Resource management

A major emergency or disaster creates special resource management problems. Arrangements essential to regular supply, such as transportation routes, communications networks, and financial systems through normal credit facilities, may be disrupted or threatened. Existing stocks of essential supplies may have been damaged or destroyed. The supply requirements may thus grow at precisely the time when the means of supply have diminished. The emergency will also create demands for additional resources, including machinery and materials to rebuild and repair facilities, fuel for machinery, and food. These resources will be required not only by those stricken by the emergency but also by those involved in the recovery work.

Resource management planning for emergencies is likely to focus on the needs of rescue, medical, welfare, and recovery services forming part of the emergency response effort but should not neglect the continuing needs of the community. Without an efficient supply system, the response to the emergency and the recovery of the local community and economy will be severely hampered. Emergency plans must therefore establish an emergency resource management organization in advance of an emergency, and supply and procurement procedures that will operate once an emergency appears imminent or occurs. Possible disruptions to the local economy and the effects on the community's welfare must be considered in this planning and, if necessary, measures prepared to overcome them.

Resource management planning must cover:

— the principles of supply in an emergency, including the selection, procurement, distribution, use, and pre-positioning of essential stockpiles;
— the roles and responsibilities of organizations at all levels in providing supply systems in the event of emergency;
— the procedures that should be established for the proper accounting of resources obtained under this plan.

If specialist equipment is to be used, it is essential to ensure that the equipment is accompanied by a trained operator.

No matter what the emergency or the condition of the community, resources should always be sought at the community level first. This is not purely for reasons of cost and efficiency: the swamping of a community with excessive outside resources can:

— bankrupt local businesses;
— destroy local pride and self-sufficiency;
— lead to an unnatural degree of dependence on regional, national, and international resources;
— increase vulnerability.

The management of supplies from external sources after an emergency can be accomplished using a system known as the "Supply Management Project in the Aftermath of Disasters", otherwise known as SUMA. SUMA is a systematic

approach to identifying supplies received, using trained personnel and computer software to manage response and recovery supplies and the sorting process during an emergency. This system has been developed for supplies received from outside an emergency-affected country and is currently being used at the sub-national level.

There are also a number of published lists of medical and other resources that can assist in satisfying some of the material needs of emergency-affected communities.

A basic kit of materials for health emergencies is described in *The new emergency health kit 1998* (*10*). The lists of materials are based on epidemiological research on displaced populations, and the kits have been field-tested in a variety of emergency conditions. The lists consist of drugs and medical supplies that can be used to satisfy the basic medical needs of 10 000 people for approximately 3 months.

When assembled the kits weigh 860 kg and occupy 4 m^3, which means that they can be transported en masse in a small truck. To allow the appropriate distribution of drugs and medical supplies, and to allow the kit to be transported by means other than truck, the kit can be packaged as separate units.

- There are 10 basic units, each weighing 45 kg, which are intended for use by basic health workers for populations of 1000. They contain drugs, renewable supplies, and basic equipment.
- There is one supplementary unit for physicians and senior health workers, for a population of 10 000, containing drugs, essential infusions, renewable supplies, and equipment. This kit contains no material that is in the basic unit, and must be used *with* the basic units.

Resupply of drugs and medical supplies following the receipt of a health kit should be based on actual need, rather than requests for complete kits.

Stockpiles of emergency response and recovery supplies or requests for such supplies can be based on the publication *Emergency relief items: compendium of generic specifications* (*11*). This publication, in two volumes, specifies the most suitable resources for emergency response and recovery, and could provide guidance and assistance to:

— donor and recipient governments and institutions concerned with planning, budgeting, and the execution of assistance in emergency situations;
— procurement officials of the United Nations system, and NGOs and development agencies involved in acquiring emergency response and recovery items.

The first volume contains equipment specifications and provides guidance on needs and recommended responses for:

— telecommunications equipment;
— shelter, housing, storage, and cooking appliances;
— water supply systems;

— food items,
— sanitation and hygiene items;
— materials handling equipment,
— power supply systems.

A chapter on logistics appears at the end of the first volume, providing guidance on packaging, quality inspection, selection of mode of transport and shipping arrangements, and insurance. The second volume contains specifications for medical supplies and equipment, including essential drugs.

Descriptions of emergency kits for a variety of purposes can be found in *Guide of kits and emergency items* (*12*). These kits are grouped under the following headings

— medical kits,
— medical modules;
— surgical instruments sets;
— logistic kits;
— miscellaneous emergency items.

Drugs are one of the most important and sensitive resources in emergency response and recovery. Both donors and recipient nations should develop policies and procedures for drug management, based on the following core donation principles (*13*):

— maximum benefit to the recipient;
— respect for the wishes and authority of the recipient,
— no double standards in quality;
— effective communication between donor and recipient.

There are 12 guidelines for drug donations

1 All drug donations should be based on an expressed need and be relevant to the disease pattern in the recipient country. Drugs should not be sent without prior consent of the recipient.
2. All donated drugs or their generic equivalents should be approved for use in the recipient country and appear on the national list of essential drugs or, if a national list is not available, on the WHO Model List of Essential Drugs, unless specifically requested otherwise by the recipient.
3 The presentation, strength, and formulation of donated drugs should, as much as possible, be similar to those commonly used in the recipient country.
4 All donated drugs should be obtained from a reliable source and comply with quality standards in both donor and recipient country. The WHO Certification Scheme on the Quality of Pharmaceutical Products Moving in International Commerce (*14*) should be used.
5. No drugs should be donated that have been issued to patients and then returned to a pharmacy or elsewhere, or that were given to health professionals as free samples
6. After arrival in the recipient country, all donated drugs should have a remaining shelf-life of at least one year.
7. All drugs should be labelled in a language that is easily understood by health professionals in the recipient country. The label on each individual container

should at least contain the international nonproprietary name (INN, or generic name), batch number, dosage form, strength, name of manufacturer, quantity in the container, storage conditions and expiry date.

8. As much as possible, donated drugs should be presented in larger-quantity units and hospital packs
9. All drug donations should be packed in accordance with international shipping regulations, and be accompanied by a detailed packing list that specifies the contents of each numbered carton by INN, dosage form, quantity, batch number, expiry date, volume, weight, and any special storage conditions. The weight per carton should not exceed 50 kg. Drugs should not be mixed with other supplies in the same carton
10. Recipients should be informed of all drug donations that are being considered, have been prepared, or are actually underway.
11. In the recipient country the declared value of a drug donation should be based upon the wholesale price of its generic equivalent in that country, or, if such information is not available, on the wholesale world-market price for its generic equivalent.
12. Costs of international and local transport, warehousing, port clearance, and appropriate storage and handling should be paid by the donor agency, unless specifically agreed otherwise with the recipient in advance.

To manage drug donations, a country should (*13*):

- Define national guidelines for drug donations and provide them to prospective donors
- Define administrative procedures for receiving drug donations that answer the following questions:
  - — Who is responsible for defining the needs, and who will prioritize them?
  - — Who coordinates all drug donations?
  - — Which documents are needed when a donation is planned? Who should receive them?
  - — Which procedure is used when donations do not follow the guidelines?
  - — What are the criteria for accepting or rejecting a donation? Who makes the final decision?
  - — Who coordinates reception, storage, and distribution of the donated drugs?
  - — How are donations valued and entered into the budget expenditure records?
  - — How will inappropriate donations be disposed of?
- Specify the needs for donated drugs, indicating the required quantities, prioritizing the items, and stating donations already in the pipeline or expected
- Manage donated drugs carefully by inspection upon arrival, confirmation to donor of arrival, storage and distribution by trained professionals, and accounting of receipts and distribution to ensure the drugs are used for their original purpose.

Evacuation

Evacuation is itself a hazard, in that it may place members of a community in some danger, and will remove them from their familiar surroundings under stressful circumstances (*5*). Evacuation is not a one-way trip — arrangements are

required for returning evacuated people to their homes. The likely stages of evacuation are warning, withdrawal, shelter and feeding, reunion, and return The following will need to be identified:

— assembly area sites;
— evacuation centre or reception sites;
— evacuation routes and alternatives;
— organizations responsible for assisting evacuation;
— teams for the registration of evacuees;
— transport arrangements,
— means of operating evacuation centres.

Hazardous materials

Hazardous materials include at least those listed in Table A2 9 (Dangerous goods classes) in Annex 2, that is:

— explosives;
— gases — compressed, liquefied, or dissolved under pressure;
— flammable liquids;
— flammable solids;
— oxidizing agents and organic peroxides;
— poisonous (toxic) and infectious substances;
— radioactive substances;
— corrosives.

These materials may give rise to emergencies or be involved in emergencies caused by other means. When contained, stored, used, or disposed of in appropriate ways, these materials are not harmful, but when released, burnt, damaged, etc. they may be dangerous to people, property, and the environment.

The following preparedness actions are required for a community, building, or organization to reduce the possible harm caused by hazardous materials:

- Reduce the quantity of hazardous materials stored to the minimum — the fewer materials stored, the less harm may be caused.
- Ensure that the production, storage, transport, use, and disposal of hazardous materials are carried out according to the relevant standards and are regularly audited.
- Allow only trained people to handle hazardous materials.
- Maintain an inventory of hazardous materials types, quantities, and locations
- Collect, and have available, safety data sheets on all materials; these describe the nature of the materials, the hazards associated with them, and emergency response and first-aid directions.
- Develop generic hazardous materials emergency plans for communities and regions.

Content of community emergency plans

The content of a community emergency plan depends on:

— the hazards the community faces;
— the types of community vulnerability;

— the culture of the community;
— the means of organizing emergency management chosen by the community;
— the organization of emergency management at the provincial and national levels.

Table 25 shows some possible elements of a community emergency plan.

Table 25. **Possible content of a community emergency response and recovery plan**

Chapter	*Section*	*Content*
1. Introduction	• Aim, objectives, scope, authority	
	• Related documents	• (refer to appendix)
	• Definitions and abbreviations	• (refer to appendix)
	• Vulnerability assessment	• (refer to appendix)
2. Management structure	• Emergency powers	• Powers to release or commandeer resources
	• Control	
	• Command	• Relationship between organizations and organizational levels
	• Communication	
	• Emergency coordination centres	• Management of ECCs
	• Post-emergency review	• Management of debriefs and review
3. Organization roles	• Description by role	• Description of roles and responsibilities
	• Description by organization	
	• Emergency control centres (ECCs)	• Management of ECCs
4. Information management	• Alerting	
	• Damage assessment	• Means of gathering information
	• Information processing	• Means of handling information
	• Public information	• Types of information released
	• Reporting	• Reporting to higher authorities
	• Translation and interpretation	• Language interpretation
5. Resource management	• Resource coordination	• Resource analysis
	• Administration	• Resource deployment and monitoring
	• Financial procedures	
	• External assistance (provincial, national, and international)	• Accounting for expenditure
6. Specific plans	• Search and rescue	• Specific plans of action for specific aspects of response and recovery
	• Evacuation	
	• Health and medical	
	• Social welfare	
	• Hazardous materials	
	• Transport and lifelines	
	• Police and security	
Appendices	• Issue history and amendment list	• Means of distributing and maintaining the emergency plan
	• Distribution list	
	• Definitions and abbreviations	• Short list of essential terms and abbreviations, and their meanings
	• Summary of vulnerability assessment	• Description of likely effects of emergencies
	• Maps	• Hazard, community, and vulnerability maps
	• Planning groups	
	• Emergency contacts	• Names and contact details of relevant people and organizations

Summary

- Emergency planning should be based on an assessment of vulnerability.
- An emergency plan is an agreed set of arrangements for responding to and recovering from emergencies; it describes responsibilities, management structures, strategies, and resources
- The emergency planning process can be applied to any community, organization, or activity
- The process of planning is as important as a written emergency plan.
- Emergency planning should be performed by an appropriate planning group.
- Potential problem analysis can determine problems, causes, preventive strategies, response and recovery strategies, and trigger events.
- The resources required to support preparedness and response and recovery strategies should be analysed.
- The roles and responsibilities of people and organizations must be defined and described.
- A management structure for emergency response and recovery should be developed based on normal management structures.
- A series of strategies and systems must be developed for response and recovery, including:
  - communications;
  - search and rescue;
  - health and medical;
  - social welfare;
  - transport and lifelines;
  - police and security;
  - alerting;
  - command, control, and coordination;
  - information management,
  - resource management;
  - evacuation;
  - hazardous materials

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13. *Guidelines for drug donations* Geneva, World Health Organization, 1996 (unpublished WHO document WHO/DAP/96 2, available on request from Action Programme on Essential Drugs, World Health Organization, 1211 Geneva 27, Switzerland)

14. *WHO Expert Committee on Specifications for Pharmaceutical Preparations. Thirty-fourth report* Geneva, World Health Organization, 1996 (WHO Technical Report Series, No 863)

Chapter 5

Training and education

Introduction

The objectives of training and education in emergency management are to

— make the community aware of the hazards that face it;
— empower the community to participate in developing emergency management strategies,
— make the community aware of appropriate actions for different types of emergencies, and the organizations to which it can turn for assistance,
— enable emergency management personnel to carry out the tasks allotted to them

A number of possible training and education strategies are suitable for different audiences and purposes. Strategy selection should be based on need, audience, purpose, and available time, money, and other resources. Training and education strategies may include [1]:

— workshops, seminars, formal education programmes, or conferences;
— self-directed learning,
— individual tuition,
— exercises;
— pamphlets, videos, media advertisements, newsletters or journals;
— informal or formal presentations,
— public displays or public meetings

This chapter describes a systematic approach to training useful for emergency management personnel and the development of public education strategies

A systematic approach to training

The systems approach to training is a process for developing appropriate, effective, and efficient training programmes. Table 26 summarizes the steps in the process

Analysing training needs

The objectives of the training needs analysis in emergency management are to:

— describe allocated tasks;
— determine those tasks that an organization's personnel are capable of undertaking,
— determine which personnel require further training

For any task there are desirable levels of skills and knowledge that will ensure that it will be performed correctly. Techniques for determining desirable levels of knowledge and skill may include [1]

— identifying competence required,
— vulnerability assessment;
— emergency planning,
— exercises,
— analysis of emergency operations

Techniques for determining existing levels of knowledge and skill may include [1]:

— skills audit;
— exercises,
— analysis of emergency operations

A comparison between desirable and existing levels of knowledge and skill will indicate the training needs

Table 26 **The systems approach to training**[a]

Steps	*Activities*	*Outputs*
1 Analyse training need	• The job is analysed and task performances, together with task conditions and standards, are listed • Training needs, and their priorities, are listed	• A list of task performances, conditions, and standards • A schedule of training and priorities
2 Design training	• Training is designed to suit the results of job analysis • Training objectives and assessments are written and placed in logical sequence	• Sequenced set of training objectives and tests
3 Develop instruction	• Instructional methods and media are chosen • Course programme and content are compiled • The instruction is trialled and amended until it is successful	• A programme of instruction has been successfully trialled
4 Conduct instruction	• The course is conducted • Tests are administered • Initial problems are remedied	• Trainees who have achieved course objectives • A course modified as necessary
5 Validate training	• Problem areas from 4 and 5 are identified by analysing — efficiency — whether best use was made of resources to achieve objectives — effectiveness — whether skills and knowledge were increased — appropriateness — the relevance of the training received to the job • Training is modified or updated as necessary	• Validated and successful training

[a] Reproduced from reference *2* by permission of the publisher, Emergency Management Australia (formerly Natural Disasters Organisation)

Designing training

Training should be based on needs To design appropriate training it is necessary to develop training objectives that are mandatory, measurable, realistic, and achievable Training objectives describe the performance required in tasks, and therefore describe what a course participant should be able to do For example, training objectives in an emergency management course may be based on participants learning to

- explain how to form an appropriate emergency planning group,
- lead a group in identifying hazards
- apply a number of methods for describing hazards, the community, and community vulnerability

Assessment can take a number of forms, such as

- observation in the workplace by a supervisor;
- demonstration in a structured and practical manner;
- project-based assessment where a relevant project is undertaken on an unsupervised basis,
- simulation of the task, including role-play,
- structured tests either written multiple-choice, short answer, extended answer, or oral ,
- continual assessment of work-based performance.

Developing and conducting instruction

A training or education plan should be developed containing

- a summary of training and education objectives,
- a programme,
- allocation of responsibility;
- resource requirements,
- delivery modes,
- assessment, validation, and evaluation processes

Validating training

To validate training instruments should be developed and implemented for

- assessment,
- validation,
- evaluation

Assessment is the measurement of an individual's current knowledge, skills, and competence, and is a baseline for measuring the effectiveness of training Techniques may include practical assessment, on-the-job assessment, and examination Assessment can be performed before and after training

Validation is the comparison between the outcomes achieved by training and education and the desired outcomes, which determines the appropriateness of the training

Evaluation is the process of determining the efficiency and effectiveness of a training and education plan. Part of the process is the comparison of outputs and objectives.

Public education

> "The aim of public education is to ensure an alert and informed community. There is a requirement to have the community informed about the characteristics and possible effects of identified hazards. Public education material needs to contain action statements which will direct the public to make desired preparations and take appropriate actions. . particular attention is given to identified special needs groups. A broad range of methods for dissemination should be considered, including:
>
> — newspapers,
> — radio,
> — television,
> — brochures,
> — public meetings,
> — school visits.
>
> It is also useful to advertise the existence of hazard analysis and emergency plans, and to place these on public view." (*3*)

Annex 4 contains information that can be provided to communities on personal protection in different types of emergencies.

Summary

The objectives of training and education in emergency management are to:

- make the community aware of the hazards that face it,
- empower the community to participate in developing emergency management strategies,
- make the community aware of appropriate actions for different types of emergencies and the organizations to which it can turn for assistance,
- enable emergency management personnel to carry out the tasks allotted to them.

A systematic approach to training is a process for developing appropriate, effective, and efficient training programmes, involving:

- analysing training needs,
- designing training,
- developing instruction,
- conducting instruction,
- validating training.

Public education programmes should be conducted to ensure an alert and informed community.

References

1 *National emergency management competency standards* Canberra, Emergency Management Australia, 1995

2 *Australian emergency manual training management* Canberra, Natural Disasters Organisation, 1992

3 *Australian emergency manual community emergency planning guide*, 2nd ed Canberra Natural Disasters Organisation, 1992

Chapter 6

Monitoring and evaluation

Introduction

Monitoring and evaluation determine how well an emergency preparedness programme is being developed and implemented and what needs to be done to improve it. The method can be applied to

- developing and implementing policy,
- vulnerability assessment,
- emergency planning,
- organizational preparedness,
- training and education.

Three ways of monitoring and evaluating preparedness are described here:

- project management,
- checklists,
- exercises.

Project management

The means of monitoring and evaluating during the implementation phase of a project include measuring the progress toward project objectives, performing an analysis to find the cause of deviations in the project, and determining corrective actions. See Annex 1 for more details.

Projects involve analysing the present and past, predicting the future, making changes, and developing new ideas and products for future use. Very often the analyses, predictions, changes, and new ideas and products are not entirely correct, and over time the environment in which the project is being implemented will change. In each part of the emergency preparedness process described in this manual it is possible to make mistakes, and there is always room for improvement.

Policies describe long-term goals and assign responsibilities, and may establish work practices and decision criteria. It is possible, however, that a policy goal may be set too high to be achieved or be incorrect in other ways. Policy review cannot be continuous, or the basis for all emergency management programmes would be continually altering and individual projects would not be completed. Policy-makers should remain receptive to criticism and suggestions, and should periodically review policies in the light of experience, changes in the policy and emergency management environment, and new challenges that arise, remembering that policy development is a participatory process. If a policy is embodied in legislation, a common reaction to suggestions for change is "But we can't, it's

the law!" Laws are made to be useful and can be changed when they no longer serve their purpose.

Vulnerability assessment can determine community vulnerabilities, describe hazards and the harm they may cause, and provide information for all aspects of emergency management. The accuracy of a vulnerability assessment is determined by the quality of

— community participation,
— the information used,
— the resources applied,
— the assumptions about the community, the environment, and the hazards,
— the conceptual models.

Vulnerability assessment will never present a perfectly correct picture of vulnerability, hazards, and potential emergencies. When an emergency has occurred, it is often discovered that the models used to describe the behaviour of a hazard are incorrect. For example, actual floods rarely follow precisely the flood heights and time scales predicted. The models therefore need to be fine-tuned. Assumptions about community vulnerability sometimes prove unfounded, and predictions of community behaviour during emergencies are not always correct. Thus, the analysis of emergencies — even minor ones that cause little harm — can yield information that will make a vulnerability assessment more accurate.

There is also inevitable change in the community, environment, and vulnerability. Effective vulnerability reduction and emergency preparedness programmes will create changes for the better, and economic, environmental, and social influences may create changes for the worse. Thus, vulnerability assessment needs to be reviewed periodically.

Emergency planning is intended to protect the community and its environment, and to reduce uncertainty and confusion during emergencies. Sometimes emergency plans do not work. One of the most common reasons for this is that plans were developed in isolation and not communicated to the right people. Other reasons may include

— poor communication, both technical and personal, during the emergency,
— lack of coordination of response work, leading to duplication, inefficiency, and ineffectiveness,
— lack of resources for the problems at hand.

After each emergency, an analysis of the events and actions that occurred is required. Each organization involved should hold debriefings, and then there should be a single debriefing for representatives of all organizations. A debriefing entails presenting facts of the emergency, describing the role that each person or organization played, and evaluating the actions taken. While debriefings are instructive for those who participate, they should also be documented and used to improve emergency planning.

Checklists

Checklists can be used to evaluate an existing emergency preparedness programme or to assist in developing a new programme. Checklists constitute a "closed set" in that they are not tools for developing new ideas or strategies. They can, however, form a compendium of current knowledge based on prior experience, and they are simple and easy to use.

Annex 3 contains a number of checklists for emergency preparedness, as well as for response and recovery. These checklists are not exhaustive, and can be added to as experience is gained or to suit the context of a community's preparedness.[1]

Exercises

A common way of monitoring and evaluating parts of an emergency preparedness programme is through conducting exercises, which can be used to test aspects of:

— emergency plans,
— emergency procedures,
— training,
— communications, etc.

There are many different types of exercise, each suited to different purposes. The purpose of an exercise, and the aspect of emergency preparedness to be tested, must be carefully decided and fairly specific. An exercise should not be conducted with the purpose of testing an entire emergency plan or all aspects of training. Some specific purposes for exercises related to communications include:

— to test the communications procedures contained within an organization's emergency procedures;
— to validate the interorganization communications covered in a plan;
— to test the call-out procedures within an organization;
— to validate the lines of command and control defined by a plan;
— to test the ability of organizations to establish and maintain emergency operations centres;
— to test the response times of organizations involved in a plan.

Some typical types of exercise include the following:

- *Operational exercise*, in which personnel and resources are deployed in a simulation of an emergency.
- *Tabletop exercise*, in which personnel are presented with an unfolding scenario, asked what actions would be required, and how the actions would be implemented.
- *Syndicate exercise*, in which personnel are divided into syndicates to discuss and consider a given scenario, and the syndicate planning and response decisions are then discussed in an open forum.

There are also a number of different ways of organizing, conducting, and reviewing exercises. One way is to go through the following steps:

[1] Further information on assessing health sector emergency preparedness can be found in *Guidelines to assess hospital preparedness for the health sector*. Washington, DC, Pan American Health Organization, 1995.

- Determine need. Exercises can be expensive and time-consuming, and sometimes dangerous. There must be a clear need for the exercise, and it must be targeted appropriately. An exercise writing team should be formed to define and design the exercise.
- Define exercise. This involves determining
  - the aim, objectives, and scope of the exercise,
  - type of exercise,
  - the authority for its conduct,
  - the performance standards that will be used to judge the degree of success of the exercise,
  - organizations to be involved,
  - resources and budget.
- Design exercise. Exercise design involves determining
  - appropriate exercise scenarios,
  - any special aids that may be required,
  - timelines,
  - exercise appointments;
  - exercise control,
  - safety requirements.
- Conduct exercise.
- Conduct exercise debriefing. The debriefing should be a meeting of those involved in the exercise to consider the degree of success in meeting the performance standards and in achieving the objectives.
- Validate exercise. This involves determining how plans, procedures, and training can be improved on the basis of the exercise results.

Selection of exercise writing team

Some of the criteria for selecting members of an exercise writing team include:

- At least one member should have some expertise in exercise writing.
- If a number of organizations are participating, each of the major organizations should be represented.
- Members should have experience in the areas to be tested or validated.
- The chairperson of the writing team should be from the lead organization.

Exercise appointments

To ensure effective exercise control, exercise control personnel should include:

- an exercise director,
- an exercise administrator,
- exercise umpires or directing staff,
- visitor or media liaison officer.

For operational exercises, the following appointments may also be necessary:

- damage control officers,
- safety officers,
- scenario coordinators.

Summary

- Monitoring and evaluation involves determining how well an emergency preparedness programme is being developed and implemented, and what needs to be done to improve it.
- Three ways of monitoring and evaluating preparedness are
  - project management,
  - checklists;
  - exercises

Annex 1

Project management

There are three major parts to project management: definition, planning, and implementation. *1*

Project definition

The project definition determines the project's aim and objectives as well as its scope, authority, and context. In addition to providing a brief outline to others of the project's intentions, the project definition gives a description of the project for those from whom funding may be sought. A project manager should be appointed to manage the project.

The aim is a statement explaining the project's purpose. This should be a single-sentence statement describing the desired end result or outcome. Objectives are what must be achieved in order to satisfy the aim — they are the tangible outputs of the project. The objectives of the project should be:

- achievable and realistic (within the constraints of the project),
- mandatory: if a specific objective is not achieved, then the aim has not been satisfied,
- measurable: evidence that the objective has been achieved can be gathered.

Scope concerns where, to whom and to what the project applies – it describes the boundaries and context of the project. Determining an appropriate scope is crucial to the success of any management activity. If the scope is too broad, it is possible that the project will not be completed within the required time. If the scope is too loosely defined, it is possible to stray into areas and topics that are not directly related to the subject and that will not contribute to the project. Authorization will be required for the project aim, objectives, and particularly the scope.

To determine the authority for the project, the following questions may be asked:

- Under whose authority does the project fall?
- To whom does the project manager report?
- Who will ensure the project's implementation?

Context is crucial to planning and implementing an emergency preparedness programme. Before emergency planning and vulnerability assessment are carried out, it is necessary to:

- be familiar with the cultural background of the community;
- determine community attitudes to hazards and emergencies;

— identify local organizations with resources and expertise,
— analyse the political structure of the community and identify those who have power and influence

The context of emergency preparedness is the "real world" within which the programme must function. If the programme is not adapted to this, it will fail.

A project manager for the emergency preparedness programme should be selected according to the following criteria:

— commitment to the project's success,
— knowledge of the community's culture,
— emergency management knowledge and skills,
— management skills such as team-building, delegating, managing performance, managing others' involvement, communication, negotiation, and conflict resolution,
— problem-solving and decision-making skills,
— project management skills.

Project planning

Project planning is the process of sequencing tasks to achieve the project objectives and to ensure timely project completion and efficient use of resources. It involves determining tasks, assigning responsibilities, developing a timetable, and determining resource allocation and timing.

To determine tasks, the following steps can be taken:

- List the project tasks or steps.
- Determine the time required to complete each task.
- Identify the overall project starting date and project completion date if they have not already been determined.
- List the project tasks, and their starting and completion dates, in the order in which they need to be completed to meet the overall project completion date.

Responsibility for each task or group of tasks should be assigned to competent people. These people should communicate regularly during the performance of their tasks to ensure appropriate coordination. The timetable should take into account all the contributions and work required for the project and should thus be based on the project process and tasks. The timetable will partially determine the resource requirements by indicating the amount of work required, and, therefore, the cost. Resource requirements for the project means "what is needed to get it done?" The following should be listed:

— the expected outputs (some of which will be similar to the objectives),
— the things that need to be done (e.g. meetings, telephone calls, and travel),
— the inputs (resources) in terms of people, materials, time, and money.

Project implementation

The management of project implementation consists of project performance, monitoring, and control, and taking corrective action.

Project monitoring and control is the process of determining progress in accomplishing project objectives. Its purpose is to ensure that the project is implemented successfully and that problems and opportunities are responded to quickly. It also allows a quick return to the project plan if the project strays off schedule.

An effective project monitoring and control system depends on having a clear standard of performance and providing feedback on project performance so that effective action can be taken. Project monitoring and control systems are based on three fundamental steps:

— measuring the progress toward project objectives according to the project timetable;
— determining the cause of deviations in project progress;
— identifying corrective actions through the use of potential problem analysis.

Reference

1. *Project management*. Princeton, NJ: Kepner-Tregoe, 1982.

Annex 2

Hazard description tables

Tables A2 1 to A2 9 on the following pages can provide assistance in describing some hazards

Table A2 1 Beaufort scale[a]

No.	Wind speed km/h	Wind speed knots	Descriptive term	Effects observed On land	Effects observed On sea
0	<1	<1	Calm	Calm smoke rises vertically	Sea like a mirror
1	1–5	1–3	Light air	Smoke drift indicates wind direction	Ripples are formed but without foam crests
2	6–11	3–6	Light breeze	Leaves rustle, wind vanes move	Small wavelets, crests have a glassy appearance and do not break
3	12–19	6–10	Gentle breeze	Leaves small twigs in constant motion	Large wavelets, crests begin to break, foam of glassy appearance
4	20–28	11–15	Moderate breeze	Dust leaves and loose paper raised from ground, small branches move	Small waves, becoming longer, fairly frequent white horses
5	29–38	16–21	Fresh breeze	Small trees in leaf begin to sway	Moderate waves many white horses formed
6	39–49	21–27	Strong breeze	Larger tree branches in motion, whistling heard in wires	Large waves begin to form, white foam crests everywhere (probably some spray)
7	50–61	27–33	Near gale	Whole trees in motion, difficulty in walking	Sea heaps up white foam from breaking waves begins to be blown in streaks
8	62–74	33–40	Gale	Twigs and small branches broken off trees walking impeded	Moderately high waves of greater length, foam is blown in well-marked streaks
9	75–88	41–48	Strong gale	Slight damage to structures, slates blown from roofs	High waves, crests of waves begin to topple, tumble and roll over
10	89–102	48–55	Storm	Trees broken or uprooted, considerable damage to structures	Very high waves with long over-hanging crests on the whole the surface of the sea takes on a white appearance, the tumbling of the sea becomes heavy and shock-like, visibility affected
11	103–117	56–63	Violent storm	Usually widespread damage	Exceptionally high waves visibility affected
12	>117	>63	Hurricane	Usually widespread damage	The air is filled with foam and spray, sea completely white with driving spray visibility seriously affected

[a] Reproduced from reference 1 by permission of the publisher

Table A2 2. **Hurricane disaster potential scale**[a]

No.	Central pressure (mbar)	Winds (km/h)	Surge (m)	Damage	
				On land	At sea
1	>980	120–150	1 2–1 5	Damage to shrubbery, trees, foliage and poorly anchored mobile homes. Some damage to signs	Some low-lying coastal roads flooded Limited damage to piers and exposed small craft
2	965–979	151–175	1 6–2.4	Trees stripped of foliage and some of them broken down Exposed mobile homes suffer major damage Poorly constructed signs are severely damaged Some roofing material ripped off, windows and doors might be affected	Coastal roads and escape routes flooded 2–4 hours before hurricane centre arrives Piers suffer extensive damage and small unprotected craft are torn loose Some evacuation of coastal areas is necessary
3	945–964	175–210	2 5–3 6	Foliage stripped from trees and many blown down Great damage to roofing material, doors and windows Some small buildings are structurally damaged	Serious coastal flooding and some coastal buildings may be damaged Battering of waves might affect large buildings, but not severely Coastal escape routes cut off 3–5 hours before hurricane centre arrives Flat terrain 1 5 m or less above sea level is flooded as far inland as 13 km Evacuation of coastal residents for several blocks inland may be necessary
4	920–944	211–250	3 7–5 5	Shrubs, trees and signs are all blown down Extensive damage to roofing materials, doors and windows Many roofs on smaller buildings may be ripped off Mobile homes destroyed	Flat land up to 3 m above sea level might be flooded to 10 km inland Extensive damage to the lower floors of buildings near the coast Escape routes cut 3–5 hours before hurricane centre passes Beaches suffer major erosion and evacuation of homes within 500 m of coast may be necessary
5	<920	>250	>5 5	Increase on the extensive damage of the previous level Glass in windows shattered and many structures blown over	Lower floors of structures within 500 m of coast extensively damaged Escape routes cut off 3–5 hours before hurricane centre arrives Evacuation of low lying areas within 8–16 km of coast may be necessary

[a]Reproduced from reference *2* by permission of the publisher and the author

Table A2.3. **Frequency of tropical storms**[a]

Basin and stage	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sep.*	*Oct.*	*Nov.*	*Dec.*	*Annual*
North Atlantic													
Tropical storms	*	*	*	*	0 1	0.4	0.3	1.0	1 5	1 2	0 4	*	4.2
Hurricanes	*	*	*	*	*	0.3	0.4	1 5	2.7	1 3	0 3	*	5.2
Tropical storms and hurricanes	*	*	*	*	0 2	0.7	0 8	2 5	4 3	2 5	0 7	0 1	9 4
Eastern north Pacific													
Tropical storms	*	*	*	*	*	1.5	2 8	2.3	2.3	1.2	0 3	*	9.3
Hurricanes	*	*	*	*	0.3	0 6	0 9	2.0	1.8	1.0	*	*	5.8
Tropical storms and hurricanes	*	*	*	*	0.3	2.0	3 6	4.5	4.1	2.2	0.3	*	15.2
Western north Pacific													
Tropical storms	0.2	0.3	0.3	0.2	0.4	0.5	1.2	1.8	1.5	1 0	0.8	0.6	7 5
Typhoons	0.3	0 2	0.2	0 7	0 9	1.2	2.7	4.0	4.1	3 3	2.1	0.7	17 8
Tropical storms and typhoons	0.4	0.4	0.5	0.9	1.3	1.8	3.9	5 8	5.6	4.3	2.9	1.3	25.3
Southwest Pacific and Australian area													
Tropical storms	2.7	2 8	2.4	1.3	0.3	0 2	*	*	*	0.1	0 4	1.5	10 9
Typhoons/cyclones	0 7	1.1	1.3	0.3	*	*	0.1	0.1	*	*	0 3	0.5	3.8
Tropical storms and typhoons/cyclones	3.4	4.1	3.7	1 7	0.3	0.2	0.1	0.1	*	0 1	0.7	2.0	14 8
Southwest Indian Ocean													
Tropical storms	2 0	2.2	1.7	0 6	0.2	*	*	*	*	0.3	0.3	0.8	7.4
Cyclones	1.3	1 1	0.8	0.4	*	*	*	*	*	*	*	0.5	3 8
Tropical storms and cyclones	3 2	3.3	2.5	1.1	0.2	*	*	*	*	0.3	0.4	1.4	11.2
North Indian Ocean													
Tropical storms	0 1	*	*	0.1	0.3	0.5	0.5	0.4	0 4	0 6	0 5	0 3	3.5
Cyclones[b]	*	*	*	0.1	0 5	0.2	0.1	*	0.1	0 4	0 6	0 2	2.2
Tropical storms and cyclones[b]	0.1	*	0.1	0 3	0.7	0 7	0.6	0.4	0.5	1 0	1.1	0.5	5 7

[a] Reproduced from reference *1* by permission of the publisher.
[b] Winds ≥ 89 km/h (Beaufort 10).
* Less than 0 05.
Note. Monthly values cannot be combined because single storms overlapping two months were counted once in each month and once annually

Table A2 4. **Modified Mercalli scale**[a]

No.	*Descriptive term*	*Description*[b]	*Acceleration (cms^{-2})*
I	Imperceptible	Not felt. Marginal and long-period effects of large earthquakes	<1
II	Very slight	Felt by persons at rest, on upper floor, or favourably placed.	1–2
III	Slight	Felt indoors Hanging objects swing Vibration like passing of light trucks Duration estimated May not be recognised as an earthquake	2–5
IV	Moderate	Hanging objects swing Vibration like passing of heavy trucks or sensation of a jolt like a heavy ball striking the walls. Standing motor cars rock Windows, dishes, doors rattle Glasses clink, crockery clashes In upper range of IV, wooden walls and frames creak	5–10
V	Rather strong	Felt outdoors, direction estimated Sleepers waken Liquids disturbed, some spilled Small unstable objects displaced or upset Doors swing, close, open Shutters, pictures move Pendulum clocks stop, start, change rate	10–20
VI	Strong	Felt by all. Many frightened and run outdoors People walk unsteadily Dishes, glassware broken Knick-knacks, books, off shelves Pictures off walls. Furniture overturned or moved Weak plaster, masonry D cracked. Small bells ring Trees shaken	20–50
VII	Very strong	Difficult to stand. Noticed by motor car drivers Hanging objects quiver Furniture broken Damage to masonry D, including cracks Weak chimneys broken at roof line Fall of plaster, loose bricks, stones, tiles, cornices. Some cracks in masonry C Waves on ponds water turbid with mud. Small slides and caving in along sand or gravel banks Large bells ring Concrete irrigation ditches damaged.	50–100
VIII	Destructive	Steering of motor cars affected Damage to masonry C partial collapse Some damage to masonry B, none to masonry A Fall of stucco, some masonry walls Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks Frame houses move on foundations if not bolted down, loose panel walls thrown out Decayed piling broken off Branches broken from trees Changes in flow or temperature of springs and wells Cracks in wet ground, on steep slopes	100–200
IX	Devastating	General panic Masonry D destroyed, masonry C heavily damaged, sometimes with complete collapse, masonry B seriously damaged Frame structures, if not bolted, shifted off foundations Frames cracked Serious damage to reservoirs Underground pipes broken. Conspicuous cracks in ground In alluviated areas sand and mud ejected, earthquake fountains, sand craters	200–500
X	Annihilating	Most masonry and frame structures destroyed with their foundations Some well-built wooden structures and bridges destroyed Serious damage to dams, dykes, and embankments Large landslides. Water thrown on banks of canals, rivers, lakes, etc Sand and mud shifted horizontally on beaches and flat land Rails bent slightly.	500–1000