a place where training on information sharing should take place. Adequate information sharing between different emergency organizations involved in the management of the disaster is critical to success and training should take place in the prevention phase as a successful practice requires significant training and interactions. Decision makers in positions at different levels (strategic, tactical, and operational) need the right information at the right time to make the right decision during disasters. A large volume of information needs to be shared among different emergency agencies for successful management of disaster response. For example, proper safety management requires:

1. Information about hazard environment. What kind of hazards are present, what are the safety measures and what should be taken to improve it and how this information are shared between different emergency organizations?
2. Information on the responder workforce. Decision makers should know who is involved in a DR and what their role is.
3. Information on present safety issues. Decision makers need to get the right information at the right time about injuries among first responders to be able to act on safety measures to protect all involved staff.
4. Information on safety equipment. Standardization of equipment if possible should be done in a preparation phase to avoid having a large number of different types of equipment coming to the scene from different sources.
5. Information about the information sharing process. Timely information about proper communication and information sharing should be available and brought up to the right level in the right amount and quality. The strategic level does not need all the information essential for the operational level staff but need timely information to manage all disaster response. When a disaster occurs there is a continuous tension between the time needed to understand a complex scenario and the urgent need for emergency response. Usually, presenting more information than necessary raises the need for channeling and coordinating the information process. The main goal is to get relevant information on time to the right level. The process of information sharing belongs to the domain of communication and is also recognized by the IFRC as one of the three primary issues in coordination (other two are collaboration and joint strategic planning).

Utilization of an early warning and alert system contributes to the timely and effective provision of information and results in an effective, but not always definitive, response. Within the EU, proper use of the Common Emergency Communication and Information System (CECIS) facilitates communication between the European Response Centre (ERC) with National Authorities and enables a more effective and quicker response to disasters for all involved organizations. By enabling information sharing on civil protection preparedness and response to relevant organizations, by improving coordination at the strategic level (matching the needs and resources, identifying gaps in assistance and searching for solutions) and the operational level (deployment of EU civil protection experts for assessment and coordination, if required), and finally by facilitating the process of arrangements for the dispatch of accepted assistance between offering and required states, CECIS helps save resources, time, and lives.

Lessons learned from the past indicate that practicing information sharing and awareness of its pitfalls are crucial. Information overload occurs when the amount of input to a system exceeds its processing capacity and consequently results in a reduction in decision quality. Information technology may be a primary reason for information overload due to its ability to produce more information more quickly and to disseminate this information to a wider audience than ever before.

Generally, there are some principles and standards for communication and information management that should be upheld throughout an event.

- Information should be *accessible*, to all actors.
- *Easy-to-use*.
- Provided in a language that is *understandable*.
- Information should be *widely available* through a variety of online and offline distribution channels, including the media.
- It should be *inclusive*, i.e. its management and exchange should be based on a system of collaboration, partnership, and sharing by multiple stakeholders, especially representatives of the affected population.
- It should *facilitate interoperability*, i.e. all shareable data and information should be made available in formats that can be easily retrieved, shared, and used by all agencies.
- It should be *accountable*, i.e. users must be able to evaluate the reliability and credibility of data and information by knowing its source.
- It should be *verifiable*, i.e. accurate, consistent, and based on sound methods, validated by external sources, and analyzed within the proper contextual framework.
- It should be *relevant*, i.e. should be practical, flexible, responsive, and driven by operational and decision-making needs throughout all phases of a crisis.
- It must be *objective*, i.e. offer varied and balanced perspectives for addressing problems and recommending solutions.
- It should follow the *principles of humanity*, i.e. it should never be used to distort, to mislead, or to cause harm to affected or at-risk populations and should respect the dignity of victims.
- It should be *timely*, i.e. it should be collected, analyzed, and distributed efficiently, and must be kept up-to-date.
- It should be *sustainable*, i.e. information and data should be preserved, cataloged, and archived so that it can be recovered for future use in areas such as preparedness, analysis, lessons learned, and evaluation.

12.4 Knowledge needed in different management levels

Basic level:

- Data Protection Acts.
- The role of information sharing in emergency management.
- Horizontal and vertical information sharing.
- Basic of information processes: collecting, analyzing, dissemination.
- Basic of the collaboration of emergencies services in MI/ Disasters.
- Four primary information sharing processes.

Advanced level: Basic +

- Need-to-share concept.
- Major Incidents/ Disaster Awareness.
- Information overload syndrome.
- Decision-making process during MI/Disasters.
- Information technology commonly used in practice.
- Lessons learned from the past.

Master level: Advanced +

- ERC and CECIS.
- Exercises as an instrument of information sharing.
- Interoperability and communications.
- Standardization.
- Complex and uncertain task environment.
- Dispatching assistance.

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Chapter Thirteen

13 Logistics

Kubilay Kaptan, Denys Liebiediev

13.1 Summary

Efficient logistics operations are of paramount importance in disaster-affected situations since many lives depend on it. In order to have efficient logistics operations in a disaster situation, many decisions have to be taken in real time or in response to the latest information.

Logistics is an essential component of emergency response plans at both state and national levels to ensure the availability of the right commodity in the right location at the right time and in the right quantities. Logistics planning for a disaster requires knowledge of geographic, social, political, and physical characteristics of the region. In general, logistics planning addresses the following questions:

- 1) What resources are needed and in what quantity? How can they be procured?
- 2) How can resources be transported to the affected location?
- 3) Who are the teams taking part in the operation?
- 4) How is coordination achieved between different teams?

To address these questions, it is necessary to determine the availability of strategic resources for logistic support by utilizing the following methods:

- 1) Analyzing the capacity of the transport infrastructure to move supplies.
- 2) Finding potential sites for logistic hubs and distribution centers.
- 3) Assessing the capacity of the ports and airports and whether they can handle emergency operations under different conditions.
- 4) Analyzing government policies, plans, and preparation for logistic support.

13.2 Aim

The aim of this chapter is to provide emergency services staff with the knowledge, skills, and abilities necessary to perform logistical support at a disaster site. Keeping an all-risk environment in mind, this chapter exposes the participants to the essential requirements of providing support, resupply, transportation, sustenance and maintenance of a department's equipment and personnel. It helps the participants to:

- Attain a general knowledge of the field of logistics engineering, including common terminology, conventions, techniques, and standards.
- Be prepared to apply systems engineering methods, techniques, and processes to problems in the logistics domain.

- Be prepared to integrate logistics engineering knowledge, techniques, and activities within a more general systems engineering effort and possess the ability to reckon and represent dates and times for supply.
- Possess a familiarity with common practices and methods within the field of logistics engineering, and.
- Possess a familiarity with standards and best practices relevant to effective logistics engineering.

13.3 Introduction

The number of disasters worldwide is growing, as well as the number of people affected by them. Logistics plays a central role in all phases of disaster management and supporting humanitarian operations. The fundamental task of a logistics system is to deliver the appropriate supplies, in an acceptable quality and in the right amounts to the locations at the time when they are needed. However, due to the inherent nature of disasters, humanitarian logistics is faced with unique challenges: the critical infrastructure, including the transportation and communication systems, may have severely been affected and their functionality compromised. There is a short time window in which the critical needs and products should be provided and delivered in order to prevent loss of life and human suffering.

Even though logistics is, presently, the most significant and most complicated component of relief procedures, most relief workers usually see it only as a sequence of local, detached actions. Improvement of emergency logistics is crucial and helps result in optimization of the humanitarian relief by much better preparedness. All the data produced and the actions executed at the planning and preparation phase must provide the foundation for the advancement of the logistics plan, which should spell out processes, responsibilities, and timetables for execution of a supply chain of emergency supplies.

This chapter covers the unique challenges and prospective solutions associated with humanitarian logistics in emergency mitigation and preparedness, disaster response, and recovery. There is an overview of similarities and the differences between commercial supply chains and humanitarian relief chains, introduction to performance metrics, and provision of tools for the analysis and design of supply chains for humanitarian critical needs products, as well as, for the coordination and teaming of humanitarian organizations. It may also cover such major issues as material convergence and earmarked financial funds for disasters.

13.4 Knowledge needed at different management levels

Basic level:

- Introduction and orientation.
- Duties and responsibilities.
- Facilities Unit, Supply Unit, Ground Support, Food Unit, Medical Unit.

- Hazardous Materials awareness.
- Field Exercise.
- Human Resource Management.
- Organizational behavior.
- Relief logistics.
- Structure and organization of relief logistics.
- Logistics preparedness.
- Specific preparedness plans.
- Development policy and relief logistics,
- Basic ethical issues arising in the practice of logistics.
- Terminology associated with logistics, and localization and internationalization.

Advanced level:

- Local logistics.
- Global logistics.
- Reverse logistics.
- Risk assessment/mitigation and disaster recovery in the supply chain.
- Sustainable supply chains.
- Nontraditional supply chains.
- Storage and warehousing.
- International emergency logistics.
- Coordination and international standards.
- Logistics of moving people—disaster-displaced and refugees.
- International systems—customs and accountability.
- Advanced financial management.
- Management accounting (finance accounting).
- Management accounting (cost accounting).
- Management information system.
- Supply chain management.
- Operations research.
- Inventory planning and management.

Master level:

- Rapid needs assessments in emergencies.
- Emergency procurement.
- Overland operations and fleet management.
- WFP overview of emergency logistics operations. Air operations.
- Definition and analysis of logistics from a systems engineering perspective.
- Integration of logistics planning and management into the systems engineering approach: process, and methods.

- Application of systems engineering related concepts, including reliability, maintainability, supportability, sustainability, and complete lifecycle planning and management to logistics planning and operations.
- Supply chain optimization techniques integration.
- Impacts of technology on logistics engineering, including discussion of select technologies, e.g. RFID.
- Estimation of death and injury, displaced population, and emergency goods.

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Chapter fourteen

14 Communication issues

Kristin Gustafsson, Amir Khorram-Manesh

14.1 Summary

Various means of communication within the organization and with other stakeholders are one of the most important factors in the successful management of a disaster. Knowledge of risk communication, issue management, effective crisis communication principles, and recognizing potential ethical and legal problems for crisis communication managers, are necessary.

14.2 Aim

The aim of this chapter is to give the participants:

- An understanding of the impact a disaster situation has on baseline communications capabilities at the human, organizational, command, and technology layers.
- An understanding of and sensitivity to the unique requirements of communicating ongoing disaster risk to different stakeholders including responders, caregivers, the local and national media, and the public.
- Knowledge of communication expectations in existing local, national, and state response plans for disasters in particular, including political realities and technical capabilities.
- Ability to synthesize all of that communications knowledge into actionable recommendations for organizations that need to respond to disasters.

14.3 Introduction

Communication within an organization vertically and horizontally with other partners is a vital part of capacity building and disaster risk reduction. Disaster teams communicate for a better understanding of the risk among public and authorities, to collaborate in the prevention of the risk, to make politicians and policy-makers willing to take precautionary actions, to warn and during the crises to limit the negative effects of the event. In other words, communication is part of the challenge before, during and after an event. Communication is an essential tool for employees at all levels in the society, from global organizations to local, and in public agencies as well as NGO's, academia or business.

In an emergency situation/disaster, accurate information should be communicated to the appropriate recipient. Effective and accurate decision-making is very much dependent on a functional communication system, but also a common language to ensure that everyone has the same picture of what is going on. Communication to the victims'

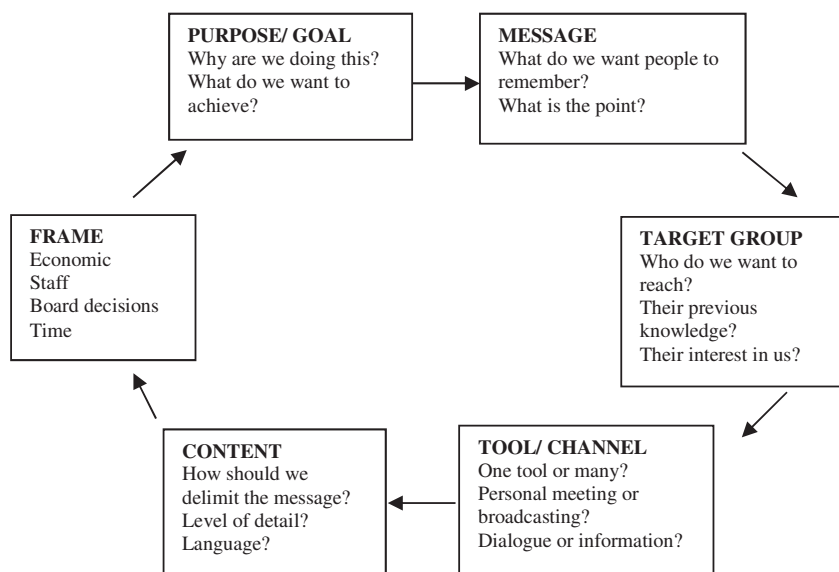
families and society’s various units such as media is also important and used properly, can save lives.

14.4 Basic communication model

Basic principles of good communication are the same regardless of the topic communicated in a given program/activity. Thus questions about target group, the aim of the activity or frame are as relevant in risk- or crisis communication as ever, even though, there are some challenges added in risk communication and crises communication respectively (see below).

There are many basic models for the planning of communication, which all consists of about the same parts or “questions to ask” during the planning of a communication activity. In the figure below the basic questions are listed.

Figure: Basic communication model (K. Gustafsson).



The planning starts with the basic questions about aim/goal of the activity, core message, and target group. If the goals are formulated in terms of what you want the target group to think, feel or do, the activity is easier to evaluate and possibly more powerful. Often the target group is “the public”, but to be able to adjust the activity to fit the target group it is necessary to find a more narrow or precise group to address. Another important issue is how much dialogue is needed to achieve the goals. In the broad sense communication embraces both information activities, with a person transmitting a message without any possibility to respond (traditional media, textbooks etc.), and dialogue where the

transmitter involves the receiver in the process (social media, group discussions etc.). Three important parts of the communication planning not mentioned in the model above are responsibilities, timeframes, and evaluation. As in all work, it is, of course, necessary to make clear who is doing what and when it should be done and the question of how the project will be evaluated need to be already considered in the planning stage.

Risk communication

When defining risk communication, major recurring elements are communication about the hazard, vulnerability, precautionary measures and/or response to them. Also, opinions about and emotions related to the risk may be involved. Thus an important element is a focus on the risk itself. Both the one-way process of information from a transmitter to receiver and the social interaction in mutual understanding or exchange of knowledge are part of risk communication. Dialogue and social interaction, it has recently been pointed out, are specifically important in contrast to the earlier understanding of risk communication which was that the authorities transmitted information to the public efficiently. Characteristics of good risk communications are action advice (people need to know what to do) and consistency of the message.

Some major challenges in risk communication are:

- 1) The importance of trust between the persons and organizations involved. Though experts and authorities in many countries are poorly trusted.
- 2) People are not passive receivers of information but actively seek and select information. They choose channels, organizations, and persons to trust and listen to, and form an individual perception of the event only partly based on the information supplied. People do not act rationally on the basis of received risk communication. Feelings such as fear may control their actions.
- 3) The necessity of dialogue. There are many arguments that two-way communication is needed; first seeking mutual understanding is a way to build up trust between people. Second dialogue is shown to be more effective in changing behavior.
- 4) The importance of an understanding of risk perception. The perception of risk differs between people and this difference must be considered in analyzing the target group. Do we want to address those who perceive the event as a low risk even in a high-risk scenario or the persons whose assessment magnifies the risk? Factors influencing risk perception are personal attitudes, group norms, values in the community, socio-demographic factors, sense of control and personality.
- 5) Changes in media. With social media, risk communication is not only two-way but multi-directional. This provides positive effects such as possibilities to get information during crises, well-informed societies, and rapid response in case of crisis, but it also brings new problems as misunderstandings spread quickly.

Channels for communication during crises: Media

At the time of disaster, the media provide prompt, first-hand coverage of the situation. The media's ability to influence international humanitarian assistance is well-known. However, they can also influence the course of management by serving as a critical partner to facilitate the transmission of messages that can generate humanitarian assistance, inform public behavior, and contribute to improving the quality of life in these circumstances. Or act as instruments of criticism and scrutiny in situations where there have been irregularities, lack of transparency, or irresponsible management of assigned resources and emergency situations. This, in turn, breeds a public demand for accountability of resources received and actions taken.

In emergency and disaster situations, the media will both demand and provide information. To strengthen partnerships between the media and disaster managers during an emergency, it is critical to understand the media's structure, main characteristics, accessibility, and their advantages and disadvantages before an event. Their presence and credibility give visibility to all stakeholders. Mass media should be viewed as important allies. To ensure a successful relationship with media, planning, understanding, trust, and credibility are necessary before, during, and after the emergency.

Television

Television typically provides national coverage but is based on imagery and as such broadcasters require images or video films. Images and videos should be prepared and delivered for broadcasting or accessed through a website. The material recorded for television should respect, at all times, the personal dignity of the subjects. To ensure correct coverage, one must meet television's demands for brevity and timeliness; if not, pieces would be edited by the television station and the message altered.

Radio

Radio provides immediate information over wide areas and can be accessed by a large population. It facilitates communication particularly with illiterate populations, and production costs are less than television. It is effective in reaching national and community audiences. After the Internet, radio is the medium that offers the most interactivity for its users.

Print media

Print media best support the publication of in-depth reports and analyses of conditions leading up to and after the emergency. They generally have wide circulation, provide daily information for diverse audiences, and people can read and re-read the information privately or publicly, reaching an even larger audience.

International news agencies

The role of news agencies during disasters is closely tied to the media outlets that purchase information from them. The output of news agencies will reflect the advantages, disadvantages, and roles that characterize their clients, whether print, radio, or television.

Computer-based media

Computer-based media offer an extremely effective means of communicating with all stakeholders, the public in the affected area and the national and international public. They have multimedia features, can provide instantaneous coverage on a global scale, and have a nearly limitless capacity to store information. Interactive formats, such as chat rooms and blogs, assist in maintaining transparency and accountability. A disadvantage is that affected populations may not have access to the Internet, particularly during disasters.

Monitoring media coverage

It is vital to follow up on the messages that are circulated in the media. This can either be conducted by hiring companies that monitor all of the media outlets or using search and news alert services that are offered on the Internet. Putting a simple, well-organized monitoring system into place allows channeling information more strategically and assists authorities in making decisions which affect various stakeholders' response and allows identification of topics that receive more or less coverage, and adjust the emphasis in messages as necessary.

14.5 Knowledge needed at different management levels

Basic level

- Human behavior in disaster and communication needs.
- Crisis communication.
- Risk communication.
- Best practices in media crisis and risk communications.
- Applying crisis communications.
- Hospital and first responder issues and planning.
- Crisis communications technologies and lessons learned.
- Managing the crisis—what to do?
- Managing the crisis—crisis detection.
- Developing a communication plan and Rumor control.
- Case studies in risk communication: Lessons learned from best practices.
- Evaluation and communication plans.
- Risk communication and working with media.
- Dilemmas and ethical issues.
- The role of media in disaster mitigation.

Advanced level:

- Existing public response communication structures.
- National Response Plan (NRP) overview, training, and exercises.
- NIMS (National Incident Management System) framework overview.
- NIMS and MMRS (Metropolitan Medical Response System).
- Media coverage of the disaster, linkage.
- Between disaster warning system and media.
- Coverage of disaster-related trauma.
- Developing message maps.
- Theories to inform risk communication.
- Trust, credibility, and participation in risk communication.
- Psychology of a crisis & emotions, risk perception, and risk communication.

Master level:

- Bio-terrorism, pre-event messaging, and law enforcement issues.
- Disease, disaster, and democracy: Engaging citizens in preparedness.
- Risk communication in the age of terrorism, natural disasters, and emerging infectious diseases.
- Introduction to emergency risk communication and planning for risk communication.

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Chapter Fifteen

15 Geospatial support

Svitlana Liebiedieva, Jan Haas, Jan-Olov Andersson

15.1 Summary

Remotely sensed data plays an essential role in disaster risk management. When a disaster occurs, emergency responders can get an overall picture of the cause, time, and the location of the disaster, its characteristic, extent, and severity of damages, based on the analysis of pre- and post-disaster satellite data. Satellite-, UAV- and crowdsourcing-derived information can also be used to inform decisions and plan actions for disaster prevention as well as recovery and reconstruction. The European Commission Joint Research Centre is responsible for the technical, scientific and contractual coordination of the Emergency Management Service (EMS) of the Copernicus program, and the European Earth Observation program.

15.2 Aim

The aim of this chapter is to explain basic principles and practical implications of cartography, remote sensing, satellite positioning, and navigation as well as geographical information systems (GIS). In addition, disaster management staff will be trained in acquiring, analyzing and presenting spatial information as well as navigation and communication technologies in support of disaster response operations. Key elements for this program are Earth Observation/Geoinformation and Cartography, Navigation, and Technical Communication/ data transfer. Other important factors to keep in mind are the responsibility and knowledge of each target group:

- **Field Staff Level:** gathering information in the field and communicating it to other field staff and field coordination level. Field staff needs spatial information for navigation and decision making in the field.
- **Field Coordination Level:** Must be able to get an overview of the situation in the field, takes/supports decisions based on spatial information and communicates situational understanding to field staff and headquarter level.
- **Headquarters Level:** Needs a strategic overview and aggregated information of the general situation sometimes in remote countries. Spatial information is used for communication to/with high-level decision makers, governments, and donors.

15.3 Introduction

It is commonplace in disaster management literature and practice that good situational understanding and localization of assets, as well as, technical communication between

headquarter and field is a crucial element of operation management. Most relevant information has an attached geolocation and has to be handled via technical devices such as satellite phones or internet communication. In recent years, remote sensing has gained more and more attention in disaster management applications. Meanwhile, there is a large and growing variety of remotely sensed imagery available, allowing for a timely acquisition of data and a new generation of disasters maps. Satellite imagery provides users with overview information of an area affected by a disaster and allows field staff to orientate themselves in the field. In addition to satellite imagery, the fast development of Unmanned Aerial Vehicles (UAVs) and their use in different domains opens a new paradigm for their use in natural disaster management. Recently the development and spread of mobile communication devices with built-in GPS enable users to capture additional information enriched with data on time and location. Furthermore, these devices allow for precise navigation for staff in the field.

Other chapters in this document cover communication aspects in respect to planning, human elements of communication and information sharing between users in the disaster response phase as this is a very important element in disaster response. As disaster management is a task that involves people in different and typically very remote locations, recent communication technologies must be used to allow for real-time communication. With the arrival of mobile devices, the use of geo-information is more commonly used by nearly all people on a daily basis. Furthermore, the spread of social media for disaster management opens up for a vast amount of crowdsourced data that can be used for collaborative mapping. Nevertheless, when it comes to disaster management, in time-critical situations knowledge of concepts, potential and limitations of the use of geodata allow involved users to speak the same language. This basic information can be found in numerous print and online sources. Current standard references concerning cartography, geo-information systems, and remote sensing are included in the reference list below.

The Copernicus Emergency Management Service (EMS) provides actors involved in the management of natural disasters, human-induced emergency situations, and humanitarian crises with timely and accurate geospatial information derived from satellite imagery, complemented by available in-situ and open source data. The EMS responds to national and cross-border disasters in Europe and large-scale disasters outside of the EU and offers various services to national authorities dealing with disaster risk management: early warning as well as rapid risk and recovery mapping.

Maps based on remotely sensed data can be very useful to support prevention and preparedness activities. After catastrophic events such as earthquakes, tsunamis, floods, severe storms, as well as humanitarian crises, EMS, Unmanned Aerial Systems (UAS) and a number of collaborative mapping technologies can deliver emergency response maps and analyses within a few hours. Another advantage of remote sensing technology can be seen in timely and efficient data acquisition over larger and dangerous or life-threatening areas. To do so, the EMS rapidly acquires and processes pre- and post-event satellite imagery

and analyses them together with other geospatial data. These maps can provide an assessment of the impact of damages caused by a disaster, which in turn can help first responders to prioritize intervention actions. Satellite, aerial and UAV images can help to plan post-disaster recovery and reconstruction initiatives. By comparing satellite images taken at different intervals, they can also help to monitor the progress of reconstruction and recovery projects.

15.4 Knowledge needed at different management levels

All levels:

- Maps/map projections, geodata/georeferencing.
- Reference systems and coordinates, Geographical Information Systems (GIS), EO Satellites.
- Image processing (multispectral/ thermal/SAR).
- Image classification, accuracy assessment, spatial, temporal, radiometric and spectral resolutions, image and map formats.
- Typical satellite map products. Potential and limits of satellite imagery at different scales.
- Map- and image interpretation, basic principles of navigation (satellite/inertial/radio), databases, road networks used as navigation references (incl. updating of those).
- Sources of navigation reference information (raster/vector data/imagery). Basic principles of land/radio and satellite communication. Image acquisition.

Specifics at Field Staff Level

- Orientation using satellite maps, raster vs. vector based maps.
- Mobile GIS Systems/Handheld/PDA etc.
- Outdoor navigation. GNSS. Personal navigation (foot and mounted).
- Basic surveying. Data collection. Indoor navigation.
- Personal mobile satellite communication. Portable satellite communication. VSAT. Fixed teleports. Terrestrial systems/vulnerability.

Specifics at Field Coordination Level

- From request to a map.
- When and how to ask for and how long does it take to get a map?
- Handling? Geographic information, maps, satellite data in field/OSOCC?
- Supporting local GI collection/management/coordination, basic fleet tracking/management, Blue force/staff tracking, and up-to-date reference information for navigation (see EO/GI chapter).
- Rapidly deployable systems, backup/redundancy solutions.

- Ad hoc GSM networks, internet basis.
- Communication to field staff/HQ.
- Data/Voice transfer via satellite.
- Distributed databases.

Specifics at Headquarters Level

- Sources and mechanisms to acquire maps and satellite imagery from, how to acquire/request a satellite map or a vector map.
- Handling GI, maps and satellite data at HQ level.
- Preparation of evacuation and contingency navigation for field staff.
- Global warning (CAP; EAS).
- Data transfer to and from the field, distributed databases, data/voice transfer via satellite, associated costs of satellite data and communication.
- Recently developed Web-GIS-platform technologies to store a wide range of solutions.

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Chapter Sixteen

16 Search and rescue (SAR), and safety and security

Andrii Lisniak, Chris Arculeo

16.1 Summary

Search and rescue (SAR) is one of the most important and dynamic processes in disaster management, which aims to identify and rescue lives in jeopardy. To do so, there are some principle methods, which can be applied. Security and safety should be always be fully considered for both staff and victims.

16.2 Aim

The aim of this chapter is to introduce the participant to SAR procedures and organization in disaster response management. The participant will learn about needed skills and competencies of SAR personnel, the role of rescue services in work on-scene, incident command structure and international standards for rescue missions worldwide.

16.3 Introduction

It is recognized that through the implementation of risk reduction programs, the risks and consequences of disasters will be reduced. One such program is the establishment of search and rescue (SAR) capabilities. SAR includes a variety of actions from rescuing and extracting victims and casualties from collapsed buildings and structures, to rescuing persons trapped in water, fire, mountains, caves etc. This chapter will describe the major activities, capabilities, roles and responsibilities of search and rescue operations in disasters.

The primary responsibility for the provision of search and rescue capabilities lies on the national or regional government. There are also a number of established international response capabilities to provide or augment national response to such disasters when assistance is sought by the affected country. Most countries have established bespoke legislation, regulation and response structures to facilitate the planning, preparation, response, and recovery from disasters. The international community has—through the United Nations (UN), the European Union (EU), the North Atlantic treaty organization (NATO) and other multilateral agreements—established protocols to provide and support SAR operations on request from the affected country. In terms of Urban Search & Rescue (USAR), guidance regarding its capacities, capabilities and general structures has been provided through the UN Office for the Coordination of Humanitarian Affairs. This guidance is contained and overseen by the International Search and Rescue Advisory Group (INSARAG). INSARAG activities are guided by United Nations General Assembly resolution 57/150 of 16 December 2002 on “Strengthening the

Effectiveness and Coordination of International Urban Search and Rescue Assistance”. Activities are also led by the INSARAG Hyogo Declaration adopted at the first INSARAG Global Meeting in 2010 in Kobe, Japan.

Disaster management and response face a series of generic and specific issues dependent on the type of disaster, the affected nation’s ability to manage and respond to the consequences of the disaster, and in managing any international assistance, which has been requested and accepted. One variable that influences Disaster Search and Rescue management and response heavily is the type of disaster. Generally, disasters can be classified as one of the following:

- Natural disasters (e.g. earthquakes, wildfires, floods, extreme heat, etc.).
- Man-made disasters, which can be either
 - Technological (e. g. hazardous material spill, nuclear power plant accident), or
 - Intentional (terrorism using chemical, biological, radiological, nuclear, or explosive weapons).

Regardless of the type, disasters have several key elements in common. They are relatively unexpected, with little or no warning or opportunity to prepare. Available personnel and emergency services may be overwhelmed initially by demands for their services. Lives, health, and the environment are endangered.

In the immediate aftermath of a disaster, needs are often greater than professional emergency services personnel can provide. In these instances, first responders become a vital link in the emergency service chain. Risk reduction and prevention programs can significantly reduce the potential impact of disasters. These programs should include assessing the community’s vulnerability to hazards, prioritizing preparedness measures and targeting effective actions for the appropriate hazard.

- To assess a community’s vulnerability to hazards, it is useful to:
- Identify the most common disasters that occur.
- Identify possible hazards with most severe impact.
- Consider recent and/or historical impacts.
- Identify susceptible locations in the community for specific hazards: people, buildings, and infrastructure.
- Consider what to expect in terms of disruption of services and length of time for their restoration.

USAR missions typically have three phases:

- **Assessment:** Facts are gathered about what types of structures are involved, the extent of damage, the layout of the building(s), hazards, and what rescue personnel and equipment are required and are available. Structural damage is usually categorized as light, moderate, or heavy. On the basis of the assessment, a course of action is determined. Assessment is an ongoing process that continues through all phases of search and rescue operations; plans are modified as needed.

- **Search:** Search techniques focus on where victims are likely to be located and areas of entrapment. Areas of entrapment inside damaged structures are called voids; they include spaces that victims get into to protect themselves (under desks, in bathtubs, in cupboards). When potential areas of entrapment have been identified and the potential number of victims estimated, search operations begin, using various systematic search patterns. Where many structures are damaged the exterior walls of buildings that have been searched are marked using INSARAG's building marking system.
- **Rescue:** Trapped victims are removed and given medical aid as necessary. Triage may be used to prioritize assistance for those who need it most. Before removing victims, it is often necessary to move or stabilize debris. Victims may be able to walk to safety themselves or may be removed using lifts, drags, or carries. Removal of victims is designed to avoid further injury.

Role of partners involved

International Search and Rescue Advisory Group (INSARAG)

INSARAG is a global network of more than 80 countries and organizations under the UN umbrella and is mandated to:

- Render emergency preparedness and response activities more effective and thereby save more lives, reduce suffering and minimize adverse consequences.
- Improve efficiency in cooperation among international USAR teams working in collapsed structures at a disaster site.
- Promote activities designed to improve search-and-rescue preparedness in disaster-prone countries, thereby prioritizing developing countries.
- Develop internationally accepted procedures and systems for sustained cooperation between national USAR teams operating on the international scene.
- Develop USAR procedures, guidelines, and best practices, and strengthen cooperation between interested organizations during the emergency relief phase.

UN Disaster Assessment and Coordination (UNDAC)

UNDAC is a standby roster of disaster management professionals from governments, UN agencies, and other disaster response organizations, that can be deployed within 12-24 hours of an emergency. UNDAC teams are deployed to natural disasters at the request of a host Government. The mechanism was set up to respond to natural disasters and is typically not activated for complex emergencies unless specific circumstances or requests justify deployment. UNDAC teams normally stay in affected areas for an initial emergency response phase (two to four weeks). They assist the affected Government in assessing and analyzing needs, and coordinate the international response by establishing an on-site operations coordination center (OSOCC) which manages information and provides liaison. After earthquakes, UNDAC teams offer reception facilities to incoming international urban

search-and-rescue teams and bilateral relief teams. UNDAC teams can request technical support for mapping, connectivity, and relief-related software solutions from partners such as MapAction and Telecoms sans Frontieres. UNDAC teams bring their own telecommunications, office and personal equipment.

On-Site Operations Coordination Centers (OSOCC)

OSOCCs are established to help local authorities coordinate international relief after a disaster. They are set up immediately by the first arriving international urban search-and-rescue team or the UNDAC team deployed by OCHA. OSOCC methods are defined and governed by UNDACs board. An OSOCC has three primary objectives: 1) To link international responders and relevant institutions of the Government of the affected country; 2) To coordinate and facilitate the activities of international relief efforts at a disaster site, notably after an earthquake, when coordination of many international USAR teams is critical to the effectiveness of rescue efforts; and 3) To provide a platform for cooperation, coordination and information management among international humanitarian agencies.

Global disaster alert and coordination system (GDACS) and virtual OSOCC

GDACS is a cooperation framework between the United Nations, the European Commission, and disaster managers worldwide, to improve alerts, information exchange and coordination in the initial period after major sudden-onset disasters. The GDAC website provides natural disaster early warning information and alerts and houses the ‘virtual on-site operations coordination center (Virtual OSOCC, or VO). The latter is used by many search and rescue actors and civil contingency agencies to coordinate their international preparedness and response.

UNHCR's role and accountability

In natural disasters, UNHCR cooperates with SAR actors, OSOCC and UNDAC teams and registers their responsibility to coordinate the links between SAR and humanitarian (cluster) responses in the first weeks of a natural disaster. Note: UNDAC does not coordinate the response to complex emergencies; existing refugee coordination structures are not affected. OSOCC is a key meeting and information point during natural disaster responses and may share office and meeting facilities. Whenever relevant, UNHCR should strive to attend coordination meetings and subscribe to information sharing mechanisms. Many natural disaster activities are coordinated through the Virtual OSOCC, especially during the first days of a response. UNHCR staff in natural disaster situations should create a user account and subscribe to relevant groups/ mailing lists. They can also create a user account at the Virtual OSOCC, and subscribe to alerts and updates on natural disasters.

Safety and Security

Victims of disasters require rapid location identification, medical first aid, and rescue. Victims of a plane crash or a shipwreck, people buried by snow, or trapped in the wreckage of their homes or places of work after a building collapse or an earthquake are in particular need. Although specialized dog teams and sophisticated listening devices are available to help search for trapped people, the bulk of rescue work is done by local first responders: fire, ambulance, and police personnel who are trained and certified. The first responders are often assisted by the general public but it takes more than just willing hands to save lives. Untrained, unorganized people may endanger themselves and those they are trying to rescue. Those wishing to assist should await the arrival of the first responders and follow their instructions.

Disaster rescue, by its very nature, is a high-risk activity. Safety must be foremost in mind. As such, it is important to communicate the location of the event and the number of people involved as well as every potential residual danger (collapsed structures, broken pipes, electric cables, etc.) to the authorities, thus allowing them to efficiently coordinate their rescue efforts.

It is important to note that anyone entering an incident area should ask themselves whether or not the damage may be the result of a criminal act. If that possibility exists, it is of the utmost importance that the integrity of the crime scene is preserved to assist law enforcement officials in the prosecution of the criminals.

The goal of search and rescue operations in a disaster situation is to rescue the greatest number of casualties in the shortest amount of time, with minimum risk to the rescuers. In reality, this means extrication (rescue) on different locations and initial medical stabilization of casualties usually trapped in confined spaces. The majority of these operations are performed in urban areas (USAR). Because of structural collapses, other causes are transportation accidents, collapsed trenches etc. Causes of these emergencies could be events with slow development (long pre-event phase) such as floods, hurricanes or with sudden development (short pre-event phase) such as an earthquake, terrorist attack, transport accidents. USAR is a multi-hazard discipline needed to perform in many varieties of disaster situations.

A Mass Rescue Operation (MRO) is a situation when the capabilities normally available for SAR are inadequate for immediate response due to a large number of casualties. MRO do not occur often but have major consequences. Preparedness is a function of critical importance for preventing large mortality and morbidity in MRO situations. Rescue teams work with other agencies during disaster response and proper education and training should be available to enable efficient multiagency approach and work. Planning cannot replace a need for education and training. Action cards should be available for work at incident places. SAR operations can be provided in a different environment with different types of risks. Risk management process should be included in every SAR operations. This continuous activity consists of Identification of mission,

Identification of hazards, Assessment of the risks, Identifying options, Evaluating risk vs gain, Perform decision, and Monitor situation.

The organization of SAR varies from one country to another. SAR is most often closely linked to the firefighting services. Global knowledge doubles every four years and improvement of the technology, communications, and disaster management also enables better SAR organization. A need for standardization of SAR procedures has been reported, especially if the SAR teams will be deployed on international missions. INSARAG was established in 1991. Located at UN Secretariat, its guidelines are published as a reference guide for international USAR operations for countries aiming to establish USAR capacity, as well as for established USAR teams. The purpose of these guidelines is to provide detailed recommendations based on the accumulation of institutional memory and experience related to international USAR response, as seen in the scope of the INSARAG mandate. UN General Assembly Resolution 57/150 (16th December 2002)—*Strengthening the Effectiveness and Coordination of International USAR assistance*—endorsed the use of the INSARAG Guidelines. In 1996 ECHO developed a specific program—DIPECHO (Disaster Preparedness ECHO)—to enable better preparedness for disasters worldwide.

16.4 Knowledge needed at different management levels

Basic level:

- Basic knowledge of SAR techniques and equipment.
- Types of SAR.
- Safety and Security in SAR operations.
- International standards for SAR operations.
- Phases of SAR.
- Basic knowledge of THIRA.
- Basic knowledge of CERT.
- Basic knowledge of UNDAC
- Basic knowledge of the DIPECHO Program.
- Basic onsite Life Support methods.
- Onsite Triage methods.

Advanced level:

Basic +

- The risk management process.
- Community Preparedness: Roles and Responsibilities.
- Basic knowledge of onsite Advance Life Support.

- Skills and competencies for work as a member at an Incident Command center.
- Mass Rescue Operations.
- Disaster Risk Reduction.

Master level:

Advanced +

- Skills and competencies for work as a member of National Crisis Headquarters.
- Skills and competencies to work as a member of an International Rescue Team.
- Evaluation of SAR work and organization on operative, tactical and strategic level during disaster response management.

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Chapter Seventeen

17 Public Health Education and Awareness of Disaster Management

Finn Nilsson, Amir Khorram-Manesh

17.1 Summary

Public awareness leads to disaster risk reduction, is an accepted maxim. Such awareness can be achieved in different ways using different methods depending upon the intended effect and population. Campaigns, knowledge integration into formal education, development of risk reduction training and capacity building, and establishing city-wide disaster safety initiatives, are some of the methods that can be used. Principles and tools for effective implementation of public education programs should be implemented as well as strategies to ensure the quality of the designed program. Finally, these measures and programs should be monitored and evaluated to ensure a sustained quality level.

17.2 Aim

The aim of this chapter is to describe how public awareness and participation in disaster planning and response help minimizing disaster effects. We also analyze existing strategies to develop community-based disaster awareness programs and actively engage the population.

17.3 Introduction

Whilst clinicians focus on treating diseases and injuries in a relatively small number of patients, the focus of public health workers is to prevent diseases and injuries on a larger scale. To do so, they need to work closely with communities and populations in order to find underlying causes and then implement innovative solutions. For example, in the increasing amounts of gun violence and shooting victims around the world, the public health perspective is not on wounds and surgical approaches, but rather on the causes of gun violence. Specific major public health foci vary from country to country, including problems such as premature or low birth-weight babies, malnutrition, infectious diseases etc. In all of these problems, the task of a public health worker is to investigate the factors that might cause these conditions and to develop programs to improve or totally abolish the conditions. The list of public health issues is long and the need for preventive measures much longer, depending upon the geographic location, living standards, etc. Today, public health encompasses areas as wide-ranging as epigenetics, chronic disease, the science of aging, mental health, disaster response, refugee health, injury prevention and tobacco control.

Disasters can be substantially mitigated by informed and motivated communities and in this public health is key. Using knowledge, innovation, and education to build a

culture of safety and resilience at all levels is one of the priorities for action for disaster risk reduction, as stated in the Hyôgo Framework for Action. Though substantial progress has been made among European countries, a nationwide public awareness strategy has been reported to be comprehensively achieved in only 48% of European countries, highlighting the need for further improvement.

Whilst it is proven that public awareness leads to disaster risk reduction, this can be achieved in different ways. Traditionally, campaigns are one of the most common methods of informing the public. Such campaigns can be run in journals, magazines, and newspapers, or in the form of flyers. However, a common problem with this method is the high illiteracy rates in developing countries. Instead, an increasingly common method of informing the population, even in high illiteracy societies, is to inform children and youths by integration of knowledge into formal education. Thereby, knowledge will be spread to all families, irrespective of educational background. Another method of dealing with public health issues is developing risk reduction training and capacity building. Scenario-based education not only identifies the weaknesses in a society or a specific issue but also improves the quality of disaster management. Another alternative is establishing city-wide disaster safety initiatives to engage the public in a common task. Finally, there must be principles and tools for effective implementation, monitoring, and evaluation of public education programs to ensure the quality of the designed programs.

One of the major issues of public health is the right to safe water and sanitation in peacetime as well as in emergencies. In an emergency situation the water, sanitation, and hygiene may not be adequate due to destroyed or damaged societal and physical infrastructure. As a result, diseases are likely to occur. People affected by emergencies often suffer from malnourishment, stress, fatigue and other ailments including injuries. These conditions, coupled with unsanitary living conditions such as substandard sanitation, inadequate water supplies, and poor hygiene, make disaster-affected people especially vulnerable to disease.

These aspects call for an improved public health system since diseases related to water, sanitation, and hygiene are all controllable and preventable. In this perspective, the full participation of the community, its volunteers, Community Health Workers (CHWs) and extended health workers even during emergencies cannot be emphasized enough. Substantial work can be accomplished at the community level for the prevention and early detection of problems and diseases. Experience has shown that wide-ranging benefits are the result when communities are actively involved in their own health and participate in water and sanitation projects. Using participatory approaches to engage the community has many benefits. Such approaches give community members the opportunity to build and strengthen problem-solving skills and empower them to take action. While communities, initially, might have limited capability to respond, giving them the opportunity to be involved helps with their own recovery process (see the mental health chapter for additional thoughts on the community recovery process). Through community

involvement, water and sanitation programs and projects can gain a thorough understanding of the needs, concerns, and values of the beneficiaries. The local skills and capacities that exist among the disaster-affected population can also be identified and strengthened. Strong community involvement is critical for projects being sustainable long after external assistance stops.

Every effort should be made to work together with disaster-affected people including vulnerable groups and the affected host community as soon as possible and to give them the opportunity to play an active role in the design, implementation, and management of water and sanitation projects.

17.4 Knowledge needed at different management levels

Basic level:

- Explain how public awareness helps reduce disaster risk and positively affects disaster response.

Advanced level:

- Describe the overall framework for the implementation of community-based disaster awareness programs.
- Utilizing strategies to involve and interact with communities at the local level in respect of disaster preparedness and response.

Master level:

- Proficient participation in planning, supervision, and evaluation of disaster awareness programs at both national and local level.

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Chapter Eighteen

18 Public Health engineering, sanitation, and hygiene

Iurii Prykhodko, Kubilay Kaptan,

18.1 Summary

People affected by emergencies often suffer from malnourishment, stress, fatigue and other ailments including injuries and infections. These conditions, coupled with unsanitary living conditions such as substandard sanitation, inadequate water supplies, and poor hygiene, make disaster-affected people especially vulnerable to disease. Providing the basic supply of water, sanitation, vector control, etc. has a direct impact on disease control and should be included in the framework of disaster management strategies. For a maximum impact, attention should be given not only to the technical aspect of public health engineering but also to human behavior and cultural aspects. All essential requirements should be considered with respect to the provision of sufficient potable water, the provision of adequate excreta disposal, waste water, vector control, etc. The most appropriate public health engineering strategies will vary from place to place and over time, and have to be established in close cooperation with the total disaster management system.

18.2 Aim

Upon successful completion of the course, the student shall:

- Be able to explain the relationship between the environment and water, sanitation, and hygiene-related diseases.
- Have an overview of key environmental health elements and how they are impacted by natural disasters.
- Demonstrate how environmental health infrastructure and practices are central to disaster management activities.
- Present standards and key indicators related to water supply, sanitation, and hygiene in emergencies.
- Understand how to conduct assessments to identify and address key risks relating to public health engineering elements such as drinking water, shelters, wastewater, vectors, solid waste, etc.
- Understand what should be considered in mitigating the environmental health risks after a disaster.
- Know how to respond to the environmental health impacts of disasters.
- Manage disaster scenarios and possible impacts, with respect to public health engineering elements.

- Be able to provide basic information about control measures for improving environmental conditions.
- Understand the importance of addressing long-term needs of the community at the onset of the emergency and throughout its duration.
- Be able to identify problems in the environment, water, sanitation, and hygiene situation during emergencies.
- Know how to apply water supply, sanitation, and hygiene standards in emergencies.
- Know how to install control measures for environmental health problems.
- Understand the long-term problems of water supply, sanitation, and hygiene.

18.3 Introduction

The three main causes of natural disasters include movement of the Earth, the weather, and extreme conditions. When the Earth moves, it can cause earthquakes, volcanic eruptions, and tsunamis. During disasters, there are many threats to human health, which are related to the environmental elements such as water, vectors, waste, sanitation, etc. For example, over two years after the 2004 Indian Ocean tsunami, which caused massive devastation, people were still living in temporary shelters, while reconstruction projects were struggling to ensure clean water supplies and good sanitation for the new housing. At this time, diarrhea was prevalent and a large number of vector-borne disease cases (dengue and malaria) could be identified in parts of Indonesia (Aceh).

In this chapter, water means water for domestic purposes and not agricultural or industrial purposes. The term sanitation is used in a broad sense and considers excreta disposal, vector control, solid and medical waste management and drainage. The term hygiene includes practices related to water hygiene (e.g. keeping water supplies safe), personal hygiene (e.g. washing hands), domestic hygiene (e.g. food hygiene) and environmental hygiene (e.g. keeping household environments free of excreta and solid waste).

There is often not enough clean, drinkable water available for emergencies, and this can create a major health hazard. Therefore, an adequate supply of clean drinking water is one of the first priorities in any disaster situation. Sanitation covers the provision of safe water, as well as the disposal of human excreta, wastewater, and garbage, insect and rodent control, safe food handling, site drainage, etc. The most effective way to alleviate the threat is to prevent or remediate the underlying environmental problem. Furthermore, the preparedness and response actions to the environmental health aspects of disasters are vital in influencing the amount of human suffering, loss of life and ill-health.

Public health engineering focuses on evaluating and managing environmental issues that have perceptible impacts on public health during disasters. Public health engineering professionals, managers, and responders have a critical function in managing environmental public health impact during disasters. Training is a necessity to ensure that the managers and responders are adequately prepared to manage adverse impacts of disasters. It is important to analyze, define and treat the environmental health problems consistently within a logic framework and process, as follows:

Assessment and analysis

This phase allows the collection of data on the population, health, technical issues, physical environment, water transportation, water storage and distribution, water use, and relevant socio-political data.

Strategy planning

On the basis of assessment and analysis, strategy planning can be initiated. A global objective must be established, divided into specific objectives, which lead to outcomes/results. Activities to obtain each of these results must be determined. Manpower and logistics and a detailed budget needed for this process must also be defined.

Implementation

In some extreme disasters, quick implementation of the public health engineering plan is a must, since it is not possible to obtain all requirements desired without starting up an intervention.

Monitoring

The objective of monitoring is to guarantee the permanent appropriateness and create a match between objectives, implemented measures, expected results and the outcome obtained within the time frame of the intervention.

Evaluation

The evaluation is intended to look at the real impact of public health engineering interventions on the situation of relevant services such as drink water, waste, sanitation, sheltering, etc. To facilitate that goal, there exist a series of standards on public health engineering services. Some of them are:

- 1) During disasters, all people should have safe and equitable access to a sufficient quantity of water for drinking, cooking and personal and domestic hygiene. Average water use for drinking, cooking and personal hygiene in any household is at least 15 liters per person per day. Even if a sufficient quantity of water is available to meet minimum needs, additional measures may be needed to ensure that access is equitable for all groups. Water points should be located in areas that are accessible to all regardless of e.g. sex or ethnicity.
- 2) People should have adequate numbers of toilets, sufficiently close to their dwellings, to allow them rapid, safe and acceptable access at all times of the day and night.
- 3) Vector-borne diseases can be controlled through a variety of initiatives, including appropriate site selection and shelter provision, appropriate water supply, excreta disposal, solid waste management and drainage, the provision of health services (including community mobilization and health promotion), the use of chemical controls, family and individual protection and the effective protection of food stores.

The numbers of disease vectors that pose a risk to people's health and nuisance vectors that pose a risk to people's well-being should be kept to an acceptable level.

- 4) The disaster management system should prepare an environment that is uncontaminated by solid waste, including medical waste, and have the means to dispose of domestic waste conveniently and effectively.
- 5) Existing shelter and settlement solutions are prioritized by the return or hosting of disaster-affected households, and by ensuring the security, health, safety and well-being of the affected population.
- 6) The people affected by the disaster need to have sufficient clothing, blankets, and bedding to ensure their dignity, safety, and well-being.

18.4 Knowledge needed at different management levels

Basic level:

- Terminologies and definitions of public health engineering and its elements.
- Impacts of disasters on environmental health infrastructures.
- Environmental health disaster preparedness and response systems.
- Responsibilities and activities of different public health engineering teams in response to disasters.
- Survival and longer term needs in an emergency.
- Diseases related to water, sanitation, and hygiene.
- Standards and key indicators for hygiene promotion, food safety, and drainage.

Advanced level:

- Leadership and management in disaster management.
- The overall framework for environmental health disaster preparedness, response, recovery, and mitigation.
- Health and safety precautions and guidelines that should be taken during a disaster.
- Water issues faced in disasters and role of environmental health actions in addressing these issues, e.g. tests, sampling, and treatment.
- Role of environmental health in waste management issues during disasters.
- The role of environmental health in addressing vector control issues during disasters.
- The role of environmental health in shelter issues and processes for conducting environmental health shelter assessment.
- Community involvement in disease prevention.
- Improving environmental conditions.
- Vector control.
- Solid waste management.
- Planning guidelines for institutions.

Master level:

- Analysis of current preparedness situation of public health engineering, and developing relevant policies, strategies, and plans to be implemented during disasters.
- Comprehensive risk assessment of disasters for environmental health elements.
- Evaluate and optimize the response plans, procedures and tools of public health engineering in terms of disaster management.
- Evaluate and enhance disaster management public health engineering performance.
- Excreta disposal, water quantity, and quality, common vectors in emergencies, water and sanitation in cholera outbreak response.

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Chapter Nineteen

19 Public Education

Kristin Gustafsson, Amir Khorram-Manesh

19.1 Summary

Public education is one of the important steps to be taken in mitigation of disasters. Such education can be provided for the public using different approaches, each with different pros and cons. Any education to the public should be carefully planned, implemented and evaluated with specific and evidence-based tools.

19.2 Aim

To describe how public awareness helps minimize disaster effects.

To analyze strategies to develop community-based disaster awareness programs and actively engage the population.

19.3 Introduction

Informed communities are one of the key elements in disaster management at all levels. Hence public education is a keystone in building resilience in our communities. Educating the public increases their awareness, which in turn leads to disaster risk reduction. Public awareness and education are necessary for changing social and cultural norms which perpetuate harmful practices. All members of the society, including religious and political leaders with high impact on society, should be made aware of the negative consequences of harmful practices and their harmful impacts not only on a specific group but on the larger community as well.

The overall goals of public education on disaster risk reduction is to 1) increase the understanding of manmade elements of disasters, threats, and vulnerability as well as the understanding of how to attack the causes and prevent them. 2) Empower people in the society to participate in reducing risks and make them certain of their capacity to reduce their risks.

There are four main approaches to public education for disaster risk reduction:

1. **Public awareness campaigns** aim to reframe the conversation about the subject and to influence both policy-makers and the public and thereby increase support and knowledge from all groups and in the long run changes in policies, law, and regulations. The campaigns are initiatives putting the topic of risk reduction or crisis management on the agenda in the media and help impress the idea on people for a while. It is important to note that public awareness campaigns often are a combination of numerous communication strategies such as print and broadcast media, social

media, web-based information, performing arts, focus groups discussing the topic and public meetings. Successful public education campaigns take time, and typically occurs in the local community and use local actors and religious and political leaders as magnifiers and cooperators. To establish city-wide disaster safety initiatives is one way to connect with the local community and peoples' experiences of disaster. One example is a "disaster safety day" to commemorate the anniversary of disasters. The campaign must be planned carefully with regard to the target group, outcome, pros and cons, background and history, its unique selling points and finally the message itself. The message needs to be 1) standardized, consistent, and backed up by the best scientific evidence available as well as experts' consensus. 2) Adapted to the local level of knowledge and be motivating, inspiring and energizing. 3) Legitimate and credible. 4) Scalable, i.e. include affordable replication strategies that can magnify the achieved results. 5) Sustainable over time and after the campaign is over.

2. **Participatory learning** encourages people to participate directly in creating solutions that fit their organization or society and personal situation. This approach is more motivating and therefore successful at a small scale, but more expensive. A key word in this approach is empowerment. To empower people and the local community to take precautionary actions adjusted to the local context. Participatory learning can be used at the organizational level the community level and the population level as well. A wide range of tools can be used. Examples are video material and web-based material and oral presentations in combination with participatory activities such as risk mapping, group discussion, games, simulation exercises and web-based activities. An example of advanced participatory learning approach is participatory disaster management planning.
3. Integration of public information into **formal education** is a way of reaching out to both youth and adults. Teaching our children how to act during a crisis, about disaster risk reduction in the community and prevention acts in the household leads not only to increased knowledge among young but also in a broader sense in their homes and families. Integrating disaster risk reduction in the curriculum is sometimes done by courses on the topic, but more often by the modules in courses or activities as a part of a course. Useful tools to support formal education include for instance textbooks, non-text learning materials and interactive activities used by teachers. Disaster risk reduction can safely be included at all levels of the school curriculum and in all public and private institutions.
4. **Informal education** at schools or communities. This is less costly than other approaches and very flexible. The aim is often to stimulate reflection and discussion in the group and success is dependent on the participants seeking more information afterward. A combination of tools are used, both face-to-face and one-way information. It is important that tools are attention grabbing, participatory and practical.

Keystones in successful communication are valid also in the framing of public education. Examples are; keep the message simple, unexpected, concrete and emotional, and never forget who your target group is. In all these approaches it is important to personalize the message and to communicate what to do. Preparedness is linked to knowing what to do in case a crisis occur. The use of positive examples in the local community is known to be a successful educational device. People tend to follow other people around them and copy good examples pointed out. Combining different tools is important since various types of contact—one-way broadcasts, face-to-face instruction, and interactions with groups—possess the best capacity to produce changes in attitudes and behavior. It is often a good idea to start on a small scale and scale it up after evaluating the first measures.

The choice of the appropriate approaches depends on the background of the society, advantages, and disadvantages of the approach, and the topic. It is also dependent on the mandates and economy of the organization planning the program.

A successful outcome relies on a good planning and the relative effectiveness of the tools employed. In planning the program some key questions should be answered:

- 1) *Aim*: why are we doing this?
- 2) *Target group*: who is the program aiming at?
- 3) *Approach*: which approach do we take?
- 4) *Effective tools*: what tools are available and most effective?
- 5) *Partnership*: who should we work with?

Effective tools for planning, implementation and evaluation of the program should be available, alongside strategies to ensure quality.

One useful evaluation process is GTO (Getting To Outcome), which is based on traditional evaluation methods, empowerment evaluation, results-based accountability and continuous quality improvement. Results-Based Accountability (RBA) focuses on the results of programs and what can be learned from program impacts and program effectiveness, rather than process output information. Continuous Quality Improvement (CQI) is a technique within Total Quality Management (TQM). It is based on principles of quality improvement, error and cost reduction and increasing client satisfaction. By using this approach, needs and resources are identified, goals are clarified, capacities are estimated and plans are formed. The process is identified by how the quality of program implementation is assessed. Finally, the entire program is evaluated by looking for instance at changes in people's attitudes and behavior and at how well the program followed the plan.

19.4 Knowledge needed at different management levels

Basic level:

- Explain how public awareness helps reducing disaster risk and positively affects disaster response.
- Explain the role of public education to increase public awareness.

Advanced level:

- Describe the overall framework for the implementation of community-based disaster awareness programs.
- Describe strategies to involve and interact with communities at the local level on disaster preparedness and response.

Master level:

- Participate in planning, supervision, and evaluation of disaster awareness programs at both national and local level.

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Chapter Twenty

20 Public sector competency

Emelia Santamaria, Amir Khorram-Manesh

20.1 Summary

The consequences of disasters are devastating and varied: lives are lost, housing, crops, and livelihoods destroyed. Humanitarian aid is provided in a variety of forms depending on the nature of the crisis. It can range from food, clothes, healthcare, shelter, water and sanitation to emergency repairs to infrastructure, demining actions, psychological support and education. Several national and international agencies are involved in this process at various levels, making knowledge of their mandate and competencies necessary.

20.2 Aim

Understand the framework for coordination within United Nations' agencies.

Understand the framework and the tools used by the European Union Civil Protection Mechanism for coordination.

Define role and responsibilities of national Public Health Authorities.

20.3 Introduction

Disasters are devastating and their consequences take lives and destroy housing, crops, and livelihoods. Humanitarian aid is needed and should be provided in a variety of forms depending on the nature of the crisis. There are several national and international agencies, which are involved in the process of delivering the needed aid. Some are introduced here.

UN-OCHA

The United Nations Office for the Coordination of Humanitarian Affairs (OCHA) is a United Nations (UN) body formed in December 1991 by General Assembly Resolution 46/182. The resolution was designed to strengthen the UN's response to complex emergencies and natural disasters. Earlier UN organizations with similar tasks were the Department of Humanitarian Affairs (DHA), and its predecessor, the Office of the United Nations Disaster Relief Coordinator (UNDRC). In 1998, due to the reorganization, DHA merged into OCHA and was designed to be the UN focal point for major disasters. It is a sitting observer of the United Nations Development Group. After merging with the DHA, its mandate was expanded to encompass the coordination of humanitarian response, policy development, and humanitarian advocacy. The agency's activities include organization and monitoring of humanitarian funding, as well as information exchange, coordination and rapid-response teams for emergency relief.

OCHA has built up a range of services in the execution of its mandate. Some of the larger ones are:

- 1) Integrated Regional Information Networks (IRIN), a humanitarian news and analysis service (1995-2014). Since 1 January 2015, IRIN operates as an independent news service and is no longer affiliated with OCHA.
- 2) INSARAG, International Search and Rescue Advisory Group.
- 3) ReliefWeb - Time-critical humanitarian information on Complex Emergencies and Natural Disasters (1996).
- 4) Central Emergency Response Fund (2006).
- 5) Humanitarian Reform seeks to improve the effectiveness of humanitarian response by ensuring greater predictability, accountability, and partnership.

Who does What Where Database and Contact Management Directory. To ensure that appropriate and timely humanitarian response is delivered during a disaster or emergency, information must be managed efficiently. The key information that is important to assess and ensure that humanitarian needs are met in any emergency/disaster are: to know which organizations (*Who*) are carrying out what activities, (*What*) in which locations, and (*Where*) which is also universally referred to as the 3Ws (*Who does What Where*). The integrated Contact Management Directory, complements the 3W database, making it easy for the user to navigate through the application (2006).

Common and Fundamental Operational Datasets (CODs) are critical datasets that are used to support the work of humanitarian actors across multiple sectors. They are considered a de-facto standard for the humanitarian community and should represent the best available datasets for each theme. The Fundamental Operational Datasets (FODs) are datasets that are relevant to a humanitarian operation, but are more specific to a particular sector or otherwise do not fit into one of the seven COD themes.

Since 2004, OCHA has partnered with the Center for Excellence in Disaster Management (CEDM) and Humanitarian Assistance to facilitate OCHA's Civil-Military Coordination (UN-CMCoord) course in the Asia-Pacific Region. The UN-CMCoord Course is designed to address the need for coordination between international civilian humanitarian actors, especially UN humanitarian agencies, and international military forces in an international humanitarian emergency. This established UN training plays a critical role in building capacity to facilitate effective coordination in the field by bringing together approximately 30 practitioners from the spectrum of actors sharing operational space during a humanitarian crisis and train them on UN coordination mechanisms and internationally recognized guidelines for civil-military coordination.

DG - ECHO

The Directorate-General for European Civil Protection and Humanitarian Aid Operations (ECHO), formerly known as the European Community Humanitarian Aid

Office, is the European Commission's department for overseas humanitarian aid and for civil protection. For its humanitarian interventions, ECHO does not implement assistance programs itself but funds operations through a wide range of around 200 partners (NGOs, UN agencies, and international organizations such as the Red Cross/Red Crescent Movement). In 2013, ECHO had 44 field offices in 39 countries, with 149 international humanitarian experts and 315 national staff members. The field offices provide an up-to-date analysis of needs assessment in a given country or region, contribute to the development of intervention strategies and policy development, provide technical support to ECHO funded operations, and ensure adequate monitoring of these interventions and facilitate donor's coordination at field level.

In addition to providing funding to humanitarian aid, ECHO is also in charge of the EU Civil Protection Mechanism. Established in 2001, the Mechanism fosters cooperation among national civil protection authorities across Europe. Currently, 31 countries are members of the Mechanism; all 28 EU Member States in addition to Iceland, Norway, and the FY Republic of Macedonia. The Mechanism was set up to enable coordinated assistance from the participating states to victims of natural and man-made disasters in Europe and elsewhere. ECHO's mandate is to provide emergency assistance and relief (in the form of goods and services) to victims of conflict and natural or man-made disasters outside the EU. Its mandate also extends to disaster prevention and post-crisis operations. ECHO's humanitarian actions are based on compliance with international law and the humanitarian principles of humanity, neutrality, impartiality, and independence. Its implementation, therefore, depends on the application of international humanitarian law (IHL).

In 2007, the European Commission adopted a "European Consensus on Humanitarian Aid" to constitute the first European political text of reference on humanitarian aid. The European Consensus reaffirms the humanitarian principles of humanity, impartiality, and independence. It also stipulates "humanitarian aid is not a management tool for crises management". However, amongst others, several NGOs called on the European Union to use its political influence to support humanitarian aid based on the mere principles of neutrality and impartiality and not on security agendas. In 2012, ECHO developed the first revision of the Consensus since its establishment, highlighting a need for stronger partnerships through a quality selection of partners and ensuring enhanced accountability towards citizens and stakeholders. Together with other donors, ECHO worked with the Inter-Agency Standing Committee (IASC) to create the Transformative Agenda. Principles of humanitarian leadership, accountability and coordination were agreed upon to improve the rapidity, efficiency, and effectiveness of humanitarian response. Additionally, a civil protection agenda was adopted as a part of ECHO's mandate to ensure better cooperation and protection during disasters among the third world and regional countries and international organizations.

The national health authority's policy and mandate for disaster response

National health authority policy differs in different countries due to legislation and background. Below we have a short description of the Philippines as an example.

In the Philippines, the Office of Civil Defense (OCD) is the implementing arm of the National Disaster Risk Reduction and Management Council (NDRRMC) and has the primary mission of administering a comprehensive national civil defense and disaster risk reduction and management program. It is this government agency which provides leadership in the continuous development of strategic and systematic approaches as well as measures to reduce the vulnerabilities and risks to hazards and manage the consequences of disasters. The NDRRMC supervises and leads in emergency management as well as coordinates the implementation of disaster risk reduction through policy making, integration, supervision, and monitoring and evaluation functions. The Department of Health is the national government agency that is concerned with coordination of health emergency and disaster response and the responsible office is the Health Emergency Management Bureau (HEMB) which also oversees the 4 phases of emergency management—mitigation, preparedness, response, and recovery. The HEMB coordinates the deployment of pre-screened national or international Emergency Medical Teams (EMT) to the designated areas/hospitals whose special needs have been identified, such as personnel/staff or specialty services. A Guideline for these EMTs was drafted to promote order in the deployment and avoid compromising healthcare delivery on the ground. At the city and municipal levels, the Disaster Risk Reduction Office (DRRMO) of Local Government Units (LGUs) which are under the supervision of the Department of Interior and Local Government (DILG), is the office responsible for the emergency management and disaster response. UN agencies such as OCHA and UNISDR are present in the country and are also involved in their capacities during disaster response.

20.4 Knowledge needed at different management levels

Basic level:

- Be able to describe the UN and EU disaster response framework.
- Be able to describe the National Health Authority's role in disaster response.

Advanced level:

- Be able to take part in disaster management at the local level according to the national disaster framework.
- Interact with national and supranational authorities' representatives at the local level.

Master level:

- Design, manage, report and evaluate disaster management plans at a local and national level according to the overall national and supranational directives.
- Interact with supranational authorities' concerning each authority's role and responsibilities.

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Chapter Twenty-one

21 Flood management

Amir Khorram-Manesh, Lars Nyberg

21.1 Summary

Even without taking climate change into account, exposure to floods, as well as flood vulnerability is increasing across Europe. In fact, floods are the most common natural disaster causing loss of life and economic damage in Europe. The adverse human health consequences of flooding are complex. Floods may damage major infrastructures and result in the displacement of populations. Being prepared to provide an effective response to these disasters is a necessity for all levels of disaster management--strategic, tactical, and operational--in the EU. Therefore, opportunities for gaining enough knowledge, effective skill, and relevant expertise in the field of flood disaster management through training, should be improved.

21.2 Aim

The aim of this chapter is to let participants:

- Understand fundamental characteristics of flood hazard and its risk, impacts, and disasters.
- Have a picture of the current perspectives for major flood disasters in the EU.
- Understand principles of flood risk and disaster management at different levels (strategic, operational, and tactical) of action.
- Be familiar with efficient responses to different flood disaster scenarios.
- Become skilled at analyzing flood situations and developing disaster management plans and procedures.

21.3 Introduction

Floods are the most common natural disaster worldwide and in Europe. It is reported that flood disasters account for about a third of all natural disasters (by number and economic losses). The health impacts of floods are not limited to mortality. Injuries, communicable diseases, chronic diseases, mental health effects, and health systems failure are other impacts of a flood. In recent years, Europe has witnessed some of the largest flooding events in its history. Indeed, seven out of the 20 most important floods ever recorded in Europe (in terms of the total reported number of affected people) occurred during the 2000–2009 decade. Over the last ten years, floods in Europe have killed more than 1,000 people and affected over 3.4 million others.

A flood is a hydrological event characterized by high discharges and/or water levels that can lead to inundation of land adjacent to streams, rivers, lakes, wetlands and

other water bodies. Flood events are caused and/or exacerbated by intense, long-lasting rainfall, snowmelt, and failure of a dam or embankment system, earthquakes, landslides, ice jams, high tides, storm surges and by human activities, including the operation of flood control systems. Floods are a hazard and not a disaster. In many places, floods are events of annual occurrence. Floods become disasters when they are of unusual proportion, occur in unusual places, or occur unexpectedly, thus exceeding the ability of the affected community or society to cope with the event. The severity of flood disasters is not solely linked to the intensity of the natural hazard but also many human-driven factors that contribute to increasing the risk for flooding and magnifying the impacts, such as soil degradation, deforestation, urbanization, and poor urban drainage. The risk of flooding for a particular community or enterprise consists of (1) The probability of a flood hazard in the area, (2) The vulnerability of the area to undesirable consequences and economic loss from floods.

In flood risk assessment, estimation of flood discharge is important, which can be done in one of the several ways: a) Empirical formulae, b) Frequency analysis, c) Regional flood analysis, d) Probable maximum flood methods, and e) Conceptual modeling.

Generally, there are three major ways by which societies have attempted to prevent or mitigate floods impacts:

- 1) Structural measures: land drainage modification, reservoirs, embankments, diversions, platforms, polders.
- 2) Non-structural measures: regulations, flood defense, flood insurance.
- 3) Do nothing: accept and learn to live with floods.

The holistic management of floods requires consideration of the following set of principles:

1. **Pre-flood activities**

- Flood risk management for all causes of flooding, and using Remote Sensing and Geographical Information Systems (GIS) to conduct this activity.
- Disaster contingency planning to establish evacuation routes, critical decision thresholds, public service and infrastructure requirements for emergency operations, etc.
- Construction of flood defense infrastructure (physical defense and forecasting and early warning systems).
- Maintenance of flood defense infrastructure.
- Land-use planning and management within the whole water catchment area.
- Discouragement of inappropriate development within floodplains.
- Public communication and education of flood risk and actions to take in a flood emergency.

2. **Operational flood management**

- Detection of the likelihood of a flood rising (hydro-meteorology).
- Forecasting of future river flow conditions from hydro-meteorological observations.

- Warning issued to the appropriate authorities and the public on the extent, severity, and timing of the flood.
- Response to the emergency by the public and the authorities.

3. **Post-flood activities:**

- Relief for the immediate needs of those affected by the disaster.
- Reconstruction of damaged buildings, infrastructure, and flood defenses.
- Recovery and regeneration of the environment and the economic activities in the flooded area.
- Review of the flood management activities to improve the process and planning for future events in the area affected and more generally elsewhere.

One of the most important subjects is the design of Early Warning Systems (EWS) for flood prevention and disaster management. The design of an EWS requires developments in a number of technologies and areas of expertise:

- Sensor equipment design, installation and technical maintenance in flood defense systems.
- Information and Communication Technology for sensor data transmission, filtering, and analysis.
- Middleware for connecting sensor data, relevant documents, analysis tools and modeling software.
- Computational models and simulation components for analysis of dike stability, prediction of dike failure, simulation of possible flood dynamics and optimization of evacuation strategies.
- Advanced interactive visualization technologies.
- Development of a decision support system that will assist public authorities and citizens in choosing the right flood protection tactics and in managing emergency situations.
- Internet connection to the early warning and decision support systems.

21.4 Knowledge needed at different management levels

Basic level:

- Terminologies and definitions of flood disaster terms.
- Nature and causes of floods, and their classification.
- Climate change and community elements in flood vulnerability.
- Basic principles of flood disaster management.
- Essential functions in response to flood disasters, e.g. public health, search and rescue, evacuation, etc.
- Responsibilities and activities of different response teams in flood disaster management.

Advanced level:

- Leadership and management in disaster management.
- Prevention and mitigation actions of flood hazards.
- Sustainable recovery and rehabilitation activities for flood impacts.
- Overall framework to implement flood disaster preparedness activities.
- Early warning system for flood management.

Master level:

- Comprehensive risk assessment of flood impacts at national and local levels.
- Analysis of current preparedness situation, and developing relevant policies, strategies, and plans to be implemented in case of the flood disaster.
- Evaluate and optimize the response plans, procedures, and tools for flood disaster control.
- Evaluate and enhance the response team's performance in flood disaster management.

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Chapter Twenty-two

22 Food safety and security

Kubilay Kaptan, Amir Khorram-Manesh

22.1 Summary

Disasters and food insecurity are directly interconnected. Floods, hurricanes, tsunamis and other hazards may ruin food, destroy agricultural, livestock and fishing and food processing infrastructure, resources, inputs and manufacturing capability. Hazards disrupt market accessibility, trade, and food supply, minimize earnings, diminish savings and erode livelihoods. Drought, plant pests and diseases such as locusts and armyworms, animal diseases like African swine fever, and food contamination or adulteration have a direct financial influence by decreasing or eliminating farm manufacturing, by negatively influencing costs, industry, and market accessibility and by decreasing farm earnings and employment. Economic crises such as soaring food prices reduce real income, force the poor to sell their assets, decrease food consumption, and reduce their dietary diversity and access to safe and quality food. Disasters create poverty traps that increase the prevalence of food insecurity and malnutrition.

During and following disasters, affected populations are at risk for outbreaks of foodborne diseases, mainly related to unsafe food storage, handling, and preparation, making food safety one of the top public health priorities. Disaster-affected populations often experience food shortages, denial of access to food or inability to safely use it. Those determinants may result in the quick emergence of food insecurity; food security here defined as uninterrupted access to sufficient, safe, nutritious food to maintain a healthy and active life.

22.2 Aim

The aim of this chapter is to describe public health hazards related to food safety and food insecurity during disasters. To analyze key determinants for the provision of safe food in the aftermath of a disaster and to analyze the framework of food security programs in emergencies: actors involved, initial assessment and implementation.

Upon successful completion of the course, the student shall:

- Recognize a food and nutrition emergency.
- Be able to target needy populations and equitably distribute an adequate quality and quantity of food aid.
- Understand key emergency nutrition interventions.
- Monitor the adequacy of the food aid and emergency nutrition response and conduct nutrition surveillance.

- Strengthen disaster preparedness and the ability to mitigate the impact of emergencies that affect food security and the productive capacities of rural populations.
- Perform rapid assessments of the impact of disasters on employment and income.
- Implement and monitor livelihood risk reduction and recovery programs.
- Understand a cost effective investment in sustainable development.

22.3 Introduction

In the aftermath of disasters, food may become contaminated very fast, exposing the public to potential health hazards. Preventive food safety measures should be implemented to ensure that safe food is delivered to the affected population, including preventive water treatments and measures to reduce food-borne diseases (e.g. cooking, disinfection). There is also need for practice guidelines to inspect and salvage food, including rules for inspection, proper labeling, and stocking of salvaged food, protocols for the disposal of food unfit for human consumption (including food contaminated by radiation/chemical agents) and respect of the cold chain. Food security means simply that food must be available in sufficient quantities and on a consistent basis. It considers stock and production in a given area and the capacity to bring in food from elsewhere, through trade or aid. It also means that people must have regular access to adequate quantities of food, through purchase, home production, barter, gifts, borrowing or food aid. Finally, consumed food must have a positive nutritional impact on people. It entails cooking, storage and hygiene practices, individual health, water, and sanitation, feeding and sharing practices within the household.

Food availability itself may not be the only factor affecting safe food provision. However, the most relevant determinants for the provision of safe food after a disaster may include education on how to consume food that the affected population is not familiar with, provision of safe water, tools and fuel for cooking, and alternatives to mass feeding when feasible.

Unsafe food may cause food-borne diseases resulting in serious public health hazards such as diarrhea, intoxication, etc. Implementation of strategies and measures to identify and response to outbreaks of food-borne diseases is necessary. In order to implement effective strategies, the actual level of food security and nutrition in the affected population needs to be continuously assessed by using a framework for food security assessment considering food availability, food access and food utilization as core determinants of food security, linked to households' asset endowments and livelihood strategies.

Food security assessment objectives include:

1. Identification of prevalence, geographical distribution, and severity of food insecurity and malnutrition in the affected population.
2. Identification of main determinants of food insecurity and malnutrition in the area.
3. Strategies to cope with the situation developed by the affected population.

4. Forecast scenarios for up to 12 months.
5. Establishing the need for an intervention (including the provision of external food supplies).

Deciding data, indicators and source of information for the developed program is of utter importance. These data should be carefully chosen and linked to the program objectives in order to be able to define intervention thresholds, prioritize and cross-tabulate them.

For an effective planning and implementation of food security assessments, there is a need for human resources, administration and logistics, primary data collection strategies, methods of analysis of the collected data and reporting the assessments results.

22.4 Knowledge needed at different management levels

Basic level:

- Causes of food and nutrition emergencies.
- Describe public health issues related to food safety and food security.
- Have an overview of the factors affecting food safety and security.
- Proficiently interact with food security programs being carried out at the local level.
- Livelihoods recovery interventions.
- Education, information and public awareness.
- Early warning and nutrition surveillance.
- Emergency food aid response.

Advanced level:

- Ensure the conditions for the provision of safe food and that food security programs are being carried out properly at the local level.
- Recognize, monitor and report public health issues arising from unsafe food or food insecurity.
- Crop and livestock production.
- Agricultural management, marketing, and finance.
- Food security information and early warning systems.
- Land and water management, including land tenure.
- Rapid employment and livelihood impact assessments.
- Emergency nutrition intervention response.
- Management of the food pipeline and distribution.

Master level:

- Plan, assess, lead/manage, monitor and evaluate public health interventions to provide safe food.
- Food security for the affected population.
- Food security and nutrition.

- Precautionary measures for fisheries and safety at sea.
- Animal and plant pests and diseases.
- HIV/AIDS and household food security.
- Infant and young child feeding in emergencies.

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Chapter Twenty-three

23 Drought and famine

Kubilay Kaptan, Amir Khorram-Manesh

23.1 Summary

Drought is one of the major natural threats to people's livelihoods and socio-economic development. Although drought tends to occur less frequently than other hazards, it can result in a larger proportion of the population being affected than by other disasters. Drought may have wide-ranging social, environmental and economic impacts. Furthermore, drought is frequently an important contributing factor for famines in which whole communities may literally starve to death. Famines are multi-factorial.

European countries have not faced a famine since World War II; however, droughts are a reason for 3% of disasters in EU, since 1970. Around 25% of people affected by disasters in the EU are victims of drought. The last severe drought in Europe was in 2003, which affected much of the continent, and resulted in many deaths from unusually prolonged high temperatures, forest fires, agricultural losses, etc. The disaster management systems in EU member states need to take appropriate strategies to prevent and/or mitigate the impacts of drought disasters, and also should be prepared to manage these disasters in case of occurrence. Education and training are essential for all disaster management staff, including managers and responders in order to reduce the risk.

23.2 Aim

The aim of this chapter is to ensure that participants:

- Understand fundamental characteristics of drought hazard and its risk, impacts, and disasters, especially famine.
- Have a comprehensive overview of the current situation of drought disasters in the EU.
- Understand principles of risk and disaster management, with respect to drought, in different levels (strategic, tactical, and operational) of action.
- Are able to efficiently manage drought disasters scenarios and possible impacts, especially famine.
- Are able to analyze the situation and develop drought and famine risk and disaster management plans and procedures.
- Link drought risk management to climate change adaptation.

23.3 Introduction

Drought

Although drought may be erroneously considered a rare and random event, it is a natural part of the climate. It occurs in virtually all climatic zones, but its characteristics vary significantly from one region to another. Drought is a temporary aberration; it differs from aridity, which is confined to low rainfall regions. A broad definition of drought is a deficiency of precipitation over an extended period of time, usually a season or more, which results in a water shortage for some activity, group, or environmental sector. However, in terms of typologies, droughts are classified as meteorological, hydrological, agricultural and socio-economic. Of the four types of drought, the first two describe the physical event, whereas the third describes the particular impact of the first two on agricultural production. Meteorological drought describes a situation where there is a reduction in rainfall for a specified period (day, month, season, or year) below a specified amount. Hydrological drought involves a reduction in water resources (stream flows, lake levels, groundwater, and underground aquifers) below a specified level for a given period of time. Agricultural drought is the impact of meteorological and/or hydrological droughts on crop yields.

Socioeconomic drought differs markedly from the other types of drought because it reflects the relationship between the supply and demand for some commodity or economic good (such as water, livestock forage, or hydroelectric power) that is dependent on precipitation. Supply varies annually as a function of precipitation or water availability. Demand also fluctuates and is often associated with a positive trend as a result of increasing population, development and other factors.

Of all the natural hazards, droughts are potentially those having the greatest economic impact and affecting the greatest number of people. Of the main natural disasters, droughts are unique in terms of the “warning time”: the length of time between the first indications that a drought is developing and the point at which it begins to impact the population of the affected area. Potential economic and social impacts of an agricultural drought can be different, e.g. reduced income for farmers and agricultural workers, inability of certain groups within the population to afford increased food prices, reduced food intake leads to deterioration of nutritional status and reduction in ability to resist infection, difficult and scarce availability of water results in a general increase in diarrheas and other water/hygiene-related illnesses, increased competition for access to remaining water sources may lead to increased incidence of local disputes/conflict, etc.

To reduce the impact of drought, there are a number of actions that may be undertaken. The most important ones are improving water resource management and gearing up all government sectors to meet the new condition and needs.

Famine

A famine is a phenomenon in which a large percentage of the population of a region or country are so undernourished that death by starvation becomes increasingly common. In spite of the much greater technological and economic resources of the modern world,

famine still strikes many parts of the world, mostly in the developing nations. Famine is associated with naturally-occurring crop failure and pestilence and artificially with war and genocide.

Famine results from a sequence of processes and events that reduces food availability or food entitlements and causes widespread and substantially increased morbidity and mortality. Drought is one of contributing factors of famine. Famine is closely related to food security. Food security embraces three main objectives: adequate supply; stable supply; and access to supply. Food insecurity, in turn, is the lack of access to enough food. There are two kinds of food insecurity: chronic and transitory. Chronic food insecurity is a continuously inadequate diet caused by a household's persistent lack of ability to buy or to produce enough food. Transitory food insecurity is a temporary decline in a household's access to enough food. It often results from instability in food prices, declining food production or household incomes—and in its worst form produces famine.

Until recently it was generally believed that the only cause of famine was a decline in food availability due to a reduction in production resulting from adverse weather, disease/pest infestation, or through a cutting-off of traditional sources of supply. However, over the last century there has been a growing understanding that famines can occur in areas where overall food availability has not declined, but as a result of a reduction in the ability of certain groups within the population to acquire the food. For instance, it can happen as a result of a loss in their income or a sudden rise in the price of food. Declines in food availability may be caused by a range of “natural” and human-induced factors. Some of “natural” factors are agricultural drought, floods, high winds, cold spells/frosts, crop disease, and pest infestation. Among the human-induced factors, there are conflicts, external economic shocks, internal macroeconomic mismanagement, forced procurement of farm produce by state organizations, and over-export of foods which reduces the amount available nationally to below required levels. Each famine is likely to have a particular combination of causal factors acting and possibly interacting in the process by which the famine develops.

Throughout history, the conflict has frequently been an important contributory cause of famines. The conflict has the effect of both reducing food availability and reducing the ability of people to acquire it. Because famines develop over a period of months and, sometimes, years it is possible to detect their process and give a warning (a “famine early warning system”) so that interventions can be made to limit their progress and avoid the destruction of livelihoods and increased mortality.

Many different programs which help to maintain food security have proven successful. These include the distribution of food to general or targeted populations, income producing programs, price control programs to help households purchase food, complimentary water, health programs to minimize morbidity and mortality and special programs to maintain livestock and other household assets. Famines are, in theory,

preventable but they require significant organizational resources. The effective government response is critical to successful relief programs in response to famine. The system by which the international community and national governments respond to developing famines is extremely complex and not well formalized.

23.4 Knowledge needed at different management levels

Basic level:

- Terminologies and definitions in terms of drought and famine.
- Various typologies of drought, factors causing drought and drought impacts.
- Food security.
- Contributing factors of famine, the role of conflicts in famine.
- Basic principles of drought risk assessment and disaster management.

Advanced level:

- Leadership and management in disaster management.
- Social and community dimensions of drought and famine disaster.
- Prevention and mitigation actions for drought hazard and famine.
- Overall framework to implement disaster preparedness activities and response measures in terms of drought and famine.
- The role and interaction of different actors in providing relief and rehabilitation in drought and famine, including governments, UN agencies, NGOs, and donors.
- Early warning system in drought and famine management.

Master level:

- Comprehensive assessment of drought risk and its impacts, especially famine.
- Development of policies, strategies, and governance for prevention, mitigation, and relief of drought and famine disasters.
- Evaluating and optimizing response plans, procedures, and tools for comprehensive management of drought and famine disasters.
- Evaluating and enhancing drought and famine disaster management system performance.
- Community risk assessment tools for drought and famine.
- Community disaster reduction planning for drought and famine.
- Land use planning: risk assessment and decision-making.
- Urban area evacuation.
- Relief operations for famine and food emergencies.

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Chapter Twenty-four

24 Medical Issues (Emergencies, Trauma)

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24.1 Summary

There are some medical issues that should be considered during multidisciplinary management of a disaster. This is particularly important in the prehospital part of the medical management, due to the initial lack of resources and proper information. Logistics and preparedness capacity of the hospitals are also important factors impacting the medical outcome of victims and deserve special consideration.

24.2 Aim

The aim of this chapter is to present the activities in the chain of health providers from the scene to the intensive care units, their interconnections with other services during the disaster management. It also provides the list of skills and verified knowledge which makes the providers competent to act during the disaster, and discusses the issue of leadership.

24.3 Introduction

Medical response to a major incident (MI) is one of the critical parts of the multidisciplinary management of an incident or disaster and its importance is highlighted by the high demands on the healthcare system during an incident. The goal of the health care system during an MI is to mitigate the loss of lives and minimize the physical and psychological consequences of the incident to the greatest extent possible. There is a chain of actions that must be coordinated, synchronized and harmonized in order to get the desired outcome. No element in this process is considered the weakest link as each link is as important as all the others.

The main issue during the management of any event is the imbalance between the needed and the existing resources, which necessitates the optimal use of available resources, as well as relocation of other resources. The outcome of the medical intervention might be displayed in quantitative and qualitative parameters, which refers to immediate post-disaster and late mortality and morbidity, including the impairment of the quality of life. For a successful response to an MI, there need to be structured and disciplined plans. Previous experiences may be used for creating such plans and may be used as points of comparison by considering the outcomes of the medical interventions carried out during those various events. By using risk and vulnerability analysis and lessons learned from the past events, we may not be able to prevent an incident but it may serve as strategies to mitigate and minimize the impact of it. In identifying risks, plans can be written wherein every risk and problem are managed by a few steps. Each individual will have their own

task. All these individual tasks together make up the organizational plan. These plans should further be tested and practiced in the form of drills to not only confirm their validity and staff's competency but also to indicate the gaps in planning and point out the weakest points.

Other stakeholders besides healthcare institutions—government and national agencies for disaster management, regional command centers, etc.—should also be part of preparedness, planning, and training activities. Many of these agencies are directly or indirectly involved in the disaster response.

Initial Assessment

The immediate first step after a disaster is to have an initial assessment of the damages and their consequences, future risks, and the outbreak of new conditions.

For medical professionals, the choice of treatment for and outcome of any medical condition is directly related to the mechanisms of injury:

- *Physical trauma*: Military combat injuries, natural disaster traumatic injuries.
- *Environmental injuries*: Electrical, chemical, and thermal burns, cold injuries, radioactive injuries, toxic gas inhalations and exposures, bioterrorism injuries.
- *Transport injuries*.
- *Hazardous materials explosions injuries*.

All details must be identified before a complete intervention plan can be established. It is also important to remember that under certain circumstances, the cause of an MI may be progressively persistent, hence can potentially affect the members of the medical teams. Therefore, these teams must always wear their appropriate Personal Protective Equipment (PPE) and be able to strictly apply the rules of self-protection, otherwise, they will end up as victims themselves.

Most major incidents produce direct immediate victims, who are suffering the direct consequence of the event, as well as, secondary human damages, either as a result of complications from the immediate post-disaster circumstances or by developing later threatening conditions. For example, following an earthquake, the assessment should refer to:

- Number of persons who suffered injuries needing immediate surgery.
- Number of victims who do not need immediate surgery but can develop complications of blunt trauma, such as renal failure. If the assessing team is not aware of the evolution of such trauma, it will focus only on obvious situations (e.g. open fractures) and will neglect people apparently with minor injuries, but who can develop potentially lethal conditions.
- The number of persons not directly affected by the earthquake, but whose medical conditions will become complicated due to unsanitary conditions from compromised water supplies.

Based on the first assessment, the following points should be addressed for each victim:

1. The type of transportation from the scene.
2. The place where the victim must be transported to get proper care.
3. The estimated travel time which will not compromise the victim's life.

The first on-scene report is crucial, but its quality depends on the qualifications of the people preparing it and needs to be completed with thorough evaluations by the specialized teams. Depending on the number of staff in the first team, it will not only provide information but also start building the first incident command post on the scene and if possible also initiate medical interventions with the available resources in the field. It is, therefore, important that first team staff members are able to:

- Apply basic triage criteria, prioritize and conduct primary emergency management/treatment.
- Efficiently apply simplified diagnostic/therapeutic methods, with minimal supplies.
- Maximize efficiency using or relocating existing resources.
- Collaborate with other involved organizations and integrate the medical activities with the overall response.

Need for coordination

Once the damages to human lives are assessed, the information is processed by the coordinating structures. The coordinating agency then ensures the transport of the first victims to the appropriate hospitals (the closest where the patients can get at least minimal medical help necessary for survival) and the delivery of the prioritized medical supplies and equipment to the disaster site. These supplies form the basis for establishing a functioning field hospital which can treat victims whose lives may be compromised by transport, or when transfer to other hospitals is not possible, or not feasible because of the number of patients needing a transfer. Local presence of a field hospital is particularly important when transport is unavailable or when an MI is ongoing, such as in cases of war.

Resource planning

In order to conduct action efficiently, resource planning must follow the initial assessment, and should include:

- *Identifying existing resources*, often extremely limited on-scene.
- *Establishing needs*: Personnel, medical equipment, transport facilities, as well as potential sources of supplementing existing limited resources.

It is crucial to have the correct information about specialty services that are needed in the disaster zone so that members of the Emergency Medical Teams that are to be deployed are composed of trained disaster medical responders who can cope with the different demands that exist in the disaster area.

Implementing medical measures

Medical measures are to be implemented in the next step, which is performed at different levels. Regardless of the level, it must be emphasized that flexibility is extremely important as the effect of any medical intervention depends on the pre-disaster status of the injured people, which is difficult to estimate at the start of the intervention, as well as on the multiple pathophysiological changes induced by any trauma. Unlike a building, for which the degree of damage is relatively clear, it is almost impossible to determine the precise outcome of the patient, as human biology is complicated and variable and taking into consideration human psychological factors make it all the more difficult if not impossible to predict the outcome immediately. For these reasons, it is mandatory that the medical teams should apply, whenever possible, the principle of **Damage Control** which consists of applying the necessary actions in order to ensure patients' survival but without overwhelming the response capacity, already affected by the initial MI.

During the entire period of medical intervention, a very important element is the **regulation mechanism** which includes:

- An efficient system of field analysis and information communication to and from the central coordinating structures/agencies.
- A coordinating multi-organizational structure able to integrate the information and to adapt the intervention to the on-going situation.
- A feedback system from the facilities already treating patients to detect potential complications and supplementary data to help the team in the field. For example, a late complication which could not be predicted but which is displayed by most of the patients should be immediately communicated to the field teams, so that appropriate measures to be taken from the beginning to avoid complications.

Besides the necessity of training, which is unanimously recognized at present, another important issue is **analyzing the results** of medical interventions during disasters, which are valuable resources for designing ongoing activities and future action plans.

Diagnostic and treatment protocols are not yet unified internationally, but attempts to establish scores are useful resources for establishing a relevant association. An example is the initial severity of the injuries in relation to the outcome of the patients, as well as to the efficacy of the treatment. This results not only in better communication between teams with different training backgrounds and protocols, but also increases the efficacy of the coordinated medical interventions, improves triage and the chances of the patients to get adequate treatment, and enhances the efficiency of using resources of involved organizations. When this type of analysis is performed it is important that it reflects the efficacy of medical intervention referring to:

- Direct visible effects of the MI.
- Indirect effects, which do not result directly from the traumatizing factor, but can complicate the initial injuries.

- Secondary effects due either to over-triaging or by special conditions affecting the victims before the MI.

In order to describe the competencies necessary for medical interventions, they can be evaluated on pre-hospital and hospital levels, which, although somehow different, have the same aim, of decreasing mortality and morbidity and increase the speed and quality of rehabilitation of the victims resulting from a disaster or MI.

Prehospital engagement

The prehospital response starts on the scene, where victims should be triaged and treated by basic and necessary means by medical staff on the scene under the supervision of triage officers. Later on, victims should be transported to collecting areas for further transportation to the hospital or more detailed treatment, when this might be necessary. This is especially true in terrorist attacks, where primary damage control of the injuries can be vital for the best medical outcome. Transport to the hospitals or other medical facilities is supervised by an ambulance loading officer, who together with the dispatch center shall define the means of transportation e.g., BLS ambulance vs ALS ambulance, helicopter, etc.

Besides healthcare staff, other organizations have their staff on the scene as well. Two major players on the scene are the police and firefighters who both have their own tasks to do. Firefighters often operate within the hot zone i.e. where the incident has taken place, while the police are responsible for the outer and inner cordon around an incident. Firefighters will be working together with healthcare staff when they have declared the scene to be safe enough for the healthcare staff to approach. The police force will be responsible for controlling the in- and out-movement of individuals, registration of deaths, control of items, crime scene analysis, etc.

It must be clear by now that such multidisciplinary work needs to have a structure and leadership that can coordinate all activities between different stakeholders, establish administrative strategies and effective modes of communication on the scene. Although various countries may have different forms of disaster response, they all need to have an Incident Command System (ICS) consisting of commanders involving various stakeholders including a Medical Incident Commander (MIC), Police Incident Commander (PIC) and Rescue Incident Commander (RIC). These on-scene commanders are in turn connected to a higher command group, the Regional Command Center (RCC). This is especially important since the start and end of the management process should be declared by a higher level and the follow-up during recovery phase must be organized and structured in all levels.

Hospital engagement

While prehospital units are working hard on the scene, hospitals will be notified and start their alerting phase in which, depending on the scale of incidents, different preparedness

levels will be declared. These levels are Green, Yellow or Red. Red, the most severe level, demands the largest amount of resources. Irrespective of the level of preparedness, each hospital must have a disaster plan, by which different functions of critical importance during hospital response will be initiated.

A disaster plan must have a so-called “All-Hazard concept” which simply means that the structure of the plan must be adjusted for the management of most of the events, irrespective of the causes. Alert process and levels of alert initiate different function in various parts of the hospital. All staff should have action cards in which each staff member is given specific tasks to accomplish. Altogether they will then accomplish a larger task. A hospital will go through different phases: *alert* phase and subsequently *receiving*, *treatment* and *recovery* phases. It is important to note that in a specific period of time and at the same hospital, different units may be working on different phases of management. While the emergency department has already finished the first steps and is in a recovery phase, the operation theater and intensive care units may be busy dealing with treatment. All these phases also demand an effective plan and structure.

Right from the onset of any disaster or MI (Major Incident), all hospitals need to initiate a *coordination and command center*, which should be in direct communication and coordination with the regional and national level agencies to ensure their support and help as necessary. The Hospital Command and Coordination Center has the mandate to administer the whole action during a major incident. It also has responsibility for the management of media, hospital information center, maintenance of hospitals technical needs e.g., water, electric and IT (Information Technology) support, management of deaths and finally, the psychological support of victims and hospital staff.

As in prehospital care, the treatment of victims at hospitals follows the principles of damage control. The knowledge in ACLS, ATLS, ABC-T, shock treatment, control of massive traumatic bleeding, diagnostic and therapeutic measures in thoracic injuries, abdominal injuries, pelvic fractures with retroperitoneal massive bleeding, skeletal trauma, CNS trauma, burns, frostbites, cardiovascular trauma, urogenital trauma, crush injuries, blast injuries, surgical infections are necessary and must be adequately conducted. Special attention should be made to chemical poisoning, infectious diseases, epidemics, terrorist incidents, irradiation, biological weapons, and basic principles of Tactical Medicine.

24.4 Knowledge needed at different Management Levels

Basic level:

- To be familiar with the sequence of medical activities from the initial call to emergency services (112) to the arrival of PHE on the scene, activities on the scene, transportation of the victims to the secondary level, in-hospital activities during MCI/disaster.
- To be skilled in ATLS, ETC and ABC-T and other relative national/international guidelines.

Advanced level:

Basic +

- Communication/informational technology.
- Command/decision-making process.
- Interagency and dispatch coordination.
- Media management.
- Security issues of medical service.

Master level:

Advanced +

- Cross-border cooperation,.
- Legislation,
- Ethical issues of MCI/disaster.

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Chapter Twenty-five

25 CBRNe

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25.1 Summary

CBRNe covers a huge area of knowledge, which cannot be taught or learned in a few days. Fortunately CBRNe issues during disasters are rare. However, there are some vital issues, which might arise during management of CBRNe events and which should be emphasized. When considering strategies for preparedness against CBRNe incidents, the possibility of a low-probability catastrophic outcome must be weighed against public health hazards of higher probability but smaller magnitude. It would be irresponsible to be complacent about the possible effects of deliberately released biological or chemical agents, but it would also be prudent to not overestimate them. Given the emotional shock of an alleged biological or chemical threat, jurisdictions must at least consider how to address such dangers, should they occur, as part of preparing for threats to public health and well-being. The use of PPE, decontamination and psychological follow-up are important parameters of the whole management strategy.

25.2 Aim

The Aim of this chapter is not to focus on all aspects of CBRNe issue, but on principal aspects of medical and non-medical issues in case of CBRNe events. Explosive events will be discussed at greater length in the chapter dealing with terrorism. This chapter also provides information concerning methods, techniques, and results of available research relating to response to nuclear or radiological emergencies. It also provides a practical, step-by-step method for developing integrated operator, local and national capabilities for emergency response.

25.3 Introduction

CBRNe is weaponized or non-weaponized **C**hemical, **B**iological, **R**adiological, **N**uclear and **E**xplosive materials that can cause great harm and pose significant threats in the hands of terrorists. Weaponized materials can be delivered using conventional bombs (e.g., pipe bombs), improvised explosive materials (e.g., fuel oil-fertilizer mixture) and enhanced blast weapons (e.g., dirty bombs). Non-weaponized materials are traditionally referred to as Dangerous Goods (DG) or Hazardous Materials (HAZMAT) and can include contaminated food, livestock, and crops. Outbreaks of infectious diseases, such as SARS, or pandemic influenza are examples of naturally occurring biological incidents.

Chemical events

Since the dawn of civilization, chemical materials have been a part of human life. Today nearly 100,000 different commercial chemicals are known. Several thousand new chemicals are developed yearly. Of these new chemicals, nearly a thousand reach the commercial market. Annual worldwide chemical production is estimated at 400 million tons. Of this production, most are bulk stored and bulk transported. Hence there is a risk of large-scale release with resulting environmental and health effects. Human toxicity from chemical exposure has been well recorded since the beginning of the industrial age. Recognition and investigation of those effects have allowed the development of therapeutic interventions. Toxic effects of chemicals may result from exposures to small amounts of foods or medications, or larger amounts resulting from accidental or intentional releases from storage or transportation facilities. The human toxic effects of smaller chemical exposure events have generally been well managed because there are rarely more than one or two patients requiring care at a time. Large-scale exposures vastly complicate the medical response to a toxic chemical event, principally because of overwhelming logistical difficulties.

A chemical incident can be defined as any event in which individuals are or could have been exposed to hazardous materials that may be harmful to their health. The chemical substances defined as hazardous material in connection with chemical incidents are inorganic or organic substances (including petroleum-based products) that due to their physical, chemical, and toxicological properties are potentially hazardous to people, animals, and the environment. In the case of the release of a substance, the hazard is marked by four main characteristics besides the released quantity of the chemical: 1) Type of toxicity, 2) Latency of the effect, 3) Persistence of the substance, 4) Transmissibility.

From studying the published reports of such incidents, we can learn some important lessons:

1) We should identify the hazardous material as soon as possible and adopt all the necessary measures reasonably.

2) The decontamination of victims prior to leaving (at least) the warm zone is essential to the protection of staff later in the rescue chain and necessary to hinder any spreading of the contamination.

3) A fear of exposure to the hazardous material can cause people to panic as a result of uncertainty; thus, the rescuer can expect an approximately 5:1 ratio of unaffected and affected casualties who require decontamination and medical treatment.

Bacteriological events

Hardly a day passes without new headlines concerning infectious diseases threats. Not all infectious disease threats evolve into outbreaks or major incidents, and all threats concerning suspected infectious diseases do not turn out to have infectious causes. Initially, the cause of major incidents is often not clearly identified. This holds true especially for incidents in which symptoms of the affected persons are diffuse, the conditions are

undiagnosed, or the hazardous materials involved are not clearly identified. Many incidents caused by material other than biological contaminants are often initially classified as suspected infectious incidents but, when the full picture becomes clear, they are found to have other causes, for example, intoxication by chemical or radiological agents. One reason for this is that most societies have surveillance systems that most of the time direct their major interest toward the more common entity--infectious diseases, which may constitute major incidents alone or as a part of or consequence of an incident having a non-infectious cause. The infections that follow as a part and are a direct consequence of a disaster may have several different causes, and they can differ depending on what type of primary incident they are secondary to. The primary incident can lead to disruption of the infrastructure in the affected society; which secondary can result in increasing biological incidents through, for example, crowding, the collapse of water supply, deteriorating sanitation and hygienic conditions; etc. Secondary effects can even be seen within medical institutions for example as a consequence of a lessened capacity to isolate infected individuals.

Radiological and Nuclear Events

Mass exposure to radiation does not occur frequently but when it does such events present significant logistical, operational, and medical challenges that may be compounded by the lack of familiarity most personnel have with the manifestation and management of radiation injury. Because of the proliferation of nuclear states, the occurrence of at least one well-documented case of smuggling of nuclear technology, the widespread availability of radioactive materials, and continuing concerns about the risk of nuclear or radiological terrorism, the risk of deliberate mass exposure to radiation has likely increased in the recent years.

Major irradiation incidents cause acute injuries and induce health risk among the population in large geographic areas, for example, severe nuclear reactor technology failures in nuclear power plants. The radioactive material might be released from the reactor and spread over large geographic areas, and the radioactive fallout can be a serious danger to the health of the population and can cause severe environmental pollution in the affected areas, with long lasting effects. Minor irradiation incidents cause acute irradiation traumas and other traumas limited to the workers at the site of the accident. The release of the radioactive material is usually limited to smaller areas, and the danger to the health of the population and environmental contamination is only local, for example, in industries that handle radioactive material, hospitals, and transportation units for nuclear material. It must be remembered that there is a difference between being contaminated and irradiated. There is no danger in taking care of irradiated patients, while there are medical and health-related consequences when taking care of contaminated patients.

Explosive events

Blast injuries are caused by rapid pressure waves created by the detonation of explosives and cause multisystem, life-threatening injuries in single or multiple victims simultaneously. Indoor explosions cause the most severe injuries and have the worst outcomes. Survivors have predominantly primary and tertiary blast injuries. Secondary blast injuries may mainly occur in suicide bombings in open and/or semi-confined spaces. Life-threatening injuries involve lungs and hollow viscera. Limb injuries are rare in civilian setting and are mostly caused by a secondary blast effect created by projectiles and shrapnel implanted in explosive devices. Blast injury associated with skeletal damages may involve multiple skeletal sites and organ systems. Non-operative management and damage control techniques together with tertiary surveys to identify missed injuries are part of the treatment regimen.

Dealing with CBRNe

Taking command

In any events when affected victims and first rescue workers appear with salivation, lacrimation, and emesis and decreased the level of consciousness, a CBRNe-Incident should be considered. By having this in mind we may ask following questions:

1. What is the leading problem?
2. How to manage a mass causality incident?
3. How can the victims be sorted out?
4. Are the staff secure?
5. How to treat and manage the situation medically?
6. Are there any antidotes available?

As a leading person in such circumstances, any decision should be made in collaboration with firefighters and the strategy staff. Principles of MCI-management should be known before starting the procedures. Although some reports suggest decontamination before triage, this issue may be discussed and procedures may differ in each situation. Many people in a mass casualty incident, as well as, CBRNe events, may have minor injuries. However, even those with minor injuries in a CBRNe event should be collected for further registration and psychological support. Every patient with symptoms should be seen by a physician who is familiar with these symptoms. Please note that health care providers may also get sick.

Personal protective equipment (PPE)

Personal protection is deeply inculcated in the education of rescue workers; however, there are new aspects in protection against CBRN hazards. This issue should not be underestimated for several reasons:

- 1) Rescue workers have to take care of CBRN-patients and also non-CBRN patients.
- 2) Contamination inside the hospital should be avoided for taking care of non-protected staff and other patients
- 3) Personal Protective Equipment (PPE) should be available for all healthcare providers who have contact with contaminated patients.

All responders must take appropriate measures to protect themselves before entering the contaminated area. Use of PPE to protect airway, skin, and eyes is an indispensable component of emergency response. Limitations on the use of PPE are; restriction of physical activity, dehydration, heat-related illness, and psychological effect. To avoid this, hospital personnel should be trained to use PPE appropriately.

There are many existing classifications of PPE, however, we use a simple classification here. *Level A PPE*; denotes fully encapsulated suit, with over-gloves and over-boots integrated into the suit. Respiratory protection is a self-contained breathing apparatus. Level A protection is required for entry into areas known to be hazardous or suspected/unknown-hazard environments. *Level B PPE*; denotes a hooded suit, double gloves, overboots, and a self-contained breathing apparatus, and may be used for decontamination procedures for an unknown substance and for entry into hot zones where the agent is not caustic. *Level C PPE*; is similar to Level B, but uses an air-purifying respirator instead of a self-contained breathing apparatus. Level C PPE can be used only after the hazardous substance has been identified, and upon verification of adequate oxygen in the environment. It is the duty of the person responsible for staff safety should consider which protection is the right one for each response phase.

Triage

Who is to be treated first? This question should be answered after sorting out the patients (triage). There are many triage methods with pros and cons for each. During a CBRNe event triage systems such as STaRT, “sweeping triage”, and the triage system used in traumatology have been suggested. Although no system is well validated for CBRNe circumstances and no method has shown an improvement of survival, the best way might be to use a simple triage that can be used both in prehospital and hospital settings.

Decontamination

Decontamination is the reduction or removal of contaminating material by a dilutional, chemical, and/or mechanical process. It should be performed whenever there is the likelihood of contamination or risk of secondary exposure. In general, decontamination is accomplished by removing the victim’s clothing followed by copiously rinsing the patient with tepid water. Gently scrubbing the skin with soap and a soft brush removes any remaining fat-soluble chemicals and solid materials. Eliminating contaminants from a victim’s skin and clothing is important for two reasons. It reduces the risk for further absorption or inhalation and the subsequent toxicity caused by the offending agent. In

addition, decontamination helps to prevent others from becoming secondarily exposed or contaminated. Those contaminated with liquids or solids require copious skin lavage and wound irrigation with water within minutes of skin contact, to minimize the degree of injury. Rinsing the patient with a high-volume, low-pressure water source dilutes, neutralizes, and helps rid the skin of reactive surface contaminants. In the case of corrosive agents, decreasing the duration of skin contact helps restore tissue to its normal pH, thereby minimizing the incidence of full-thickness burns. Using soap to emulsify fat-soluble agents and a soft brush to remove mechanically any remaining solid materials is also beneficial. Soap and water decontamination, although ideal, might slow the decontamination process, delay transfer from the scene, and utilize manpower that more appropriately might be directed towards the rescue and care of the non-ambulatory survivors. For vapor, soap and water might not be required.

Psychological support

All communities exposed to disasters experience multiple traumatic events including threats to life, loss of property, exposure to death, and often economic devastation. Disasters by definition overwhelm institutions, healthcare, and social resources and require months and even years of recovery for both individuals and communities. Characteristics of the event may greatly increase the stress experienced, such as lack of familiarity with the prevailing hazard, use of fear as a weapon, intensity of impact, the predictability of the event, or caused by human action. Many responses to trauma and disasters (with or without CBRN-issues) can be expected, but the following symptoms signal the need for further evaluation by mental health and other medical and human service professionals;

- Disorientation (dazed, memory loss, inability to give date/time or recall recent events).
- Suicidal or homicidal thoughts, plans, actions.
- Domestic violence, child or elder abuse/neglect.
- Acute psychosis (hearing voices, seeing visions, delusional thinking).
- Inability to care for self (not eating, bathing, changing clothing, or handling daily life).
- Severe anxiety (constantly on edge, restless, obsessive fear of another disaster).
- Problematic use of alcohol or drugs.
- Depression (pervasive feeling of hopelessness and despair, withdrawal from others).

25.4 Knowledge needed at different management levels

Basic level:

- Risks for involved and uninvolved persons.
- Principles of Personal Protective Equipment (PPE).
- Principles of triage.
- Principles of decontamination.

Advanced level:

- General symptoms of chemical poisoning.
- General symptoms of biological poisoning.
- General symptoms of radiological and nuclear poisoning.
- Limitation of different personal protective equipment (PPE).
- Pitfalls of triage.
- How to decontaminate concerned persons and rescue workers.

Master level:

- The principle of psychological management of contaminated persons.
- Different phases of health care in CBRNe patients.
- Questions around protection (vaccination).
- Limitations of decontamination.

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Chapter Twenty-six

26 Mental healthcare and psychosocial support

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26.1 Summary

About 5 to 30% of people that experience a disaster will come to have problems with PTSD (Post Traumatic Stress Disorder). The impact, outcome, and consequences of such condition differ individually due to key factors such as an experienced threat to the individual's life or his surroundings, the level of education, age, sex, social group and minority status. Parallel stress in life will influence the outcome, as well as, the support PTSD sufferers may get after the disaster. Psychological support can have a high impact in returning to normal life after a disaster.

26.2 Aim

The aim of this chapter is to give a better understanding of the psychological aspects and consequences of a disaster/major incident and the benefits of offering psychosocial support to the victims. It also gives some overview on prevention of some of the known conditions, and the role of emergency staff in managing and preventing these conditions.

26.3 Introduction

Over the last 20 years, psychosocial support has played an increasing role in emergency response and a great number of high-quality guidelines and best practice studies have been written to give insight into relevant topics. Most of these projects have concluded that a harmonization should be reached between the different national and regional approaches. Emergencies create a wide range of problems experienced by the individual, family, community and societal levels. At every level, emergencies erode normally protective supports, increase the risks of diverse problems and tend to amplify pre-existing problems of social injustice and inequality. For example, natural disasters such as floods typically have a disproportionate impact on poor people, who may be living in relatively dangerous places. Mental health and psychosocial problems in emergencies are highly interconnected, yet may be predominantly social or psychological in nature. Thus, mental health and psychosocial problems in emergencies encompass far more than the experience of PTSD.

Not everyone has or develops significant psychological problems. Many people show resilience, which is the ability to bounce back from negative events or adversity. There are numerous interacting social, psychological and biological factors that influence

whether people develop psychological problems or exhibit resilience in the face of adversity.

Depending on the emergency context, particular groups of people are at increased risk of experiencing social and/or psychological problems. Although many key forms of support should be available to the emergency-affected population in general, good programming specifically includes the provision of relevant supports to the people at greatest risk, who need to be identified for each specific crisis. All sub-groups of a population can potentially be at risk, depending on the nature of the crisis.

The following are groups of people who frequently have been shown to be at increased risk of various problems in diverse emergencies:

- (a) Women: pregnant women, mothers, single mothers, widows and, in some cultures, unmarried adult women, and teenage girls.
- (b) Men: ex-combatants, men who have lost the means to take care of their families, young men at risk of detention, abduction or becoming targets of violence.
- (c) Children: separated or unaccompanied children, orphans, children recruited or used by armed forces or groups, trafficked children, children in conflict with the law, children engaged in dangerous labor, children who live or work on the streets, undernourished/under-stimulated children.
- (d) Elderly people: Bereft of caregivers.
- (e) Extremely poor people.
- (f) Refugees.
- (g) Internally displaced persons (IDPs), and
- (h) Migrants in irregular situations.

No one remains untouched after being exposed to a disaster. However, many survive without developing any significant psychological symptoms. For others, the reactions and symptoms will disappear over time. The majority of people never ask for psychological help and try to cope with their problems by using learned coping strategies and practical pursuits. Learned strategies, however, may be dysfunctional in a new stressful situation and by pursuing more pragmatic attitude, disaster health assistance becomes more often practical in nature rather than mental. Individual well-being will then be dependent on the degree of individual resilience and tolerance of the extreme stress related to a disaster. Some groups, such as elderly, due to less physical and mental resilience, and youth, due to lack of experience, may become more vulnerable to long-term consequences. Additionally, a more practical approach demands a developed social support system as a foundation for recovery.

The main consequence of a disaster for an individual is often loss. This can be either a tangible loss (loss of loved ones, home, material goods, employment, income) or intangible (safety and security, predictability, social cohesion and support, trust and safety, independence, hope, and loss of control). The way any individual will react to the impact of a disaster depends on:

- 1) Prior experience with a similar event.
- 2) The intensity of the disruption in the survivor's life.
- 3) Individual resilience.
- 4) The length of time between the event and the present.
- 5) Pre-existing vulnerabilities e.g. age (youth/seniors), disability, health impairments, and gender (women).
- 6) Whether the cause of the disaster is man-made or natural.

The objective of an action plan for mental health care and psychosocial support in emergencies is to introduce and develop the mental health and psychosocial component of health care during emergencies, as well as to offer an appropriate response to the mental and psychosocial needs of the population. Implicit in this central objective are the following goals:

- To eliminate or reduce the risk of suffering psychosocial injury.
- To reduce distress among the population.
- To contribute to prevention and control of the range of social problems arising among the population, especially among those most affected.
- To prevent, treat, and rehabilitate the mental disorders occurring as a direct or indirect consequence of the disaster or emergency.
- To provide support and psychosocial care for the members of the response teams.
- To ensure the psychosocial recovery of the population affected by the disaster after the acute phase.

Plans might be based on the basic principles of (a) interdisciplinary and multi-sector strategy, (b) social participation, (c) comprehensive approach to health, with a special eye on primary health care. Vulnerability and risk, human rights, ethnic, linguistic, and cultural characteristics, gender equity, and flexibility and adjustment to local circumstances are other factors which might drive the development of PTSD remediation plans.

Possible symptoms

An individual may react to the trauma with both psychological and physical symptoms. These could include: loss of appetite, headaches, chest pain, diarrhea, stomach pain, nausea, hyperactivity, increase in alcohol or drug consumption, nightmares, inability to sleep, fatigue, irritability, anger, self-blame or blaming others, isolation, withdrawal, fear of recurrence, fear of darkness, fear of being alone or of crowds or strangers, sensitivity to loud noises, feeling stunned, numb, or overwhelmed, feeling helpless, mood swings, sadness, depression, grief, denial, concentration, memory problems, confusion, relationship conflicts/marital discord.

However, it is important to emphasize that disaster stress is a normal response to an abnormal situation and should not be treated unless it persists. In addition, some emotional states such as anger, fear, anxiety, depression, sleeplessness can result from an interruption in medication. People with pre-existing dementias may show greater

confusion. However, confusion in elderly cannot always be attributed to dementia and other conditions such as dehydration, injury, lack of medications, delirium, and depression may be the real causes and should be treated appropriately.

Particular attention should be paid to Post Traumatic Stress Disorder (PTSD), which is triggered by a terrifying event that either has been experienced or witnessed. Symptoms may include flashbacks, nightmares and severe anxiety, as well as, uncontrollable thoughts about the event. These symptoms may start shortly after the event or appear years after and create significant issues in private and social life of the patient. Symptoms are usually categorized into four groups: intrusive memories; avoidance; negative changes in thinking and mood; or changes in emotional reactions. The intensity of symptoms can vary over time and may result in suicidal thoughts, depression and anxiety, drug and alcohol abuse, and eating disorders.

There are criteria for diagnosis, which should be done by a professional and can result in different treatment strategies: medication or psychotherapy. During therapy, psychosocial support is needed.

Role of disaster mental health

The primary task for mental healthcare is to

1. Strengthen people's normal response to an abnormal situation.
2. Improve their resistance, resilience, and ability to recover.
3. Identify those at risk for severe social and psychological impairment.
4. Identify those in need of additional or special help and services.
5. Mitigate post-trauma complications.
6. Convey a sense of compassion and support for people.

Supportive communication is always needed and conveys empathy, concern, respect and confidence. Essential attributes and skills needed for psychological support are:

- Being patient and having good listening skills.
- Being approachable and trustworthy.
- Projecting a caring attitude, kindness, and empathy.
- Exhibiting a non-judgmental approach and being culturally aware.
- Being committed, flexible and with an ability to tolerate chaos.

Psychological first aid (PFA) is an evidence-informed approach for assessing people's exposure to PTSD. PFA aims to reduce the occurrence of PTSD and promotes and sustains an environment of:

- *Safety*. Help people meet basic needs for food and shelter and medical attention. Provide repeated, simple and accurate information on how to get these basic needs met.
- *Calm*. Listen, be nonjudgmental, be friendly and compassionate even if people are being difficult. Offer accurate information about the disaster or trauma, and the relief efforts underway to help victims understand the situation.

- *Connectedness*. Help people contact friends and loved ones. Keep families together, children with parents etc.
- *Self-efficacy*. Give practical suggestions that steer people toward helping themselves and engage people in meeting their own needs.
- *Hope*. Find out the types and locations of government and non-government services and direct people to those that are available. When they express fear or worry remind them that more help and services are on the way.

There are some identifiable elements of escalation people exhibit when they become upset. They may challenge authority or ask questions that may not seem related to the situation. They may refuse or balk at following directions, lose some control or employ words they may not normally use. Some become threatening or intimidating. These, not necessarily in order are some of the expressive acts people employ when under internal pressure, though specific behaviors vary as everyone reacts differently to stressful situations.

In order to de-escalate the situation, a relationship should be established and the cultural aspects should be fully considered. Using easy to understand language, talking to the person with respect is some of the points that can make the relationship work in the right direction.

For a helper, there are many challenges. It is not easy to be part of the collective crisis and be repeatedly exposed to grim experiences. It is challenging to carry out physically difficult, exhausting or dangerous tasks, lacking sleep and feeling fatigued, facing the perceived inability to ever do enough, facing moral and ethical dilemmas, being exposed to anger and lack of gratitude, being detached from personal support systems, feeling frustrated by policies and decisions by supervisors and guilt over access to food, shelter, etc. The helper's situation and problems are often pushed into the background, but after the event, they must not hesitate to draw on the support of other people. Helpers also need to be trained to cope with the situation through training, using guidelines and working vertically and horizontally within their organizations and other partners. They also need to know how they can help themselves in that situation by using self-help techniques. Using these techniques they have to know the normal reactions to stressful events, be aware of their tension and consciously try to relax, use the buddy system and talk to someone they trust and with whom they feel at ease, listen to what people close to them say and think about the event, reconcile expectations with results, work on routine tasks if it is too difficult to concentrate on demanding duties, never self-medicate and seek professional advice if reactions continue. In order to reduce the stress, helpers need to have a cognitive/behavioral approach to their inevitable stress by resting adequately, exercising, getting enough air, expressing emotions (laughter/tears), using various relaxation techniques, and finally using the prescription medication if needed.

Debriefing/Defusing for disaster helpers

Debriefing/Defusing should be used as soon as possible after a critical event (less than 72 hours). It is designed to assist responders to deal with the physical or psychological symptoms they have been exposed to, to process the event and reflect on its impact and to express the emotions and thoughts associated with the crisis event. The Community Emergency Response Team (CERT) leader has a responsibility to provide pre-disaster stress management training, to brief personnel before response, emphasize teamwork, encourage breaks, provide for proper nutrition, rotate staff, phase out workers gradually, arrange for a intermittent and post-event debriefing, conduct follow-up defusing with CERT team members and clinical incident stress debriefing (CISD).

26.4 Knowledge needed in different management levels

Basic level:

- The mechanism behind psychological trauma and how that affects us and others in our surrounding.
- An overview of how we can counteract the trauma and how secondary traumatization can be prevented.

Advanced level:

- How to use different psychosocial methods to give psychosocial support to traumatized people.
- How to help disaster professionals of all categories to continue work in a difficult working environment and their personal life.
- How to screen impacted people to give adequate support for different categories of trauma.

Master level:

- How to use different psychotherapies in the treatment of PTSD.
- Giving correct support to disaster professionals.

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Chapter Twenty-seven

27 Vulnerable population

Eric Carlström, Amir Khorram-Manesh

27.1 Summary

Anyone exposed to a disaster will be hurt, however, the physical and psychological consequences of such trauma are more prominent in people who belong to any of the vulnerable groups. There are many vulnerable groups in a society with various needs. Knowledge about their presence and management of their situation is of high importance in a disaster situation or at the time of a major incident.

27.2 Aim

The aim of this chapter is to raise awareness about existing problems with management of vulnerable groups and the ethical and legal perspectives that may emerge in disasters with regard to resource allocation for vulnerable populations. It also aims to emphasize the importance of planning for these groups.

27.3 Introduction

The degree to which populations are vulnerable to hazards is not solely dependent upon proximity to the source of the threat or the physical nature of the hazard, social factors also play a significant role in determining vulnerability. Members of “Vulnerable Groups” are those individuals at greatest risk of disease or injury within a population. There are many reasons why individuals or groups are particularly vulnerable.

Although there is not one universally accepted definition of vulnerable populations, from a public health perspective, the vulnerability can be defined simply as an increased potential for loss in a hazardous situation, including reduced capability to respond effectively. Some might be vulnerable because they are given less priority for limited resources, or belong to an ethnic, social, religious or political minority or have greater difficulty accessing treatment and care. Vulnerable groups include:

- Women (e.g. pregnant women, mothers, single mothers, widows and, in some cultures, unmarried adult women and teenage girls).
- Children (from newborn infants to young people 18 years of age), including separated or unaccompanied children (including orphans), children recruited or used by armed forces or groups, trafficked children, children in conflict with the law, children engaged in dangerous labour, children who live or work on the streets and undernourished/under stimulated children.
- Elderly people especially when they have lost family members who were caregivers.

- Poor people.
- Refugees, internally displaced persons (IDPs) and migrants in irregular situations.
- Physically and mentally disabled people, those living with HIV/AIDS, those with special treatment needs such as advanced healthcare at home.
- Population in disaster intensive areas such as earthquake intensive areas, areas exposed to flooding, landslide, terrorism etc.
- The population exposed to extreme weather conditions such as heat, cold, extreme weather, etc.

For an influenza pandemic, for example, a useful framework for defining and identifying sources of vulnerability considers the likelihood of exposure, of contracting the disease, and of treatment. Health disparities, differences in treatment access, living conditions, health literacy, risk perceptions, and confidence in the government's ability to respond could exacerbate risks for particular populations.

Mortality rates among young children are higher than the crude mortality rate among the whole population in emergency settings, so attention is focused on this age group. However, even under normal conditions mortality is higher in young children.

The vulnerability of the elderly to disasters is related to their impaired physical mobility, diminished sensory awareness, chronic health conditions, and social and economic limitations that prevent adequate preparation for disasters and hinder their adaptability during disasters. Frail elderly, those with serious physical, cognitive, economic, and psycho-social problems, are at especially high risk. This segment of the population is growing rapidly. Therefore, it is important that emergency management recognizes the frail elderly as a special needs population, and develop targeted strategies that meet their needs. Several management strategies are presented and recommendations for further action are proposed.

Prevention measures:

Long-term predictions, about the anticipated general location of a forthcoming earthquake, have proven to be useful. Early warning of drought, cyclone, and flood is reducing the vulnerability of communities previously at risk and significantly reducing deaths and injuries.

Peer relationships are a valuable mechanism for facilitating cooling behaviors among the elderly during heat events. To prevent disparities in heat morbidity and mortality in an increasingly changing climate, heat preparedness plans, interventions, and messages are considered as fruitful. Decision-making related to commonly promoted behaviors such as air conditioner use and cooling center attendance is complex, and these resources are often inaccessible financially, physically, or culturally.

When addressing preparedness for vulnerable people, community-based organizations are often underutilized resources. They traditionally have a special

commitment to locate and reach such at-risk individuals to provide human services while accommodating individual needs. They offer day-to-day services and often have earned the trust of the people they serve. Hence, they can also help to provide accurate post-disaster needs and mobilize the community and local resources in crisis situations.

27.4 Knowledge needed in different management levels

Basic level:

- Knowledge about various vulnerable groups.
- Knowledge of disaster plans and own role in rescuing any subgroup of vulnerable groups.
- Practical skills needed to specifically manage vulnerable populations' health and or evacuate them to a safer area.

Advanced level:

- The ability to make decisions during natural disasters threatening vulnerable populations.
- Good communication ability with operational and strategic level.
- Good collaboration ability with other organizations.

Master level:

- Knowledge of disaster plans and own role in rescuing any subgroup of vulnerable groups.
- Practical skills needed to specifically manage vulnerable group health and/or evacuate them to a safe area.
- Knowledge about ethical, cultural and legal aspects of aiding vulnerable groups.

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Chapter Twenty-eight

28 Terrorism preparedness and critical infrastructure

Boris Hréckovski, Amir Khorram-Manesh

28.1 Summary

A new era of terrorism creates new challenges and calls for multidisciplinary management of terrorist attacks. Civilian-military cooperation together with terror medicine are key components of such management and consist of many stages before, under and after any attack. Preparedness, planning, command, and control, communication and collaboration are all necessary parts of disaster management and also applicable to any terrorist attack. All these components are part of a chain of actions that starts with vital decision-making and utilization of all needed resources. In order to manage the situation in harmony between all agencies involved, multidisciplinary training should be conducted frequently, and standardized and mutual protocols for risk and resource assessment should be created.

28.2 Aim

The aim of this chapter is for the participants to understand the basics of terrorist tactics, procedure, and techniques which will form the basis for disaster response to terrorist-caused incidents. The participant will learn the basics of terrorist incident response management and of terror-response medicine.

28.3 Introduction

Oxford dictionary defines terrorism as the unlawful use of violence and intimidation, especially against civilians, in the pursuit of political aims. In general, terrorist groups commit their acts of violence to produce widespread fear as a means to obtain local, national and international attention and recognition, to harass, weaken or embarrass government or government-related organizations in order to affect a country's economy or have an impact on political decision-making. The ideology and motivation behind terrorist acts influence the targets of terrorist operations, especially regarding the number of casualties. As a rough rule-of-thumb, purely political groups have very selective goals to achieve their political aim. For these groups, the number of deaths matters, since killing a high number of innocent people will not serve their political goals. Ideological groups (religious, ethnic, or ideational) might aim to hurt as many victims from among the target population as possible, either because they have dehumanized their target population, or possibly due to an apocalyptic frame of reference they adhere to in their ideology.

The ideology of terrorism has shifted in the twenty-first century from socio-political ideologies such as communism and anarchism to a greater emphasis on

nationalism. Terrorism's modern version was formed after the Second World War and the rise of nationalist movements in the old empires. In Europe, terrorist attacks have become more common. They may occur anywhere, even in countries where terrorism was not common before. Terrorist events require an immediate response in the form of disaster management. When terrorism strikes, overburdened healthcare systems (notably those undergoing radical reduction of emergency hospitals and hospital beds due to economic cost-cutting), over-utilized EMS (Emergency Medical Services) and sub-specialization of the medical profession, will be challenged both medically and organizationally.

There are many types of terrorist incidents. The most common include bombing and arson, armed attack and assassination, kidnapping, hostage-taking, hijacking and skyjacking, cyber terrorism and CBRN attacks. The current approach to terrorism analysis involves an examination of individual terrorist, or terrorist organization's use of particular weapons, used in specific ways, and the tactics and strategies being exhibited. These TTPs (Techniques, Tactics, and Procedures) of terrorism have historically exhibited a wide range of options by individual terrorists, or terrorist organizations. They appear worldwide because TTP are often transferred between various terrorist groups. The worldwide evolution of TTPs, depends on changing circumstances, resource availability, and changing ideologies, or 'war-focus'.

A common recent worldwide TTP seems to be mass casualty attacks by suicide bombers. Recent terrorist attacks in Europe using heavy trucks as a weapon shows changes in tactics and the main question is what is to be expected next. The knowledge used by terrorist come from two sources; 1) *Explicit Knowledge* is the theoretical information which is often stored in hard copies, such as textbooks, manuals, and video files. This is extremely easy to get hold of, but without the appropriate teaching or experience, is commonly not effectively used. 2) *Tactical Knowledge* is most commonly taught or learned through experience and hands-on teaching. This requires training establishments and although more effective, is harder, and more difficult to obtain and transfer.

Recent video materials published by terrorist organizations through the internet clearly show terrorist training camps in which children train to become the next generation of terrorist fighters. These are a serious threat to the future. Training children as future terrorists seem to be a crucial measure for existing terrorist groups to secure their long-term success. Acquiring deep knowledge, and the deep indoctrination and desensitization since childhood, enable the group to consider themselves as better and more dangerous fighters. This includes a systematic process of indoctrination as the children are trained to be fully-fledged operatives. Growing up without joy, tenderness and without the possibility of experiencing a child's normal environment, they will learn that suffering, violence, death and despair are a normal way of life. We cannot predict nor imagine what the consequences of this program will be in the near future and when the Lost Generation start having their own children. Today, there is no comprehensive strategy in place for rehabilitation and re-education of the Lost Generation. In order to deal with the tragic

consequences of this project, governments need to develop long-term strategies with a multiagency approach.

A new field of medicine has emerged as a result of the global proliferation of terrorism. Terror medicine is related to emergency and disaster medicine but focuses on the constellation of medical issues uniquely related to terrorist attacks. The field encompasses four broad areas: *preparedness*, *incident management*, *mechanisms of injuries and responses*, and *psychological consequences*. Other important criteria for a successful management of a mass casualty event e.g., command and control, communication, coordination and collaboration and logistic must be learned as well. National/regional/local disaster plans to mobilize hospital, prehospital and remote resources, quick and vital decision-making by incident command officer to initiate the plan, medical management and organizational plan including simple triage (prehospital and hospital) and the use of damage control strategy, quick transport of victims in small groups to the appropriate hospital, quick identification of victims and utilization of provisional identification cards, and continuous training in a multidisciplinary setting including creation of common protocols and guidelines are major points for a successful management of a terror attack and should be planned before any incident happens.

Mass terror attacks call for a new approach to terrorism preparedness of the civilian population. From a military perspective, the effective transportation of forces and military equipment relies on civil resources and infrastructure, such as railways, ports, airfields and roads. The military rely on basic government functions in order to facilitate and protect these vulnerable assets, which can be targeted by an external attack and internal disruption. Civil preparedness facilitates good organizational and functional basis during emergencies or disasters in peacetime or in periods of crisis. Civilian preparedness also means that civilian organizations are to cooperate with the military and are supposed to give the military necessary support when needed. This will be more emphasized in the healthcare sector, where in many countries military hospitals and internal resources have been reduced in order to support military actions abroad. The potential for cooperation from the military to civilian agencies have been met with some skepticism from the civilian side, which has been under constant resource reduction due to constraint economics.

Depending on the type of terrorism injuries, the physical and medical outcome will be different. In the new era of terrorism, the most common injuries to the civilian population consist of blast injuries and multiple gunshots. Blast injuries are caused by rapid pressure waves created by the detonation of explosives and cause multisystem, life-threatening injuries in single or multiple victims simultaneously. Indoor explosions cause the most severe injuries and have the worst outcomes. Survivors have predominantly primary and tertiary blast injuries. Secondary blast injuries may mainly occur in suicide bombings in open and/or semi-confined spaces. Life-threatening injuries involve lungs and hollow viscera. Limb injuries are rare in civilian setting and are mostly caused by a secondary blast effect created by projectiles and shrapnel implanted in explosive devices.

Blast injury associated with skeletal damages may involve multiple skeletal sites and organ systems. Non-operative management and damage control techniques together with tertiary surveys to identify missed injuries are part of the treatment regimen.

Low or high velocity energy delivered by a gunshot, can result in a multimodal injury sustained to the vital organs. The impact of the bullet on tissues is characterized by a cavitation process or direct delivery of energy. Muscles, bone, and blood vessels are mainly affected in the limbs. Almost all high-energy gunshots are considered contaminated and should be treated accordingly. Stabilization of bone, soft tissue care, adequate wound coverage, and restoration of limb function are important parts of the treatment strategy. Bone loss and soft tissue coverage together with maintenance of limb alignment and joint congruency restoration in cases of severe comminution are the major challenges.

Irrespective of resource distribution and details in incident management, the multidisciplinary work before, during and after a terrorist attack needs to be practiced in order to synchronize the abilities and identify the limitation of each involved group. Knowledge of basic terror medicine, communication and information sharing, collaboration and coordination should all be exercised and trained and psychological follow-up of both victims and staff must be carefully planned.

28.4 Knowledge needed at different management levels

Basic level:

- Terrorist techniques, tactics, and procedures.
- Preparedness for terrorist incidents.
- Response management during a terrorist incident.
- Security measures during a terrorist incident.

Advance level:

Basic +

- Multiagency approach in terrorist incident management.
- Basics of terror medicine.

Master level:

Advance +

- Skills and competencies need for work as a member of a Regional or National Command Centre during terrorist incidents.
- A review of strategy for the prevention of terrorist attacks.

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Chapter Twenty-nine

29 Evacuation of disaster victims

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29.1 Summary

In major incidents/disasters, victims should be evacuated to safe places. A successful evacuation process depends on many parameters, which must be included in a thorough disaster plan. Such a plan is based on risk and vulnerability analyses and identifies appropriate measures for multidisciplinary management of an evacuation.

29.2 Aim

The aim of this chapter is to discuss the various type of evacuation and the importance of planning for such evacuation, particularly in the case of a medical evacuation from a medical facility.

29.3 Introduction

Emergency evacuation refers to the process of moving a number of victims/people from one place to another during difficult and pressing circumstances. Evacuations can occur outdoors, on the scene of a large incident, indoors during for example mass gatherings, or in large high-populated buildings such as hospitals, train stations or airports. Each emergency evacuation has its own characteristics and requires a different management approach depending upon the following;

1. **The cause of the incident.** Although the aftermaths of a natural or man-made disaster often vary only very slightly; it is important to know the cause of the incident. This is especially true with regards to the risk of further events.
2. **The complexity of the incident.** The level of complexity of an incident i.e. whether the infrastructure is intact or there are severe disturbances, with destroyed surroundings, is crucial in determining the correct management approach. A complex incident will have a considerable impact on logistic and resource distribution compared to more simple incidents.
3. **The duration of the incident.** Is the incident slow and progressing or it is intense and quick? During a slow, developing incident there is time to think, plan and organize the management operation. While a quick onset incident, requires all necessary instruments, such as plans, staff, resources etc. to be in place. Generally, an incident with a quick onset is more chaotic, requiring individuals to take more independent decisions.

4. **The location of the incident.** It is important, at least from a healthcare perspective, to know whether we are adding new patients to another waiting hospital with intact resources, or if we are moving already sick patients in need of intensive care to another waiting hospital. In the former, the organization must be active in resource distribution, yet the victims should be triaged and evaluated with regards to the needs for treatment and care. In the latter, however, a functioning hospital with planned operations and full intensive care patients will be moved to another hospital. It is obvious that the overloading and severity of evacuation is greater in the previous scenario.

With regards to hospital evacuation, in general, two scenarios can be anticipated: an immediate evacuation (hospital fire, bomb threat, etc.) or a situation with variable time to plan the evacuation (flooding, hurricanes, etc.). Both require a functioning hospital evacuation plan, where responsibilities between different collaborating agencies have been clearly defined. A hospital evacuation is a very complex operation including the provision of necessary medical care and monitoring during the evacuation, transfer of medical records, and allocation of patients to alternate medical facilities or temporary shelters as well as coordination of different modes of transport. The process may further be complicated by the breakdown of hospital and/or societal infrastructure (power, roads, and communications). Ethical dilemmas can be anticipated.

5. **Type of evacuation.** There can be different types of evacuation depending upon the cause of an incident. In the event of, for example chemical and biological events, it may be necessary and safer to evacuate the area or building. Even during an indoors fire, staying in the building while being isolated by fire resistance walls, may be a safer option. Victims may be moved vertically or horizontally to a safer place. Total evacuation in contrast, due, for example, to flooding, landslide, threats (bomb), etc. may take place by evacuating a building, a campus or an entire city.
6. **Triage (sorting).** Sorting the victims is an important and necessary operation in order to move each patient to the correct recipient using the correct transport measures. At outdoor events triaging is conducted at several locations: earlier directly in the hot zone i.e. the center of the event, later at the patient collecting areas and finally at the ambulance loading zones. Along with moving the victims, the type of triage varies from a simple primary triage to a more complex secondary one. At indoor events, triage can be harder, especially if the location is not a medical facility. Aspects such as crowding and the limitation of the area, building or surroundings, may force first responders to merely evacuate everyone, rather than conducting a primary sorting. In these cases, a better triage may be conducted in an area outside and in close proximity to the incident location.
7. **Logistics.** Different scenarios have different transportation needs. At an outdoor event, private and public vehicles will often be used. The need for ambulance transportation will be high and in a disastrous situation, routine instructions or rules may not be valid.

In the disco fire in Gothenburg 1998, for example, ambulances transported two victims simultaneously in order to save more lives. In Paris 2015, 256 patients were transported over 300 times, the number of deaths during transportation was only two. The rate of mortality and morbidity is of course not only dependent on the speed of transportation but also the competency in each ambulance.

With regards to a hospital evacuation, there is a need for planned activity within the hospital. Each patient transported inside or outside hospital needs to be accompanied by staff. Therefore, it is necessary to have a plan regarding resources and the competency needed for transportation. However, in severe situation with limited information flow, there is a risk that the staff moving out with patients may not come straight back to the hospital, which will result in a shortage of staff in the long-term, as demonstrated in the flooding of Bangkok 2011.

What do we need for a safe evacuation?

- All units and professions should have conducted a risk and vulnerability analysis to identify all risks related to their activities and surrounding.
- Preventive measures targeting all risks should be defined in a multiagency approach, where different professions may put forth their perspectives regarding specific risks.
- A plan should be written based on the identified risk as well as self-capability, including resources.
- A distinct command and control structure should be defined.
- Communication methods should be identified and defined. For ‘communication’, a broad definition is applied, including how different profession contact each other, as well as the way information, is communicated internally and externally regarding the ongoing situation.
- Careful logistics plans should be identified and declared.
- Patient safety should be considered in a plan before anything can happen. Patient identification, triage, medication issues, the availability of medical files and responsibilities should be discussed and documented.
- Recipient facilities/hospitals should be identified.
- Chief coordinating centers should be involved early to overview resource use and distribution, in order to give support to all involved on the local level.

29.4 Knowledge needed at different management levels

Basic level:

- Knowledge of disaster plans, staffs role and techniques for evacuation (practical).

Advanced level:

- Evacuation plan, including decision-making ability at different levels.
- Communication at operational and strategic levels.

- Develop skills in collaboration with other organizations

Master level:

- Knowledge of different types of evacuations including ethical, cultural and legal aspects of evacuation.
- Develop and practice communication and collaboration ability with own and other organizations.

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Chapter Thirty

30 Recovery and reconstruction

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30.1 Summary

Recovery and reconstruction (RR) is a dynamic process with an early relief component and a long-term reconstructive one. It needs a flexible strategy based on continuous feedback and needs assessment. Corrective measures must be established according to priorities, within a holistic approach. Local, national and international cooperation when needed, must follow the same targets, respecting the local and national characteristics, harmonizing them in order to endorse the recovery plan. Effective communication in order to mitigate damage and assist recovery during the same time and a flexible, adaptive attitude must guide the RR actions.

The objective of RR management is to provide effective and efficient coordination and delivery of programs and services to assist and hasten the recovery of affected communities. Recovery management embraces the measures taken before, during and subsequent to any event. The information on recovery management is intended for all personnel involved in emergency management, not only recovery workers and managers. It is necessary for all involved in emergency management to have knowledge of recovery management functions to achieve the necessary coordination between agencies, services, workers, and managers. The contents of this chapter are designed to highlight the concepts of:

- Recovery models used by the European Union and International operations.
- Recovery planning and response to a disaster environment, especially in terms of major disaster incidents.
- Broadening and enhancing the understanding of roles and responsibilities.
- The importance of the overall recovery effort, in addition to the European Union and international focus, wherein the coordination and problem-solving aspects of disaster operations is addressed.

30.2 Aim

The purpose of this chapter is to understand and think critically about response and recovery operations in the profession of emergency management. We need to learn about the nature of emergencies and disasters and assess alternative viewpoints about how we should deal with them. While reviewing the disaster research literature, important functions will be mentioned along with various strategies and tools to be utilized for the effective management of response activities. In this chapter, we survey recovery policies and programs, and methods to promote a quick return to normalcy with the mitigation of

future disasters in mind. This chapter aims to make participants proficient in promoting recovery and reconstruction.

30.3 Introduction

Development is a dynamic process, and disasters are the opportunities to vitalize and/or revitalize this process, especially to generate local economies, and to upgrade livelihood and living conditions. This is especially relevant in the context of developing nations. Post-disaster reconstruction and rehabilitation is a complex issue with several dimensions. The government, non-government, and international organizations have their own stakes in disaster recovery programs, and links must be established among them, as well as with the community. In other words, post-disaster rehabilitation and recovery programs should be seen as opportunities to work with communities and serve local needs. One problem to be overcome is that relief and development often lead to burdens on the recipient government, and also often fail to serve the actual purpose and to reach the people in need.

The European Union (EU) with its Member States are the world's largest donor of humanitarian aid. EU relief aid aims at saving lives, preventing and alleviating human suffering, and safeguarding the integrity and human dignity of populations affected by natural disasters and man-made crises. The European Commission ensures the rapid and effective delivery of EU relief assistance through its two main instruments: humanitarian aid and civil protection. In partnership with over 200 organizations around the world, EU humanitarian aid is delivered where it is needed the most. The Commission, through its Humanitarian Aid and Civil Protection department (ECHO), made available over 1.5 billion Euros of humanitarian funding in 2015, reaching over 134 million victims of conflict and disasters worldwide. With headquarters in Brussels and a global network of field experts, ECHO provides assistance to the most vulnerable people solely on the basis of humanitarian needs. In doing so, ECHO promotes principled and effective humanitarian action. In the context of the sudden influx of refugees in Europe, new legislation was adopted in 2016, enabling the provision of emergency support within the EU in response to exceptional crises with severe humanitarian consequences. Additional funding of 300 million Euros was allotted for 2016, with 200 million Euros available each year for 2017 and 2018.

RR is included in the post-disaster phase, containing all the actions initiated as a response to a disaster, aiming for early recovery of the affected communities. Although it starts immediately after the disaster, it contains several measures which can be found in all phases of the disaster management cycle, such as coordination and on-going assistance. Different approaches have been established, but the main steps of the post-disaster response can be summarized as follows:

- Disaster relief includes all the means to provide immediate shelter, life support and basic needs of those individuals affected by the disaster or involved in disaster response.

- Disaster recovery is a coordinated process of supporting the affected communities in their effort of reconstructing infrastructure, economy, and environment taking into consideration the locality's cultural practices and social traditions and issues. Regardless the type of the disaster, RR has three main phases: *planning*, *implementation* and *post-implementation analysis*. Each phase takes place at different levels through several processes. It must be emphasized that during these phases, assessing the relationship between needs and outcomes must be a continuous process which assures the success of the entire process. Consequently, RR must be understood as a dynamic process which demands a huge capacity for adapting tasks to the field situation, requiring a complex view of material and human resources, as well as an integrated multi-organizational approach.

RR planning includes the following elements:

- a. Assessment.
- b. Establishing an action plan.
- c. Validating and financing the plan.

RR assessment is focused on identifying the key outcomes necessary and sufficient to keep the RR process working. A major factor in performing this assessment is the available time, as a full assessment of the socio-economic situation and access to the services may not be possible sometimes when the situation is changing fast, no matter the amount of time available. Several aspects must be covered by this assessment, namely:

- The causes and the characteristics of the disaster.
- The extent of the consequences of the major incident (MI).
- Risk analysis, including natural, economic, social, security etc. risks, as well as their trends (predictably up, predictably down or unpredictable), and including the population and the regions at risk.

Since the assessment must cover all the domains affected by the MI, it must not be performed by individuals but by teams established based on priority settings.

Elaborating a dynamic map of risks would be of high benefit as it is a useful tool in guiding the resources as well as to avoid useless human and material efforts, and the parameters for selecting the participants involved in RR.

Establishing an action plan is a complex process which should be based on the assessment and allotted resources (available resources and necessary resources) and three questions must be considered:

1. *What resources must be used, by whom and when?*

The difference between available resources and necessary resources must be considered in terms of *where from* and *how fast* needed but missing resources can become available (and if this time does not exceed a limit of usefulness).

2. *What are the expected outcomes?*

It is mandatory that identifying expectations should be realistic since complete one-step recovery of any type of damage following an MI is unlikely. It may be possible for isolated incidents, but since this topic refers to MI, the possible outcomes must be classified in successive endpoints rather than using a one-step plan. When establishing the outcomes, quantitative landmarks are usually used and these should be considered as flexible intervals rather than fixed values since multiple factors can interfere with the recovery process; therefore, the outcomes must be designed considering all these potential negative (rarely positive) influences. Failure to ensure this flexibility may result in an irreversible disturbance of the process, since planning any future step depends on the outcomes of previous actions.

3. *What are the regulatory mechanisms: feedback from the field, coordinating structures, and monitoring activities?*

Planning the regulatory mechanism is crucial for RR, due to the high variability of the post-disaster situation. Such regulation must at least include answering the following two questions:

- Whether the human and material damages have reached their final state after the disaster, meaning that once the MI finished, they do not evolve at all?
- Alternatively, whether there is a persisting factor which complicates the initial damages or leads to new ones? This situation is more frequently encountered than the final state situation. It can, moreover, generate a “cascade” of damaging factors which must be addressed.

The regulatory mechanism must include:

1. *Recording the sources of information and the channels to get information on the field.* The type of information and the timing of its delivery depends on the nature of the disaster, as well as on the communication possibilities. Field operations must be informed about the actions initiated by the center, so as to thoroughly monitor them and report action outcomes to the center.

2. *A central coordinating agency which analyses the information must include specialists from key domains related to the nature of disaster, as well as resource providers.* The purpose of this analysis is to establish whether the corrective actions have attained their milestones or not. If not, necessary supplementary measures would need to be employed to support the corrective action.

Successful actions must be continued, remaining resources must be identified and further needs must be established. Providers of further resources as well as how these resources will become available must also be described. The coordinating agency (national or international) must provide directions and standards to the field teams, ensure that linkage and communication between different sectors at the same level, and between levels are efficient and known.

3. *The result of this analysis is delivered to the field coordinating structure, which is responsible for implementing the proposed measures.* For each measure, it is advisable that it should be monitored continuously, not only at the end of the task, since late detection of any imbalance between the expected pathway and the actual situation might result in an impaired outcome which is different from what was proposed and often inferior. Once the regulatory mechanism is established, it is important for its continuity to be assured as any gap might result in a severe disruption of the entire process.

Financing the action plan does not only involve (as it might seem) the economic and financial mechanisms, but the team as a whole, since the careful assessment of each step must be performed during this process, too. As precise financial evaluations are difficult to be achieved during the immediate post-disaster situation, which changes continuously, multidisciplinary cooperation is mandatory in order to avoid confusing situations. Although this action might seem statically and completely based on the assessment, it is not, since as presented before, it must be adapted to the field status. Therefore, a feedback regulatory mechanism which ensures the dynamic character of the financing activity is crucial for the success of RR.

The implementation of the RR plan continues the planning action but it is not temporally separated from it, since planning does not stop when the plan is implemented in the field. Moreover, since a rapid action is needed in most cases, the time between the two phases is very short, so practically they co-exist after a very short interval until the first practical measures are taken. Implementing the RR plan requires the combined action of organizations and structures in all fields affected directly or indirectly by the MI (Major Incident). It is important that the feedback and regulatory mechanisms work properly, as most of the implementing actions need adjustments due to the evolving character of the situation. Regardless of the domain and the level of their activity, all the structures involved in implementing the RR plan must have enough information so as to adapt to any unusual situation within the limits of the plan. Therefore, the coordination of debriefing the field personnel by the central structures must be carefully performed so as not to jeopardize their ability to respect the plan, while actively involving them in correcting potential inconsistencies of the plan detected in the field.

The RR plan, aside from these aspects mainly specific to the relief phase, involves complex measures addressing all aspects of socio-economic life, regional and national specific features, and regional implications. Particular attention must be paid to cross-cutting issues within the country-specific context since a tailored solutions need to be applied in these situations. The teams involved in RR should, therefore, contain persons familiar with cross-cutting national issues, who are able to harmoniously integrate them into the RR structure.

The post-implementation analysis is an ongoing process with a short-term post-relief phase and a long-term one centered on reconstruction. The same aspect of continuity is crucial since this analysis takes place immediately the plan is operational and therefore,

several multidisciplinary teams must monitor different stages of the post-implementation period so as to maximize the efficacy of the efforts and establish useful knowledge for future critical situations. Both positive and negative aspects must be studied, identifying what went well and what went wrong, so as to transform the current situation into a valuable source for future training and avoid future failure.

The main work in the recovery process depends on individual and organizational competency in identifying, addressing, and evaluating social, psychosocial, and environmental impacts of public health emergencies and disasters, including bioterrorism events and threats. Key aspects of this competency expectation include:

- Describing the major phases of an emergency event and disaster recovery, and various stages within each phase.
- Describing the prioritization process of recovery and factors affecting the establishment of these priorities.
- Identifying key participants in the recovery process and their roles.
- Describing how an evaluation of the medical, public health and public service responses to emergencies and disaster can be designed and carried out.
- Describing approaches and tools for data collection under emergency conditions.
- Describing how evaluation data can be used to improve emergency preparedness and response.
- Describing the concept of multiple barriers and the effects of crises on various barriers.
- Describing specific disease transmission processes interrupted by major environmental interventions and selecting priorities to adapt to individual circumstances.
- Describing important social and psychosocial effect of emergencies and disasters and the groups at highest risk.
- Discussing strategies for preventing and mitigating social and psychosocial impacts.

30.4 Knowledge needed in different management levels

Basic level:

- Introduction and research methods.
- Overview, plan and organization phase.
- Control and disaster phases.
- Emergency Management, Damage Assessment Survey, Task Force.
- Response Plan, Incident response, policy and rules.

Advanced level:

Basic +

- Temporary and permanent housing. Building inspection.
- Public works, planning and community re-development.
- Hazard mitigation program. Risk assessment.
- Recovery and Reconstruction strategy. Gender and vulnerable groups' aspects.

- Threat Assessment, Vulnerability Analysis, Vulnerability Management.
- Business impact analysis and strategies for business resumption planning. Business continuity.
- Post-crisis trauma. Getting back to normalcy.
- Managing crisis communications.

Master level:

- Demolition of damaged historic buildings.
- Understanding asset ranking in Incident Response vs. in Disaster Recovery.
- Environmental, natural and human threats.
- Social engineering, network vulnerabilities, technical vulnerabilities.
- Business impact analysis data collection.
- Budgeting for: incident response, disaster recovery, business continuity and crisis management.
- Managing evidentiary data in an electronic environment.
- Simulation Exercise: Sample disaster recovery plans. Site planning simulation exercise.
- Law enforcement involvement.

30.5 Further reading

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Handbook of Disaster and Emergency Management

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