

Humanitarian Supply Management and Logistics in the Health Sector



Emergency Preparedness
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Preface

Emergencies and disasters place exceptional demands on the logistical and organizational skills of the affected country. This challenge is felt with particular intensity in the health sector, where deficiencies in the flow of supplies may have dire consequences. The problem does not merely lie in the procurement of emergency goods and equipment. Special attention must also be paid to the management of those supplies already at hand or in the pipeline. Supplies may be piling up at the central level while acute shortages are painfully evident at the emergency site. Unsolicited—and often inappropriate—donations also compete for storage and transport facilities that may be in short supply.

Humanitarian personnel may be unfamiliar with standard accounting and stock-control procedures. Alternatively, these procedures may be overlooked under the pressure of the emergency. Accountability and a thorough paper trail are likely to fail at exactly the moment when the mass media are most eager to find evidence of misappropriation of external assistance, and thus perpetuate the myth of local incompetence or, worse still, corruption.

Since the publication in 1983 of PAHO's handbook, *Medical Supply Management after Natural Disasters*, and particularly over the last decade, considerable progress has been made worldwide toward the effective management of humanitarian supplies, proper accountability, and greater transparency. The development by the Pan American Health Organization of the SUMA emergency supply management methodology has helped to place the effective and accountable control of the supply chain high on the list of priorities of both governments and nongovernmental organizations.

This handbook aims to present the most basic concepts of humanitarian supply management and logistics. Although the handling of medical and pharmaceutical supplies is given special attention, the logistics principles described here have multisectoral applications, not only in emergency situations, but also in the day-to-day operations that must be a part of disaster prevention and preparedness.

Throughout this manual, a basic premise is maintained: that disaster management is primarily a national responsibility. While the massive inflow of donations may occasionally exceed the capacity of the affected country to absorb them, the most effective and appropriate response by the international community and humanitarian organizations is to contribute to capacity building at the national level. This manual is directed at those who are locally responsible for managing the flow of supplies and ensuring the timely delivery of emergency supplies to disaster victims—from civil protection experts to custom officers, and from ministry of health and social security professionals to the dedicated volunteers of humanitarian organizations.

It is our hope that this publication will contribute to greater effectiveness and accountability in the process of providing humanitarian assistance to the victims of disasters, and therefore to more equitable access to health by the affected population.

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Introduction

Procurement, storage, mobilization, distribution—these and other aspects of providing material assistance to people affected by disasters, and the handling of those supplies employed by relief organizations in their aid operations, require an organizational structure to ensure the efficient management and utilization of resources that in emergency situations, almost by definition, tend to be limited.

This structure is provided by logistics, the art or strategy of achieving practical objectives as promptly and methodically as possible while making the most effective use of available resources.

Two basic premises are addressed in this handbook:

1. Humanitarian supply logistics cannot be improvised at the time of the emergency. Countries and organizations must see it as a cornerstone of emergency planning and preparedness efforts. Employing resources appropriately, and being able to secure those that are not at hand, depends on first identifying their availability and location, as well as the sources for obtaining them. All those activities demanded by logistical deployment during an emergency—the mechanisms for standardizing the various processes and all the necessary documents for recording information and controlling, monitoring and following up on the flow of supplies—must be prepared, understood, and tested in advance.
2. The various stages in the flow of supplies from their point of origin to the moment they reach their recipients—whether they be the organizations managing the emergency or the actual beneficiaries of the assistance—are a chain made up of very close links. How any one of these links is managed invariably affects the others. Supply management must therefore be the focus of an integral approach that looks at all the links in the sequence and never loses sight of their interdependence. This is known as supply chain logistics.

This handbook is intended as a guide to certain basic aspects of emergency supply logistics and as reference material for all those involved in

the management of humanitarian supplies. It describes a series of procedures for the correct handling of supplies at each of the stages of the logistics chain. Some of these procedures reflect the standards of international organizations involved in disaster response. Many others, however, are the distillation of concrete experiences by those in the field.

While no guidelines can be universally applicable, the techniques and procedures proposed here should be of some value in almost all circumstances involving emergency operations.

The manual is aimed at all those who work in emergency management, whether government officials or members of nongovernmental organizations; the procedures outlined should be applicable in both cases. The content has been organized in such a way that those who are already experts in the field can use it as reference material, while those who wish to learn about the subject will find a systematic presentation of the most relevant aspects of the logistics of managing humanitarian supplies.

This is a new contribution by the Pan American Health Organization and the World Health Organization to national efforts to strengthen operational capacity, particularly in those aspects related to the management of humanitarian assistance. It expands and updates information in PAHO/WHO's Scientific Publication *Medical Supply Management after Natural Disasters* (1983).

Chapter 1

*The Context*¹

The purpose of this chapter is to provide a general context for the most common scenarios that would call for an intervention by humanitarian organizations, as well as for those recurring conditions in which these organizations must act to meet the needs of the victims of disasters.

Disasters – General Aspects

The term “disaster” is usually applied to a breakdown in the normal functioning of a community that has a significant adverse impact on people, their works, and their environment, overwhelming local response capacity. This situation may be the result of a natural event—say, a hurricane or earthquake—or it may be the result of human activity.

Some organizations make a distinction between “disasters”—the result of natural phenomena—and “complex emergencies” that are the product of armed conflicts or large-scale violence and often lead to massive displacements of people, famine, and outflows of refugees. Examples would include the Balkan crisis, the Ethiopian, Somali and Sudanese famines, the genocide in Rwanda and the violence in East Timor.

Each disaster is unique—its effects not only have to do with the type of natural or man-made phenomenon, but also with the economic, health, and social conditions of the area. However, there are common features, and identifying them can help improve the management of humanitarian assistance and the use of resources. The following aspects should be taken into account when considering the nature of a disaster (see also Table 1.1):

1. There is a correlation between the *type* of disaster and its impact on health, particularly the occurrence of injuries. For instance, earth-

¹ This chapter was originally written by Dr. Edgardo Acosta Nassar and partially modified to meet the needs of this handbook. Dr. Acosta is Executive Director of FUNDESUMA, a foundation dedicated to maintaining and disseminating the SUMA humanitarian supply management methodology. Dr. Acosta has extensive international experience in disaster preparedness and management.

quakes cause many traumas that demand medical attention, while floods tend to produce relatively few injuries;

2. Some of a disaster's effects do not have an immediate impact on public health, but pose a potential threat. Population displacements and environmental changes may increase the risk of a spread in communicable diseases. In general, though, epidemics are not *caused* by natural disasters;
3. Immediate and potential health hazards in the aftermath of a disaster seldom materialize simultaneously; they tend to strike at different times, and with variable intensity within the affected area. Thus, injuries tend to happen at the time and place of the impact, demanding immediate medical attention, while the risk of an increase in communicable diseases evolves more slowly and reaches maximum intensity with overcrowding and breakdowns in hygiene;
4. After a disaster, the need for food, clothing, shelter, and primary health care is rarely absolute; even the displaced often have the resources to satisfy some of their own basic needs. Moreover, it is common for the victims of a disaster to recover quickly from the initial shock and participate spontaneously in search and rescue efforts and other relief initiatives, such as the storage and distribution of emergency supplies;
5. Wars and civil conflicts generate a particular set of health problems and operational obstacles. Overcoming them requires dealing with many political, social, ethnic and geographical issues.

Effective humanitarian relief management is based on anticipating problems and identifying them as they arise, and providing specific supplies at the right time where they are most needed.

Main Effects of Disasters

The various effects of disasters on the population and its surroundings generate different kinds of needs and require different approaches to meet those needs. It is therefore important to have a general sense of what these effects are, and which systems are most commonly affected. However, experience shows that the effects in question cannot be taken as absolutes, since the impact and form a disaster takes depends on the specifics of the affected region. Bearing this in mind, the following is an overview of some basic characteristics of these effects.

Social Reactions

The behavior of disaster victims rarely explodes into general panic or sinks into stunned apathy. After the initial shock, people tend to start acting positively to meet well-defined personal goals, leading to an increase in individual activities that, in spite of being spontaneous, quickly self-organize into collective endeavors. Earthquake survivors, for instance, are usually the first to engage in search and rescue efforts, often within minutes of the impact; in a matter of hours, self-organized groups have already assigned themselves specific tasks that play a key role in relief and recovery.

It is only in exceptional circumstances that actively antisocial behavior such as looting takes place. However, sometimes individuals' spontaneous reactions, while perfectly rational from the point of view of self-interest, can prove detrimental to the community as a whole, as when public utility employees do not show up at the workplace until they have taken steps to ensure the safety of their family and possessions.

Since rumors abound after a disaster, especially concerning epidemics, the authorities may face tremendous pressure to adopt emergency measures, such as massive vaccination campaigns against typhoid or cholera, without there being solid public health evidence for doing so. Moreover, many people are reluctant to apply the measures considered necessary by the authorities.

After an early warning has been issued concerning a major risk, and even after a disaster has actually taken place, many are reluctant to be

evacuated, although their homes may no longer be safe or, quite simply, may no longer exist.

Communicable Diseases

Natural disasters do not cause massive outbreaks of infectious diseases, although in some circumstances they may increase the odds of their spreading. In the short term, the increase in morbidity is frequently the result of fecal contamination of drinking water and food, causing gastrointestinal diseases.

The risk of epidemic outbreaks of communicable diseases is proportional to the density and displacement of the population, since these factors degrade living conditions and substantially increase the demand for drinking water and food, which tend to be scarce in such circumstances. In the immediate aftermath of a disaster, the risk of contamination grows—as in the case of refugee camps—as existing sanitation services such as water supply and sewerage systems break down and it becomes impossible to maintain or restore public health programs.

In the case of complex disasters, malnutrition, overcrowding, and the lack of basic sanitary conditions are frequent. In such circumstances, outbreaks of cholera and other diseases have occurred.

Population Displacements

When large population displacements take place, whether spontaneous or organized, humanitarian assistance becomes crucial—and urgent. People tend to flock to urban areas, where public services do not have the capability to handle sudden, very large increases in the population served, leading to increased mortality and morbidity rates. If the disaster destroys most homes in a given area, large local “migrations” may take place within the same urban environment, as victims look for shelter in the homes of relatives and friends.

In situations in which large numbers of the population flee their homes due to war or other forms of violence, and the threat to life is imminent, organized reactions are much less likely, since the chief priority of the

victims is to get away from the danger as quickly as possible. In these cases, the timely intervention of international aid organizations can still make the difference between life and death. Even so, these agencies may find among these populations attitudes of mutual assistance and organized response that can maximize the effectiveness of the intervention.

Exposure to the Elements

Health hazards associated with exposure to the elements are not common in temperate zones, even after a disaster, as long as the displaced are kept in dry places where they can remain sheltered from the wind and cold. However, in other climates with significant extremes in temperature, whether too hot or too cold, proper shelter can be vital. Hence, the need to provide emergency shelter should not be seen as a given, but depends instead, to a large extent, on local circumstances.

Food and Nutrition

Food shortages in the aftermath of a disaster are generally due to two causes. The first is the destruction of food stocks in the affected area, which combines with personal losses to reduce the immediate availability or affordability of food. The second is disorganized distribution systems, which may contribute to shortages even if there is no absolute scarcity of food.

After an earthquake, lack of food is rarely severe enough to cause malnutrition. River floods and unusually high tides causing coastal flooding may affect food stocks and ruin crops, as well as interfering with distribution. Efficient food distribution may be a key need in the short term, but large-scale imports or donations of food are seldom needed.

One crucial exception must be mentioned. In the case of mass displacements of people, the victims do not carry much in the way of provisions, if they carry anything at all. All too frequently, supplies in the population centers that play host to them are insufficient and are quickly depleted.

Water Supply and Sewerage

Water supply and sewage systems are especially vulnerable to natural disasters. The interruption of such services leads to severe health risks. These systems are widely distributed, often poorly maintained or in disrepair even before a disaster strikes, and exposed to a variety of hazards. Deficiencies in the quantity and quality of drinking water, or the safe disposal of fecal and other human waste, bring about a degradation of sanitary services, which in turn contributes to creating favorable conditions for the spread of water-borne diseases.

Mental Health

In the immediate aftermath of a disaster, anxiety, neurosis and depression are not a major public health issue, and can generally be handled temporarily by other members of rural or traditional communities without external support. Confounding expectations, it is relief workers who may comprise a high-risk group. Whenever possible, all efforts must be made to preserve the social structure of families and communities. Likewise, the indiscriminate use of sedatives or tranquilizers during the relief stage of the disaster must be vigorously discouraged.

In the industrialized or urbanized areas of developing countries, a significant increase in mental health problems often accompanies the long-term rehabilitation and reconstruction phase. Treatment must be provided.

Special reference must be made to the traumas that are the result of contact with the horrors of armed confrontation and other forms of extreme violence. The violent death, disappearance, or injury of relatives and friends aggravates the trauma, which generally calls for protracted therapy.

Damage to Infrastructure

Natural disasters frequently cause severe damage to key facilities, affecting the health of those sectors of the community that depend on the services provided. In the case of hospitals and health centers whose

structure is unsafe, natural disasters put its occupants at risk and limit institutional capacity to provide services to the victims. The 1985 Mexico City earthquake triggered the collapse of 13 hospitals. In three of them alone, 866 people died, including 100 hospital staffers; some 6,000 beds were lost. In 1998, Hurricane Mitch damaged or destroyed the water supply systems of 23 hospitals in Honduras and affected 123 health centers. The disasters set off by the El Niño phenomenon in Peru between 1997 and 1998 affected almost 10% of the country's health services.

These destructive effects also have an impact on infrastructure, equipment, and other useful resources for managing the arrival, storage, and distribution of emergency supplies.

Table 1.1 Short-term effects of major disasters

Effect	Earthquakes	Windstorms (without flooding)	Tsunamis and sudden floods	Slow-onset floods	Landslides	Volcanoes and mudslides
Deaths ^a	Many	Few	Many	Few	Many	Many
Severe injuries requiring extensive treatment	Many	Moderate	Few	Few	Few	Few
Increased risk of communicable diseases	This is a potential hazard after any significant natural disaster. The potential increases in close correlation with overcrowding and the degradation of the sanitation situation.					
Damage to health facilities	Severe (structure and equipment)	Severe	Severe, but localized	Severe (equipment only)	Severe, but localized	Severe (structure and equipment)
Damage to water supply systems	Severe	Minor	Severe	Minor	Severe but localized	Severe
Lack of food	Infrequent (generally caused by economic or logistical factors)		Common	Common	Infrequent	Infrequent
Large population displacements	Infrequent (tend to occur in urban areas that have suffered severe damage)		Common (generally limited)			

^a Including potential lethal effects in the absence of prevention measures.

Chapter 2

Logistics

Logistics and Emergencies

Although the word "logistics" applied originally to the military procedures for the procurement, maintenance, and transportation of materiel, facilities, and personnel, it now has practical applications in civilian life. It generally refers to a system whose parts interact smoothly to help reach a goal promptly and effectively thanks to the optimized use of resources. While this is an immensely productive approach, its downside is that the failure of even one of the components can affect the final result.

Many commercial enterprises have a logistics department that coordinates, through a logical and sequential series of steps, all aspects related to procurement, transport, maintenance, stock management, and the flow of both material and intangible inputs—broadly speaking, all activities considered auxiliary to the production and marketing process.

In emergency relief operations, logistics are required to support the organization and implementation of response operations in order to ensure their timeliness and efficiency. Mobilizing the staff, equipment and goods of humanitarian assistance organizations, the evacuation of the injured or the resettlement of those directly affected by the disaster, requires a logistics system to maximize effectiveness.

Logistics Planning and Preparedness²

It is beyond the scope of this section to explain in detail how to develop an emergency response logistics plan. However, it is feasible to provide a few guidelines for developing such a plan, as well as to underscore the importance of planning as a key component of any disaster reduction effort.

² This section is based on *Logistics*, a module prepared by R.S. Stephenson, for the United Nations Development Programme, Disaster Management Training Program (Madison, University of Wisconsin, Disaster Management Center, 1991).

Logistical activities have to be planned, since adequate preparations are essential to a smooth operation. It is indispensable to renounce the commonly held notion that transport and other arrangements can be improvised, depending on circumstances “in the field” when disaster strikes. Planning is both necessary and practical, since it is generally possible to foresee the types of disasters that may affect a given location and the needs that such disasters will be likely to engender.

In fact, logistics should be an active component of any national emergency response plan, as well as of the individual plans of disaster response organizations and key institutions such as schools and health establishments. Logistics must be closely linked to all other operational activities in the context of responding to a given emergency.

The Plan

Planning and anticipation are vital to an effective logistical system. The plan must be based, first of all, on a good working knowledge of the geographical, social, political and physical characteristics of the area where the operations are to take place. Such a plan must not only be well thought out in advance, so that it can run smoothly—it must, above all, be clearly understood and accepted by all stakeholders in any future relief operation.

The plan must provide clear answers to the following questions:

- ◆ Which tasks must be carried out? How do they relate to all the other activities, and what are the correct sequences for carrying them out?
- ◆ Who will be responsible for performing such tasks? (Rather than individuals, what must be identified here are organizations or departments.)
- ◆ Who will be in charge of the overall coordination of the logistical system?
- ◆ What resources are needed? How, when, and where can they be procured?
- ◆ What alternative actions can be implemented if the system is somehow disrupted?

Preparedness

After these questions have been answered satisfactorily, we must draw up a list of preparatory activities. The more time and effort we invest in such activities, the greater the return in terms of our knowledge of the theater of operations, our weaknesses and those of our partners, eventual needs, and alternative solutions depending on different scenarios. These activities, which are described below, can be broken down by national regions, depending on the size of the country, beginning with those areas most at risk from natural disasters. Alternatively, organizations may decide on which geographical areas they will focus their attention.

Preparedness must also be based on the vulnerability and resource assessments normally carried out to develop a national or regional emergency response plan. We must never forget that logistics has to be a key component of any such plan.

Preparatory activities must include the following:

- ◆ *Assessing the vulnerability of key infrastructure*—The goal is to identify the strengths and weaknesses of public works and strategic structures of the country or region—highways, water supply systems, schools, hospitals—as well as alternative actions that may be required should the infrastructure collapse. Specific actions would include:
 - ▲ Systematically mapping and evaluating national transport infrastructure (ports, airports, highways, railroads, and waterways), taking into account the capacity and potential weaknesses of strategic routes, possible bottlenecks (bridges, ferries), availability of communication resources, and risks to the infrastructure in the event of an emergency. It is essential to determine the vulnerability of ports and airports to natural disasters. We must consider, for instance, the exposure of hangars and warehouses, or loading and fueling equipment, to the impact of a hurricane or an earthquake;
 - ▲ Analyzing the historical meteorological records of the country or region to determine the impact that severe weather might have on the capacity of the transport system at different times of the year;

- ▲ Regularly monitoring major new construction or changes to existing structures that might cause bottlenecks or the temporary need for rerouting, e.g., changes in a bridge's weight or width restrictions, the closure of a route due to road repairs, and so on.
- ◆ *Determining the availability of strategic resources for logistical support*—These resources are constantly changing, so they must be reviewed frequently to keep the information as up-to-date as possible. The review must also involve the private sector, the public sector, and national and international nongovernmental organizations.
 - ▲ Taking stock at the national level of the location and sources of key supplies—including drugs and medical supplies, food, clothing, fuel, and rescue equipment. This inventory must also determine how long it would take for critical supplies to be delivered to their required destinations;
 - ▲ Analyzing the capacity of the transport system for moving people and supplies—assessing in detail the country's transport capacity, such as the size of fleets, their type and capacity, location, costs, and availability;
 - ▲ Assessing potential sites for logistic bases, supply distribution centers, and fuel distribution points—including public and private facilities, large storage complexes, factories, and other facilities that might be adapted to these purposes;
 - ▲ Assessing the availability of spare parts and repair services—including private and public repair shops;
 - ▲ Determining the capacity of ports and airports to handle emergency supplies under different scenarios:

Ports: Examining the capacity of port facilities to handle the arrival, storage, and flow of consignments, including repackaging and distribution. Reviewing with the port authorities the various procedures and formalities for the arrival of emergency consignments, and so on.

Airports: Determining their capacity, which types of aircraft can land, which services are offered, availability of machinery and

equipment for unloading and loading, whether fuel supplies are available, and so on.

Other transport options: Determining alternative routes and options, such as waterways, in the event of an emergency.

- ◆ *Reviewing government policies, plans, and preparations*—It is very important for international agencies and nongovernmental organizations to know the government’s emergency response policies and plans. Since government disaster response agencies are the ones entrusted with coordinating relief efforts, it is crucial for the organizations that take part in these efforts to establish solid links with the local or national agencies. The contacts can also be used to negotiate mutual cooperation agreements for emergency situations, such as providing tax-exempt status to humanitarian supplies, priority treatment at customs, and so on.

All the information compiled and the activities carried out at the planning and preparation stage should serve as the basis for the development of the logistics plan, which must spell out procedures, responsibilities, and timetables for implementation.

Supply Chain Logistics

This handbook will focus on supply chain logistics in emergency situations, the purpose of which is to “deliver the right supplies, in good condition and the quantities requested, in the right places and at the time they are needed”.³ The links in this logistics chain are not necessarily sequential or linear; indeed, they are often carried out in parallel. However, they must not be considered as separate activities but integrally, due to their complex interrelationships.

Although a general coordinator must keep track of all the threads, no one could expect a single individual to micromanage the entire process. Accordingly, someone should be responsible for procurement, transport, storage, and distribution, as outlined below.

Procurement

The purpose of the procurement process is to make sure that the organizations involved in relief management have the resources needed to

meet identified needs. This in turn requires identifying the sources of those goods and services and the way in which they will be acquired.

Transport

Transport is the means whereby supplies reach the places where they are needed. A transport strategy must not only take into account the means of transport but also the actual possibilities of getting supplies from point A to B, as well as alternatives for the prompt, safe delivery of relief assistance.

Storage

The purpose of storage is to protect the emergency supplies in an organized, systematic fashion until they can be delivered to their ultimate recipients. It must also take into account reserve supplies, or stockpiles, for future or unforeseen needs.

Distribution

The chief goal of the logistics chain in relief operations is delivering aid to the people affected by a disaster, or at least to the organizations entrusted with managing emergency supplies, in a way that is proportional to existing needs, fair, and properly controlled to prevent abuses or waste.

Putting it all Together

It is important to underscore the fact that all of the above components are closely linked. The failure or ineffective functioning of any of the links in the chain will affect overall performance. For instance, if the transport of a load of supplies has been organized correctly, but upon arrival it turns out that no provisions were made for storage, the efficiency of the transport effort will have been to no avail. Alternatively, if there are enough resources to cover the needs of an affected area, but no transport to take them where they are needed, the success of the other efforts will be, for all practical purposes, moot, because they were not properly synchronized with the transport component. One missing link is all that is needed for the chain to break.

Chapter 3

*Assessing Logistical and Supply Needs*⁴

The Importance of Needs Assessment

Assessing logistical and supply needs is crucial to determine as accurately as possible:

- ◆ The needs of the population after a disaster;
- ◆ Available local capacity and resources;
- ◆ Complementary capabilities and resources required for meeting those needs.

Such assessments should be fully integrated into the general needs-assessment process that is carried out in a disaster area to determine the type and severity of the damage and the most urgent intervention priorities. The quality of this assessment is very important, since requests for supplies will be based on the disaster situation as identified on the ground.

It should be emphasized that the need for accurate assessments should not lead to paralysis. While assessments are the tool that enables relief managers to identify the affected sectors and the nature of the damage, and to quantify and qualify more precisely the type of assistance required, there is no need for them to be completed before the most pressing relief actions are undertaken.

Needs assessments should make it possible to answer the following questions:

- ◆ What are the needs?
 - a . What are the needs of the population?
 - b . What are the operational needs?

⁴ This chapter was written with the support of Alvaro Montero Sánchez. Mr. Montero is a consultant for USAID/OFDA and FUNDESUMA on emergency operations centers.

- ◆ What is available capacity?
 - a . What is the capacity of the local infrastructure?
 - b . What resources (including human and information resources) are available locally?
- ◆ What factors may hinder or facilitate relief efforts?
- ◆ What are the social, cultural and environmental characteristics of the potential disaster area that may have a bearing on the effectiveness of the relief efforts?

It is important to determine not just the needs of the affected population, but also of the organizations in charge of providing relief assistance. Some of the key questions that need to be answered are the following:

- ◆ What is needed?
- ◆ How much is needed?
- ◆ When is it needed? (Is it urgent?)
- ◆ Where is it needed?

We also know that disasters are dynamic, changing processes. Accordingly, an assessment of this sort must not only help us to identify the current situation, but also to foresee likely needs in the future.

Needs of the Population

As we have seen, it is important not to stereotype disasters, since the needs they generate depend not only on the kind of event but also on the socioeconomic and other characteristics of the affected region or country. Nevertheless, experience shows that some aspects of everyday life are more likely to be affected by disasters, making it possible to foresee the most probable needs for survival.

Such aspects include the following:

- ◆ **Health care:** Most catastrophic events tend to affect public health to a greater or lesser extent, generating additional or urgent needs in this area.
- ◆ **Availability of water:** It is common for drinking water supply systems to suffer damage or fail to function.

- ◆ **Availability of food:** Not all events lead to dwindling stocks of food, but people who have lost their homes or belongings will likely require some temporary support in this regard.
- ◆ **Shelter:** The impact of a disaster might force people to look for temporary shelter until they resolve their housing situation.
- ◆ **Sanitation:** The generally sudden disruptions of the everyday functioning of a community, as well as the displacement or temporary resettlement of the victims, can cause environmental degradation and imperil health due to a rise in unsanitary conditions.

Bearing in mind which kind of disaster we are facing, we can come to preliminary conclusions on what type of assistance will most likely be necessary, and launch an appropriate response in the field until more thorough assessments reveal to us in greater detail the needs that must be met.

Operational Needs

All too often, local organizations involved in emergency response do not have the resources to respond effectively to a disaster. It is therefore important to determine what resources an organization has (or is lacking), and what is required for relief operations to be carried out effectively. If logistical planning and preparations have taken place before the event, this will make it easier to determine which resources are available—and which are lacking and must be procured elsewhere. (See also the section on Logistics Planning and Preparedness in Chapter 2.)

Assessment of Local Capacity

By local capacity we mean not only the physical resources available at the site of an emergency, but any factors that may help emergency supply management, such as local knowledge of the terrain or weather patterns, or social capital in the form of community organizations, formal and informal communications channels, and the like.

Local Infrastructure Capacity

Since disasters tend to affect lifelines, including roads and infrastructure in general, it is essential to carry out a quick inventory of their availabil-

ity and operational capacity for the mobilization and reception of incoming supplies.

From the point of view of infrastructure, the following issues must be dealt with:

- ◆ The state of roads, waterways, and other transport infrastructure needed to guarantee the arrival of emergency supplies in the region or country that has been affected. Are there any restrictions on their effective use, such as the threat of landslides blocking access to a town, or a landing strip that may be unavailable in the event of flooding? Are any changes being contemplated, such as the digging of a tunnel? Is maintenance so deficient that the infrastructure is becoming increasingly vulnerable to the impact of an earthquake or hurricane?
- ◆ The existence and availability of supply storage facilities;
- ◆ The existence and availability of means of transport;
- ◆ The state and capacity of points of arrival (airports, ports, borders, and so on). Are there any restrictions on their use? Are changes in the works, such as the expansion of a runway? Is maintenance a problem?

Local Availability of Resources

One can frequently find the necessary supplies locally, or at least not far from the emergency zone. Part of our assessment, then, must involve identifying the existence and location of such resources. Attention should not be paid only to commercially available goods that need to be purchased; there may also be public, and even private, resources that can eventually be put to use in relief efforts. This applies to resources for the affected population as well those required by relief organizations.

Factors That May Restrict or Facilitate Relief Efforts

Many factors may hinder or, alternatively, facilitate relief efforts. For instance, during a complex emergency, or in particular political contexts, national authorities may restrict humanitarian operations and supplies. A government may ban foreign-based relief organizations from entering the

disaster or conflict area, or even the country itself. Another may put forward religious, political, or health reasons for preventing the arrival of a given product or material.

On the other hand, some governments may adopt exceptional measures to facilitate the efforts of relief organizations and the arrival of humanitarian assistance into the country or the area where operations are underway. This would include offering priority treatment at customs, lowering or eliminating tariffs and taxes, or making government facilities available to humanitarian operations.

The assessment report must mention the existence of any such measures, since they will have an impact on the supplies that may or may not be used and the movement of relief teams. Restrictions may have to be circumvented, while favorable measures should be maximized.

Other Relevant Issues

Any other information that may affect supply availability, transport and distribution should also be recorded to assist in decision-making—weather forecasts, other events related to the event causing the emergency, or safety and security considerations that must be taken into account regarding the movement and positioning of supplies.

Social, Environmental and Cultural Features of the Affected Population and Region

In order to provide the most appropriate and effective assistance to the affected population, it is imperative to identify and understand their social and cultural customs, as well as environmental characteristics of the area they occupy.

This information must be taken into account when making decisions about the type of supplies needed, how they can best be distributed, and how they are likely to be used—in the case of clothing, housing, or household items—or consumed, when it comes to water, food, and drink.

The following are essential tasks:

- ◆ Identifying the population's dietary habits, including the types of food they will not consume for religious, cultural, or traditional rea-

sons, the kitchen utensils they use for cooking, and any other relevant information that can help determine what kind of assistance to offer and what kind to avoid;

- ◆ Identifying local and regional producers before asking for food assistance or negotiating the acquisition of food in other regions;
- ◆ Finding out what type of clothes are used, and which ones are not worn due to cultural or environmental reasons;
- ◆ Identifying the most common types of housing and construction materials, including the cultural or environmental reasons, if any, for such buildings and building practices;
- ◆ Collecting information about the needs and type of assistance considered a priority by the community itself;
- ◆ Identifying ethnic or cultural minorities and their specific needs, in order to prevent any form of exclusion.

Once again, a proper assessment will help to guide the decisions needed to provide appropriate and effective assistance. Defining the need for specific supplies must be done as part of the overall assessment of the emergency.

Chapter 4

Coordination

The actors who intervene in relief operations are diverse, with different mandates and working methods. Although they all share the desire to help, lack of coordination is common in emergency situations. Disputes between organizations, or the unwillingness to share information and work side by side, can delay the provision of care to disaster victims, lead to duplication of efforts, and waste valuable resources.

To prevent this predicament, and to maximize available resources and expertise, relief efforts should be launched in a spirit of coordination. This will be possible to the extent that participating organizations know each other, share information, identify and acknowledge their respective strengths, and explore ways of collaborating and supporting each other.

Coordination Structures

The Actors⁵

Minor emergencies are generally handled by specialized national or local agencies, perhaps with the collaboration of international organizations present in the country. However, when an event is catastrophic, other sectors of the nation and the international community must often mobilize to provide relief. The increase in the arrival of emergency supplies and response personnel places an extra burden on the efforts to coordinate relief on the ground. It is crucial to establish effective working relationships with the following stakeholders (see also Annex 4.1):

- ◆ The local population: The residents of the affected area are the first to engage in search and rescue operations, and often among the first to share vital supplies such as food and water with victims of the disaster.
- ◆ Neighboring communities or regions: It is also common for neighboring communities or even countries to respond quickly with donations and the sending of volunteers.

⁵ This section is partially based on J. Davis and R. Lambert, *Engineering in Emergencies*, Intermediate Technology Publications Ltd., 1995, London.

- ◆ The national and local governments: A significant adverse event generally prompts the intervention, not only of the national disaster response agency, but of other government bodies as well.
- ◆ Foreign governments: The governments of other nations intervene through their embassies and their bilateral cooperation agencies. This assistance, which occurs between the two governments, may include financial and in-kind donations, the financing of rehabilitation and reconstruction projects, or the sending of consultants and experts. (See Annex 4.1.)
- ◆ Multilateral agencies: These are mostly intergovernmental agencies, such as those of the United Nations, whose mandate includes disaster reduction or humanitarian assistance. Generally, their support focuses on technical assistance related to their own field of expertise, sending consultants and experts, or supporting the allocation of resources to help the affected country in rehabilitation and reconstruction efforts. (See Annex 4.1.)
- ◆ Nongovernmental organizations (NGOs): National and international, religious or social, their capabilities, experience and resources cover a wide spectrum. Some international NGOs specialize in emergency management, and their skills and resources are tailored for disaster situations. (See Annex 4.1.)
- ◆ The private sector: National or transnational in scope, for-profit corporations can get involved at different levels, from donations to providing specialized services in areas such as transportation, warehouse rentals, or the sale or in-kind donation of equipment, food and drugs.
- ◆ Specialized institutions: These can provide highly valuable technical assistance in areas such as vulnerability assessments and risk reduction, needs assessment, and more concrete efforts such as water purification or medical supply management.
- ◆ Military institutions: A country's armed forces have the experience and equipment to support logistical operations. They have their own means of transport, including sophisticated aircraft such as helicopters, highly flexible and deployable human resources, and essential skills in crucial fields such as rapid road repair and bridge construc-

tion. When the armed forces are taking active part in a conflict, however, their involvement in relief operations must be closely reviewed and might not be advisable for security reasons.

Coordination Mechanisms

It must be borne in mind that most countries have a national focal point—a National Emergency Commission, Civil Defense or Civil Protection—in charge of disaster response. It is generally a permanent structure, with its own budget and organizational structure. At times, however, governments establish temporary, ad hoc structures to respond to a particular disaster which will, at some point, transfer responsibility for their activities to permanent government agencies. Regardless of the arrangement involved, it makes sense, in order to discourage the duplication of efforts, to try to channel all emergency assistance through such structures.

The tasks of coordinating relief efforts must be viewed from a cross-sectoral, inter-institutional, and interdisciplinary perspective. They should also, obviously, start long before an emergency takes place, and be reinforced during a catastrophic event. Some of the key activities during these two crucial stages in the coordination process are the following:

During the Preparedness Phase

- ◆ Determine who is supposed to do what in the context of humanitarian intervention: which national, international, governmental, non-profit organizations are present in the country, and what are their specialties and fields of action;
- ◆ Carry out frequent meetings and coordination activities to decide and even rehearse what is to be done before, during, and after an emergency;
- ◆ Develop joint plans and seek collaborative agreements with the various organizations for the stages before, during, and after an emergency;
- ◆ Carry out inventories (national, regional, or institutional, as the case

may be) of resources and contacts that would prove useful in the event of an emergency, and keep the inventories up to date;

- ◆ Exchange information about resources that may be useful in the event of an emergency, whether the resources are in the hands of participating organizations or come from another source.

During the Response Phase

- ◆ Carry out joint assessments of the situation in the field. This can be extremely useful, since it allows for an interdisciplinary view of the emergency and makes it easier to identify areas for inter-agency collaboration;
- ◆ Maintain close and permanent contact between the various organizations involved;
- ◆ Share among the organizations the results of any assessments and findings with a view to finding fields of action where the strengths of the various organizations can complement each other;
- ◆ Share information about the activities undertaken and planned by each organization, to prevent duplication of efforts;
- ◆ Promote the exchange of resources among the organizations, as well as the development and implementation of cooperation agreements;
- ◆ In emergency situations that require a complex response, establish specialized working groups with representatives from all relevant organizations. Examples include a water and sanitation group, or a medical assistance group.

Cooperation Agreements

Disaster response organizations' primary goal is to provide relief to those in need. Depending on its nature and history, each organization tends to specialize, to a greater or lesser extent, in a given work area. It is also evident that no agency, on its own, can handle all the logistical problems attending a natural catastrophe.

The way in which international donors transfer resources for humanitarian assistance has led to the emergence of many new relief organizations and the entrance of existing institutions into this field, resulting in intense competition among these organizations for external resources.

In spite of this competition, it is essential to develop mutual support and cooperation agreements, so that humanitarian assistance can be delivered promptly and relief efforts can complement each other. These agreements must be both specific and feasible, so as not to create false expectations.

Requests for Humanitarian Assistance

Calls on the International Community

When the impact of a disaster is such that it overwhelms national response capacity, a call for help soon goes out to the international community. This is the responsibility of the national government, and the requests for assistance are usually channeled by embassies and the country offices of the various UN bodies. The crucial point, again, is not to make such requests until needs have been assessed and it is clear that they cannot be met with local resources. Only then can international solidarity provide emergency relief that is truly useful.

As part of disaster preparedness efforts, the foreign ministries of some countries—regrettably few—have issued guidelines to their diplomatic representatives abroad in the event of a disaster. These guidelines are meant to help the diplomats inform the authorities, potential donors, and the public about the impact of the event, the needs of the victims, and the type of assistance that would prove most valuable in the circumstances, based on official reports issued by those responsible for disaster response.

Ideally, this should help to identify and screen aid offers, reducing the number of inappropriate donations and helping to make sure that useful supplies arrive when and where they are most needed.

Similarly, the country offices of international organizations may call on headquarters or other counterparts in the region to provide humanitarian assistance. Normally, these organizations have their own procedures

for mobilizing aid. It goes without saying that when calling for donations, they should apply the same criteria outlined above.

Information Exchange and Coordination with International Organizations

International organizations, whether they have a country office or send delegations when a disaster occurs, are excellent vehicles for identifying sources of appropriate assistance, procuring the aid and channeling it to the victims. It is therefore vital to establish mechanisms to keep them informed of the evolution of the situation in the field of operations and the needs as they are identified.

Instructions for Donors

Guiding potential donors, not just about the type of assistance needed, but also about the most appropriate way to make it reach its destination, is extremely important. International organizations with ample experience in disaster relief claim that there are some supplies and forms of assistance that should never be the subject of an open, massive appeal:⁶

- ◆ Used clothing and footwear: Generally, needs of this sort are met locally. In any case, for reasons of hygiene and convenience, it is best to obtain such items locally;
- ◆ Pharmaceutical products: The arrival of drugs of every sort in all kinds of presentations, quantities, and packaging only serves to distract already overstretched human and logistical resources, since the drugs need to be classified, labeled and, often, discarded or destroyed;
- ◆ Food: The sending of food of any sort should not be encouraged, at least not as a given. In the event that food should be needed, donors should be advised to send non-perishable goods that can be adapted to local consumption patterns and correctly labeled;
- ◆ Blood and blood derivatives: Once again, local donations are usually enough to satisfy local needs. Moreover, the arrival of such prod-

⁶ Adapted from Pan American Health Organization (PAHO), *Humanitarian Assistance in Disaster Situations: A Guide for Effective Aid*. Washington D.C., 1999.

ucts from abroad causes more difficulties than benefits, from the health and logistical point of view;

- ◆ Medical and paramedical personnel: Generally, national health services can cope with the need for medical care during an emergency. Should additional human resources be needed, it is always better for them to come from another part of the country than from abroad;
- ◆ Other specialized personnel: Generally, national relief organizations have enough staff to meet the basic requirements of an emergency. Any need for specialized assistance should be handled directly through the relevant organizations, to prevent a rush of unneeded "experts";
- ◆ Field hospitals: These are not recommended; by the time they have been set up and are ready to operate, local health services and facilities will probably have been restored;
- ◆ Medical equipment, new or old: Medical equipment is rarely needed or, if necessary, it is generally highly specific, to be dealt with by asking specialized organizations, not by broadcasting a general appeal;
- ◆ Tents: New trends in disaster response discourage their use. Should they be needed, it is always better to exhaust the possibilities of local procurement, preventing the technical difficulties and cost of having them sent in from abroad.

It should be stressed that in very specific cases it might be necessary to request some material or aid of the kind listed above. However, these cases should be addressed by asking a specialized institution and providing all the specifications of the supplies needed. Such items should not be included in lists used for general appeals.

The best approach is to ask the national and international community only for those supplies and assistance that will be unquestionably useful as determined by an assessment of real needs.

Whenever possible, cash donations are preferable since they can be used to purchase supplies and services locally, saving the time and resources required for shipping and storing supplies.

Another key consideration is how supplies are sent. Guidelines for donors should take into account the following:

- ◆ Consignments should be sorted by product before they are dispatched. Donors must be asked not to mix different products in the same package;
- ◆ Consignments should be classified in advance, and packed according to standard categories (see section on Categories in Chapter 5);
- ◆ Consignments should be labeled and identified, ideally in the local language, or else in a language that can be easily understood or translated at the disaster site;
- ◆ Consignments should display the expiry dates of the products sent. Products with limited shelf life should not be sent if they will expire in less than one year or, in very special circumstances, six months at the shortest.

The task of making international and national donors aware of the need for appropriate donations requires a permanent information and education effort as part of each country's overall disaster preparedness strategy. The goal is to ensure that generosity goes beyond good intentions alone, and is of actual benefit to disaster victims.

Following Up on Offers of Assistance

Many governments and international organizations have become aware of the need for more targeted donations, and will not send any consignments until they have been notified of the needs that must be met. However, they might still offer assistance that could be useful later on, but not immediately.

When an offer of this sort is made, an answer should be sent immediately to the donor and a system must be in place to record such offers and follow up on them when they are finally needed.

This approach also allows some time for evaluation and consultation when the offer includes unusual supplies whose usefulness is not immediately apparent. In such cases, specialized national organizations should be consulted.

One of the most awkward diplomatic tasks is to refuse an offer of aid outright. Sometimes, after consultations have been made, local decision-makers may determine that the supplies offered would be useless, draining energy and resources away from the distribution of more effective assistance. Recipient countries should feel free to reject, with all due courtesy, such offers and to provide guidance to potential donors about the types of assistance that would be more appropriate in the circumstances.

In practice, every donation has a cost for the recipient since financial and human resources are required for storing the supplies, transporting them, and all too frequently discarding those that are in poor condition or are otherwise unusable.

Annex 4.1

International Organizations that Intervene in Emergencies⁷

Any country can be a potential donor of humanitarian aid to another nation affected by a disaster or emergency. Bilateral assistance, from government to government, is probably the most significant overall source of foreign assistance, whether it involves human resources, humanitarian supplies, or both.

In order to show the great variety of international organizations working in the field of humanitarian aid, this annex lists some of the best-known among them. The list does not in any way pretend to be comprehensive, and it leaves out many dedicated organizations with ample experience in providing emergency assistance.

1. United Nations Agencies

United Nations Development Program (UNDP)

The United Nations Development Program (UNDP) promotes and supports disaster preparedness activities in member countries. In disaster situations, the UNDP Country Office can help governments in areas such as channeling international assistance requests. The Country Office may also coordinate a Disaster Management Team (UN-DMT) comprising representatives of the various United Nations agencies, whose goal is to provide effective and coordinated assistance to governments in the wake of a disaster and during subsequent recovery and reconstruction efforts. Web site: <http://www.UNDP.org>

United Nations Office for the Coordination of Humanitarian Affairs (OCHA)

The United Nations Office for the Coordination of Humanitarian Affairs (OCHA), which in 1998 replaced the Department of Humanitarian Affairs, coordinates the response of the U.N. system to humanitarian emergencies. Its mission, in collaboration with other national and international actors, is to mobilize and coordinate effective humanitarian actions aimed at relieving human suffering in disasters and emergencies. An advocate for the rights of disaster victims and other affected groups, it also promotes prevention and preparedness, and encourages sustainable solutions to the problems posed by natural or manmade hazards. Web site: http://www.reliefweb.int/ocha_ol

⁷ More complete listings of disaster-related organizations can be found at <http://www.reliefweb.int>, <http://www.colorado.edu/hazards/>, and <http://www.crid.or.cr>.

United Nations Disaster Assessment and Coordination (UNDAC) teams are groups of professionals who can be convened by the United Nations under the coordination of OCHA, at the request of an affected country, to carry out rapid assessment of priority needs and support the national authorities and the United Nations Resident Coordinator in the coordination of international relief aid on the ground. These teams are appointed and funded by U.N. member governments and by OCHA, UNDP and operational humanitarian United Nations agencies such as WFP, UNICEF and WHO. Web site: <http://www.reliefweb.int/undac>

World Food Program (WFP)

The World Food Program (WFP) provides and coordinates food assistance and is frequently assigned the coordination of general logistics in large-scale emergencies. Its “Food for Work” program provides temporary livelihoods to the affected population during the rehabilitation and reconstruction stage. Web site: <http://www.wfp.org>

United Nations High Commissioner for Refugees (UNHCR)

The mission of the United Nations High Commissioner for Refugees (UNHCR) is to protect refugees and search for sustainable solutions to their problems. It coordinates all assistance to refugees. Web site: <http://www.unhcr.ch>

United Nations Children's Fund (UNICEF)

The main concerns of the United Nations Children's Fund (UNICEF) are the health, education and welfare of women and children in developing countries. It has mechanisms in place to cover their needs during emergencies, including food, water, sanitation, health care, and social services. Web site: <http://www.UNICEF.org>

World Health Organization (WHO)

The World Health Organization (WHO) is in charge of coordinating international health action. The Pan American Health Organization (PAHO) and other regional WHO offices act as focal points for national health authorities and donors when disasters strike. WHO can provide technical cooperation aimed at assessing health needs, coordinating international health assistance, managing the stocks and distribution of supplies, carrying out epidemiological surveillance, establishing measures for disease control, assessing environmental health, managing health services, and estimating the costs of assistance projects. WHO also promotes the implementation and use of the SUMA system for humanitarian supply management. Web sites: <http://www.who.org> and <http://www.paho.org>

2. Intergovernmental Agencies

European Community Humanitarian Office (ECHO)

The European Community Humanitarian Office (ECHO) works in collaboration with nongovernmental organizations, specialized United Nations agencies, and other international organizations, providing food and other emergency assistance and helping refugees and displaced populations. It also invests in projects aimed at disaster prevention in high-risk regions. Web site: <http://www.europa.eu.int/comm/echo/>

Organization of American States (OAS)

The Organization of American States (OAS) is a regional body that supports member states by assessing their vulnerability to natural hazards and implementing measures to mitigate the impact of disasters. It provides technical assistance in development planning, the design of projects, and training. It also manages the Inter-American Fund for Assistance in Emergency Situations (FONDEM). Web site: <http://www.oas.org>

Caribbean Disaster and Emergency Response Agency (CDERA)

CDERA is a regional organization established by the Caribbean Community; based in Barbados, it has 16 member states. Its chief functions are coordinating the response to any disaster affecting member countries and contributing to disaster reduction. Web site: <http://www.cdera.org>

Coordination Center for the Prevention of Natural Disasters in Central America (CEPRENAC)

CEPRENAC is an official organization within the Central American Integration System (SICA). It works with national scientific and operations agencies to build local capacity for vulnerability reduction. Its objective is to promote disaster reduction in Central America through the exchange of experiences, technology and information, the joint analysis of common strategic problems, and channeling foreign cooperation. Web site: <http://www.ceprenac.org>

3. Nongovernmental Organizations

The International Federation of Red Cross and Red Crescent Societies (IFRC)

The IFRC is an international humanitarian organization bringing together national bodies from 175 countries. Its international secretariat is based in Geneva. It coordinates international humanitarian assistance

and intervenes in affected countries through its national societies or, should no national office exist, with the Federation's own staff. Its great experience and flexibility, and its considerable resources, make the IFRC the most useful nongovernmental source of cooperation and support for the health sector. Web site: <http://www.ifrc.org>

Médecins sans Frontières (MSF)

MSF is a European organization comprised of several independent national bodies (MSF Spain, MSF France, MSF Holland, etc.). Its interventions focus on medical assistance, but it also has great experience and capacity in logistics, water purification, sanitation, and the provision of temporary shelter. Web site: <http://www.msf.org>

Doctors of the World

Doctors of the World is a humanitarian medical NGO that intervenes in emergencies and carries out medium- and long-term development projects. Web site: <http://www.doctorsoftheworld.org/>

Cooperative for Assistance and Relief Everywhere (CARE)

CARE International is a confederation of 10 national agencies from North America, Europe, Japan and Australia. Headquartered in Belgium, it manages development and aid projects in 62 countries in Africa, Asia, Latin America and Eastern Europe. CARE USA, based in Atlanta, oversees CARE projects in Latin America and provides emergency assistance to communities affected by disasters. Web site: <http://www.care.org>

World Vision International

World Vision International is a Christian organization that intervenes in aid activities during disasters. It also provides development aid. Web site: <http://www.wvi.org>

Caritas Internationalis

Caritas Internationalis is an international confederation of 146 Roman Catholic agencies working in 194 countries and territories. It promotes, coordinates, and supports emergency aid and long-term rehabilitation activities. Web site: <http://www.caritas.org>

OXFAM

The Oxford Committee for Famine Relief (OXFAM), originally an English organization, is a network of 11 humanitarian groups from Australia, Belgium, Canada, Hong Kong, Ireland, the Netherlands, New Zealand, Spain, the United Kingdom and the United States. It provides funds and technical assistance for immediate and long-term aid in disaster situations. Web site: <http://www.oxfam.org>

Action Against Hunger

Action Against Hunger is a European organization that focuses on food security and distribution and supports projects to rehabilitate agriculture and food production. U.S. Web site: <http://www.aah-usa.org>. U.K. Web site: <http://www.aah-uk.org>

The Salvation Army

The Salvation Army intervenes in more than 100 countries, providing social, medical, educational and other types of community assistance. In disaster situations, national affiliates provide health assistance and emergency supplies. Web site: <http://www.salvationarmy.org>

World Council of Churches

The Council is a coordinating body representing over 330 Christian and Orthodox denominations from 120 countries and territories worldwide. It supports disaster relief efforts through its member churches in various countries. Web site: <http://www.wcc-coe.org/wcc/english.html>

Save the Children

Save the Children intervenes in long-term development projects. In emergency situations, it provides humanitarian supplies and rehabilitation and reconstruction assistance. Web site: <http://www.savethechildren.org/home.shtml>

International Red Cross Committee (ICRC)

The International Committee of the Red Cross (ICRC) is a humanitarian Swiss organization, strictly private and neutral, that is based in Geneva. It protects and helps the victims of armed conflicts or civil disturbances and monitors the application of international humanitarian law. Web site: <http://www.icrc.org/eng>

Voluntary Organizations in Cooperation in Emergencies (VOICE)

Voluntary Organizations in Cooperation in Emergencies (VOICE) is a network of European nongovernmental organizations that provide emergency and rehabilitation assistance and contribute to disaster preparedness and conflict prevention. VOICE often collaborates with ECHO (see above). Web site: <http://www.oneworld.org/voice>

Chapter 5

Key Characteristics of Emergency Supplies

What Are Emergency Supplies?

Humanitarian or emergency supplies are those goods, materials, and equipment used by organizations to provide relief in a disaster, particularly those required to meet the essential needs of the affected population. Such supplies cover an enormous spectrum, from food, drugs, and clothing to rescue equipment, electric generators, construction materials, and tools.

As noted earlier, these supplies come from many different places. Some are procured or channeled by organizations in response to specific needs on the ground; most, however, are the result of the spontaneous solidarity of the national and international community.

From the point of view of their origin, then, supplies can be of two kinds:

1. Those requested or acquired by organizations based on their intervention profiles—medical, economic, reconstructive—and on the needs of the affected population. Regardless of their relevance, they are generally managed by institutions that have asked for them, are aware of the contents of the shipments, and can assign a specific recipient for the aid.
2. Those supplies that are the result of the praiseworthy solidarity of the rest of the country or the world, but which do not necessarily meet the needs faced on the ground. They frequently do not have a specified recipient, and their management is the responsibility of national emergency authorities, who may have to start out by identifying the goods, their characteristics and condition; the authorities must also assign a use—if any—for the supplies, select the recipients, and coordinate delivery.

Categories

Based on the experience of many humanitarian organizations around the world and the thousands of emergencies they have faced, it is generally

possible to determine in advance which supplies are most likely to be needed. The World Health Organization (WHO), in consultation with other international organizations, has adopted a standard classification that places humanitarian supplies in 10 different categories.

This form of identification is particularly useful for the sorting and recording of supplies. The SUMA system employs these categories for managing the data on incoming supplies. (See Annex 8.1 at the end of Chapter 8.)

The categories are the following:

1. Medicines;
2. Water and environmental health;
3. Health supplies/Kits⁸;
4. Food;
5. Shelter/Electrical/Construction;
6. Logistics/Administration;
7. Personal needs/Education;
8. Human resources⁹;
9. Agriculture/Livestock;
10. Unclassified.

The "unclassified" category is used for those supplies that may have expired, cannot be identified due to lack of labeling or any other reason, are useless in the circumstances, have spoiled, or were packed too haphazardly (different types of supplies in the same bags or boxes) for them to be effectively classified during the critical stage of the emergency.

Every category is subdivided into subcategories, and the subcategories into items, as in the following example:

8 The "Medicines" category refers exclusively to pharmaceutical products. The "Health" category refers to those non-pharmaceutical supplies aimed at supporting health care activities; they include surgical instruments and materials, laboratory equipment, X-rays, and so on.

9 While "Human resources" are not considered supplies, it is useful to have a category to classify the expertise of volunteers or support personnel, particularly those from abroad, who offer assistance during an emergency.

Category	Water and environmental health
Subcategory	Water treatment
Item	Calcium hypochlorite

Human Resources

Obviously, the people who take part in relief activities should not be considered, nor classified as, supplies, but their participation in humanitarian operations entails a series of needs and services, from their transport and mobilization to their feeding, lodging and health care, which must be taken into account in logistics planning. The teams on the ground should be as self-sufficient as possible, so as not to place an added burden on the already diminished resources of the affected country or region.

The Standardization of Emergency Supplies

The United Nations Development Program's Inter-Agency Procurement Services Office (UNDP/IAPSO) has published a series of practical handbooks or catalogs on the availability, technical aspects, and use of standardized equipment and materials that can be used for disaster response by humanitarian organizations. The *Compendium of Generic Specifications*,¹⁰ contains information on emergency items for humanitarian relief such as the following:

- ▲ Telecommunications equipment;
- ▲ Shelter, housing, storage and kitchen equipment;
- ▲ Water supply and distribution equipment;
- ▲ Food;
- ▲ Hygiene and sanitation goods and equipment;
- ▲ Equipment for the handling of different materials;
- ▲ Electrical power supply equipment.

10 United Nations Development Program (UNDP), *Emergency Relief Items. Compendium of Generic Specifications*, Volume 1, New York: UNDP, 1995.

The *Compendium of Basic Specifications*,¹¹ deals specifically with:

- ▲ Medical supplies and equipment;
- ▲ A select set of essential drugs;
- ▲ Guidelines for donations of medicines.

The purpose of these catalogs is to facilitate the procurement of appropriate equipment and materials by organizations and donors from qualified suppliers in a timely fashion.

Another useful tool is the *Register of Emergency Stockpiles*, a worldwide listing of various organizations' emergency supply stockpiles in various regions.¹²

Hazardous Materials

Hazardous materials are those that, though useful, have a chemical composition that might be dangerous to people and their surroundings.

Fuels, chlorinated products, cooking gas, oxygen, or laboratory reagents, which are used in everyday circumstances and are also needed during an emergency, require careful handling to prevent fires, explosions, poisoning, pollution, and injuries.

Hazardous materials fall into nine categories, based on their predominant risk (radioactive, explosive, corrosive, flammable, poisonous, etc.) and, within these categories, according to other characteristics of the substances themselves and their chemical reactions. (See Annex 5.1.)

International regulations set standards for labeling these products according to their characteristics and potential effects, the way they must be transported, and the precautions that must be taken when they are handled or stored.

Those who participate in emergency supply transport and storage must have access to these guidelines, which also describe the composition of the products, their mutual incompatibilities, and procedures to follow in

11 United Nations Development Program (UNDP), *Emergency Relief Items. Compendium of Generic Specifications*, Volume 2, New York: UNDP, 1996.

12 For more information, please visit <http://www.iapso.org>, or contact: registry.iapso@iapso.org.

the event of an accident. Knowledge of these standards ensures the proper handling of hazardous materials.

One such set of guidelines, the *2000 Emergency Response Guidebook* of the Canadian Transport Emergency Center (CANUTEC), can be found online at: http://www.tc.gc.ca/canutec/erg_gmu/erg2000_menu.htm.

Another useful link, in Spanish, is: <http://www.profepa.gob.mx/saa/audita68.htm>. It shows a listing of hazardous material emergency response centers with their Web addresses, and links to other sites of interest.

Specialized Materials¹³

Frequently, a need arises for equipment or materials so specialized that no one can expect their arrival as part of the general donations. Instead, disaster response agencies must acquire them on their own or rely on international organizations that might have them available or can offer guidance on where and how to procure them.

Organizations such as OXFAM, Médecins sans Frontières, the World Health Organization (WHO), or the Office of U.S. Foreign Disaster Assistance of the U.S. Agency for International Development (OFDA/USAID), for instance, have assembled kits for water treatment, storage and distribution, or the building of shelters. Other kits focus on cholera prevention and treatment, lighting and power generation, pharmaceuticals, or essential medical equipment.

These kits are generally donated or lent to relief agencies. The contents and characteristics of existing kits are described in detail in the catalogs of the respective organizations.

Specialized equipment is often very costly. It is therefore essential to be certain that a real need exists for such supplies before asking for them. It is also important to have a clear picture of what is required (the specifications), so that donors have the information necessary to respond effectively.




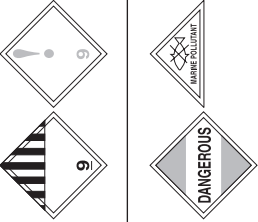
13 See also the section on "Standardization of Emergency Supplies," earlier in this chapter.

Annex 5.1

Classification and transport placards for hazardous materials

<p>Class 1: Explosives</p> <ol style="list-style-type: none"> 1.1. Explosives that have a mass explosion hazard. 1.2. Explosives that have a projection hazard. 1.3. Explosives that have a fire hazard. 1.4. Explosives that present a minor blast hazard. 1.5. Blasting agents. Very insensitive explosives. 1.6. Explosives. Extremely insensitive detonating devices. 	
<p>Class 2: Compressed Gases</p> <ol style="list-style-type: none"> 2.1. Flammable gases. 2.1. Non-flammable gases. 2.3. Poisonous gases. 2.4. Corrosive gases (Canada). 	
<p>Class 3: Flammable liquids</p> <ol style="list-style-type: none"> 3.1. Flashpoint below -18°C. 3.2. Flashpoint between -18° and 23°C. 3.3. Flashpoint higher than 23° and lower than 61°C 	
<p>Class 4: Oxidizers and organic peroxides</p> <ol style="list-style-type: none"> 5.1. Oxidizers. 5.2. Organic peroxides. 	

Classification and transport placards for hazardous materials (cont.)

<p>Class 6: Poisonous and toxic materials</p> <p>6.1. Poisonous materials.</p> <p>6.2. Toxic materials.</p>	
<p>Class 7: Radioactive materials</p>	
<p>Class 8: Corrosive materials</p> <p>Acids and bases</p>	
<p>Class 9: Miscellaneous Hazardous Materials</p> <p>9.1. Miscellaneous hazardous merchandise (CANADA)</p> <p>9.2. Environmentally hazardous materials (CANADA)</p> <p>9.3. Hazardous waste (CANADA)</p> <p>Other hazardous materials transportation placards</p>	

Source: Departamento de Protección Integral, Refinadora Costarricense de Petróleo (RECOPE), Costa Rica.

Chapter 6

*Procurement*¹⁴

Sources and Procurement of Emergency Supplies¹⁵

The supplies required to respond to an emergency come from different sources, whether disaster relief organizations acquire them directly, receive them as donations from the national and international community, or get them as loans.

Normally, all these procurement methods will come into play in an emergency, and each has its advantages and disadvantages. Not only that, but we are seldom in a position to choose the most appropriate one in the circumstances. Whenever possible, however, the decision should be based on technical criteria and an unbiased assessment of the needs of the affected population.

Purchasing

Purchasing can be local or external. To choose one or the other, certain issues should be borne in mind.

Local purchasing: The merits of local purchasing depend on several criteria, such as the local availability of the products needed, their quality and quantity, and how urgently they are needed. In any case, a cost/benefit analysis (including the key question of quality) must be made, and this may call for technical advice.

Bulk purchases: Buying a specific product in large quantities may eventually have an adverse effect on the local market, by upsetting the equilibrium of supply and demand and artificially raising prices. On the other hand, sensitive local purchasing can promote the economic recovery of the affected region.

14 This chapter has benefited from contributions by Médecins sans Frontières (MSF) and Gerard Gómez, of the MSF Regional Emergency Response Office for Latin America and the Caribbean.

15 See also the section on requesting international assistance in Chapter 4.

Storage: Since space limitations are common when storing emergency supplies, it is sometimes possible to negotiate with local vendors so that the purchased goods can remain in their warehouses until needed by the end users.

External purchases: Frequently, local availability of specific items is low or unpredictable, or the quantity and quality of locally available products is not good enough to meet needs efficiently. In these cases, procurement from abroad or from another part of the country is an option, as long as delivery times are acceptable.

Donations

Donations may make up the bulk of the supplies received and handled during an emergency. When they comprise items that have not been requested, are not a priority, or do not meet the needs generated by the emergency, they often complicate unnecessarily the logistics of relief operations.

However, donations are still very important. When appropriate, they can not only be of value to the affected population, but also provide budgetary relief for the often cash-strapped disaster relief organizations. They also promote and strengthen solidarity. (See also Chapter 12 on standards and guidelines for requesting and donating drugs and medical equipment.)

Loans

Some people, organizations, and private firms lend equipment or their services and expertise during a particular phase of the emergency. Although many of these loans are spontaneous, it is important to identify potential lenders before disaster strikes and, if possible, establish agreements for these services during the planning stage.

Table 6.1 shows some of the advantages and disadvantages of the various forms of supply procurement.

Table 6.1 – Pros and cons of different kinds of acquisition.

Form of acquisition	Advantages	Disadvantages
Local purchase	<ul style="list-style-type: none"> ◆ Prompt delivery ◆ Lower transport costs ◆ Support for local economy 	<ul style="list-style-type: none"> ◆ Not always available in the quantity and quality needed ◆ Can generate competition between organizations for the purchase of a product ◆ Can cause shortages in the local market
Imports	<ul style="list-style-type: none"> ◆ Possible to obtain better quality, larger quantities ◆ Can order according to specifications 	<ul style="list-style-type: none"> ◆ Longer delivery time ◆ Higher transportation costs ◆ Do not support the local economy
Donations	<ul style="list-style-type: none"> ◆ Free or low-cost (bear in mind: every donation has a cost) ◆ Promotes national and international solidarity 	<ul style="list-style-type: none"> ◆ Frequently, items have not been asked for ◆ Supplies sent may not meet local needs ◆ If unusable, their handling leads to a waste of time and resources ◆ It is hard to reject them if they are useless
Loans	<ul style="list-style-type: none"> ◆ Sometimes, it is equipment or material that is hard to purchase ◆ Lowers operation costs 	<ul style="list-style-type: none"> ◆ Depends on how long the items can be on loan ◆ The loaned items must be cared for and must be replaced if damaged ◆ It is hard to demand responsibility, quality, or the meeting of deadlines and other commitments

Requisitions

The clearer and more specific our requests, the sooner the needed supplies will arrive and the more useful they will be. Misunderstandings can crop up when requesting emergency supplies, particularly when it comes to technical aspects. The following factors should be taken into consideration:

- ◆ *Requisition forms:* Standardized documents should be used to request emergency supplies. The forms should be numbered, dated, and include carbon copies to help follow up on the response to each request. (See Annex 6.1.)
- ◆ *Assignment of responsibility:* Only one clearly identified individual should be assigned responsibility for making requisitions.
- ◆ *Clarity:* Requisitions should be clearly phrased, including all the details needed to identify the supplies wanted. The use of catalogs or any other kind of illustration, including drawings if needed, is always recommended to eliminate possible ambiguities. Once again, technical advice is called for when requesting supplies, especially in the case of unfamiliar products.
- ◆ *Priority:* Every requisition should indicate clearly the priority of the supplies depending on identified needs, the volume of distribution, and stock control.
- ◆ *Frequency of requests:* It depends on the needs of the affected population, the volume to be distributed, and current stocks. However, one should not wait until the last minute before requesting new supplies, since a new shipment will take time to arrange, and to reach its destination.
- ◆ *Medicines and hazardous materials:* It is necessary to know the national laws and regulations regarding the entry and handling of these goods, including the procedures to obtain authorization for their import.
- ◆ *Follow-up on requisition orders:* When keeping track of requested supplies in transit, the number and date of the requisition must be mentioned. (See Annex 6.1.)

Sending Supplies

One way of easing the task of those who take delivery of emergency supplies in the field, sparing them additional complications, is to pack the supplies correctly following standardized procedures.

Another key principle of effective assistance is to send only those supplies that have been actually requested. It may occur that some product is likely to be needed, but has not been requested. In those cases, the best approach is to consult those responsible for operations in the field or suggest that the item be requested.

A few basic measures can make a big difference in how supplies are mobilized and received. The following section will mention a few of them.

Packing and Labeling the Loads

Ideally, the supplies to be sent should first be classified and sorted. Items of different kinds—say, garments and drugs—should never be sent in the same package. In fact, to the extent possible, items should be packed separately.

- ◆ In order to facilitate identifying the contents of the packages, they should be marked using the symbols and colors system that many international organizations currently use to identify the various categories and items (see Annex 6.2):
 - ▲ Green for drugs and medical equipment;
 - ▲ Red for food;
 - ▲ Blue for clothing and household items;
 - ▲ Yellow for equipment and tools.
- ◆ No supplies should ever be sent if there are any doubts about their quality or condition. Similarly, short-dated products should not be sent unless it is known that they will be distributed and used promptly.
- ◆ Each package should be clearly labeled with the following information:
 - ▲ Contents (generic);
 - ▲ Destination;
 - ▲ Name, address, and telephone number of the recipient;

- ▲ Name, address, and telephone number of the sender;
- ▲ Any specific characteristic or care that must be taken with the package ("fragile", "needs refrigeration", "hazardous material").
- ◆ Labeling must be done with indelible ink; labels should not fall off easily.
- ◆ Packages belonging to the same lot or batch should be numbered "x of y", where y is the total number of packages in the lot. For instance, in a lot of 100 packages, the first should be labeled 1/100, the second 2/100, all the way up to 100/100. This makes it easier to verify and follow up on the quantity of packages that arrive at a reception center.
- ◆ When packing a consignment, it is important to bear in mind the kind of handling the packages will undergo. The durability of the packing material is important.
- ◆ Depending on the means of transport (for instance, by air), efforts should be made to reduce "added weight", i.e., the weight of the packing material.
- ◆ One of the packages should include a copy of the packing list and be labeled as the one carrying the list. The label should be placed inside a plastic envelope and attached to the exterior of the package to prevent it from getting wet or being torn.

Volume, Weight, and Size of the Packages

It is rare for reception points on the ground to have loading and offloading machinery such as forklift trucks. In principle, the size, weight, and shape of the packages should be such that each one can be handled by one individual without mechanical aid, as follows:

- ◆ **Weight:** The packages should weigh between 25 kg and 50 kg;
- ◆ **Volume:** The volume should be such that it can be handled manually. Sometimes the weight may be all right but the size of the package makes it hard to handle;
- ◆ **Shape:** Packages should have the most symmetrical shape possible,

to make it easier to hold and lift them. Oddly shaped packages or shapeless packages should be discouraged.

Consignment Notice

Reception centers have to prepare for the arrival of new loads. They need to find storage space, arrange for transport if a transshipment needs to be made, and make sure there are enough employees or volunteers present to offload the shipment. It is therefore essential for officials at the point of origin to provide the reception center with as much advance information as possible about the consignment and the means of transportation to be used. The following information should be included.

- ◆ Regarding the consignment:
 - ▲ Type of goods or equipment included in the consignment;
 - ▲ Quantity (number of packages, boxes, etc.);
 - ▲ Weight and volume;
 - ▲ Special care required (e.g., refrigeration);
 - ▲ Requisition number (if any).
- ◆ About the means of transport:
 - ▲ Type and characteristics of the transport;
 - ▲ Shipping company (if any);
 - ▲ Person in charge of the transport.
- ◆ Regarding the itinerary:
 - ▲ Estimated time of departure and likely route;
 - ▲ Estimated time of arrival (the reception point should be notified of any change as promptly as possible);
 - ▲ Exact destination (in an area where there might be several reception points).
- ◆ Any other information considered relevant to facilitate reception.

Consignment Documents

◆ Local or national consignments

Normally, local shipments require less documentation than international consignments. They must be accompanied by a cargo or load manifest describing the consignment and any other information about the supplies sent (see Annex 6.3), as well as by the packing list mentioned earlier.

◆ International consignments

In these cases, the shipment travels with a waybill or bill of lading and its respective load manifest, prepared by the carrier. It should be noted that the manifest prepared by the carrier on its own stationery is for the use of the company itself and customs purposes. It is advisable for the organization that is sending the shipment to include its own manifest as well as a packing list outlining the contents of the load by package, to facilitate the internal controls of the organization. (See Annex 6.3.)

Control and Monitoring

Shipping operations, like any other link in the logistics chain, call for control and monitoring procedures that can track the emergency supplies from the time they are shipped until they arrive at their final destination. These controls help disaster managers, among other things, to:

1. Know the route taken by the supplies and thus be able to identify, for instance, where a consignment that has not reached its destination might have been detained;
2. Identify all the people who have been responsible for the shipment, from its point of origin to its final destination;
3. Have the necessary documents to keep track of the shipping and reception of the supplies.

In the case of consignments, these functions are made possible by the load manifest, which must be printed in standardized forms that include, as a minimum, the following information (see also Annex 6.3):

- ◆ Consignment number (consecutive);
- ◆ Date of shipment;
- ◆ Place of origin of the shipment;
- ◆ Means of transport;
- ◆ Name and signature of people responsible for the consignment, i.e. the sender, the carrier, and the recipient;
- ◆ Description of the load;
- ◆ Space for remarks.

These forms should also have the following characteristics:

- ◆ Be printed and bound in blocks;
- ◆ Be consecutively numbered;
- ◆ Provide copies for everyone involved in the process: sender, carrier, and recipient.

Cargo Insurance

When a shipment is sent through an authorized carrier, the insurance is generally part of the transport contract (see the section on “Incoterms” in chapter 7). Otherwise, it is necessary to find out what types of shipping insurance are available and what it is they cover. Clearly, one should not wait until the middle of an emergency to seek out this information. On the contrary, it is part of the preparations required for correct emergency logistical planning.

Annex 6.1













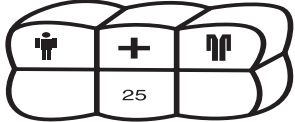
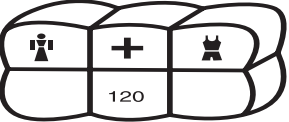
Sample – Consignment Requisition Form

Request for Supplies Request 00/303/LIB-3 Place and date:		
Deliver at:	Priority - URGENT - Normal Explain if necessary:	
Authorized Operator (name and signature):		
Requested Item	Characteristics/Specifications	Quantity
REMARKS:		

Annex 6.2

Selected symbols for supply identification (used by the International Federation of Red Cross and Red Crescent Societies)

Basic symbols

 <p>Men 15 years and older</p>	 <p>Women 15 years and older</p>	 <p>Boys 4-14 years</p>	 <p>Girls 4-14 years</p>	 <p>Infants 0-4 years</p>	
 <p>Outerwear— men, women, and children</p>	 <p>Suits, jackets, slacks, shirts— men, women, and children</p>	 <p>Dresses, skirts and bouses— women</p>	 <p>Sweaters, jackets—men</p>	 <p>Shoes—men, women, chil- dren</p>	 <p>Undergar- ments, sleep- wear, socks— men, women, and children</p>
<p>Labeling of bales</p>				<p>KEEP DRY</p> <p>Blankets </p>	
 <p>Symbols stamped on this bale signify that it contains 25 overcoats for men.</p>			 <p>These symbols represent 120 undergarments for women.</p>		

NOTE: These can be made with stencils, preferably metal. To label bales, they should be painted with aerosol paints, using the stencils as patterns.

Annex 6.3

Sample Shipping Manifest

0001			Shipping Manifest		
Shipment N°		Date of shipment		Requisition N°	
Consignee:			Origin of shipment:		
Exact delivery address:					
Means of transport:			Agent/responsible party:		
Quantity	Type of packaging	Detailed list of contents			
Number of pieces				Total weight (kg)	
Special instructions (handling, transport, storage)					
Remarks					
Dispatch: name, company, date		Transport: name, company, date		Recipient: name, company, date	

Chapter 7

Receiving Supplies

Arrival of Supplies

Emergency supplies—whether donations, loans or purchases—arrive from different points and by different means: land, sea, air. In other words, consignment entry points can vary greatly, and so can reception points.

Consignment Entry Points

Generally, regardless of whether emergency supplies arrive from abroad or other parts of the affected country, they will go through maritime or river ports, airports, or across terrestrial borders. These are transit points for the supplies before they arrive at their ultimate destination. Since final recipients are often not identified as such by the senders, it is often the local or national government that takes over the handling of the emergency consignment from the entry point.

It is at the entry point, ideally, that incoming supplies should be registered based on the manifest (see Annex 6.3, Chapter 6), the bill of lading, or any other shipping document that accompanies and describes the load. Registration can be made using the SUMA system, or any other method that can keep track of supplies from the point of arrival to their ultimate destination.

As already noted, a reliable system must be in place, since the massive arrival of consignments can overwhelm the operational capacity of entry points, threatening to turn an orderly logistics chain into chaos.

Reception Sites

These are the collection sites installed by disaster relief agencies, private firms, or civil society groups to receive donations. They can also function as transshipment points, places for preparing and packing consign-

ments, and central warehouses. They may be located in the affected region itself or elsewhere.

Receiving International Shipments

Customs Procedures and Shipping Papers

It cannot be stressed too often: the planning stage of the logistics activities requires careful preparations, since crucial aspects need to be coordinated in advance and preliminary agreements reached with the relevant authorities.

During the planning phase, it is essential to establish contact with the customs authorities to learn their procedures and requirements and, if possible, negotiate special conditions, such as tax exemptions or priority processing of humanitarian supplies. These agreements should be backed by signed documents, to prevent having to renegotiate conditions every time high-level customs officials are assigned to new posts. During an emergency, moreover, access to customs and other authorities might become more restricted, as many other organizations and individuals attempt to obtain preferential treatment in the handling of their imports.

Some countries have ratified the Convention on the Privileges and Immunities of the United Nations, of 13 February 1946, which includes a series of measures to expedite the inflow and outflow of humanitarian supplies. Multilateral agreements among member states of regional pacts, such as the Central American Common Market or the South American Mercosur, have led to the inclusion, in their customs legislation, of preferential treatment for such supplies. It is important to know about the applicability of such measures in individual countries.

When emergency supplies arrive from abroad, it is generally more convenient to hire a customs agency to handle all the formalities. However, this is not always possible. It is therefore important to know that all international shipments must include as a minimum the following documents, which are required to clear the goods through customs:

- ◆ Bill of Lading or Waybill. This is the shipping contract and proof that the shipment is on board. The document describes the load in

terms of number of packages, volume, weight, and any other useful information. Bills of lading (B/L) apply to maritime transport; way-bills refer to both land and air transport. (See Annexes 7.1 and 7.2.)

- ◆ **Manifest.** This document indicates the type of products sent, their point of origin and their destination. It is for the use of customs officials in the country receiving the goods.
- ◆ **Packing List:** Ideally, the shipment should include this list, which identifies the load package by package, although the list is not required. This list is used in most cases when an organization is both sending and receiving the humanitarian supplies (for example, CARITAS in Argentina sends a shipment to CARITAS in Guatemala).

Normally, the shipper sends these documents once the supplies have been handed to the carrier. If this has not happened, one should request that the documents be sent as soon as possible to proceed with the necessary arrangements.

Other documents that may accompany the load, depending on specific situations, include the following:

- ◆ **Donation Certificates:** They state that the shipment is a donation and therefore part of a non-profit effort. This is important to ensure that these supplies are not subject to import tariffs in the destination country.
- ◆ **Health Certificate:** This has to be included whenever the shipment includes food of any kind, and certifies that the products have been tested and are fit for human consumption. In many countries, customs and health authorities will not accept a shipment of food if it does not include this certificate. It is essential to bear in mind that the certificate, by itself, is not a full guarantee of the state of the food, since depending on the type of product, delays en route or conservation problems may mean that the shipment is no longer safe to eat.
- ◆ **Declaration of Hazardous Materials:** This should be included when the shipment carries one or more chemical products that require special care, handling or testing, such as insecticides, laboratory reagents, or water purification products. (See Annex 7.3.)

International Commercial Terms (Incoterms)

The international purchase, sale, and transport of goods are subject to International Trade Standards with a unified terminology, known as Incoterms (see Table 7.1). These terms specify the conditions that apply to the transaction and the responsibilities of the seller and buyer (or shipper and consignee) regarding costs and insurance risks, the place of delivery, and so on. When acquiring products abroad, it is important to have a clear idea of which Incoterm applies to the transaction. The first edition of the Incoterms was published in 1936; the newest of several additions and changes is Incoterms 2000, which reflects current trends in international trade. There are 13 Incoterms in all, of which the most common are the following:

CIF: When the price paid by the buyer includes the cost of the merchandise itself, insurance to protect the shipment, and the price of the freight. This term is used exclusively for maritime and river transport. The equivalent term for other forms of transportation, by air, land, or a combination of several modes is CIP, which stands for “Carriage, insurance, paid to.”

When using CIF or CIP, the seller or shipper agrees to:

1. Deliver the shipment at a destination port specified by the buyer or consignee as stipulated in the documents, and secure and pay for the transport of the merchandise;
2. Pay for insurance to cover the shipment from the point of origin until the merchandise is unloaded;
3. Take charge of the customs paper work needed for the shipment to leave its country of origin and reach its final destination.

The buyer or consignee must, in turn:

1. Assume all risks of loss or damage or any other costs incurred after the load is taken over by the carrier;
2. Deal with import formalities, as well as the offloading and additional transportation of the shipment upon arrival at the port.

In the case of FOB, or free on board, the seller agrees to:

1. Place the products on board the carrier's ship;
2. Deal with customs formalities both for export from the country of origin and import at its final destination.

The buyer agrees to:

1. Hire the transport and pay for the insurance required for shipment to its final destination.
2. Deal with import formalities, as well as the offloading and additional handling of the shipment upon arrival.

The term FOB is only used for maritime and river transport. The equivalent term for land, air, or multimodal transport is FCA, which stands for "free carrier."

With ExW, the price only covers the value of the merchandise at the seller's facilities (Ex Works). The only responsibility of the seller is to sell the product.

It is the buyer's responsibility to arrange and pay for transportation and insurance from the point the shipment leaves the seller's facilities until it reaches its final destination. It is also the buyer's responsibility to complete customs formalities for export and import.

The relevant type of Incoterm is noted in the Bill of Lading or Waybill, and the point of delivery must always be stipulated. For instance: CIF to Puerto Caldera; CIP to J. M. Córdova International Airport, Medellín; FOB to Puerto Armuellez.

In the case of ExW, the papers must specify the factory or facility where the merchandise is to be picked up, when the seller has facilities in different cities or countries.

Table 7.1. Incoterms – Commonly used transportation terms

Incoterms	Description	Responsibility of the Seller (Exporter)	Transport
EXW – Ex Works	Goods available or delivered at the seller's facilities	Deliver the goods to the buyer as stipulated in the sales contract. All other costs must be assumed by the buyer, including the preparation and packing for shipping, unless a different arrangement has been agreed to.	Any
FCA – Free Carrier	Good are placed on board the agreed transport	All costs and customs export formalities, until the goods are placed under the custody of the carrier. The buyer pays for the transportation of the goods and all necessary insurance.	Any
FAS – Free Alongside Ship	Goods placed alongside the ship at the agreed-upon port of departure	All costs and customs export formalities until the goods are delivered alongside the ship of the carrier designated by the buyer. The buyer pays for the loading and transportation of the goods and any insurance required.	Only maritime and river
FOB – Free On Board	Goods delivered and stored on board the agreed vessel	All costs and customs export formalities until the goods are loaded on board the ship selected by the buyer, who must pay for the freight and insurance.	Only maritime and river
CFR – Cost and Freight	Goods delivered at the agreed-upon delivery port	All costs and customs export formalities until the goods and bill of lading are delivered by the carrier at the agreed-upon port of arrival. The buyer pays for insurance.	Only maritime and river
CPT – Carriage Paid To	Goods delivered at the agreed-upon destination	All costs and customs export formalities until the goods are delivered at the agreed upon destination. The buyer is responsible for the insurance.	Any
DES – Delivered Ex Ship	Goods delivered at the agreed-upon port of arrival	All costs and customs export formalities until the goods are delivered at the agreed-upon destination by the carrier's vessel. The buyer pays for the insurance, offloading costs, and taxes.	Only maritime and river

Source: Adapted from International Federation of Red Cross and Red Crescent Societies, *Handbook for Delegates*, and updated from Servicios Aduaneros Avimay, *Incoterms 2000* (San José, Costa Rica, 2000).

Table 7.1. (continued)

Incoterms	Description	Responsibility of the Seller	Transport
DAF - Delivered at Frontier	Goods delivered at the agreed upon national border, import taxes to be paid by buyer	All costs until the goods are delivered at the agreed-upon border checkpoint.	Any
DEQ - Delivered Ex Quay	All costs until delivered at the quay of the destination port	All costs and customs export formalities until the goods are delivered at the quay of the destination port, including offloading costs and import taxes.	Only maritime and river
DDP - Delivered Duty Paid	Goods delivered at the agreed-upon point within the destination country; all taxes paid	All costs and customs export formalities until the goods are delivered at an agreed-upon point within the destination country, including taxes.	Any
CIF - Cost, Insurance, Freight	Goods delivered at the agreed-upon destination port; all charges paid	All costs and customs export formalities until the goods are delivered at the destination port, including maritime insurance.	Only maritime and river
CIP - Carriage and Insurance Paid to	Goods delivered at the agreed upon destination; all charges paid except for taxes	Same as CPT, except that the seller is also responsible for insuring the goods.	Any
DDU - Delivered Duty Unpaid	Goods delivered at the agreed-upon point within the destination country; no taxes paid	Same as DDP, except that the buyer must pay the import taxes.	Any

Receiving Local Shipments

Local shipments are generally less complicated than international shipments, since there is no need for the authorizations and other paperwork involved in moving goods across national borders. Nevertheless, preparations are still required.

These shipments are generally sent by land to their final destination in the field, for storage or distribution. They may arrive by commercial carrier or in the transport vehicles available to the disaster relief organization.

Offloading the Supplies

Generally, final destination sites do not have access to hydraulic lifting equipment; instead, brawn and brain must come into play. It is important to know what type of vehicle will carry the load, and what the characteristics of the consignment are, in order to plan for its arrival. Factors to keep in mind when preparing to receive a shipment include:

- ◆ A team should be available for offloading. It is also important to select carefully the precise spot where the consignment will be offloaded, preferably profiting from the topography of the ground by, for instance, improvising ramps or taking advantage of small irregularities so that the vehicle platform is even with the ground;
- ◆ Car or truck tires (without the metal rim) can be used to cushion the fall of packages that cannot be unloaded by hand;
- ◆ All possible safety measures must be taken for the protection of both the emergency supplies and the people offloading them. Regardless of the workload or the urgency with which the supplies may be needed, haste should not lead to accidents or damaged goods;
- ◆ One person must be in charge of supervising and controlling the offloading process to prevent the inappropriate handling of the packages and to count the packages to make the sure the consignment is complete as indicated in the packing list.

Shipment Verification

The content of the shipment must be verified at the point of reception and offloading. If this is postponed, it may never take place, or it may be done too late to identify anomalies and assign responsibilities. Verification must include as a minimum the following procedures:

- ◆ Counting the packages and verifying the weight, which must correspond to the information on the shipping documents;
- ◆ Verifying that the load does indeed contain the goods that were expected and identified in the shipping documents as well as the request order, if one was placed;
- ◆ Checking the general condition of the load, both the packaging and the goods. It is important to watch out for leaks, torn packages, or items in poor condition;
- ◆ Verifying if any items are missing. If there is evidence that some of the packages have been opened, it is important to find out whether any items have disappeared.

Acknowledging Receipt of Goods

Regardless of whether the shipment was international or national, the recipient must notify the sender of the arrival of the goods as soon as possible. After the verification process is complete, additional details should be sent concerning the condition and contents of the consignment.

Controls

The function of the shipping documents is to help verify that the shipment does indeed contain what was announced by the sender. It is always necessary to engage in double-checking by engaging in both documentary verification (what is stated in the papers) and visual or physical verification of the actual supplies received. The organization's packing list should be the official document to guide the process.

The sender or provider should be notified as soon as possible of any discrepancy or problem noted. These problems should be noted in the "Remarks" space of the packing list (see Annex 6.3, Chapter 6). A copy of the list must remain with the recipient, another copy is retained by the carrier as proof of delivery, and the third goes back to the sender.

Annex 7.1.

Waybill

055 No. 5233 4730

055- 5233 4730

Shipper's Name and Address MEDECINS SANS FRONTIERES 14 AVENUE DE L'ARGONNE 33700 MERIGNAC		Shipper's Account Number 2		Air Waybill Issued by ALITALIA S.p.A. Via Salaria 400 Roma 00198 IATA I.C. 17 - 06/000000 Tel. 06/52334730 - Telex 320000000 R. P. O. 000100 - 00100 Roma, 0 - 19299			
Consignee's Name and Address MEDECINS SANS FRONTIERES/ETHIOPIE C/O R.R.C. PO BOX 8225 ADDIS ABABA ETHIOPIE		Consignee's Account Number 3		Class of Goods 4		It is agreed that the goods described herein are accepted in respect of weight and condition provided no claim for damage SUBJECT TO THE CONDITIONS OF CONTRACT OR THE REVERSE HEREOF THE SHIPPER'S ATTENTION IS DRAWN TO THE NOTICE CONCERNING CARRIER'S LIMITATION OF LIABILITY. Shippers may increase such limitation of liability by declaring a higher value for carriage and paying a supplementary charge if required. La merce qui descritte nelle buste e nei pacchi sono accettate a condizione che il mittente sia informato del peso e delle condizioni di accettazione e di responsabilità del trasportatore. L'ATTENZIONE DEL MITTENTE E' CHIAMATA SU UN AVVERTIMENTO SULLE CONDIZIONI DI CONTRA TO CONCERNENTE LA LIMITAZIONE DI RESPONSABILITA' DEL VETTORE. A richiesta sul supplementare il limite di responsabilità del vettore può essere aumentato pagando un supplementare di spesa.	
Making Carrier's Agent Name and City SETAVION C/DEE B 14 33700 MERIGNAC		Agent's IATA Code 20 4 7066		Account No.		Accounting Information	
Agent's IATA Code 20 4 7066		Account No.		Account No.		Account No.	
Agent of Shippers (A.S.P.) or Air Carrier's and accepted Shipment BORDEAUX MERIGNAC		Date of Issue 5		Date of Issue 6		Date of Issue 7	
Agent of Destination ADDIS ABABA		Agent of Destination 10		Agent of Destination 11		Agent of Destination 12	
Reporting Information 222 PKGS ADRESS ONE POUCH ATTACHED FOR MSF		DANGEROUS GOODS AS PER ATTACHED SHIPPER'S DECLARATION		STATUT C		13	
No. of Pieces 222		Gross Weight 2403		Net Weight 2403		Net Charge 20200	
Total 48040,00		Total 48040,00		Total 48040,00		Weight and Quantity of Goods (Total Declared on Invoice) 20 PKGES RESTRICTED UN. 1748 202 PKGES NOT RESTRICTED RELIEF SUPPLIES.	
Weight Charge 48040,00		Other Charges CHC 58,00 AWA 36,70		Other Charges RAC 129,80 RAA 84,70		Other Charges RAC 129,80 RAA 84,70	
Total other Charges Due Agent 121,40		Total other Charges Due Carrier 187,80		Total other Charges Due Agent 121,40		Total other Charges Due Carrier 187,80	
Total amount 88349,20		Total amount 88349,20		Total amount 88349,20		Total amount 88349,20	
For Carriers Use only if Destination		Charge of Destination		Total other Charges 6/4/74		Signature of Shipper or his Agent OR 0240434028 /056812 MERIGNAC	
For Carriers Use only if Destination		Charge of Destination		Total other Charges 6/4/74		Signature of Shipping Office or its Agent 055-5233 4730	

ORIGINAL 3 (FOR SHIPPER)

Explanation of Waybill¹⁶

1. Official Waybill Number. The first three digits are the International Air Transport Association's (IATA) airline code.
2. Information on the shipper.
3. Information on the consignee. The provider must be asked to always include the consignee's telephone number and exact address.
4. Issuing Carrier's Agent information. The name and other details of the shipping agent or company that is handling the shipment.
5. Airport of departure.
6. These spaces are used if several airports will be involved in trans-shipment.
7. Currency of reference for calculating costs.
8. Depending on the Incoterms of the sales contract and invoice, this space indicates which charges are paid upon departure and which must be paid upon arrival.
9. This space must be filled in case the shipment has a declared value.
10. Airport of arrival.
11. Specifies the airline carrier (SN: Sabena; AF: Air France, and so on) plus the flight number.
12. Flight date.
13. Insured value assigned by the shipper.
14. Space for recording relevant information such as the documents that accompany the shipment, who must be notified upon arrival, etc.
15. Number of pieces.
16. Gross weight.
17. Chargeable weight.
18. Rate and charge (price per kg).
19. Nature and quantity of goods (including dimensions or volume).
20. A column specifying which charges have been prepaid and which must be collected from the consignee.
21. Other charges that must be paid.
22. Signature of issuing carrier or its agent upon the departure of the shipment (mandatory).

¹⁶ Source: Médecins sans Frontières, France.

Annex 7.2.

Bill of Lading

<p>Shipper</p> <p>MEDECINS SANS FRONTIERES 14 AV DE L'ARGONNE 33700 MERIGNAC</p> <p>MEDECINS SANS FRONTIERES NUM 34 STREET 334 PHNOM PENH CAMBODGE TEL ET FAX (855 23)26232</p> <p>Consignee</p> <p>SDV CAMBODGE 26/28 RD SOTHEAROS PHNOM PENH CAMBODGE</p> <p>Place of receipt TEL/FAX 27955</p> <p>Vessel Name KAI 07/419</p> <p>Port of discharge SINGAPORE</p> <p>Place of delivery PHNOM PENH CY</p> <p>Final destination for the Merchant's reference PH 7297</p>	<p style="text-align: right;">530 217 504</p> <p style="text-align: center;">Mitsui O.S.K. Lines Ltd.</p> <p style="text-align: center;">COMBINED TRANSPORT BILL OF LADING</p> <p>RECEIVED in correct good order and condition except as otherwise noted the total number of Containers or other packages or units enumerated below for transportation from the place of receipt to the place of delivery subject to the terms hereof. One of the original Bills of Lading must be surrendered duly endorsed in exchange for the Goods on Delivery Order. The presentation of this document (duly endorsed) to the Carrier by or on behalf of the Holder, the rights and liabilities arising in accordance with the terms hereof shall without prejudice to any rule of common law or statute rendering them binding on the Merchant become binding in all respects between the Carrier and the Holder as though the contract evidenced hereby had been made between them. The WITNESSES hereof the number of original bills of lading issued and the number of copies issued, one of which has been retained by the Carrier, are as follows: (Term Book hereof)</p> <p style="text-align: center;">ON BOARD FREIGHT PREPAID</p> <p style="text-align: center;">19 MAI 1994</p>																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Container No.</th> <th>Seal No. Marks and Numbers</th> <th>No. of Containers or packages or units</th> <th>Description of goods</th> <th>Gross Weight</th> <th>Measurements</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>TC SHIPPERS OWNED 267/3 SEAL N 000058</td> <td>3</td> <td>731 COLIS MEDICINES 9407 EGS</td> <td>30.379</td> <td>KC</td> </tr> <tr> <td>1</td> <td>TC SHIPPERS OWNED 583/0 SEAL N 000056</td> <td>3</td> <td>757 COLIS MEDICINES 9244 EGS</td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>TC SHIPPERS OWNED 564/0 SEAL N 000040</td> <td>3</td> <td>150 COLIS MEDICINES 2046 EGS</td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>TC SHIPPERS OWNED 613/7 SEAL N 000041</td> <td>3</td> <td>806 COLIS MEDICINES 9682 EGS</td> <td></td> <td></td> </tr> </tbody> </table>		Container No.	Seal No. Marks and Numbers	No. of Containers or packages or units	Description of goods	Gross Weight	Measurements	1	TC SHIPPERS OWNED 267/3 SEAL N 000058	3	731 COLIS MEDICINES 9407 EGS	30.379	KC	1	TC SHIPPERS OWNED 583/0 SEAL N 000056	3	757 COLIS MEDICINES 9244 EGS			1	TC SHIPPERS OWNED 564/0 SEAL N 000040	3	150 COLIS MEDICINES 2046 EGS			1	TC SHIPPERS OWNED 613/7 SEAL N 000041	3	806 COLIS MEDICINES 9682 EGS		
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<p>* Total number of Containers or other packages or units received by the Carrier in words: THREE</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Receipt and Charges</th> <th>Rate</th> <th>Tax</th> <th>Prepaid</th> <th>Collect</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Receipt and Charges	Rate	Tax	Prepaid	Collect																									
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Explanation of Bill of Lading¹⁷

1. Official Bill of Lading Number.
2. Shipper.
3. Consignee. Not always the real or final recipient. The merchandise may be consigned to a shipping agent in case there is no representative of the organization that owns the shipment at the place of delivery. In these cases the name and other information concerning the organization must be supplied followed by the phrase "care of" (c/o), authorizing the agent to handle the shipment. This is significant since the bill of lading, just like the waybill, are property titles.
4. Notify party – generally the organization as well as the agent.
5. Name of the ship and voyage number.
6. Port of loading.
7. Port of discharge.
8. The main body of the bill of lading, which contains, as required:
 - ▲ Number of container or quantity of pieces or pallets;
 - ▲ Customs seal number of the agent or shipper;
 - ▲ STC (Said To Contain): Declaration of the content;
 - ▲ Weight.
9. Total number of pieces or containers.
10. Details of prepaid charges and collect charges.
11. Number of original bills of lading.
12. Signature of the carrier's agent upon delivery of the shipment (mandatory).

Annex 7.3.

Declaration for Hazardous Materials

SHIPPER'S DECLARATION FOR DANGEROUS GOODS DECLARATION DE L'EXPÉDITEUR POUR MARCHANDISES DANGEREUSES						
Shipper/Expéditeur Médecins Sans Frontières Logistique 14, av. de l'Argonne 33700 Bordeaux-Mérignac FRANCE tel: 56 13 73 73 fax: 56 13 73 74			Air Waybill No N° de la LTA 1 Page 01 de 1 Page Shipper's Reference Number (optional) Références de l'expéditeur (optionnel)			
Consignee/Destinataire MEDICOS SIN FRONTERAS ESPANIA RUA FERNAO LOPES, 76 CP 1780 LUANDA ANGOLA						
Two completed and signed copies of this Declaration must be handed to the operator. Deux exemplaires remplis et signés doivent être remis à la Compagnie.			WARNING Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consultant, a forwarder or an IATA cargo agent.			
TRANSPORT DETAILS DETAILS DU TRANSPORT			AVERTISSEMENT Le non-respect sur quelque point que ce soit de la réglementation pour le transport des marchandises dangereuses peut constituer une infraction aux lois en vigueur, punissable par la loi. Cette déclaration ne peut en aucun cas être remplie, écrite, signée par un consultant, un transitaire ou un agent messagerie IATA.			
This shipment is within the limitations prescribed for: (select one option) Cette expédition est dans les limites autorisées soit: (cocher la mention voulue)		Airport of Departure Aéroport de départ		Shipment type (select one option) Type d'expédition		
PASSENGER AND CARGO AIRCRAFT AERONS PASSENGER ET CARGO		NON-REACTIVE (MUNICIPAL)				
Airport of Destination Aéroport de destination						
NATURE AND QUANTITY OF DANGEROUS GOODS (see sub-section 2.1 of IATA Dangerous Goods Regulations) NATURE ET QUANTITÉ DE MARCHANDISES DANGEREUSES (voir chapitre 2.1 de la réglementation IATA pour le transport des marchandises dangereuses)						
Proper Shipping Name Nom technique d'expédition	Class or Division Classe ou division	UN No. N°	Packing Inst. Règles d'emballage	Quantity and Unit of Packing Quantité et type d'emballage	Packing Inst. Règles d'emballage	Authorization Autorisation
ETHYL ALCOHOL	3	UN1170		1 FIBREBOARD BOX X 5 LITRES	305,II	
HYDROCHLORIC ACID	8	UN1789		1 PLYWOOD BOX X 1 LITRE	809,II	
SULFURIC ACID	8	UN1830		1 PLYWOOD BOX X 1 LITRE	809,II	
METHYL ALCOHOL	3	UN1230	6.1	8 FIBREBOARD BOXES X 1 LITRE	305,II	
Additional Handling Information Informations complémentaires concernant la manipulation						
I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in the proper condition for transport by air according to the applicable International and National Government Regulations. Je certifie déclarer que le contenu de cette expédition est décrit complètement et correctement et qu'il est classé, emballé, marqué et étiqueté et en tous points en bon état pour le transport aérien conformément aux réglementations Internationales et Nationales en vigueur.				Name/Titre et signature Serge GANIVET Laboratory Manager Place and Date Mérignac, le 22 nov 1993 Date of date Signature (for mailing only) (pour envoi seulement)		

Chapter 8

Record-Keeping, Control, and Monitoring of Supplies

Arrival and Recording of Supplies

Procedures at Entry Points and Reception Centers

Keeping records of which emergency supplies have arrived in each consignment is a key task—it is the first contact with incoming donations, and effective record-keeping at this point will determine to a large extent whether the rest of the system performs as it should. As noted in the previous chapter, supplies should be registered as soon as possible at the entry points and reception sites using a standardized system that includes tools for control and follow-up. This requires the deployment of record-keeping and classification teams at each point, guided by a coordinator who can resolve disputes about sorting, classification, priorities and other issues concerning the donations, their various categories, and other pre-established criteria.

The SUMA methodology has produced positive results in countless emergencies and is a robust, well developed tool, which we recommend using. (See the SUMA System in Annex 8.1.)

The most important record-keeping procedures at entry points are:

- ◆ Using the standard definition of consignment employed in humanitarian assistance operations, namely, a set of goods “that arrive at the same time, on the same means of transportation, from the same sender, and directed to the same recipient.”¹⁸
- ◆ Making a record of each consignment upon arrival based on the shipping papers. Generally, entry points do not have the proper conditions (of space, for instance) to verify in detail that the shipment does indeed include all the items mentioned in the packing list; alternatively, the consignment may be addressed to recipients who must take the loads to their own warehouses. When recording incoming supplies, it is important to note as many details as possible, such as:

- ▲ Consignee;
 - ▲ Point of departure;
 - ▲ Means of transportation;
 - ▲ Date and time of arrival;
 - ▲ Number of packages;
 - ▲ Weight (if possible, by category, e.g., 1,000 kg of food, 1 kg of drugs, and so on);
 - ▲ Contents and type of packing used;
 - ▲ Condition of the shipment upon arrival.
- ◆ Sorting and labeling by priority. The organization in charge of handling the supplies should establish priorities for the different kinds of items based on the most urgent needs. For instance, in the event of an earthquake, medical supplies and equipment for treating injuries and fractures may be a priority, whereas during a flood it is food and water purification equipment that will require the most urgent distribution.

Sorting by priority makes it possible to expedite the processing of the most urgently needed supplies, putting to one side those that can be sent later. All boxes and packages should be labeled clearly, indicating their priority, and grouped together in different sectors of the entry point or reception site.

For instance, the SUMA system uses the following levels:¹⁹

Priority 1: Urgent—for immediate distribution. Identified by a red label.

Priority 2: Non-urgent distribution. These are goods that are not immediately required but will be useful at a later stage of the emergency. Identified by a blue label.

Priority 3: Non-priority goods—non-urgent distribution. Items that have been damaged, have expired, are unknown, useless, or of doubtful value. They are put to one side to be reexamined when time permits. Identified by a black label.

Goods can also be labeled or marked to indicate that they need refrigeration or any other special treatment.

- ◆ Incoming supplies should also be classified by categories and sub-categories, as mentioned in the “Categories” section of Chapter 5. Besides helping to identify the goods received, this helps to unify the classification, storage and inventory control processes.

Control, Monitoring, and Follow-up Systems

Emergency supplies will have to follow a route and a series of stages from the point of entry or reception until they are handed over to the end users, the affected population. To prevent losses or diversions, and ensure a more efficient use of resources, an instrument is required to certify the progress of the supplies through the various stages and identify the next stage in the process. These controls should indicate what types of supplies have been mobilized, in what quantity, and in what condition. They should also identify the parties that have intervened in the process.

The documentary tools and the control and follow-up procedures should be agreed upon and designed during the preparation phase of logistics planning.

The registration forms used should bear some kind of official stamp or logo, be consecutively numbered, and include copies for all the people responsible for the shipment at its various stages. The careful design of the documentation is important, since it should both confirm and complement the information gathered at the various stages of the consignment’s journey.

It is also important to define clearly who will be responsible for control at each of those stages. When defining control procedures one faces the difficult task of finding a balance between the use of methods simple enough that they do not hinder the flow of supplies, and of methods sufficiently thorough to keep adequate track of the consignment’s movement, integrity, and condition as it goes through the various intermediate points towards its final destination. A key issue is making sure that all the people in charge are familiar with the various types of documen-

tation and procedures, and can supervise the various activities and human resources involved.

The following aspects should be controlled at each stage of the movement of supplies within the affected country or region (see also Table 8.1):

- ◆ Arrival of the donations and other supplies at the points of entry (ports, airports, borders) and the reception sites (collection centers, institutional warehouses, and so on) includes the following:
 - ▲ Arrival and registry of the goods;
 - ▲ Temporary storage;
 - ▲ Dispatch of the supplies (delivery to recipients for their use or distribution, delivery to authorized carriers for sending to other storage facilities).
- ◆ Transport of the donations and other supplies to other storage facilities or their ultimate destination in the field includes:
 - ▲ Loading of the supplies;
 - ▲ Notification to the recipient of the delivery of the load;
 - ▲ Transport (including transshipments);
 - ▲ Offloading of the supplies.
- ◆ Reception in the field or at secondary storage facilities requires:
 - ▲ Physical and documentary verification of the consignment (quantity, weight, quality);
 - ▲ Registration of incoming supplies;
 - ▲ Notification to recipient of the arrival of the load.
- ◆ Storage of supplies includes these activities:
 - ▲ Record of the arrival of the supplies;
 - ▲ Inventory and stock control;
 - ▲ Sanitary and safety measures in the storage facility;

- ▲ Record of expiry dates and rotation of stocks;
- ▲ Servicing and maintenance of equipment (e.g., water pumps, electrical generators, etc.);
- ▲ Record and certification of the loss or destruction of items.
- ▲ Record of the dispatch of the supplies to the final or intermediate recipient.
- ◆ Dispatch of the consignment from the storage site (deliveries for final use or for sending to distribution points) requires:
 - ▲ Loading the goods;
 - ▲ Notification of delivery to recipient;
 - ▲ Transportation (including transshipments);
 - ▲ Offloading supplies.
- ◆ Distribution of the supplies includes:
 - ▲ Record of the supplies that arrive at the distribution points;
 - ▲ Storage;
 - ▲ Record and identification of beneficiaries;
 - ▲ Record of the delivery of the goods to the beneficiaries;
 - ▲ Inventory and stock control;
 - ▲ Daily distribution report.

Table 8.1. Supply monitoring and control matrix

Stage or situation	Control instrument / procedures*	What needs to be verified	Verification site
Arrival in the country or the emergency zone of donations and other unsolicited humanitarian assistance	<ul style="list-style-type: none"> - Electronic record (such as the SUMA system) - Manual record forms 	<ul style="list-style-type: none"> - Contents by categories - Quantity and weight - Quality (condition of the supplies) - Place of origin 	<ul style="list-style-type: none"> - Points of entry (ports, airports, borders) - Reception centers and other collection facilities
A specific request from the field is made	<ul style="list-style-type: none"> - Official requisition form with consecutive numbering 	<ul style="list-style-type: none"> - That the person making the request is authorized to do so - Content of the request - Consult with people in field regarding doubts or suggestions 	<ul style="list-style-type: none"> - Site where request is received
When donations and other supplies are sent to the field or to destination other than storage sites	<ul style="list-style-type: none"> - Official requisition form, consecutively numbered - Official delivery authorization form 	<ul style="list-style-type: none"> - That the person making the request is authorized to do so - Signatures and stamps for delivery authorization - That the load that is delivered corresponds (in type and quantity) to what appears on the shipping documents - Destination of the load 	<ul style="list-style-type: none"> - Temporary storage site - During the loading of supplies into the agreed-upon vehicle
Transport of supplies	<ul style="list-style-type: none"> - Official delivery authorization form - Manifest or packing list with consecutive numbering 	<ul style="list-style-type: none"> - Signatures and seals authorizing delivery - That the load corresponds to what appears in shipping documents (type, quantity) - Destination 	<ul style="list-style-type: none"> - Temporary storage facility - During the loading and offloading of supplies
* All forms must be consecutively numbered and include carbon copies for each of the people responsible for any stage of the shipment.			

Table 8.1. (continued)

Stage or situation	Control instrument / procedures*	What needs to be verified	Verification site
Reception of supplies at the place where they were requested	<ul style="list-style-type: none"> - Manifest or packing list with consecutive numbering - Form to record the arrival of the load at the reception facility 	<ul style="list-style-type: none"> - General condition of the load - The contents, quantity and quality of the goods received must correspond to what was requested - The load should correspond to what is stated in the shipping papers 	<ul style="list-style-type: none"> - Reception site
Storage of supplies	<ul style="list-style-type: none"> - Record of supplies arriving at the warehouse - Physical and documentary inventory - Record of supplies leaving the warehouse - Record and certification of loss or destruction of goods, or of defective, expired items 	<ul style="list-style-type: none"> - Inventory control - Hygiene and warehouse security measures - Correct rotation of stocks 	<ul style="list-style-type: none"> - Distribution points - Storage centers in distribution areas
Distribution of supplies	<ul style="list-style-type: none"> - Form showing arrival of supplies at reception center - Registration and identification of consignees - Distribution cards - Distribution report form - Stock control 	<ul style="list-style-type: none"> - Compliance with criteria for choosing beneficiaries - Correct application of established procedures and instruments for supply distribution - Reconcile difference between distributed and remaining supplies 	<ul style="list-style-type: none"> - Distribution sites - Storage centers in distribution areas
* All forms must be consecutively numbered and include carbon copies for each of the people responsible for any stage of the shipment.			

Dealing with Non-Priority Items and Other Supplies²⁰

A significant proportion of incoming donations contain non-priority items or, simply, items that are useless or irrelevant. Both types of supplies increase the workload. However, it is important to make a distinction between the two.

Non-Priority Items

As noted earlier in this chapter, some supplies may arrive that are not a priority but might prove useful at another stage of the emergency. Therefore, these products must be classified, labeled and stored until they are needed.

Discarding Other Supplies

Those items that are considered useless due to their condition (damaged, expired, totally inappropriate) should be discarded as soon as possible, particularly to make room for useful supplies.

Regrettably, this is not an easy process, since quite often these supplies arrive by the ton, requiring their own logistics in terms of transport, temporary storage, and waste management.

There is also a diplomatic or public relations difficulty, since the public—including the donors—are not pleased to see supplies discarded that in their opinion are needed to satisfy the needs of the affected population, although in reality they are not appropriate for human use or consumption.

Discarding these items should be taken very seriously: they are not "simply garbage". It is often more convenient to keep them in storage until they can be discarded safely, rather than discarding them where people may recover them or where they could constitute a public health hazard.

These materials may be incinerated, buried, or otherwise disposed of. The

20 On the question of discarding drugs and other medical supplies, see Annexes 12.1 and 12.2 in Chapter 12, "Managing Medical Supplies".

key is to have clear guidelines about the disposal process, so as to discourage improvisation. The situation is even more delicate when it comes to drugs or hazardous materials, which cannot be discarded without the participation of specialists, given the special handling and disposal they require.

Annex 8.1

The SUMA System for Managing Humanitarian Assistance

The Humanitarian Supply Management System (SUMA) was launched as a collective effort by the countries of Latin America and the Caribbean, with the technical support of the Pan American Health Organization (PAHO), the Regional Office for the Americas of the World Health Organization (WHO), and with the financial support of the government of the Netherlands, to improve the management of humanitarian supplies in disaster situations.

Its objective is to help resolve the multiple problems involved in the mass arrival of assistance to a region or country affected by a disaster, whether supplies come from other cities or regions within the affected country, or have been provided by the international community.

SUMA's systematic approach, involving trained staff, sound classification procedures, and a user-friendly, flexible information technology mechanism, ensures that incoming supplies are properly sorted, inventoried, prioritized, and stored at their point of entry.

To attain this objective, all donations, regardless of their origin or ultimate recipient, are processed at the point of entry using the SUMA system before they are delivered. This requires that relief management organizations and institutions, whether governmental or nongovernmental, cooperate closely to adopt operational policies and strategies before a disaster strikes.

As countries gain experience in the use of SUMA, they often start implementing it to meet goals that were not included in the original SUMA project. A case in point is the use of SUMA to keep track of supplies provided by local rather than international donors. Similarly, the system has been implemented at the local level to set up two field units at the same location, one to receive incoming donations and the other to manage their distribution. Regardless of how the system is adapted to local needs, it must be stressed that SUMA need not be used only for large-scale emergencies that require international support, but also can be used locally whenever the need arises to receive or mobilize supplies.

System Components

The system has three levels:

1. SUMA CENTRAL
 2. The SUMA Field Unit
 3. Warehouse Management
- ◆ SUMA CENTRAL is designed to operate at emergency management headquarters, i.e., the facilities where national authorities are managing a disaster or emergency.

At this level, the main tasks are to:

- ▲ Establish the criteria to be used by the Field Units, such as reception sites, consignment directories, definition of the main user, etc.;
 - ▲ Create Field Units;
 - ▲ Consolidate the information sent by the Field Units;
 - ▲ Respond to queries and prepare reports to support the decision-making process and promote inter-institutional coordination;
 - ▲ Maintain the program tables (lists).
- ◆ FIELD UNITS are designed to work at the points of entry (e.g., borders, ports), and at local collection centers where supplies arrive during an emergency, such as airports, collection sites, etc.

The main tasks at this level are to:

- ▲ Sort and identify incoming supplies and label them “URGENT – FOR IMMEDIATE DISTRIBUTION,” “NON-URGENT DISTRIBUTION,” and “NON-PRIORITY ITEMS;”
- ▲ Classify supplies by category and subcategory, and itemize them;
- ▲ Reply to selective queries about available items;
- ▲ Prepare reports on consignments that have arrived at that field unit;

- ▲ Provide delivery receipts for recipients;
- ▲ Consolidate all relevant data on diskettes to be sent to SUMA CENTRAL.

The SUMA Field Unit team also uses paper forms in case the computers fail, or whenever the logistics of data collection requires their use.

- ◆ The WAREHOUSE MANAGEMENT module is a tool that registers the arrival of supplies to storage centers or warehouses and their departure for distribution. These warehouses receive supplies as well as electronic tracking information sent on diskette by the Field Units or SUMA CENTRAL. In this way, institutions can coordinate the internal management of relief supplies or their distribution to other facilities or organizations involved in disaster relief efforts.

The main tasks carried out at this level are:

- ▲ Keeping track of the local inventory;
- ▲ Preparing reports on existing stocks and deliveries, according to several criteria and categories;
- ▲ Following up on the inventory in other warehouses, whether they are branches of the main warehouse or separate collection centers.

The Consignment

A consignment is the basic unit of reference for recording supplies using the SUMA system. It is a set of supplies that the same sender sends to the same recipient and that arrives at the same time by the same means of transport. The entire process of classifying and manipulating data on incoming supplies focuses on consignments.

The point of entry is the place where consignments arrive: sea and river ports, airports, borders, customs offices, warehouses, etc.

Activities in the Supply Reception Facilities

Before supplies can be delivered to their intended recipients, three steps must be taken:

- ◆ Sorting;
- ◆ Classifying;
- ◆ Taking inventory.

Sorting

Supply management and distribution priorities are determined by the guidelines set forth by the emergency management agency or the SUMA Team Coordinator. These priorities depend on the type of disaster and the national or local needs. For instance, in the event of an earthquake, medical supplies for the treatment of wounds and fractures would be crucial; in the case of floods, priority items would include food and water.

All incoming boxes and packages must be sorted and then labeled and color-coded so as to show clearly their level of priority. Moreover, health supplies must be identified with an additional green label. SUMA's priority levels and corresponding color codes are the following:

Priority 1: URGENT – FOR IMMEDIATE DISTRIBUTION. These items must be distributed immediately at the site of the emergency. Label color: Red.

Priority 2: NON-URGENT DISTRIBUTION. These items are not urgently needed during the critical phase of the emergency, but may be useful later, during the reconstruction or development phases. Label color: Blue.

Priority 3: NON-PRIORITY ARTICLES. Some supplies may already have expired, or they have been damaged in transit. It may be impossible to identify them, or they will be useless in the context of the current emergency. Alternatively, they may have been packed together in such haphazard fashion that it would be impossible to sort them efficiently during the critical stage of the emergency. In these cases, recipients may classify these items later, when time and resources allow. Label color: Black.

Classification

Within the SUMA system, relief supplies fall into one of the following 10 technical categories:

1. Medicines;
2. Water and environmental health;
3. Health supplies/Kits;
4. Food;
5. Shelter/Electrical/Construction;
6. Logistics/Administration;
7. Personal needs/Education;
8. Human resources;
9. Agricultural/Livestock;
10. Unclassified.

The basic recording unit in each consignment is the item. Examples include wheat, canned soups, aspirin and lidocaine. Each item can be identified by a series of characteristics such as its generic and brand names, its presentation and packaging unit (pills, kilograms, boxes or bags), and the total quantity received.

Each item falls within a category and a subcategory. For instance, an ambulance would be an item that would fall within the "Health" category and the "Transport of patients" subcategory.

The "Unclassified" category enables the staff at the point of entry to deal with expired items, items that are unidentifiable or unusable, or items that are too difficult to sort on the spot and must be classified eventually by the recipient when time and resources allow, during or after the emergency.

Inventory

The inventory stage makes it possible for daily reports to be sent to the relevant national or local authorities on what supplies have been received and other relevant data, including the sender, the intended recipient, the categories of the supplies received, their quantity, and so on. Recipients can then make informed decisions on how to allocate these resources and otherwise manage the emergency. They can also notify donors directly of the arrival of their consignments.

Chapter 9

*Storage*²¹

Emergency supplies must be stored until they can be distributed or used. However, it is not simply a matter of finding a warehouse large enough to accommodate the shipments. An organized system must be in place to keep track of the type and quantity of supplies and their location in the warehouse, including reserve stockpiles for future needs. The entire storage process is of crucial importance for protecting emergency supplies until they can be handed over to their recipients. Organizing a warehouse so that it functions correctly means complying with current standards for protecting the quality and security of the products shipped.

Some warehouses have been specially designed to facilitate storage, having the necessary space and characteristics for the safe loading, offloading, and handling of the merchandise. However, in most emergencies one has to settle for whichever spaces are available—and these are often schools, community centers, gyms, and the like, that were not designed for storage.

While it may not be possible to apply the following warehouse management standards and procedures to the letter, they should guide the storage process regardless of whether the warehousing facilities were built for that purpose or improvised by adapting other available facilities.

Types of Warehouse

Ignoring for the moment their physical characteristics, warehouses tend to fall into four types depending on their function. In reality, however, they are seldom separate, but are often different sectors of the same building, depending on the type of supply handled, the size and duration of the operation and, above all, the availability of space.

General Delivery Warehouse: This is a warehouse, often large, where products may be stored for a long time or just until they can be sent to

²¹ This chapter would not have been possible without contributions by Médecins sans Frontières (MSF) and Gerard Gómez, delegate of the MSF Latin America and the Caribbean Regional Office for Emergencies.

secondary warehouses or distributed in the field. General delivery warehouses are often located in the capital of the country or at strategic points of a given region.

Slow Rotation Warehouse: A warehouse where non-urgent or reserve stockpiles are kept, including goods that are not in frequent demand, such as spare parts, equipment, tools, and so on.

Quick Rotation Warehouse: A warehouse where emergency supplies tend to move quickly in and out, on a daily or at least fairly regular basis. Such warehouses are more common near the heart of the emergency zone, and tend to store goods that require prompt distribution among the affected population.

Temporary Collection Sites: In the course of an emergency, it is common to use any space available to stockpile incoming supplies until a more appropriate space can be found. The yards, offices, meeting rooms, and garages of disaster relief organizations quickly fill up with mountains of clothes, food, drugs, and other products. It is generally hard to set up an organized storage system in such places, particularly due to lack of space, and it is desirable to move the supplies to a proper warehouse as soon as possible. However, temporary collection sites can be used to sort and classify the donations, so as to send to the warehouses proper only those goods considered useful, already presorted by category.

The Choice of Storage Site

A special effort must be made to find an appropriate place for storing emergency supplies, even though choices are often few in an emergency zone. When selecting the site, however, certain basic issues must be borne in mind.

Type of Supply To Be Stored

Pharmaceutical products and foods require a well-ventilated, cool, dry place. Some of these products may even need temperature control. Other items, such as clothing or equipment, have more flexible requirements. Emergency supplies tend to include a bit of all these items, and quite often they have to be stored in the same warehouse.

Size and Access to the Site

The size of the storage site is highly important. One must take into account not just its current capacity but also the potential for expansion of the storage area. It is always better to find a place that is larger than appears necessary. Access is another key issue, particularly by large vehicles. Location and distance in relation to the emergency zone are also important.

◆ Internal conditions of the site (structural and nonstructural):

Ideally, the warehouse should be a sturdy concrete building. Regardless of the construction materials employed, however, it should be in a good state of repair and maintenance, and not require major repairs to make it functional. It must be roofed and have doors; good lighting and ventilation are also necessary. Before the warehouse is used for the first time, it is important to check and repair the electrical installations, the water-supply and sanitation system, any leaks in the roof, and any cracks or holes in the walls or floors.

◆ External site conditions (topography and social environment):

The site should be checked for its vulnerability to natural hazards, such as the risk of flooding or landslides. Stagnant water, nearby waste disposal sites, overgrown weeds and other deficiencies should be avoided or remedied. The social environment must also be evaluated to prevent any security problems that may arise.

Estimating Storage Needs and Capacity²²

The size of the warehouse needed depends on the quantity of supplies expected. However, in emergency operations it is generally hard to foresee how many packages or bundles will come in, since most of the items sent are unsolicited. It is therefore best to choose the largest possible space, even if at first the quantity of supplies does not seem to justify such a course of action.

Storage space is three-dimensional, i.e., it has width, height, and depth.

²² This segment is partly based on the United States Defense Logistics Agency's (DLA) *Stockpile Administration Handbook*, elaborated by John Price II. Penn. (New Cumberland, Pennsylvania, U.S.A., 2000).

In order to determine the useful capacity of a site, some basic variables must be known (see table 9.1):

- ◆ Gross space – Measured in square meters, it is the total dimensions of the warehouse (the space inside the walls) and is obtained by multiplying the length of the space by the width.
- ◆ Gross cubic meters – Looks at the entire vertical and horizontal space. It is obtained by multiplying the width by the depth by the height of the building.
- ◆ Structural loss – It is the space that is "wasted" since it is occupied by pillars, columns, dividing walls, bathrooms, and any other structural component within the building.
- ◆ Support space – Offices, space to store warehousing equipment such as forklifts, and the operations area (classification, packing, etc.).
- ◆ Net square meters – It is the actual storage space. To obtain this figure, subtract from the gross space the structural loss, the support space, and any other area that cannot be used for storage.
- ◆ Net cubic meters – This includes the entire vertical and horizontal space less the structural loss and overhead obstructions (lamps, pipes, beams, etc.).

Table 9.1. Basic formulas for measuring storage space

Width x depth = square meters (m ²)
Width x depth x height = cubic meters (m ³)
Total square meters of the space – (structural loss + support space) = net square meters (i.e., actual available storage space)

Moreover, it must be borne in mind that different supplies have different "storage volume" requirements. Table 9.2 shows examples of the estimated space needed to store a metric ton of different types of supplies.

Table 9.2. Space required to store metric ton of selected items²³

Grains (rice, corn), flour, sugar in sacks	2m ³
Powdered milk in sacks or boxes	3m ³
Pharmaceuticals	3m ³
Vegetable oil in cylinders or tins	1.5-2m ³
Blankets in compressed packages (approx. 700)	4-5m ³
Loose blankets	8-10m ³
Clothes	7-10m ³
Tents (approx. 25 family tents)	4-5m ³
Kitchen utensils (between 35 and 40 boxes)	4-5m ³

There are times in emergency operations when greater control over supplies is feasible. For instance, when food is distributed in a temporary shelter, the number of refugees may be well known, making it possible to predict the quantity of food supplies and the storage space needed. Table 9.3 illustrates how to estimate the space needed for a known quantity of supplies.

²³ Taken from International Federation of Red Cross and Red Crescent Societies (IFRC), *Handbook for Delegates*, Geneva, 1997.

Table 9.3. Determining the storage capacity needed²⁴

Need to know	Examples
Population to be served	Expected arrival of 30,000 people
Intended distribution of supplies	One tent per family (average of 6 people per family)
Frequency of distribution	Once
Estimated period of time during which these supplies will continue to be needed	Three months
Weight / Unit volume of goods	1 metric ton = 25 tents = 5m ³
Reserve supplies	10%
Calculations Quantity of tents to store = 30,000/6 = 5,000 + 10% = 5,500 tents Volume of the tents = 5,500/25 x 5 m ³ = 1,100 m ³ For a height of 2 meters, floor area required = 1,100 m ³ / 2 m = 550 m ² Load on the floor = 5,500 tents/25 tents per metric ton = 220 MT 220 MT / 550 m ² = 0.4 MT or 400 kg/m ² (acceptable) Estimate 550 m ² + 20% for access and ventilation = 600 m ² of floor space	

Another simple tool for estimating the area required is shown in Table 9.4.

Table 9.4. Area estimate for 100 tons of rice with a storage height of two meters

1 MT of rice = 2 m ³
100 MT of rice = 200 m ³
Area needed for the item: 200 m ³ (2m = 100 m ²)
Total floor area required: 100m ² + 30% = 130 m ²
Verification of real load capacity per m ² = 100 MT : 100 m ² = 1000 kg/m ²

24 Taken from UNHCR, *Supplies and Food Aid Field Handbook*, Geneva, June 1989.

25 Taken from International Federation of Red Cross and Red Crescent Societies (IFRC), *Handbook for Delegates*, Geneva, 1997.

Alternative Storage Sites

There will be times when it is impossible to find an adequate structure to warehouse the goods, and it becomes necessary to explore alternatives for temporary storage.

One option is to build a temporary structure out of timber and corrugated iron, or using reinforced plastic, a procedure employed by Médecins sans Frontières or USAID/OFDA. Other alternatives include prefabricated structures for building hangars, which come with curved metal sheets that can be quickly assembled.

Simpler but strictly short-term solutions include storing the supplies in shipping containers or in the trucks in which they arrived. This is not advisable in the case of drugs or food, which have little resistance to high temperatures.

In any case, the decision of what type of structure should be built is directly related to the expected duration of the operation, as well as the possibility of finding a site with better conditions in the near future. If an alternative storage site is built, it must meet the same standards mentioned in the section “Choice of Storage Site” of this chapter.

Staff Required

One individual must be in charge of managing the storage process, although he or she may of course have assistants depending on the volume of operations. The key point is to prevent several people from having the same level of authority, since this causes confusion in the management of the supplies, making it hard to determine who is responsible when problems arise.

A team is required for maintenance and for handling the supplies in the warehouse area (offloading, loading, classification, moving items, and so on). This team can comprise relief personnel, volunteers from community organizations, or even the victims themselves.

The use of local volunteers reduces operational costs. However, problems may arise regarding the security of the goods or the stability of the staff. Although the job does not involve highly specialized tasks, volunteers

must still receive basic training to do their job, and providing this training can be a waste of resources if people keep dropping out of the effort.

When disaster victims participate in storage management, a "food for work" arrangement can be a good way of providing payment in kind for the beneficiaries' work. However, consultations should first be made with the donors of the food, since some organizations, such as the World Food Program (WFP), have restrictions in this regard.

In any case, the coordinator must receive a salary, given the nature of his or her functions and responsibilities. It is also necessary to hire security personnel to guard the supplies and control the arrival of unauthorized parties.

To ensure that they perform their jobs as intended, all staff members must receive a written job description with clear instructions about their functions and duties.

Equipment and Material Required in the Warehouse

To ensure that the warehouse functions properly, some basic equipment and materials are required. The following are some examples:

- ◆ A computer system should be in place with preinstalled software such as the SUMA applications, a spreadsheet program, or any other electronic method to record and keep track of supplies and their movements;
- ◆ Forms and cards to control stocks and inflows and outflows of products. Basic stationery, calculators, and other office supplies;
- ◆ A metallic filing cabinet with a lock;
- ◆ A first-aid cabinet and fire extinguishers of the ABC type;
- ◆ An electric generator with its own maintenance material;
- ◆ Refrigeration equipment;
- ◆ Shelves and wooden pallets on which to stockpile products;
- ◆ Tools for opening and closing crates and boxes, adhesive tape for packaging;

- ◆ Scales, metric measuring tape, ladders;
- ◆ Cleaning materials and products;
- ◆ Wheelbarrows and hydraulic loading and moving equipment;
- ◆ Safety gear for the workers;
- ◆ Weights and measures conversion tables.

Warehouse Sectors

Normally, 70% of the available space in a warehouse is used for storage, and the remaining 30% as working areas for handling and moving goods, packing, and access. To make a warehouse more functional and practical, it is necessary to identify its specific sectors. A basic space distribution scheme can be summarized as follows:

- ◆ **Arrival zone:**²⁶ The place where supplies arrive and are offloaded. Supply reception, verification and control should take place here before the goods are stored;
- ◆ **Sorting, classification and recording zone:** This is where supplies are sorted by priority (urgent, non-urgent, useless) and are classified by category and subcategory;
- ◆ **Packing and delivery preparation zone:** This is where supplies are prepared for delivery to the next or final destination. Empty boxes and packing material can also be kept here in case some items need to be repackaged;
- ◆ **Storage area:** This is the place to store the donations and other supplies that have not yet had a destination assigned to them. The area is divided according to the type of supply: food, clothing, personal needs, medical products, etc.;
- ◆ **Delivery zone:** This is where supplies are kept when they are ready to be delivered. The supplies should be kept on separate pallets and labeled according to their destination;

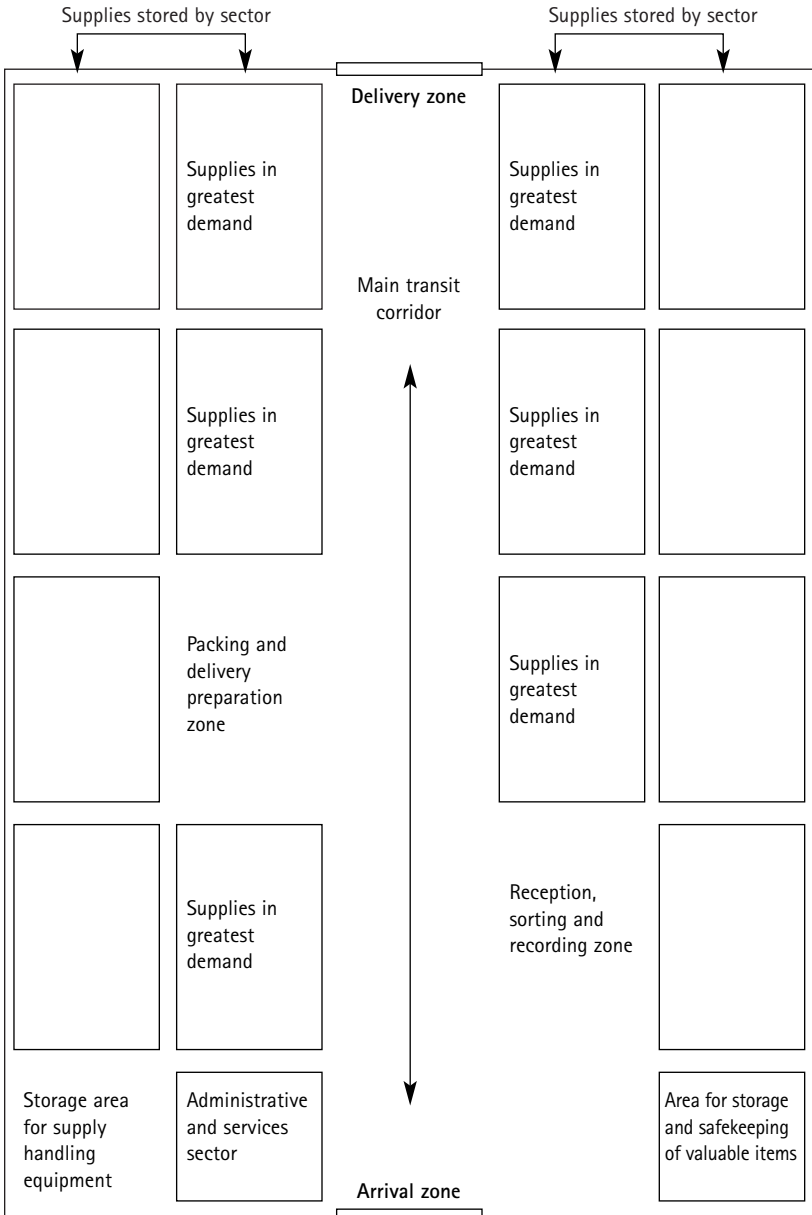
²⁶ The arrival zone and the delivery zone should coexist in facilities that have only one access door. In these cases, each side of the entrance (left or right) should be assigned permanently for one activity, either loading or offloading.

- ◆ **Administrative sector:** It can be a simple desk and filing cabinet (metallic, with a lock) for handling administrative matters.

Figure 9.1 shows the plan of a warehouse with all the sectors described above.

Planning the use of space and the internal distribution of the sectors should be carried out before the first supplies arrive. It is advisable to place marks on the floor to identify where the various types of supplies are to go. When the various sectors have been marked off, signs similar to those used in supermarket aisles can be hung to indicate where the different kinds of supplies can be found in each sector.

Figure 9.1. Warehouse sectors and movement zones



Storage and Internal Distribution of the Supplies

The golden rule of warehouse management is never to mix products of a different sort on the same rack, pallet, or pile. In particular, hazardous materials (including powdered cement) should not be stored in the same place as food and other products for human consumption or use.

Likewise, there are a series of factors that must be born in mind when planning how to use the space, for instance:

- ◆ **Similarity and quantity:** Products of the same type should be stored together, not in multiple locations throughout the warehouse;
- ◆ **Demand:** The goods that are in greater demand should be placed in the most accessible areas;
- ◆ **Measurements and weight:** The larger and heavier the packages, the lower their stacks should be;
- ◆ **Characteristics:** One must bear in mind the particular characteristics of the goods, such as whether they are hazardous to human health, fragile, sensitive to light or humidity, perishable, and so on.

Other key issues are the following:

- ◆ The place should be cleaned thoroughly before being used as a warehouse for emergency supplies, and it should be kept clean thereafter. Having the place sprayed for pests before any goods are stored is highly recommended. The floor should be clean and dry before any of the goods are stacked on it;
- ◆ Supplies should be stored by sectors, depending on their type;
- ◆ To prevent humidity and other problems, the products should not be in direct contact with the floor or walls. Pallets or other platforms should be used; they should be free of protruding nails or splinters that can tear the packages and bales;
- ◆ If there are not enough pallets, they should be used primarily to support those products that are less resistant to humidity or have been stored in sacks, paper bags, or cardboard boxes. Bottles and tins can

be stored directly on the floor, although not for long. Another temporary solution is to layer the floor with plastic sheets;

- ◆ Floor strength should be borne in mind when piling packages of a given weight. Special precautions should be adopted when items are stored on an upper story;
- ◆ The height of the stowage should be based on the resistance of the packing material or the instructions on the boxes or crates, if any. It is also important not to block the lighting or ventilation in the warehouse;
- ◆ To prevent stacks from tipping over, it is wise to alternate the direction of the boxes or bales on each layer;
- ◆ Height should be kept to a minimum. Avoid high stacks of heavy boxes or packages. If working in an area at risk from seismic activity, it may be necessary to add some external support to the stacks to reduce the danger of collapse;
- ◆ There must be sufficient space between the stowage racks or shelves to allow for the free movement of the people engaged in the maintenance, control, or handling of the goods. Room must also be made for the unencumbered movement of hydraulic lifting equipment if available, as well as to allow for air to circulate. The recommended distance is between 70 cm and 1 m, depending on the availability of space;
- ◆ Special care must be taken to ensure that liquids, such as cooking oil or water, are stored upright in their containers to prevent leaks;
- ◆ Torn packages should be repacked or distributed as soon as possible, as long as the damage to the packing does not entail a risk for the human consumption of the product;
- ◆ Items for human use or consumption should never be repacked in containers whose previous content is unknown, since they could have contained hazardous products.

Procedures for Arrival and Dispatch

These procedures are carried out in the areas designated for arrival and dispatch of goods at the warehouse, using the appropriate forms. These procedures should be established in advance, be thoroughly understood by the people in charge, and used systematically. Forms should include spaces for the names and signatures of the people involved in the process. (See Annexes 9.1 and 9.2.)

Arrivals

The following are some of the standard procedures that should be applied when supplies arrive at the warehouse:

- ◆ Every load that arrives should be checked to see if the quantity, weight, and quality correspond to the information contained in the shipping papers, by carrying out a physical examination of the load;
- ◆ Once verification is made, goods should be recorded in the warehouse inventory. It is important to write down any special information about the supplies, such as whether a smaller quantity than expected was received, or the items were different from those mentioned in the packing list. On these occasions, a file must be opened about each specific case, for future verification and reference when investigating the anomaly;
- ◆ Sometimes all or part of some consignments may be returned to the warehouse, because they could not be distributed or were not needed. These should be recorded as returns, not as new arrivals;
- ◆ By engaging in a physical examination of the load, it should be possible to identify:
 - ▲ Bundles, crates, boxes, or sacks that are torn or wet;
 - ▲ Packages that show evidence of having been rifled;
 - ▲ Leaking containers;
 - ▲ Tins that are bulging, rusty or crushed, which might indicate that the contents are not suitable for human consumption;

- ▲ Tinned items without a label, with labels in an unknown language, or with expired dates. These products should not be distributed, since it is impossible to guarantee the quality of their contents;
- ◆ When food is received, say grains or cereals, it is important to verify that there has been no contamination by insects. If insects are detected, the products should not be allowed into the warehouse to prevent infestation of the food already in storage. Any disinfectant treatment should be carried out by a specialist;
- ◆ Powdered milk must be inspected to make sure it is not rancid;
- ◆ In the case of corn, rice, beans or other grains, it must be determined upon arrival if they are meant for consumption or as seeds for sowing. Again, the inspection should be carried out by a person trained to make such distinctions.

Dispatch

The following are some of the standard procedures when dispatching supplies from the storage site:

- ◆ Products should spend as little time as possible in storage; hence the rotation of the stocks on the basis of "first in, first out". The items that have been in the warehouse longest should be placed in the front rows of the stowage racks so they can be distributed first, and the items that come in later are to be placed at the back, rotating them to the front as deliveries are made;
- ◆ The same principle applies to products with an expiry date: the first to be dispatched are those nearest their expiry date;
- ◆ A dispatch can only be carried out with an official authorization document that has been signed by the person authorized to do so;
- ◆ The same procedure of physical and documentary verification that was carried out when goods entered the warehouse must be carried out when they leave the warehouse, to make sure that the supplies that are being delivered correspond to the packing list or other identification documents;

- ◆ Every dispatch must be recorded so it can be withdrawn from the inventory records.

Control and Monitoring Systems

It is part of the responsibility of warehouse managers to ensure that supplies are used by those who really need them, and prevent their loss or diversion. Pilferage or theft should be kept to a minimum. Similarly, the storage conditions must be such that they allow for the optimum conservation of the supplies.

Security of the Supplies

- ◆ Only the authorized staff should have free access to the warehouse facilities. The presence of third parties should be discouraged as much as possible, and their access regulated and only allowed when in the company of an authorized official.
- ◆ The storage area must be secured against break-ins and theft by means of locks, fences, external perimeter lighting, and so on.
- ◆ Whenever possible, the most valuable goods and items must be kept under lock and key.
- ◆ The use of the keys to the warehouse must also be strictly controlled.
- ◆ Finally, guards must be available around the clock, seven days a week.

Rotation of the Supplies

- ◆ Minimum and maximum stock levels must be determined, as well as the point at which new supplies must be requested. The size of the stockpiles may differ depending on the type of supply and its rotation cycle.
- ◆ The "first in, first out" principle must be applied strictly, which in turn requires an up-to-date list of the dates of arrival and expiry dates of the goods.

Control and Monitoring

- ◆ Clear and strict procedures must be in place to control the arrival and delivery of the supplies.
- ◆ Each new arrival must be recorded in the inventory. Even those products that arrive in poor or unusable condition must be recorded as such.
- ◆ A stock control card must be available for every type of product stored in the warehouse (see Annex 9.1). On the card, the dates and quantities that have arrived must be recorded; spaces must also be available on the card to register information about the delivery of the supplies. The current level of stocks of the same product must be recorded, as well as the sector of the warehouse where the product is kept.
- ◆ Regular inventories should be performed; control cards, printed inventories, and the computer database (if one is in place) should be kept up to date. Inventories and delivery documents should correspond to the information recorded on the stock control cards.
- ◆ Clear and up-to-date controls and records of losses and certification of expired or spoiled items must be kept. Normally, the destruction or discarding of expired or spoiled medicines must be carried out under the supervision of a specialist.
- ◆ Individual forms are needed to record all warehouse activities, such as arrivals, deliveries, and requisitions. (See Annexes 9.2 and 9.3.) These forms should be numbered consecutively and must include the date and basic information about the people involved in the process.

Occupational Health and Safety in the Warehouse

The warehouse should be a safe place not only for the emergency supplies but also for the people who work with them. Occupational health and safety measures must therefore be designed in advance and implemented rigorously.

- ◆ There should be no smoking in the warehouse;

- ◆ All the staff must be aware of existing hazards and security measures to prevent accidents;
- ◆ Maintenance staff must wear protective devices for their backs and hands handling shipments. Any other protection devices or tools required to carry out their tasks safely must be rigorously employed at all times;
- ◆ Signs and labels alerting workers to any type of danger should be clearly visible;
- ◆ Fire extinguishers and first-aid equipment should be clearly visible, located in an accessible place, and be in good working condition. The people who work in the warehouse should know how to use all such equipment.

Maintenance and Sanitation Measures

Maintenance

Regular inspections should be carried out to determine the condition of the building, particularly its electrical installations, locks, roof, and structural integrity in general. Any necessary repairs must be carried out as soon as possible to prevent the damage from getting worse.

Hygiene

The warehouse and its environs should remain clean at all times. The uncontrolled accumulation of waste products such as empty cardboard boxes should be discouraged. It is important to get rid of stagnant water, overgrown weeds, or any other feature in the vicinity that may encourage the proliferation of insects and rodents.

A warehouse cleaning plan must be implemented, including both daily and periodic cleaning sessions. An inspection of the state of cleanliness of the stowage racks, corners, and sectors of the building must be carried out regularly. Similarly, a plan must be in place for managing and disposing of solid waste, whether spoiled supplies, packing material, or

empty containers. Warehouse inspections should be carried out at least once a week, in order to detect problems. These inspections must include, as a minimum, the following tasks:²⁷

- ◆ Checking for and eliminating from the food piles insects, spider webs, or cocoons;
- ◆ Detecting damage caused by rodents, birds or insects, or the careless extraction of samples from the grain and cereal sacks;
- ◆ Looking for damage caused by water or humidity, such as mold, stains, discoloration, or hardening of the packages, bales and bundles;
- ◆ Detecting leaks in containers and the loss of supplies due to tears in the packages;
- ◆ Detecting tinned food cans that are bulging, leaking, or rusty;
- ◆ Detecting signs of fermentation in cereals. Several layers of the stowage piles should be sampled, particularly the ones in the middle.

The inspection should cover all sides of the stowage piles. All corners and dark areas of the warehouse should be inspected to locate potential rodents' nests or an accumulation of dust or waste. The most useful measure that can be taken to get rid of insect or rodent infestations is to prevent them in the first place. Domestic animals must not be allowed into the warehouse. Contaminated food should not be mixed with other products for human consumption. It is common to fumigate warehouses every so often. However, this should be undertaken by qualified exterminators only.

As a complement to these hygienic measures, Table 9.5 shows some conditions that must be met for the correct storage of certain supplies.

Hazardous Materials

Hazardous materials should not be stored in the same place as products meant for human consumption. The person in charge of the warehouse

27 Adapted from World Food Programme, *Stockage des denrées alimentaires. Manuel des pratiques d'entreposage*. Rome, 1979.

must become familiar with the standards and regulations for identifying, handling, transporting and storing these substances. Products of this type should be identified with standard warning labels, and product compatibility should be checked before storing any types of hazardous materials together (see also the section on hazardous materials in Chapter 5 and Annex 5.1).

Table 9.5. Storing food and equipment²⁸

Type of supply	Desired condition	Storage in humid climate	Useful Life	Remarks
Grain cereals	Dry, without germination, without impurities. Maximum 15% humidity.	Dry, cool, well ventilated place. On pallets. Maximum 70% environmental humidity.	Approx. 6 months	Inspect odor, humidity level, evidence of parasites.
Cereal flour	Dry, not too tightly stowed, sweetish odor. Maximum 15% humidity.	Same as grain cereals.	Approx. 6 months	Same as grain cereal.
Canned food	No rust, no swelling, no leaks, cartons in good condition, expiry date OK, with labels identifying content.	Preferably on pallets.	6-12 months, depending on expiry date	Detect deformed tins. If when opening one gas comes out, it means the content is spoiled.
Powdered skim milk (in bags)	Dry, clean odor, ivory color.	Dry place, cool, well ventilated, preferably in the shade.	One year.	Can keep between 2-3 years in the dark at about 15° C. Milk sometimes hardens; this does not alter its value, so long as its odor and color do not change.
Powdered whole milk (in bags)	Dry, clean odor, ivory color.	Dry place, cool, well ventilated, preferably in the shade.	8-10 months.	Same as skim milk.

28 Adapted from International Federation of Red Cross and Red Crescent Societies, *Handbook for Delegates*, Geneva, 1997.

Table 9.5 (continued)

Type of supply	Desired condition	Storage in humid climate	Useful Life	Remarks
Sugar	Dry, granulated, without lumps, shiny.	Dry place, well-ventilated storage racks.	Several years	Absorbs humidity very quickly. Hard, humid sugar is still fit for human consumption.
Medicines	Expiry date OK. In original packaging. Packs without tears; no exposure to the elements.	Dry, cool, well-ventilated place. On pallets. Some require refrigeration	Depends on expiry dates	Control temperature if products require refrigeration
Blankets	Packed. Prevent humidity.	Dry place, well-ventilated storage racks.		Damp blankets should be dried immediately. Beware of fleas and moths.
Clothing	Packed, clean.	Dry place, well-ventilated storage racks.		Wet clothing should be dried immediately. Beware of fleas and moths.
Tents	Packed. Prevent humidity.	Dry place, well-ventilated storage racks raised up from the floor.		Damp tents should be dried immediately. They will rot quickly if stored when wet.

Annex 9.1

Sample Stock Control Form

Stock Control Form					
Warehouse: _____					
Product/code _____ Batch _____					
No. _____ Sector _____					
Date	Arrivals	Dispatch	Destination	Balance	Name and signature of responsible party

Remarks:

Annex 9.2

Sample Supply Arrival Form

0001				
SUPPLY ARRIVAL RECORD				
Type and No. of transport document		Date of arrival	Date of entry	
Point of Origin:		Consignee:		
Means of transport:		Delivered by:		
Description of supplies	Quantity	Weight	Expiration date	Type of packaging
Quantity of packages:		Total Weight in Kg:		
Name, signature of recipient, place and date				
Remarks (report any difference between the type, weight and quantity of supplies recorded in the shipping documents and what is received):				

Annex 9.3

Sample Form for Supply Dispatch

0001				
SUPPLY DISPATCH RECORD				
Date of dispatch:		Corresponds to request No.		
Name of requester:		Delivery authorization No.		
Consignee:		Means of transport:		
Supply description	Quantity	Weight	Expiration date	Type of shipment
		Total weight in kg		
Remarks				
Dispatch: name, signature, date		Transport: name, signature, date		Received by: name, signature, date

Annex 9.4

Sample Stock Report Form

Stock Report						
Warehouse:	From (date):			To (date):		
Product	Initial stocks	Arrivals (include date)	Deliveries (include date)	Losses (if any)	Final balance of stock	Expiration date
	Units					
	kg					
	Units					
	kg					
	Units					
	kg					
	Units					
	kg					
	Units					
	kg					
	Units					
	kg					
	Units					
	kg					
	Units					
	kg					
	Units					
	kg					
Explanation of losses:						
Remarks:						
Name and signature of responsible party:				Date of the report		

Chapter 10

*Transport*²⁹

Transport is the link in the logistics chain that makes it possible for emergency humanitarian assistance to reach its destination. When designing an emergency supply transport strategy, it is not enough to consider in the abstract the best means of transport or the resources needed to mobilize supplies from A to B. Alternative means, methods, and routes should be considered as a matter of course. The challenge does not lie in eventually getting the supplies to their destination, regardless of when they may be needed—but in making sure that they arrive safely and on time.

The movement of supplies within the country or area of operations is only one part of the process. The arrival of goods from abroad—donated by the international community, or acquired by a disaster relief organization—also imposes its own logistical challenges.

Getting emergency supplies from their point of origin to their final destination involves the combined use of different means of transport over air, land, or water.

Types of Transport and Their Characteristics

The various means of transport have advantages and disadvantages from the point of view of operational needs, ranging from their cost to their capacity and speed (see Table 10.1). When deciding which means of transport to use, we must think of two main issues: the needs on the ground, and feasible forms of transport.

- ◆ **The needs** – How urgently are the supplies needed? What type of supplies are being shipped? How large and heavy is the shipment going to be? What is the destination? What distances must be traversed?
- ◆ **Feasible forms of transport** – What means of transport are avail-

²⁹ This chapter has benefited from the contributions of Médecins sans Frontières (MSF) and Gerard Gómez of MSF's Regional Emergency Response Department for Latin America and the Caribbean.

able? How much do they cost? How much can we afford? How hard is it to reach the intended destination, given the weather and the state of available routes?

Enough resources will not always be available to pay for the ideal form of transportation and it may not always be available, in any case. Even if a particular means of transport is available, conditions in the field may rule out its use. Thus, it is not enough to determine what is needed; we must also know what is feasible. For every means of transport chosen there should be an alternative, should circumstances prevent its use.

Table 10.1. Characteristics of different means of transport

Type of transport	Characteristics	Advantages	Disadvantages
Air (Airplanes)	Usually employed when supplies are needed urgently, or when there is no other way to reach the affected area.	<ul style="list-style-type: none"> ◆ Quick and reliable. ◆ Can reach far-away areas. ◆ Makes it possible to come closer to the area of operations. 	<ul style="list-style-type: none"> ◆ High cost. ◆ Depending on the size of the plane, cargo capacity may be small. ◆ Susceptible to meteorological conditions. ◆ Requires plenty of space and safe conditions for landing and takeoff. ◆ Requires special fuels, such as Jet A1, which although common are not always available in the area of operations.
Air (Helicopters)	Much more versatile than planes.	<ul style="list-style-type: none"> ◆ Can land in difficult areas. 	<ul style="list-style-type: none"> ◆ Has limited cargo space.
Land (motor vehicles)	Use depends mainly on the physical and safety conditions of the access routes to the delivery points.	<ul style="list-style-type: none"> ◆ Highly flexible. ◆ Inexpensive and readily available (it is easier to find cars and trucks than any other vehicle). ◆ Given its availability, cargo capacity increases. 	<ul style="list-style-type: none"> ◆ Routes might be in bad shape, impassable, or simply not exist. ◆ Land travel may be dangerous in certain areas, due to the threat of landslides, floods, earthquake damage, armed conflict, or bandits.
Land (rail)	Use, obviously, depends on the existence and route of the railroad and its condition	<ul style="list-style-type: none"> ◆ Large load capacity. ◆ Operating costs are generally quite low. 	<ul style="list-style-type: none"> ◆ Frequently awkward to load and offload supplies in railroad yards or stations. ◆ Need to use other transport to take the supplies to the warehouse or operations center.

Table 10.1 (continued)

Type of transport	Characteristics	Advantages	Disadvantages
Maritime	Used mostly for transporting supplies from abroad. Requires access to a harbor or pier.	<ul style="list-style-type: none"> ◆ Large load capacity. ◆ Economical. 	<ul style="list-style-type: none"> ◆ Slow. ◆ Need to use other transport to take the supplies to the warehouse or operations center.
River	Useful for supplying riverside and nearby communities with moderate amounts of emergency aid, or for moving people and supplies in the event of a flood.	<ul style="list-style-type: none"> ◆ Low cost of operations. ◆ Access to areas hard to reach by other forms of transport. 	<ul style="list-style-type: none"> ◆ Small load capacity, depending on the size of the vessel. ◆ Use depends on the size and other characteristics of the river or other waterway.
Human and animal	It is a solution for small loads, generally in remote areas or places motor vehicles cannot reach.	<ul style="list-style-type: none"> ◆ Low operational costs. ◆ Access to difficult areas. 	<ul style="list-style-type: none"> ◆ Limited load capacity. ◆ Slow.

Commercial vs. Non-commercial Transport

Non-commercial or free transport, sometimes offered by other organizations or volunteer groups, reduces the cost of the operation. In general, however, the owners of the transport do not assume responsibility for the safety of the goods. It makes sense to use such transport, and sometimes it is the only means available, but only if one is capable of taking special security measures to protect the load.

With commercial carriers, special rates can sometimes be negotiated for humanitarian supplies. However, commercial transport is a for-profit business like any other. When hiring such transport, it is wise to bear in mind not only the price but also the reliability, safety, speed and quality of the firm. Since it is a service contract for which we will have to pay, we are entitled to demand that the contract be fulfilled down to its smallest particulars.

Different types of contracts have their own advantages and disadvantages. It is therefore essential to evaluate special requirements of the shipment, and review carefully what is included in the fare, e.g., loading and offloading, the driver's fees, and so on. When planning to hire a firm's transport services, it makes sense to bear in mind the issues outlined in Table 10.2.

Table 10.2. Types of transport contracts³⁰

Type	Advantages	Disadvantages
By the ton or ton/km	Client pays for the transport of the goods regardless of the time the trip takes, or whether the truck is full or not. The cost of the service is clearly agreed upon from the start.	<ul style="list-style-type: none"> - The carrier might include other clients' loads in shipment, which may compromise safety of supplies. - The driver might use a less direct route to add kilometers to the bill.
Per vehicle per journey	Client has exclusive use of the vehicle(s).	<ul style="list-style-type: none"> - The carrier might not be interested in filling each vehicle to its maximum capacity, thereby multiplying the number of trips. - The size of the vehicle might not correspond to the size of the load.
Per vehicle per day	Exclusive use of the vehicle. Usually the best option for short trips.	<ul style="list-style-type: none"> - The carrier might choose to "take it easy" on each trip. - In the event the truck needs protracted repairs, the daily fee might still be applicable unless stipulated otherwise in the contract.

30 Adapted from International Federation of Red Cross and Red Crescent Societies (IFRC), *Handbook for Delegates*, Geneva, 1997.

Determining the Type of Transport Needed

To determine the type and quantity of transport needed, certain aspects must be borne in mind:

- ◆ The nature of the supplies to be transported;
- ◆ The weight and volume of the load;
- ◆ The destination: distance, form of access to the delivery point (by air, water, land), and the condition of the access routes;
- ◆ The urgency of the delivery.

Table 10.3 shows a simple procedure for estimating the number of vehicles needed, whether they be trucks, boats, or planes, to transport a load with a known weight and deadline for delivery. Annexes 10.1-10.3 show estimated load capacities for different means of transportation.

Table 10.3. Formula for estimating the number of vehicles required³¹

Calculation procedure:

- How many tons must be moved? By when?
- How long will the vehicles take to take a load from the delivery point to the reception point and return? (Do not overestimate the speed, and include loading and unloading.)
- What load capacity does the vehicle have?

$$\text{No. of possible trips per vehicle} = \frac{\text{Period}}{\text{Duration of round trip}}$$

$$\text{No. of loads} = \frac{\text{Total No. of tons}}{\text{Vehicle capacity}}$$

$$\text{No. of vehicles} = \frac{\text{No. of loads}}{\text{No. of possible trips / vehicles}}$$

Add 25% extra time for contingencies.

This table is based on the weight of the load. However, one must also take into account the volume—that is, the space occupied by the packages depending on their shape and size.

³¹ Taken from J. Davis and R. Lambert, *Engineering in emergencies*, London: Intermediate Technology Publication Ltd., 1995.

If vehicles of different load capacity intervene in the operation, the estimate should be recalculated for each vehicle. Similarly, if the supplies are going to different destinations, each destination requires its own calculation.

Vehicle Control

When circumstances allow it, it is always better to hire a transport company than to have to manage a fleet of vehicles, which is an extremely complex and delicate task. But the reality, in most emergencies, is that the vehicles available are of various types and come from various sources. Some will be diesel, some gasoline models. Some will be in good condition, others in need of repair. Some will come with their own driver; others will require a driver to be hired—or a volunteer to drive them.

The key thing, in any case, is to ensure that the vehicles are in good mechanical condition and to establish maintenance and control procedures to prevent any down time.

Managing a fleet of vehicles is practically a logistics operation in its own right, due to the number of actions required, such as the following:

- ◆ One individual must be entrusted with following up on all matters related to the transport vehicles: supervising the drivers, controlling arrival and departure times, and making sure that all the rules regarding the use and maintenance of the fleet are strictly followed.
- ◆ The use of forms must be implemented to control all matters related to the vehicles used. Ideally, each vehicle should have its own log where all relevant details are noted, such as the condition of the vehicle, its activities, who is responsible for it, what mechanical maintenance has been carried out, what the mileage is, how much fuel is being consumed, and what its itineraries are.
- ◆ A policy of “one vehicle, one driver” must be implemented, to make sure that one person is responsible for the maintenance and control of each vehicle. When several people use the same vehicle, it tends to deteriorate faster, and it is harder to determine who is accountable for its misuse or lack of maintenance.
- ◆ Drivers should get precise instructions about the use of the vehicle’s log, about the daily and regular checkups that are needed and the

attendant maintenance needs, as well as about their responsibilities and expected behavior.

- ◆ Drivers must make a daily review of their vehicles and before starting on their deliveries, particularly if large distances are involved. The supervisor must be notified immediately of any problem regarding the vehicle, mechanical or of any other sort.
- ◆ Drivers and their vehicles should have their papers in order and onboard the vehicle, as well as all necessary insurance and permits.

The following are some examples of the items that must be checked for each vehicle:

1. Daily Vehicle Review

- ◆ Amount of fuel
- ◆ Oil level
- ◆ Radiator water
- ◆ Battery water level
- ◆ Windshield cleaner
- ◆ Brake fluid
- ◆ Hydraulic system fluid
- ◆ Tire pressure (including spare tire)
- ◆ General state of the lights
- ◆ Tension of the fan belt
- ◆ Basic tools

Vehicle Service Control Form

Service	Details	Date	Mileage	Next service
Motor oil				
Oil – Gearbox, transmission				
Fuel filter				
Air filter				
Suspension system				
Brakes				
Fan belt				
Change/rotation of tires				
Other services				

The information entered in vehicle service forms (as illustrated above) must be checked periodically by the person in charge of the fleet, to verify that the forms are being used correctly, and monitor the condition of each vehicle.

Fuel and Lubricants

Fuel is always in demand, and particularly when it is scarce—a common situation during an emergency. To keep the relief operations vehicles well supplied with fuel and lubricants, a meticulous gas mileage record must be established based on the routes taken.

Sometimes it is possible to get credit at a gas or petrol station, and vehicles are refueled upon presentation of authorized coupons. This is a very

convenient solution that eliminates having to store and supply fuel. However, strict control is required to prevent abuses and pilferage.

- ◆ Vehicles should only be supplied with fuel and oil upon presentation of coupons or purchase orders signed by the authorized person and bearing the seal of the organization. There must be a previous agreement with the gas station about the characteristics of the document. This will be equally useful when it is time to pay the supplier, since only the amounts indicated in the official coupons will have to be paid.
- ◆ The vehicles' fuel and oil consumption must be recorded in their log, indicating the date, time, and mileage at each refueling.
- ◆ The logs should be checked every so often by the person in charge of the fleet, who should look into any anomaly in consumption levels that might indicate mechanical problems or inappropriate use.

Fuel Consumption/Mileage Form

Refuel date	Mileage	Quantity and type of fuel	Average consumption (Km/liter)

Table 10.4 shows examples of average fuel consumption for different types of vehicles. These averages are only for reference, since they can vary depending on the characteristics of the route, the load, the speed, and other factors.

Table 10.4. Average fuel consumption per 100 km³²

Gasoline Engine		Diesel Engine	
Sedan	8-12 liters	Simple pickup	10-13 liters
Pickup	14-17 liters	4x4 Pickup	13-16 liters
Land Cruiser	21-27 liters	Land Cruiser	14-17 liters
Minibus	15-18 liters	Small truck (3.5 to 8 tons)	18-28 liters
		Large truck	35-50 liters

Transporting Supplies

When a consignment is on the road, it must be protected against damage, the weather, theft, and other eventualities. Applying basic, standardized security measures such as those listed below can guarantee that the goods will arrive at their destination safely.

- ◆ Vehicles should never be loaded beyond their payload capacity. Not only that—when the route is full of potholes, tight curves or other dangers, it is better to apply the safe load concept, i.e., less than the maximum load, to make sure the vehicles are more maneuverable in difficult terrain.
- ◆ In an open vehicle the payload must be covered with plastic or canvas to protect it from dust and rain, and also to keep from view the items that are being transported.
- ◆ The load should be fastened with ropes to prevent its movement, which might damage the packages or bales or destabilize the vehicle.

32 Taken United Nations High Commissioner for Refugees, *Supplies and Food Aid Handbook* (Geneva: UNHCR, 1989).

- ◆ When carrying items that are longer than the bed of the vehicle, such as iron rods, timber, or pipes, the protruding segment has to be marked with a red handkerchief or flag that can be seen clearly by other drivers.
- ◆ Ideally, vehicles should travel with a seal on their cargo doors, which must not be opened except by the recipient of the load. However, many vehicles do not have cargo doors. In those cases, it is essential before the journey begins to discuss with the driver the security measures that must be taken and his or her responsibility for the supplies. The same situation applies if vehicles must remain loaded while parked overnight.

The Transport of Hazardous Materials³³

When transporting hazardous materials, it is crucial to apply to the letter the HAZMAT guidelines for each product. Moreover, some basic measures need to be applied to guarantee the safety of the staff.

- ◆ Hazardous materials must be transported separately from products meant for human consumption.
- ◆ The packages carrying this type of material must be labeled properly, and the vehicle must carry a placard that meets international standards for the transportation of hazardous materials (see Annex 5.1 at the end of Chapter 5). Moreover, the driver must be aware of what to do in the event of an accident or spill.
- ◆ In any case, when transported by commercial carriers, hazardous materials must by law be identified as such so the firm can carry out the necessary safety procedures (see Annex 7.3, Chapter 7).
- ◆ It is necessary to verify the compatibility of chemical products that may be shipped together, to prevent a reaction during the trip.
- ◆ As an added security norm, fuel—particularly gasoline, kerosene, and other highly flammable substances—must be transported in non-metallic containers. If there is no other option, metal drums or other metal containers should be transported on pallets or any other surface so that they do not touch the metal floor or deck, and

33 See Chapter 5, section on Hazardous Materials.

padded or otherwise prevented from coming in contact with each other or metal walls, in order to prevent friction that might lead to combustion.

- ◆ Drums and other containers of hazardous materials must be thoroughly inspected before they are transported anywhere, to locate and prevent any leaks.
- ◆ Aircraft—both airplanes and helicopters—are often banned from carrying fuels as cargo, regardless of how they are stored. Restrictions also apply to the transportation of chemical products.
- ◆ Aircraft will often transport equipment such as electric generators, water pumps, or outboard motors only when they are brand new, since fuel residues in the fuel tank can be risky during flight. Sometimes they will agree to transport used equipment, but only if their fuel tanks are completely empty and have been washed thoroughly.

Convoys or Caravans

The term convoy or caravan applies to a group of vehicles traveling together, for the sake of convenience or safety, towards the same destination. Although it is preferable to avoid convoys, because individual vehicles can move faster and organizing a caravan takes time and a great deal of planning, they make sense when long distances or dangerous conditions—desert routes, inclement weather, hazardous mountain passes, the presence of armed bandits or rebels—make it necessary for vehicles to travel in a group.

In certain cases different organizations combine efforts and use caravans to transport assistance to the operation zone.

Basic Safety Measures³⁴

Emergency operations are carried out in conditions that are, by definition, abnormal. Certain roads may have been destroyed or are in very bad condition, armed groups may hinder freedom of movement, or the

34 On safety aspects of relief missions in conflict zones, a good resource is *Staying Alive* by David Lloyd Roberts (ICRC, Geneva, 1999).

social or political situation may be risky. It is therefore essential to reinforce all security and protection measures.

Given the complexity of an operation of this type, moreover, certain basic norms must be followed to ensure that humanitarian assistance gets to its destination safely. The following measures apply not only to convoys but also to individual vehicles:

- ◆ The vehicles used in the operation must be in optimum mechanical condition, and be checked thoroughly before departure; verify that they have received maintenance recently;
- ◆ For security reasons, it is best to travel during daylight hours;
- ◆ Convoys must travel under the authority of someone capable of enforcing discipline and making decisions in the event of a problem—mechanical failures, accidents, or security risks. The person in charge must be known by everyone participating in the convoy. When a caravan is made up of several organizations traveling together, they must coordinate in advance all aspects related to authority and decision-making during the journey;
- ◆ Safety norms must be established in advance and understood by all the people involved in the operation, to ensure the security of the staff and the supplies. The following are a few examples:
 - ▲ Standards of behavior;
 - ▲ Maximum traveling speed;
 - ▲ Care and safety of the supplies;
 - ▲ Itinerary, including rest stops;
 - ▲ Relations with the authorities on the road.
- ◆ Although military escorts may seem like a good idea, it is important to weigh their pros and cons. In situations of armed conflict, for instance, being escorted by an armed contingent may generate distrust about the neutrality of the relief operation, or even turn a convoy into a military objective;
- ◆ Similarly, it may not always be wise to display the logo or name of the organization on the vehicles, since this might make them a target.

- ◆ The vehicles in the convoy must have some way of communicating among themselves as well as with the departure and destination points;
- ◆ People's ID cards, vehicles' registration papers, and the consignment's shipping documents must be in order and on board during the journey. Drivers must carry a copy of the load manifest and an official authorization from the organization to transport these goods should they be required by authorities along the route;
- ◆ When a national frontier must be crossed, arrangements must be made in advance with the authorities of the countries involved to facilitate the crossing. Drivers and accompanying staff must be chosen carefully to ensure that no one will be turned around or face hazardous conditions in the destination country due to racial, ethnic, or nationalist conflicts;
- ◆ When the route chosen involves going through restricted areas, it is important to obtain in advance the authorization of the authorities in charge of those areas, as well as guarantees of safe passage;
- ◆ When it is people who are being evacuated or transported, it is important for a medical team to accompany the convoy. The team should carry basic equipment to deal with essential health care needs along the way. Water, food, and other basic supplies for ensuring people's welfare must be carried in the same vehicles, and the quantity of these supplies must be based not only on the expected itinerary, but on the possibility that a delay or breakdown should happen en route;
- ◆ Any convoy or individual vehicle must carry basic mechanical and other tools to deal with any problems on the way, as well as personal survival items such as first-aid kits, water, blankets, and food;
- ◆ If the caravan includes vehicles that carry hazardous materials, such as fuel, these must travel at the back of the convoy;
- ◆ At least one small vehicle capable of moving quickly up and down the line toward the convoy's head and rear should form part of the caravan, to help the other vehicles keep pace and remain close to each other and convey any messages in the event of a breakdown in the communications equipment;

- ◆ It is highly desirable for convoys to include support personnel, such as medical personnel, and capable mechanics.

Selecting the Route

Selecting the route to be taken depends on the kind of transport available, the urgency of the delivery, and the delivery schedule (i.e., whether partial deliveries must be made at intermediate points). Following are factors to consider when selecting the route:

- ◆ As a general principle, the safest route must be chosen even if it is not the fastest or shortest one. Many variables may influence this decision, and they should all be discussed and considered as possible scenarios;
- ◆ When deciding on the route to be taken, it is important to identify key services along the way, such as places where one may obtain fuel, food, mechanical repairs or medical care;
- ◆ It is also important to identify potentially insecure segments of the route, such as roads in bad condition, landslide-prone areas, or sectors where bandits or other armed irregulars are known to operate;
- ◆ Any change or deviation from the agreed-upon route, as well as any other special situation that may arise during the trip, must be communicated immediately to the nearest base, whether it is the point of departure, the delivery point, or a base in between.

Management of Air Operations

At times, an organization may have to hire an airplane, or several, to deliver the supplies. At other times, the large number of consignments arriving by air demands that a coordination plan be drawn concerning aircraft landings and the reception and offloading of the supplies at the airport or landing strip.

These tasks require a great deal of preparation. One person must be assigned to handle this work specifically, preferably someone with experience in logistics.

The routes and departure times of charter flights are different from those of commercial airlines, since they are determined by the customer in coordination with the airline company. At other times, it is government aircraft, generally part of the armed forces, that collaborate with the relief effort. Regardless of the carrier, some basic measures should be taken to make optimum use of air transport:

- ◆ The landing site should ideally be an airport, or at least an airstrip, but this is not always possible. If there is no airport, a good place for landing must be identified and used. The length and width of the improvised airstrip depends on the type of plane that must land and take off from the site. Ground conditions should be checked, and repairs or changes must be made to the strip to ensure safe landings;
- ◆ All available information about the characteristics of the landing site (length, width of the runway, the material with which it is paved, its orientation and location), as well as available services (lighting, refueling possibilities) and other important details such as the local weather report or safety information, must be conveyed to those in charge of the aircraft;
- ◆ When using an airport or landing strip, it is indispensable to coordinate with the authorities in charge of the facilities in order to secure access to the various working areas, determine what those areas are, and obtain all other information necessary to manage the operation successfully;
- ◆ All formalities required for landing must be negotiated in advance with local officials, if there are any. It is also necessary to establish what kind of equipment and support will be needed on the ground for landing and offloading the supplies. The question of refueling is significant, since airplane fuel and pumping equipment may not be available at the destination site;
- ◆ The date and estimated time of arrival must be defined clearly in advance. To prevent confusion between a.m. and p.m., it is more convenient to use a 24-hour cycle, so that 1 p.m. is 1300 hours; 2 p.m., 1400 hours, and so on. For flights coming in from a different time zone, it is essential to establish whether arrival time is local time or some other time;

- ◆ The person in charge of the operation, or his or her deputy, must be at the landing site at least one hour before arrival, to check conditions on the ground and remove any obstacles—people, livestock, objects on the runway—that may affect the safety of the landing.
- ◆ It is vitally important to establish a coordination center where flight schedules and routes are defined each day. The center must be manned, at the very least, by the person responsible for air operations, a pilot or representative of the airline, and whoever is in charge of coordinating the relief operation.

Annexes 10.2 and 10.3 describe the main characteristics of various kind of aircraft.

Annex 10.1

Overland Transport Capacities³⁵

<i>Means of transport</i>	<i>Load capacity</i>
Standard railway car	30 MT (52 m ³)
Standard container 20 feet/6.1 m	18 MT (30 m ³)
40 feet/12.2 m	26 MT (65 m ³)
Long truck with trailer	22 MT
Long articulated truck	30 MT
Medium-sized truck	6-8 MT
Pickup (4x4)	1 MT
People	
Load on head or shoulders	20-35 kg
Load on back	35-70 kg
Pack animals	
Camel	200-300 kg
Ass	50-120 kg
Horse	100-150 kg
Carts (pulled by a single animal)	
Ass	200-400 kg
Horse	Up to 1,200 kg
Ox	500- 1,000 kg

Note: MT=metric tons.

These examples are merely illustrative since, in the field, terrain variables including road conditions may affect the safe load capacity of a vehicle; for security reasons, often vehicles may not be loaded up to their maximum capacity.

³⁵ Adapted from United Nations High Commissioner for Refugees, *Handbook for Emergencies* (UNHCR, Geneva, 1988) and J. Davis and R. Lambert, *Engineering in Emergencies* (Intermediate Technology Publication Ltd., London, 1995).

Annex 10.2

Characteristics of different types of aircraft³⁶

Model	Fuel	Required runway length (meters)	Cargo weight (metric tons)	Cargo volume (cubic meters)
Antonov-124	Jet	3040 m	135.90 MT	840 m ³
B 377/C97	AvGas	1520 m	14.50 MT	N/a
B 707-320C	Jet	2432 m	36.24 MT	168 m ³
B-727-100	Jet	2128 m	15.86 MT	227 m ³
B-727-200	Jet	2523 m	24.92 MT	227 m ³
B-747-100	Jet	2858 m	101.02 MT	581 m ³
B-747-200	Jet	3253 m	103.74 MT	621 m ³
Beach 18	AvGas	547 m	1.13 MT	8 m ³
Beach 99	Jet	532 m	2.27 MT	N/a
C-130	Jet	912 m	11.32 MT	56 m ³
C-141B	Jet	1915 m	18.12 MT	126 m ³
C-17	Jet	1368 m	40.77 MT	585 m ³
C-46	AvGas	912 m	5.44 MT	93 m ³
C-5	Jet	2341 m	58.90 MT	364 m ³
Caravan	Jet	578 m	1.13 MT	9.5 m ³
Casa C-212	Jet	760 m	1.81 MT	N/a
Cessna 185	AvGas	426 m	0.41 MT	N/a
Cessna 206	AvGas	456 m	0.50 MT	N/a
Cessna 207	AvGas	578 m	0.54 MT	10m ³
Cessna 340A (Propjet)	Jet	760 m	N/a	N/a
Cessna 414	Jet	730 m	N/a	N/a
Cessna 421-C (Propjet)	Jet	730 m	N/a	N/a
Dash 7	Jet	669 m	5.12 MT	59 m ³
Dash 8	Jet	821 m	3.85 MT	39 m ³
DC-8 51 F	Jet	2432 m	27.63 MT	N/a
DC-8 54 F	Jet	2432 m	43.40 MT	N/a
DC-8 55 F	Jet	2432 m	43.94 MT	N/a
DC-8 61 F	Jet	2432 m	37.60 MT	N/a

³⁶ Adapted from Field Operations Guide For Disaster Assessments and Response. U.S. Agency for International Development. Office of U.S. Foreign Disaster Assistance (OFDA/USAID).

Model	Fuel	Required runway length (meters)	Cargo weight (metric tons)	Cargo volume (cubic meters)
DC-8 63 F	Jet	2432 m	42.58 MT	N/a
DC-8 70 F	Jet	2432 m	38.50 MT	N/a
DC-8 73 F	Jet	2432 m	46.21 MT	N/a
DC-9	Jet	2128 m	15.86 MT	126 m ³
DHC-6 Otter (Propjet)	Jet	578 m	1.59 MT	14 m ³
F-27 (Propjet)	Jet	1824 m	3.40 MT	56 m ³
F-28 (Propjet)	Jet	1580 m	6.80 MT	95 m ³
Helio Courier	AvGas	186 m	0.54 MT	4 m ³
Ilyushin 76	Jet	853 m	3.40 MT	232 m ³
L-100-10 Hercules (Commercial)	Jet	1307 m	11.33 MT	126 m ³
L-100-20 Hercules (Commercial)	Jet	1368 m	16.76 MT	148 m ³
L-100-30 Hercules (Commercial)	Jet	1307 m	18.12 MT	170 m ³
L-188 Electra (Propjet)	Jet	1824 m	14.50 MT	104 m ³
L-55 Learjet	Jet	1368 m	N/a	N/a
Skyvan	Jet	456 m	1.58 MT	22 m ³
Transall C-160	Jet	1003 m	16.76 MT	137 m ³
Turbo Porter	Jet	189 m	0.63 MT	4 m ³
Westwind I 124	Jet	1490 m	0.54MT	N/a

Annex 10.3

Characteristics of Different Types of Helicopters³⁷

Model	Fuel	Internal load (Kg)	External load (Kg)	No. of passengers
B 204	Jet	970 kg	1,156 kg	10
B 205	Jet	970 kg	1,156 kg	14
B 206B	Jet	284 kg	339 kg	4
B 206 L	Jet	362 kg	362 kg	4
B 212	Jet	970 kg	1,156 kg	14
B 214	Jet	1,119 kg	2,611 kg	12
A Star	Jet	410 kg	522 kg	5
Allouette II SA318C	Jet	336 kg	485 kg	4
Allouette III	Jet	522 kg	597 kg	6
Hughes 500C	Jet	261 kg	336 kg	4
Hughes 500 D	Jet	261 kg	336 kg	4
LAMA SA 315B	Jet	522 kg	522 kg	4
BV-107	Jet	2,611 kg	3,357 kg	Cargo only
BV-234	Jet	8,393 kg	8,393 kg	44
Hiller FH 1100	Jet	261 kg	336 kg	4
Bell G-47	AvGas	298 kg	373 kg	2

³⁷ Ibid.

Chapter 11

Distribution

The main objective of humanitarian logistics is to provide assistance to the people affected by a disaster or to organizations managing the disaster response. Delivery of assistance must be proportionate to needs, equitable and controlled to avoid abuse and waste.

Key Principles

Distribution cannot be generalized and indiscriminate. On the contrary, it must be proportional and controlled. While every organization has its own policies and motivations for providing assistance to disaster victims, certain criteria must transcend the individuality of the organization and be applied at all times to produce a more equitable and effective distribution.

1. Political or religious beliefs, ethnicity, nationality, or any other form of negative discrimination cannot be criteria for determining the eligibility of the potential beneficiaries of humanitarian assistance.
2. During the most active phase of the emergency, it is imperative to distribute those goods and items that are strictly necessary to cover immediate survival needs or to improve the living conditions of the affected population.
3. Assistance should be delivered only to those who truly need it, in direct proportion to their needs.
4. Humanitarian assistance aims to support people in a situation in which their ability to satisfy their own needs has been suddenly curtailed, so it must cover the most critical needs immediately.
5. Humanitarian assistance cannot resolve a population's entire problems. However, it can support them in finding solutions to their most pressing difficulties, complementing the efforts made by the disaster victims themselves.
6. Humanitarian assistance must be relevant, appropriate, and adapted to local customs and environmental conditions.

7. Humanitarian aid must be temporary. Long-term assistance generates dependency on outside aid and fails to stimulate the economic recovery of the affected area. Even in the case of displaced populations, who will need support for a longer period, the type of aid provided must promote self-sufficiency and a prompt return to normalcy.

Responsibilities and Criteria for Distribution

The distribution of humanitarian assistance is a highly complex activity that demands a great deal of expertise. A poorly run operation can have a negative impact on the very population it is meant to serve. Before engaging in the distribution of relief assistance, it is important to have a clear picture of the responsibilities it entails and the criteria that must govern the distribution of assistance, to ensure that it will bring about a positive change in the living conditions of the affected population.

Criteria

The distribution of humanitarian assistance should never take place until the capacity to meet the organizational requirements demanded by such an operation is in place. The criteria for selecting the beneficiaries, as well as the distribution procedures and methods, must be defined in advance in as much detail as possible.

To the extent possible, we should stick to our organization's "specialty": that which it does best. This discourages us from engaging in activities in which we have no experience, or improvising actions different from those we set out to do.

One must bear in mind as well that, given the evolution of the emergency, initial criteria may need to be revised and adapted to new circumstances. Even so, any change in the intervention strategy must reflect the reality on the ground and be the result of a thorough assessment of how best to contribute to the overall relief effort.

Responsibilities

As already noted, the purpose of humanitarian assistance is to have a positive impact on the survival and living conditions of the affected population. It is therefore the responsibility of disaster managers to make sure all efforts are directed at those goals.

In conditions of scarcity, or in certain political or military contexts, access to humanitarian supplies is central in the struggle for power and control. Politicians and other interested stakeholders will often try to control distribution in order to improve their public image or benefit certain constituencies to the exclusion of others.

Certain groups or individuals may claim to speak for the affected population, and try to usurp the assistance. At the same time, other groups, due to their isolation or for cultural reasons, may experience greater difficulty in reaching the distribution centers, or even finding out that they exist. Such cases must be monitored to prevent exclusion.

Equity in distribution and protection of humanitarian supplies are key responsibilities in ensuring that the assistance is not managed unscrupulously for political or financial gain.

Distribution Systems

Situation of the Disaster Victims

Whenever possible, assistance should be delivered directly to the intended beneficiaries or through reliable intermediaries chosen especially for this task. The distribution system to be adopted depends on the specific conditions of the population in need, as well as the capacity of an organization to handle the distribution.

The state of the affected population tends to vary depending on the type of disaster and the social, geographical, and political context. In fact, in the same theater of operations different situations may arise. Very broadly, these situations include the following:

- ◆ Disaster victims who have suffered damage to their homes and properties but who still live there or in the near vicinity;

- ◆ Disaster victims who due to the severe damage to their community, have had to be sheltered temporarily away from their normal place of residence;
- ◆ People displaced from their communities (generally as a result of violence) and whose return is in doubt;
- ◆ Refugees who have fled their own country out of fear for their safety or their life. The term "refugee" is officially applied only to those who have been recognized as such by the UN High Commissioner for Refugees (UNHCR). However, this does not mean aid should not be given to them before official recognition takes place, since their most basic needs cannot be postponed. What it does mean is that assistance will eventually have to be coordinated by the UNHCR.

Direct Distribution

Engaging in direct distribution requires a good working knowledge of the affected population and the physical and social environment. It also calls for logistical, administrative, and infrastructural capabilities. Direct distribution can provide greater control over the use of donations. However, it can prove extremely challenging if there is a lack of experienced personnel or the capabilities mentioned are not available. Some important factors affecting the success of direct distribution are the following:

- ◆ When distribution takes place in an unfamiliar area, it is important to identify people who know the region well and the community, who can provide guidance and contacts, and who can facilitate access to the community. However, one must be careful not to fall into the hands of individuals who may wish to manipulate the aid for personal advantage, or to benefit a particular group instead of the general population;
- ◆ It is also important to identify community leaders and organizations that are representative of the affected population and who can help coordinate the relief efforts. Care must be taken, nevertheless, not to lose autonomy or control over the emergency supplies;
- ◆ Identifying the pressure groups within the affected population, the

local dynamics of rivalries and alliances, assists in foreseeing possible tensions and conflict scenarios in order to take measures to prevent or bypass them;

- ◆ A system must be implemented for recording and identifying aid beneficiaries. When distribution of humanitarian supplies is first carried out, beneficiaries must receive a document to keep track of future deliveries. Most organizations use coupons, ration cards, or vouchers containing information about the beneficiaries and all assistance given to date. These documents should be presented every time aid is distributed (see Annex 11.1);
- ◆ A visible mark (a stamp, signature, or fingerprint) must be made on the distribution document to certify that the delivery has been made, and to prevent "second helpings;"
- ◆ It is better to register families rather than individuals. The number and age group of household members must be recorded, so that assistance can be provided in an equitable and proportional manner. It is also important to record the special needs of household members, particularly those belonging to vulnerable groups such as children, the elderly, pregnant women, or people with particular ailments or handicaps (see Annex 11.1);
- ◆ Beneficiaries must be treated equitably. Every effort must be made to prevent exceptions, preferential treatment, or nepotism. Such behavior can only lead to conflicts, undermine an organization's standards, and even threaten security;
- ◆ Delivery procedures should not be changed frequently. It confuses the beneficiaries and can reduce the effectiveness of the distribution system;
- ◆ The organization must take steps to prevent the exclusion of people who qualify as beneficiaries but who, for whatever reasons, do not have easy access to distribution points;
- ◆ Distribution areas must be identified with signs or placards, and its perimeters secured, to prevent crowding or the direct contact of the affected population with the supplies;
- ◆ Beneficiaries must be briefed—as often as required—on the distribu-

tion system to be used, including such procedures as standing in line, taking a number, specific daily or weekly delivery times, or the use of loudspeakers;

- ◆ It is important to assign responsibilities to the beneficiaries themselves in tasks related to the distribution of the aid—such as helping with the offloading or carrying of supplies, organizing the queues, or building distribution sites. Sometimes it will be necessary to ask local people, particularly local leaders, to help organize the deliveries, for instance by acting as interpreters or providing advice on how to adapt the distribution process to local or ethnic customs.

Indirect Distribution

When working in unfamiliar places, it is difficult for an organization to distribute supplies properly and fairly in the short time available. In some cases, the operative functions of an organization do not include handling direct distribution. In these circumstances, it is important to find a local, trustworthy counterpart that knows the population and the place, and can handle distribution.

When this approach is used, the distribution of the goods to their recipients must be carefully monitored to ensure fairness and proportionality. Another drawback is that it diminishes the visibility of an organization, something that may be undesirable. If such a course is, nevertheless, chosen, the following should be done:

- ◆ Identify a reliable counterpart with strong contacts on the ground, such as community groups, nongovernmental organizations, local institutions, or neighborhood committees;
- ◆ Avoid organizations that are in conflict with the community or other groups, as well as organizations openly associated with a political party or armed faction. In any case, one should not maintain exclusive relations with any particular group, but aim for a balanced relationship with all relevant organizations to prevent a perception of partiality and to avoid placing the operation in jeopardy;
- ◆ Before anything else, come to an agreement with the counterparts concerning the distribution procedures to be used and the control

and monitoring mechanisms, including any reporting obligations by the counterpart;

- ◆ Remain in close contact with your counterparts, follow up on their actions, get their feedback, and keep a presence on the ground to support their efforts and ensure that distribution follows the agreed principles and standards;
- ◆ Conduct periodic physical and documentary reviews of the supplies that have been distributed and the remaining stocks, and monitor the distribution activities of the counterparts in the field.

Monitoring and Control³⁸

Organizations must ensure that the humanitarian assistance reaches the victims of the disaster, instead of ending up in the wrong hands. Monitoring and control mechanisms must be in place at every stage of the handling of emergency supplies, especially during their distribution.

Documentary Control and Monitoring

Documentation for the arrival of loads at the storage centers, dispatch of supplies from these centers and distribution of supplies should be consistent. Any discrepancies should be immediately investigated.

People in charge of distribution must be made fully aware of the importance of always using the agreed-upon forms (see Annex 11.1). Otherwise, it will not be possible to keep track of the supplies.

At the end of every day, the people in charge of distribution must prepare a report. If there is a warehouse at the distribution center, its inventories must always be kept up to date.

In the case of indirect distribution, the counterparts must always present clear reports on the use of the resources entrusted to them in serving the affected population. It is the responsibility of the organization facilitating those resources to provide the appropriate forms for those reports and ensure that the reports are produced on schedule.

38 See also Chapter 8.

Physical Control and Monitoring

Examining the documents is not enough. It must be complemented with frequent physical reviews at the distribution sites. The purpose is not only to make sure that the books balance, but also to determine whether the procedures employed are the right ones, to identify needs, and to correct any problems that may arise.

Annex 11.1

Sample Beneficiaries Record

RECORD OF BENEFICIARY FAMILIES				
Card #	Date and place of record			
Assigned distribution point / center:				
Information about the family				
Name	Relationship	Age	Sex	Special needs
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
Current location of the family:				
Explanation of special needs of some members of the family (pregnant women, breast-feeding women, nutritional complement, etc.):				
Name and signature of head of household				

SAMPLE - DISTRIBUTION CARD (reverse of the RECORD OF BENEFICIARY FAMILIES)

ASSISTANCE DISTRIBUTION CARD

Distribution place and date:

Products and quantities received

Beneficiary's signature

Distribution place and date:		Products and quantities received				Beneficiary's signature	

Distribution place and date:

Products and quantities received

Beneficiary's signature

Distribution place and date:		Products and quantities received				Beneficiary's signature	

Distribution place and date:

Products and quantities received

Beneficiary's signature

Distribution place and date:		Products and quantities received				Beneficiary's signature	

Distribution place and date:

Products and quantities received

Beneficiary's signature

Distribution place and date:		Products and quantities received				Beneficiary's signature	

Distribution place and date:

Products and quantities received

Beneficiary's signature

Distribution place and date:		Products and quantities received				Beneficiary's signature	

Annex 11.2

Table for estimating required food quantities

Daily average ration (grams)	Days	Total consumption per person during the period (kg)	Total required quantity (in metric tons)						Quantity of people who can be fed with:			
			For 500 people	For 1,000 people	For 2,000 people	For 5,000 people	For 10,000 people	1 metric ton	50 metric tons	100 metric tons	200 metric tons	
10	90	0.9	0.45	0.9	1.8	4.5	9.0	1,111	55,560	111,110	222,220	
	120	1.2	0.6	1.2	2.4	6.0	12.0	833	41,670	83,330	166,670	
20	90	1.8	0.9	1.8	3.6	9.0	18.0	555	27,780	55,560	111,110	
	120	2.4	1.2	2.4	4.8	12.0	24.0	417	20,830	41,670	83,330	
30	90	2.7	1.35	2.7	5.4	13.5	27.0	307	18,520	37,040	74,070	
	120	3.6	1.8	3.6	7.2	18.0	36.0	278	13,890	27,780	55,560	
40	90	3.6	1.8	3.6	7.2	18.0	36.0	278	13,890	27,780	55,560	
	120	4.8	2.4	4.8	9.6	24.0	48.0	208	10,420	20,830	41,670	
50	90	4.5	2.25	4.5	9.0	22.5	45.0	222	11,110	22,220	44,440	
	120	6.0	3.0	6.0	12.0	30.0	60.0	167	8,330	16,670	33,330	
60	90	5.4	2.7	5.4	10.8	27.0	54.0	185	9,260	18,520	37,040	
	120	7.2	3.6	7.2	14.4	36.0	72.0	139	7,140	13,890	27,780	
80	90	7.2	3.6	7.2	14.4	36.0	72.0	139	7,140	13,890	27,780	
	120	9.6	4.8	9.6	19.2	48.0	96.0	104	5,210	10,420	20,830	
100	90	9.0	4.5	9.0	18.0	45.0	90.0	111	5,560	11,110	22,220	
	120	12.0	6.0	12.0	24.0	60.0	120.0	83	4,170	8,330	16,670	
	180	18.0	9.0	18.0	36.0	90.0	180.0	56	2,780	5,560	11,110	

Source: United Nations Children's Fund, *Assisting in Emergencies, A Resource Handbook for UNICEF Field Staff* (Geneva: UNICEF, 1986).

Table for estimating required food quantities (continued)

Daily average ration (grams)	Days	Total consumption per person during the period (kg)	Total required quantity (in metric tons)						Quantity of people who can be fed with:			
			For 500 people	For 1,000 people	For 2,000 people	For 5,000 people	For 10,000 people	1 metric ton	50 metric tons	100 metric tons	200 metric tons	
125	90	11.25	5.6	11.3	22.5	56.3	112.5	89	4,440	8,890	17,780	
	120	15.0	7.5	15.0	30.0	75.0	150.0	67	3,330	6,670	13,330	
	180	22.5	11.3	22.5	45.0	112.5	225.0	44	2,220	4,440	8,890	
150	90	13.5	6.75	13.5	27.0	67.5	135.0	7,474	2,700	7,410	14,810	
	120	18.0	9.0	18.0	36.0	90.0	180.0	5,656	3,780	5,560	11,110	
	180	27.0	13.5	27.0	54.0	135.0	270.0	3,737	1,850	3,700	7,410	

Chapter 12

*Managing Medical Supplies*³⁹

The term "medical supplies" applies to drugs and medical, dental, and laboratory products and equipment. In an emergency, drugs are a top priority: it is necessary to ensure that they are readily available, but also that they are used rationally.

Even in normal times, the health system must optimize the use of resources and make sure they are available to all who need them. When disaster strikes, the same supply procurement and distribution process must remain in place—and it must remain effective in more challenging circumstances, since it must adapt to both the urgency of the situation and the scarcity that often accompanies an emergency.

Drugs and other medical supplies must be selected, procured, stored, and distributed in such a way that the right supplies are available at the right time, that their quality and safety can be guaranteed, and that they are used correctly.

Selection

The objective of the selection process is to develop a list of basic and critical medical supplies to be provided to the affected population in a safe and effective manner.

Selection Committee: A medical supplies selection committee must be appointed, comprising a multidisciplinary team—doctors, nurses, pharmacists—who know the situation at the local level, including the needs of the affected population. Representatives of the ministry of health must also participate in the group.

Selection Criteria: The selection of medical supplies must take into account the health care needs of the affected population, the characteristics of the patients who require treatment, the availability of supplies, and the capacity of the health system to meet these requirements.

³⁹ This chapter was originally written by Dr. María Margarita Restrepo and partially modified to adapt it to the present needs. Dr. Restrepo teaches at the Faculty of Pharmaceutical Chemistry at the University of Antioquia in Medellín, Colombia. She also collaborates with FUNDESUMA and PAHO, with whom she has participated in several emergencies in the region as advisor on medical supply management.

Generally, the medical authorities of the various countries have a list of basic drugs and medical products. Should no such list exist, the one prepared by the World Health Organization (WHO) may be used.

It is also essential to establish the degree of competence required to define a group of drugs or a special therapeutic category, so that sound decisions are made.

Basic List: A basic list of medical supplies must be prepared to deal with the acute phase of the disaster and potential epidemics. To prepare this list, one should take into account the types of risks and the most common pathologies that occur in this kind of situation.

Table 12.1 presents an example of a basic list to respond to those health problems that occur in most disasters.

WHO has prepared standard lists of essential drugs and medical supplies (known as "emergency kits") for use in emergency situations. The purpose of these kits is to ensure the prompt and effective provision of those supplies needed to satisfy priority needs.⁴⁰

The standard kit consists of two parts: a basic unit and a supplementary unit.

The basic unit includes indispensable drugs and medical supplies and equipment for primary health care, and can be used by primary health care workers with limited training.

The supplementary unit contains drugs and medical supplies for 10,000 people, and can be managed only by professional physicians or health workers. The selection and quantification of drugs are based on the guidelines for treatment that have been prepared by WHO technical services.

40 World Health Organization (WHO), *The New Emergency Health Kit*. First Edition, (Geneva, 1990).

Table 12.1. Suggested basic drugs for emergency situations

1. Analgesics, antipyretics, non-steroid anti-inflammatory drugs	
Acetylsalicylic acid	Tab 500 mg
Ibuprofen	Tab 200, 400 mg
Paracetamol	Tab 500 mg, bottle 125 mg / 5 ml
Morphine hydrochloride	Injection 10 mg/ml
2. Anti-allergic drugs	
Chlorpheniramine maleate	Tab 4 mg, inj 10 mg/ml
Dexamethasone phosphate	Inj 4 mg/ml
3. Anti-infectives	
3.1 Anthelmintic and antiparasitic drugs	
Albendazole	Tab 400 mg
Mebendazole	Tab 100 mg
Metronidazole	Tab 500 mg, inj 500 mg, suspension 200 mg/5 ml
3.2 Antibacterial drugs	
Amoxicillin	Tab or capsule 500 mg, suspension powder 125 mg/5 ml
Penicillin sodium	Inj powder of 1 million UI, 5 million UI
Procaine penicillin	Inj powder 1 million UI
Cloxacillin sodium	Cap 500 mg, suspension powder 125 mg/5 ml, inj powder 500 mg
Chloramphenicol	Inj powder 1 g
Trimethoprim-sulfamethoxazole	Tab 80 mg + 400 mg, suspension 40 mg / 200 mg
3.3 Antifungals	
Ketoconazole	Tab 200 mg, oral suspension 100 mg / 5 ml
Benzoic acid + salicylic acid	Tube 6% + 3
3.4 Antiseptics	
Chlorhexidine	Solution 5%
Polyvidone iodine	Solution 10%
4. Respiratory tract, drugs acting on	
Salbutamol	Tab 4 mg, bottle 2 mg/ml
Theophylline	Tab 200 mg
5. Oral Rehydration Salts	

Programming Acquisitions

The process of programming acquisitions is aimed at having the necessary health supplies in the quantities required to care for the affected population at the right time, while guaranteeing the quality of the supplies.

In order to plan ahead and forecast the needs of the affected population, a close relationship must exist between the people in charge of supply management and the health workers in the field, by means of adequate exchange of information.

The quality of the supplies must be the chief criterion, independently of the providers, so it is vital to determine what supplies will be needed.

Estimating Needs

In order to anticipate the need for supplies, one must:

- ◆ Identify and clearly define what sources of supplies are available, since it is not wise to depend exclusively on foreign assistance;
- ◆ Carry out an epidemiological assessment to estimate the quantity of supplies needed, bearing in mind not only situations during the acute phase of the disaster but also the potential epidemics that may occur after that phase;
- ◆ Identify the affected population, including if possible its demographic composition, grouped mainly by age;
- ◆ Establish the frequency of each type of illness;
- ◆ Compare the uniform treatment standards for each of the morbidity patterns with the national list, if one exists. Should one not exist, health professionals must be consulted about the supplies needed to deal with each ailment.
- ◆ Estimating the needs can be done as follows: Necessary quantity = Frequency of morbidity x Quantity of supplies needed per treatment;⁴¹

41 Carmen Contreras and Carlos Moreno (Editors) *Gerencia y administración de sistemas de suministros de medicamentos esenciales* (Medellin, Colombia, COHAN, PAHO/WHO Collaborating Center; 1999).

- ◆ It is essential to check the stock report every day, including the donations that have arrived.

Types of Providers

Once the quantity of supplies needed has been estimated, it is necessary to identify and define the various sources of the supplies, including the following:

- ◆ **Local or national purchases:** Have an inventory of local providers and the quantities of the required drugs that they have available for immediate delivery;
- ◆ **International purchases:** International providers can facilitate these purchases, particularly not-for-profit organizations such as UNICEF or PAHO;
- ◆ **Donations:** Considering that this is one of the main sources of emergency supplies, and hence of medical supplies, this issue will be explored at length below.

Reception and Evaluation of Acquisitions

Reception is the process of comparing what was received with what was requested, verifying administrative specifications such as the quality of the items received. This procedure must be applied regardless of how and where the goods were acquired.

Donations

The drugs and other health supplies donated by foreign organizations or countries and local donors can be tailored to the specific needs of the affected population, or they can be the result of spontaneous solidarity. Regrettably, the latter case is the most frequent, which often creates more problems than solutions, including the following:

- ◆ Spontaneously donated supplies may not meet the needs of the affected population. Drugs, in particular, may not be therapeutically useful

for the types of morbidity prevalent in the emergency zone, or else may not match the level of care of the institution receiving them;

- ◆ In most cases, donated drugs may not be correctly classified. The labels may not meet the necessary specifications for identification, such as the international generic name for the drug, they may carry commercial names unknown in the recipient country, lack expiry dates, or be labeled in a language that is not understood locally;
- ◆ Sometimes donated quantities may surpass current needs, putting a strain on storage efforts;
- ◆ Quite often, the drugs received have already expired or suffered some form of decay that makes their consumption dangerous.⁴²

Criteria for Requesting and Receiving Donations

Since drugs are one of the main types of supplies required during an emergency, the World Health Organization (WHO) established a series of guidelines for drug donations, aimed at improving their quality and preventing the difficulties outlined above.

A group of international organizations have established a forum that also aims to set standards and create better conditions for requests and donations of this type of supply. Their Web site, <http://www.drugdonations.org>, includes a series of useful documents, such as guidelines for the correct disposal of drugs, conditions for requesting specialized medical equipment, and others. It is possible to subscribe to an electronic newsletter to get up-to-date information and news on the subject.

The WHO guidelines for drug donations⁴³ are based on four key principles:

1. The maximum benefit for the recipient: This implies that donations must be based on expressed needs, and donations that have not been requested should be avoided;
2. Respect for the wishes and authority of the recipient: Donations must conform with official policies and administrative regulations;
3. Identical standards of quality for all: If the quality of an article is unacceptable to the donor country, it is also unacceptable as a donation;

42 Ibid., p. 228.

43 WHO *Guidelines for Drug Donations*, (Geneva, May 1996).

4. Effective communication between donors and recipients: The chief goal is for donations not to be sent without prior notice.

Bearing in mind these four principles, the following are some of the guidelines donors should heed before sending any shipments.

Selection of Drugs

- ◆ All drug donations should be based on an expressed need and be relevant to the disease pattern in the recipient country;
- ◆ 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 list of essential drugs, unless specifically requested otherwise by the recipient country;
- ◆ The presentation, strength and formulation of donated drugs should, as much as possible, be similar to those commonly used in the recipient country.

Quality Assurance and Shelf-life

- ◆ All donated drugs should comply with the quality standards of both the donor nation and the recipient country;
- ◆ No drugs should be donated that have already been issued to patients and then returned to a pharmacy or elsewhere, or given to health professionals as free samples;
- ◆ After arrival in the recipient country, all donated drugs should have a remaining shelf-life of at least one year.

Presentation, Packing and Labelling

- ◆ All drugs should be labeled in a language that is easily understood by health professionals in the recipient country; the label on each individual container should contain:

- ▲ The International Nonproprietary Name (INN, or generic name);
 - ▲ Batch number;
 - ▲ Dosage;
 - ▲ Strength;
 - ▲ Name of the manufacturer;
 - ▲ Quantity in the container;
 - ▲ Storage conditions; and
 - ▲ Expiry date;
- ◆ To the extent possible, donated drugs should be presented in the largest quantity units available, as well as in hospital packs;
 - ◆ 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. Drugs should not be mixed with other supplies in the same package.

Information and Management

- ◆ Recipients should be informed of all drug donations that are being considered, prepared, or actually underway;
- ◆ The declared value of a drug donation should be based upon the wholesale price of its generic equivalent in the recipient country, or, if such information is not available, on the wholesale world-market price for its generic equivalent.

Storage Systems

The purpose of storage is to ensure that health supplies retain their quality and effectiveness by creating the necessary physical, hygienic and infrastructural conditions. Adequate storage conditions guarantee:

- ◆ The quality of the drugs until they are used;
- ◆ Their therapeutic effectiveness;
- ◆ The prevention of accelerated aging or decay.

The warehouse or other storage site must be well-ventilated and easily accessible and receive regular cleaning and maintenance.

Storage Areas

The place where supplies are stored should make it possible to separate drugs from other health supplies.

The drug storage area must be divided into several zones:

- ◆ A zone dedicated to storing drugs for immediate distribution, preferably on shelves and located close to the exit;
- ◆ A zone to locate full boxes of supplies;
- ◆ Another zone to store drugs that do not require priority distribution.

In each zone, the drugs should be organized by expiry date, placing the ones that will expire soonest nearer the front of the pile.

Boxes should be placed on platforms or pallets and not directly on the floor.

Storage Conditions⁴⁴

Drugs and medical supplies and equipment in general require much greater care than other types of supplies. Guidelines must be followed with the utmost rigor, and strict monitoring must be applied to ensure that the products are well conserved until they are needed. It is important to control the following environmental conditions under which the goods will be stored:

- ◆ **Light:** Many drugs are sensitive to light, or photosensitive, and spoil when exposed to excessive light; they must be kept away from direct sunlight and lamps.

44 Amariles, Pedro, et al., *Guía integral para el funcionamiento y mejoramiento de un servicio farmacéutico* (Medellín, 1999).

The packages in which drugs come have been designed to protect the drugs they carry. The type of package is taken into account when estimating the useful life of the drug: it must never be destroyed before drugs are distributed. On the contrary, efforts must be made to preserve the original package;

- ◆ **Humidity:** Another factor to control in drug storage areas is humidity. A highly humid environment can promote the growth of microorganisms such as fungi and bacteria, as well as precipitate chemical reactions such as the oxidation of the drug's components. Tablets may soften, as well;
- ◆ **Temperature:** Maintaining the right temperature is essential for the stability of the drugs. Every type of drug has a range of temperatures within which it can be stored without losing its properties. This temperature range should be indicated on the package; if it does not appear, the assumption is that the drug should be kept at room temperature, guarding against extremes of heat or cold.

The wrong temperature can have two main effects on drugs: loss of strength or chemical reactions that render them toxic.

Correct storage temperatures are the following:

- ▲ Room temperature: 15-30° C.
- ▲ Cool: 8-15° C.
- ▲ Refrigerated: 2-8° C.

Freezing (temperatures below 0° C) or temperatures above 30° C should be avoided, because they generally lead to loss of strength or of the physicochemical characteristics of the product.

Vaccines—indispensable for controlling epidemics in a disaster—require a strict control of the cold chain all the way from the point of acquisition to the place where they are administered to patients. Freezers or refrigerators are needed, as are thermometers to verify the internal temperature; should this equipment be unavailable at one or more links of the cold chain, insulated boxes are to be used with ice thermometers.⁴⁵ It is advisable to attach a form to the refrigerator door or the side of the cold box to record daily temperatures.

45 Gel packs now available on the market are more effective than ice. They do not melt, they are reusable, and they eliminate the problem caused by ice coming in direct contact with the medicines.

Controlling and Monitoring Products in the Storage Centers

- ◆ Stock levels. Keeping track of stock levels helps to determine whether any given item is oversupplied or becoming scarce. Drugs should be kept in storage for the shortest time possible, but the stock of a given product should never be allowed to reach zero while it is still required. Using a system of minimum and maximum stock levels might not be feasible when responding to a disaster, but during the recovery phase enough supplies must be at hand to cover all needs, which calls for estimating the level of stocks required to cover the affected population during that period.
- ◆ Stock level estimates. Estimating the stock levels needed to provide basic health care to the affected population calls for collecting data on morbidity, the number of people affected, the patterns of drug use, and the span of time during which the population will be cared for.
- ◆ Stock control. This process is directly linked with the acquisition process. It ensures that adequate quantities of necessary drugs are requested and are received. Effective stock control should ensure that stocked drugs do not spoil due to overlong storage or outlive their shelf life.
- ◆ Shelf-life control: It is important to monitor regularly the expiry dates of stored drugs and keep a record. Short-dated drugs should be distributed first. If any drugs are found to be past their expiry date, they should be discarded in a safe manner. Under no circumstances should an expired drug be administered, since it may be ineffective or harmful—unless a qualified professional can state otherwise.

Identifying Signs of Decay in Some Drugs

Certain physical signs can reveal loss of potency or decay in drugs, and people entrusted with managing drug stocks should be on the lookout for them. They include:

- ◆ Spots on tablets;
- ◆ Hardening or softening of capsules;

- ◆ Presence of non-dispersed particles in liquid;
- ◆ Opaque solutions;
- ◆ Changes in color;
- ◆ Presence of bubbles in liquid;
- ◆ Swollen or bulging containers.

Distribution

In disaster situations, distribution is one of the key steps in the management of health supplies. Its purpose is to ensure that medical supplies are quickly made available to the people who need them, preserving the quality of the supplies and preventing waste and the inappropriate use of resources.

For distribution to be carried out effectively, the various organizations receiving supplies must coordinate their efforts, particularly with government agencies responsible for health care, such as the ministry of health.⁴⁶

This calls for the development of an information system that records the number of people affected, the health problems that require care, current stocks in each of the warehouses or storage facilities, and the deliveries that have been made or are expected in the near future.

Supplies must be distributed based on the demand for them and on the existing stock. To ensure effective distribution, the following issues should be considered:

- ◆ A reliable transport system must be in place. The vehicles of the public health system or agencies such as the Red Cross can be used. Sometimes it may be possible to negotiate with suppliers delivery of the products directly to health care units or other sites where they are required;
- ◆ Delivery schedules must be based on identified needs, stock levels and consumption patterns, the transport system and the time and distance involved in making each delivery.

46 Management Sciences for Health, *The Supply of Drugs* (Boston, 1989).

Although an emergency situation is, by definition, exceptional, patients must still be provided with information about correct drug use. Patients taking medicines and persons prescribing them should be monitored.

Discarding Pharmaceutical Products

Discarding or destroying expired or ineffective drugs and other medical supplies, as well as those that have been damaged in transport, handling, or through deficient storage, entails a series of economic, social, environmental and logistical consequences. Annexes 12.1 and 12.2 summarize recommended methods for safely carrying out these tasks. These tables have been taken from a document that should be obligatory reading for all staff involved in the management of medical supplies: *Guidelines for safe disposal of unwanted pharmaceuticals in and after emergencies*.⁴⁷

47 The product of a joint effort by the World Health Organization (WHO), other UN agencies involved in the issue, and a group of international NGOs, this document can be found at <http://www.drugdonations.org/eng>, or by contacting Department of Essential Drugs and Other Medicines, World Health Organization (WHO), Avenue Appia 20, CH-1211 Geneva 27, Switzerland; Tel: 41 22 791 3528, Telefax: 41 22 791 4167.

Annex 12.1

Summary of Pharmaceutical Categories and Disposal Methods During and After an Emergency⁴⁸

Category	Disposal methods	Comments
Solids Semi-solids Powders	Landfill Waste encapsulation Waste inertization Medium and high temperature incineration (cement kiln incinerator)	No more than 1% of the daily municipal waste should be disposed of daily in an untreated form (non-immobilized) to a landfill.
Liquids	Sewer High temperature incineration (cement kiln incinerator)	Antineoplastics not to sewer.
Ampoules	Crush ampoules and flush diluted fluid to sewer	Antineoplastics not to sewer.
Anti-infective drugs	Waste encapsulation Waste inertization Medium and high temperature incineration (cement kiln incinerator)	Liquid antibiotics may be diluted with water, left to stand for several weeks and discharged to a sewer.
Antineoplastics	Return to donor or manufacturer Waste encapsulation Waste inertization Medium and high temperature incineration (cement kiln incinerator) (chemical decomposition)	Not to landfill unless encapsulated. Not to sewer. No medium temperature incineration.
Controlled drugs	Waste encapsulation Waste inertization Medium and high temperature incineration (cement kiln incinerator)	Not to landfill unless encapsulated.
Aerosol canisters	Landfill Waste encapsulation	Not to be burnt: may explode.
Disinfectants	Use To sewer or fast-flowing watercourse: small quantities of diluted disinfectants (max. 50 litres per day under supervision)	No undiluted disinfectants to sewers or water courses. Maximum 50 litres per day diluted to sewer or fast-flowing watercourse. No disinfectants at all to slow moving or stagnant watercourses.
PVC plastic, glass	Landfill	Not for burning in open containers.
Paper, cardboard	Recycle, burn, landfill	--

48 Based on WHO et al., *Guidelines for Safe Disposal of Unwanted Pharmaceuticals in and after Emergencies*. First Edition. Geneva, 1999.

Annex 12.2

*Disposal by Incineration*⁴⁹

“The European Union Directive on the incineration of hazardous waste (Ref. 12) states that:

‘All incineration plants shall be designed, equipped and operated in such a way that the gas resulting from the incineration of the hazardous waste is raised, after the last injection of combustion air, in a controlled and homogeneous fashion and even under the most unfavourable conditions anticipated, to a temperature of at least 850°C, as achieved at or near the inner wall of the combustion chamber, for at least two seconds in the presence of at least 6% oxygen; if hazardous wastes with a content of more than 1% halogenated organic substances, expressed as chlorine, are incinerated, the temperature has to be raised to at least 1100°C.’

“Article 7 of the same Directive gives emission limit values for the exhaust gases from incineration plants. The values provided are to prevent emissions into the air giving rise to significant air pollution. In addition to temperature and residence time other operating conditions must also be followed to combust pharmaceuticals safely and efficiently (e.g. treatment and handling of ash).

“Studies by Pharmaciens Sans Frontières in 1996 in Mostar have shown that the donated pharmaceuticals, in mixed boxes, had a halogen weight content (i.e. the elements chlorine, fluorine, bromine, iodine, and the isotope astatine), of approximately 0.1% of the total weight including associated packaging. This is well below the 1% threshold given in the EU Directive. The very low halogen content reported for the donated pharmaceuticals indicates that the lower temperature of 850°C could be adopted for these types of pharmaceuticals.”

49 Extract from WHO et al., *Guidelines for Safe Disposal of Unwanted Pharmaceuticals in and after Emergencies, First Edition* (Geneva, 1999).

Chapter 13

Transparency and Information in Emergency Supply Management

Transparency

The actual use of emergency supplies—whether they reach the affected population or are wasted or diverted for profit or political advantage—sometimes raises suspicion among the public, and even among international donors. Instances of donation mismanagement feed this suspicion, although in many cases it is caused by lack of information regarding the final destination of the aid.

All organizations that intervene in relief efforts must embrace transparency in the handling of supplies, particularly when they have called on national and international solidarity to complement the resources available at the local level, turning these provisions into public goods.

Transparency requires the existence of reliable mechanisms to verify that the management of supplies at every stage is correct, fair, and effective and to keep donors informed about the results of their assistance. It is the best way to maintain confidence and open new doors for the resources we need to expand our actions and save more lives.

Information

Information about the supply management operation must be disseminated from the very start of the emergency, when needs are assessed and requests go out for national and international cooperation. Throughout the course of the operation, interim reports must be published about the supplies at hand and those that are needed. Disseminating such reports from an early stage prevents rumors of negligence or mismanagement.

In addition to the reports published by the mass media, it is important to consider the information that is shared directly in the field with the various stakeholders. Those responsible for supply management must be forthcoming in providing oral or written reports to local organizations, the affected population, and other actors.

Reports to Donors

Donors involved in humanitarian assistance—whether governments, large corporations, international organizations, or individuals—need, and wish, to remain informed of the final use to which their resources are put. They want to know whether these resources were used correctly and their contribution has been useful.

For their part, humanitarian organizations continue to rely to a considerable extent on the generosity of donors to cover the assistance needs of the people they serve, and they need to have some assurance that this assistance will be available for future interventions.

It is therefore essential for a reliable resource management system to be in place that can show clearly how the aid was handled and what its final destination was. In short, donors must be kept informed.

The first step is to send confirmation to the donors as soon as their contributions have arrived, whether in cash or kind. How the notification is effected depends, among other things, on the type and location of the donor. These are some of the possibilities:

- ◆ Notifying the local representative of the donor, whether an embassy, a country office, or a commercial subsidiary;
- ◆ Notifying the donor's headquarters directly, if it is possible to make contact;
- ◆ Many donations come from the public or small donors who may not be individually identifiable. The mass media must be used to issue general expressions of gratitude and report on donation figures and how the supplies are being used. Organizations with electronic media such as Web sites can use them to publish their donation reception and distribution reports.

Public Information

Public information can serve the most diverse needs, from promoting a particular attitude in the population to easing tensions caused by ignorance of the aid operations under way.

- ◆ The population must be kept informed about the types of supplies needed, and actively discouraged from sending unnecessary items. Reception points for donations must be identified, and any other facts must be made public that may help potential local donors and reduce the number of unwanted donations;
- ◆ Similarly, the affected population must be informed of the needs that are being met and the attendant details, such as when and where distribution is taking place, and who are the people or organizations responsible for the distribution, so that those in need of humanitarian aid can have access to it;
- ◆ The public needs to know about the types and quantities of supplies received and distributed, the operations underway, the results of these operations, and the challenges that remain. This makes it easier for the public to understand—and sometimes even provide support—when logistical complications make it difficult to complete particular relief efforts.

Reports must be succinct but thorough. Some thought must be given to the specific media outlets that can best reach the target audience, and to liaison efforts with media representatives in the field. A few examples of the most effective type of media in these circumstances are:

- ◆ Commercial broadcasters (radio and television);
- ◆ Community radio stations;
- ◆ Local newspapers and bulletins;
- ◆ Community mural newspapers displayed in places where community groups meet;
- ◆ Churches, neighborhood committees, local associations.

Relations with the Press

The media play a key role as watchdogs during an emergency, and they tend to focus on where the relief supply system fails rather than on where it succeeds. This tendency can be reversed by adopting an effective communication strategy towards the press, including abundant information,

press releases, press kits, and the like, so that the media end up as partners in getting important messages out. For instance, the mass media can be one of the most effective mechanisms for providing feedback to donors about the real needs on the ground and the importance of abstaining from sending unwanted donations.

Those in charge of supply management cannot wait until the media ask for reports. They must take the initiative by determining as soon as possible the content of the information that will be released, the way it will be presented (press releases, press conferences, interviews), how frequently they will be issued, which media outlets must be targeted, and who will act as official spokesman. In this way, the organization will be playing a proactive role in information dissemination, rather than letting journalists set the agenda.

It is advisable, even when information is provided orally—say at a press conference—for it to be presented also in print after careful verification of all the facts. Reports may be general, about the entire zone or region affected, or provide details of specific locations, depending on whether the media outlets targeted are local, national, or international.

Finally, public information should not be seen as an undesirable additional load, but as a tool that can benefit and facilitate relief efforts. Donors, media outlets, and the public can be the best allies when well informed and when operations are transparent and accountable.

Chapter 14

*Telecommunications*⁵⁰

Reliable communication among the various sectors that intervene in relief and aid activities, connecting the various places where these activities take place, is imperative for the success of any operation. The transmission of data, the exchange of information, the confirmation of supply movements, the request for new deliveries, and the safety of the teams on the ground—these are only a few of the needs that telecommunications can serve during logistical supply operations.

The first thing to consider is that telecommunications are governed by laws, codes, rules and procedures, both national and international, and that the use of radio frequencies is closely linked with issues of national sovereignty.

It is equally imperative to bear in mind that the information transmitted over telecommunication networks is often sensitive, confidential, or otherwise not suitable for indiscriminate dissemination. Therefore, the use of telecommunications equipment must be subject to appropriate procedures and strict guidelines for users.

The Communication Strategy

The communication network must link the various operation centers:

- ◆ The logistical operations coordination center;
- ◆ The distribution centers;
- ◆ The bases of operation in the field;

⁵⁰ The document by the United Nations Development Program, *Emergency Relief Items. Compendium of Generic Specifications* (UNDP, New York, October 1995), is highly recommended for those interested in this topic. The book includes a catalog of standardized equipment as well as technical advice on how to decide on the most appropriate equipment. Also recommended is the *ITU-D Handbook on Disaster Communications*, by the International Telecommunications Union (ITU). It describes the national and international organizational and regulatory frameworks of disaster communications and the technical operational procedures to be followed in such situations. It can be obtained as documents 2/167 and 2/168 at the following site: http://www.itu.int/ITU-D-StGrps/SGP_1998-2002/SG2/Documents/DocList.htm.

- ◆ Ports, airports, land borders, and any other place where supplies will be coming in or will be mobilized;
- ◆ Mobile and convoy units;
- ◆ Central and peripheral warehouses.

If international organizations are involved, moreover, contact must be guaranteed with the national body that coordinates emergency activities.

Similarly, deciding which telecommunications systems and equipment to use depends on several considerations, such as the following:

- ◆ The needs to be met must be carefully analyzed to determine what system will be used and what equipment will be required;
- ◆ The equipment must be well adapted to the characteristics and context of the area in which it will be put to use;
- ◆ The various types of equipment must be compatible. Think of an integrated communications network, not of individual solutions;
- ◆ An expert must analyze the context and equipment needs and supervise its installation and any training that may be required;
- ◆ The use of radio equipment and its respective frequencies requires permits from the national authorities.

Telecommunications Systems⁵¹

It is highly likely that the local telephone network in the affected area (if there is telephone service, which is not always the case) will be down depending on the type and intensity of the disaster, and restoring full service may be a matter of hours—or months. Similarly, the various types of communication systems cater to different needs and have different capabilities ranging from voice transmission to the exchange of text and graphics. For this reason, various options must be taken into account to maintain active communications.

51 Based on the section on telecommunications of the chapter on “Logistics” of the *Handbook for Delegates*, International Federation of Red Cross and Red Crescent Societies (IFRC), Geneva, 1997.

Telephone: As already noted, the telephone service may remain indefinitely affected; access may be very limited or unreliable, and in the worst case may not exist at all. This may also be true of mobile phones. However, when the service is available, it is a flexible and reliable solution;

Fax: Less and less used since the arrival of the Internet, electronic facsimile technology remains a low-cost option for sending text and low-grade graphical information as long as there is access to telephone lines;

Satellite Communications : An option that is quite expensive, although it is extremely reliable. The equipment itself may not be that costly, but connecting to the network is not cheap. At present, there is equipment that in addition to being reasonably portable can hook up to the Internet, making it possible to transmit graphical and other types of data as well;

Radio: It is perhaps the most flexible, dynamic, economic and widely used solution in the field. There are several options:

- ◆ **HF Radio:** High frequency, or short-wave, radio equipment makes it possible to communicate over short, medium or long distances, depending on the modulation. HF radio may be used for voice transmissions—the Single Side Band or SSB System—or for the transmission of text data (the PACTOR System—more on this below). The quality of the connection depends on the carrier wave, which varies with the time of day, the weather, sunspot activity, distance, and other factors.

Due to their high energy consumption, there are no HF walkie-talkies. However, it is possible to install HF radios in vehicles when mobility is important.

When working with SSB systems, two frequency bands are available: the Upper Side Band (USB) and the Lower Side Band (LSB).

- ◆ **VHF Radio:** Very high frequency (VHF) radio is used for local voice communication. Manual equipment (walkie-talkie) is available, but its coverage is limited to fairly short distances. Hence, a VHF network requires radio bases with fixed antennae, mobile radios in vehicles, and relay stations to link the various ground stations;
- ◆ **UHF Radio:** Ultra high frequency (UHF) radio is similar to VHF, but leads to better results in densely built urban areas;

- ◆ **VHF Relay Stations:** A relay station is essentially a radio set that serves as an automatic link between other radio equipment operating in the same frequencies. In fact, repeaters need two frequencies. They need to be placed on high ground so that their coverage is as broad as possible. It must also be borne in mind that technical failure of one relay station will leave the whole network out of service. Another aspect to bear in mind is the security of the relay equipment, since it must often be installed in isolated or remote places;
- ◆ **TOR:** The Telex-Over-Radio (TOR) system is used to transmit text over HF radio. It is quickly being replaced by PACTOR (PACKET TOR) technology, which employs the same data packet switching protocols developed for the Internet;
- ◆ **PACTOR:** PACTOR can be used to send text and other data over HF radio. It requires a PACTOR modem connected to the radio transceiver and a computer, either a desktop or a laptop computer on which special software called GLPLUS must be installed. PACTOR can also communicate with plain TOR stations as long as only text is transmitted;
- ◆ **E-mail:** Electronic mail is an efficient system that brings together telecommunications and computer science. It makes it possible for individuals and organizations to communicate in writing and exchange digitalized data (graphics, audio, video). However, its use is currently restricted by the availability of telephone lines. Although satellite telephones can also be used to send e-mail, sending large, complexly formatted messages or file attachments must be discouraged because of the long time they will take to transmit and the resultant line saturation;
- ◆ **The Internet:** The Internet is a global "network of networks" which can transmit information around the world in seconds. E-mail is one of the main components of Internet traffic, but many other services are available. The most prominent example is the World Wide Web. Nowadays, it is rare to find an organization that does not have its own Web site or "home page", with information about its activities, facts about the emergencies it is involved in, and appeals for contributions to relief efforts. These sites can be visited by all computer users with an Internet connection, regardless of where they happen to be. (See

Annex 4.1, at the end of Chapter 4 for the addresses of selected humanitarian organizations.)

Basic Procedures

Regardless of the communications systems used, or the combinations thereof, basic procedures must be established for the safe and efficient use of these systems. The following are just two examples:

- ◆ *Training:* All members of a relief mission must be provided with at least basic training on the use and care of the various types of communications equipment that will be used during the mission. This must include the ability to send and receive messages unassisted;
- ◆ *Rules and codes:* There must be clear, explicit rules for the transmission of information. For instance, when the radio equipment in use is such that transmissions can be heard by anyone with a receiver, it is essential to make this clear to those who will be sending information. They must understand which information is confidential and should not be transmitted, or should be transmitted using code words or any other appropriate vocabulary. In situations of heightened security, it is useful to have pre-established times for the various stations to communicate with each other, as well as code names and passwords. In all cases, a log must be carefully kept of all contacts established, all issues discussed, and all messages received.

Chapter 15

*The Application of New Technologies to Emergency Logistics*⁵²

Regardless of whether the delivery of a many-ton shipment or of a small envelope is at stake, identifying and following up on these items en route and certifying that they have been delivered to their rightful recipient has always been a challenging, sensitive task. Commercial shipping ventures employ a series of tools that enable them to document and confirm the delivery of a shipment to the right destination within the stipulated time, or else to determine with a fair degree of certitude at which point of its journey the shipment may be at present. These tools have evolved over time with advancements in technology, and today many options are available for the monitoring and control of consignments. Bar codes, magnetic strips, and optical character recognition, to name a few, make it easy to capture and convey relevant information with near-perfect precision.

While these technologies are chiefly used in the trade sectors, it is not unrealistic to expect that humanitarian agencies will also employ them eventually to follow up on their consignments in the field and, in general, to keep track of their humanitarian assistance operations and the routine management of their logistical activities.

The purpose of this chapter is to provide brief descriptions of some technological applications currently available and consider how they might be used in the everyday logistical management of emergency supplies.

⁵² This chapter has benefited from the contribution of John Price II, of the Defense Logistics Agency (DLA) of the United States. His responsibilities include overseeing the transport of various supplies, mostly military, from the United States to many destinations abroad and following up on their distribution. He also has considerable experience in the design and management of storage sites.

Bar Codes⁵³

Bar code labels make it possible to represent alphanumeric characters (letters and numbers) by means of bars and blanks of varying widths that can be "read" automatically by optical scanners. The system recognizes and processes these symbols, compares their patterns with those already stored in computer memory, and displays the information it has interpreted.

This standardized coding system means that there can be a one-on-one, unique, non-ambiguous relationship between the pattern and that to which it refers. There can thus be no two identical bar codes around the world, any more than there can be two identical sets of fingerprints.⁵⁴

Bar codes can be printed on paper, plastic, metal, or other materials. They can go on stickers, packages, documents, etc. The codes can be read at various distances—from direct contact to several feet away—depending on the scanning equipment, the symbols used and the size of the bar codes.

Thanks to the use of magnetic ink in the printing of bar codes—a technology known as magnetic ink character recognition, or MICR—character legibility can be retained even when the bar codes have become smudged or have been stamped over. At present, bar codes are mostly used in:

- ◆ Product packages;
- ◆ Identification cards;
- ◆ Catalogs or price lists;
- ◆ Product labels;
- ◆ Forms, receipts and invoices.

The components of bar code technology are the following:

- ◆ **Optical scanning** : This makes it possible for bar codes to be "read", the essential component of this technology. Scanning is carried out by means of a photoelectric sensor that can detect the contrast between the shadows (the bars) and the light (the empty space between the bars). Once the pattern has been captured, it can be decoded to get at the information originally encoded in the bar code. Several instru-

53 Other sources for this chapter include *Códigos de barras. Eficiencia y Rapidez en la Captura de la Información*, by Jaime Alcides Carrillo Balderrama, and various Internet sites.

54 Diana P. Quintero Muñoz, *¿Qué es un código de barras?* <http://atenea.udistrital.edu.co/egresados/dquinter/>.

ments can be used for this purpose, such as laser and non-laser hand-held and fixed-position scanners, pen scanners, CCD readers, camera-based scanners, and so on.

- ◆ **Decoding:** The information on a bar code label has been encoded employing a "language" of patterns having to do with the size and location of the elements visible to the naked eye as bars and spaces or black and white bars. In some codes, only the width of the bars has meaning; in others, the space between the bars is also significant in decoding the information.
- ◆ **Check digit:** Also known as the control character, it is generally the last in the series and is used to verify the validity of the code label as a whole. The value of the check digit must match the sum of the values of all the preceding characters; it is recalculated on the spot to verify that the scanning has been successful.
- ◆ **Symbol Sets:** Given the great variety of applications and needs for bar codes, there are several sets of symbols available. Alphanumerical and numerical are some of the most common. Alphanumerical involves the use of both letters and numbers. Examples include:
 - ▲ **Code 39:** General purpose code used around the world. Makes it possible to convey digits from 0 to 9, letters from A to Z, and other ASCII characters.
 - ▲ **Code 93:** Similar to Code 39.
 - ▲ **Code 128:** Highly reliable, excellent density, used around the world.
 - ▲ **LOGMARS:** Similar to Code 39, but used exclusively by the United States Government.

Numerical only convey numbers. Examples are:

- ▲ **EAN-13:** Used in Europe for numbering retail products. Can convey digits from 0 to 9;
- ▲ **EAN-8:** Compressed version of EAN-13, for smaller packages;
- ▲ **UPC-A:** Universal Product Code, used in the United States and Canada for retail sales;

- ▲ Code 11: Mainly used for telecommunications equipment. Can convey digits from 0 to 9.

Printing bar code labels nowadays is easy. Labeling software is available that works with ink-jet and laser printers, both in DOS and Windows. Many programs can design and print code bar labels. Necessary software can be downloaded from the Internet (enter “bar codes” or “barcodes” for Internet search engines).

Bi-dimensional Barcodes

Bi-dimensional or 2-D barcodes can store as many as 1,800 printable ASCII characters or 1,100 binary characters per symbol. The Portable Data File (PDF) 417 format can encode an enormous amount of information on a small surface and ensures a high level of error correction, so that even partially damaged bar code labels can be read. These bar codes can encode your average shipment information, such as stock number, quantity, priority, presentation unit, source and destination port, consignee, required delivery date, price per unit, and any other type of information required.

Logistics information encoded in 2-D format can be decoded without reference to an external database, since all the information is stored on the tag itself.

In the field, the 2-D format is ideal for storing large amounts of information about specific products, such as the expiry date of medical products, information about the manufacturer, lot number, dosage, and so on, making it possible to have immediate access to these data.

The use of bar codes in the delivery of consignments can increase speed, productivity, and precision by reducing the likelihood of human error. Managing warehouse inventory is greatly enhanced when bar code scanners are employed.

AMS Laser Cards

The automated manifest system (AMS) laser cards have been developed by the Defense Logistics Agency (DLA) of the United States Government to store substantial amounts of information about shipments. The size of a

standard credit card (8.5 x 5.5 cm), they can contain up to 1,200 pages of text, including information such as:

- ◆ Stock number;
- ◆ Requisition number;
- ◆ Shipment date;
- ◆ Quantity;
- ◆ Consignee.

AMS cards are attached to the shipment's pallets and containers. The consignee simply inserts the card in the card processing unit, a hardware item that can read the card and write on it (employing PC software) and can forward or print all the information regarding a shipment.

They are ideal for multiple-load shipments, air shipments and full containers. They are inexpensive and reusable. A warning is activated when a card is full (2.8 MB). There is practically no interference due to magnetism or extreme weather.

Radio Frequency Identification Tags and Labels

The distribution warehouse of the Defense Logistics Agency, in Pennsylvania (United States), was the site of the first test of RFID or Radio Frequency Identification Tags and Labels. They were originally tried on shipments headed for Somalia and Haiti in 1993, and began to be used regularly in April 1995. RFID tags are attached to pallets, trucks, and large containers to monitor the location of shipments en route. The manifest information is stored on the label (in conjunction with AMS laser cards). These labels can store up to 128 Kilobytes of information.

RFID Interrogators

RFID Interrogators, or tag readers, are positioned along the delivery route and can read the tags or labels as they go through each position, whether on a truck, airplane or ship. The tags "wake up" and report their specific

ID number to the 644 MHz interrogator, which reports the time, date, and label details to a common server that can be accessed by the consignee to gain instant information about the current position of that particular shipment.

On the ground, a manual interrogator can search for the relevant tags in several pallets or containers and produce a warning sound when it locates a specific shipment.

RFID tags are relatively inexpensive and can be reused.

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