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2020

GOVERNMENT OF MEGHALAYA

STATE DISASTER MANAGEMENT AUTHORITY

HANDBOOK ON DISASTER LOGISTICS

Meghalaya State Disaster Management Authority

C/O Directorate of Land Records and Survey

Lower Lachumiere, Shillong-793001

HANDBOOK ON DISASTER LOGISTICS

PUBLISHER

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STATE DISASTER MANAGEMENT AUTHORITY
MEGHALAYA
"ALERT TODAY, ALIVE TOMORROW"

PREPARED ON BEHALF OF

MEGHALAYA STATE DISASTER MANAGEMENT AUTHORITY

BY

LEGIA.E.S. LYNGDOH

Message

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Catastrophic events arising from the interaction of existing vulnerabilities of the population, a lack of significant coping capacity and exposure to hazards such as earthquakes, landslides, cyclones, floods; often results in the need for deployment of emergency responders to rapidly distribute emergency relief supplies to protect the lives and well-being of the affected vulnerable population. The success or failure of any relief operation is determined by the effectiveness and efficiency of logistics services. Sound logistics can save the lives of many and help rebuild communities effectively. Therefore, logistics management needs to be considered as a key support function and must be incorporated into planning at all stages of relief programs.

The Meghalaya State Disaster Management Authority's publication on *Disaster Logistics* elaborates on a wide range of logistics management issues such as carrying out assessments, procurement, storing, transporting and distribution of emergency supplies. The overall aim of the publication is to orient disaster management practitioners to existing body of knowledge on disaster supply chain management and logistics so as to improve emergency logistic management in the state of Meghalaya. I am confident that this initiative will be valuable in providing guidance to all those who are engaged in emergency logistics.

Executive Director,
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Acknowledgement

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My thanks and appreciations also go to my colleagues and the people who have willingly helped me out in the preparation of the publication.

Last but not the least, I would like to acknowledge with much appreciation the numerous specialists, humanitarian agencies and organisation whose hard work and contributions to the field of emergency logistics over many years, has helped shaped this publication. I am indebted to the various organisations for their continuous, conscientious and invaluable effortstowards documenting their knowledge from field experiences and best practices in emergency logistics, without whom this publication might not have seen the light of day.

DECLARATION

The Handbook on Disaster Logistics has been complied in an effort to discuss issues relevant to disaster logistics, and is distributed without profit for educational purposes.

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ABBREVIATIONS

1. Mtrs: Meters
2. Kcal: Kilocalories
3. g: Grams
4. IU: International unit
5. Mg: Milligram
6. µg: Microgram
7. ml: Millilitres
8. FTE: Full-time equivalent
9. UNHCR: United Nation High Commissioner for Refugees
10. BGAN: Broadband Global Area Network
11. GPS: Global Positioning System
12. VHF: Very high frequency
13. HF: High frequency
14. PA: Public Address
15. VSAT: Very small aperture terminal
16. kVA: Kilo-volt-ampere
17. NaDCC: Sodium dichloroisocyanurate
18. IFRC- International Federation of Red Cross and Red Crescent Societies
19. CD: computer disc
20. GFR: General Financial Rules
21. OTE: Open Tender Enquiry
22. LTE: Limited Tender Enquiry
23. SLTE: Special Limited Tender Enquiry
24. PAC: Proprietary Article Certificate
25. STE: Single Tender Enquiry
26. DGS&D: Directorate General of Supplies and Goods
27. GeM: Government e-Marketplace
28. SoPP: Schedule of Procurement Powers
29. VfM: Value for Money
30. RC: Rate Contract

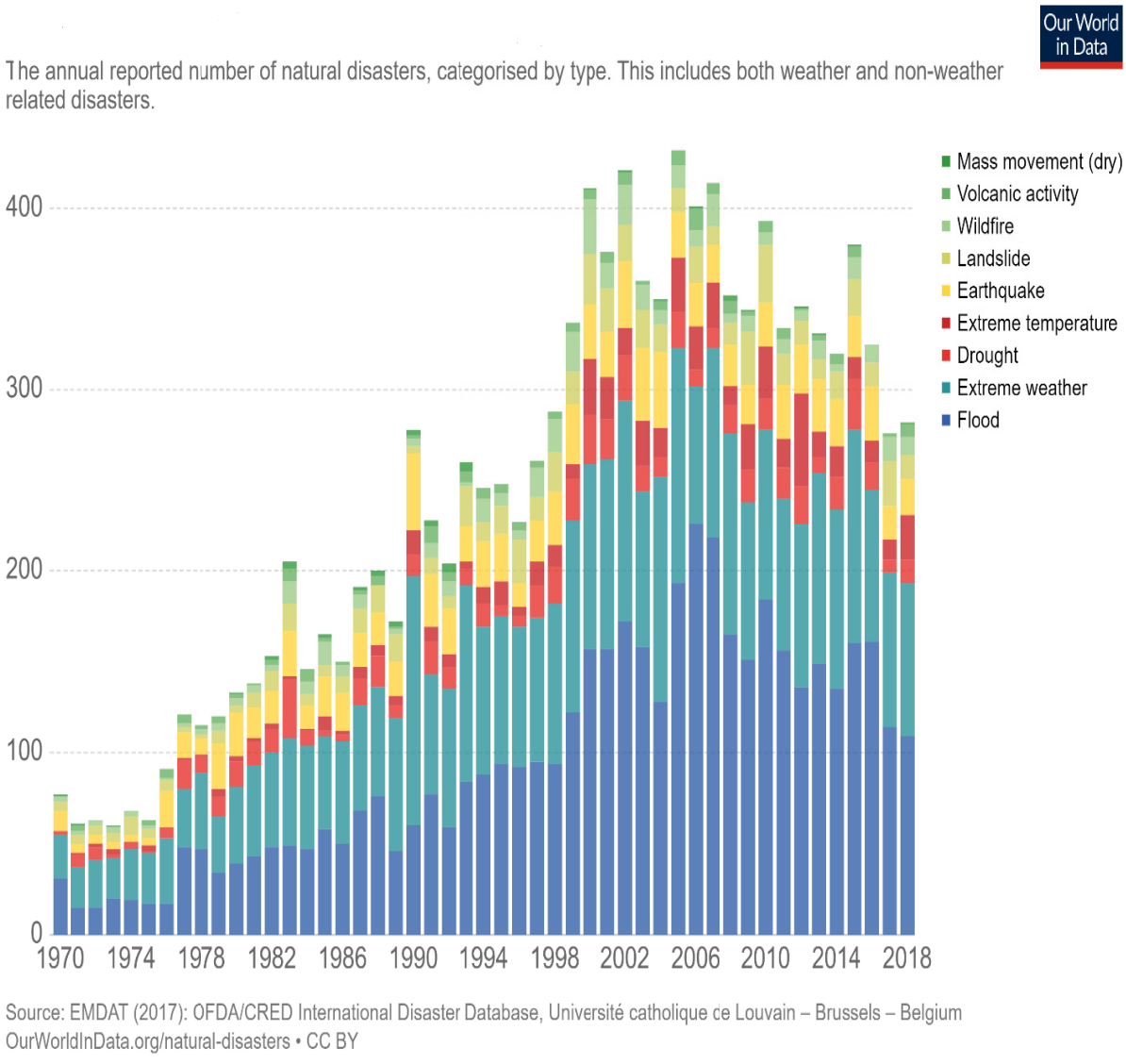
31. CPPP: Central Public Procurement Portal
32. OEMs: Original Equipment Manufacturers
33. $m^{2:}$ metre square
34. m^3: metre cubic
35. MT: metric ton
36. cm: centimetre
37. L: length
38. W: width
39. H: height
40. USAID: United States Agency for International Development
41. OFDA: Office of Foreign Disaster Assistance
42. EOQ: Economic Order Quantity
43. No. Number
44. UNICEF: United Nations Children Fund
45. EDP: Extended Delivery Point
46. Km: Kilometres
47. WFP: World Food Programme
48. NDCN: National Disaster Communication Network
49. WiFi: Wireless Fidelity
50. WiMax: Worldwide Interoperability of Microwave Access
51. IP: Internet Protocol
52. INMARSAT: International Maritime Satellite Organisation
53. INSAT: Indian National Satellite System
54. MMCP: Mini Mobile Communication Pack
55. NDRF: National Disaster Response Force
56. MEOC: Mobile Emergency Operation Centre
57. ETC: Emergency Telecommunication Cluster
58. UN: United Nations
59. ICT: Information Communication Technology
60. UNDP/IAPSO: United Nations Development Program's Inter-Agency Procurement Services Office

DISASTER LOGISTICS: A HANDBOOK

Introduction:

Throughout history, disasters and emergencies have inflicted heavy cost in countries with detrimental impact on population, material and physical resources as well as economies and development. Below is a graphical representation of natural disasters by types reported globally.

- Global reported natural disasters by type.



Corresponding to the rise in numbers of natural and man-made disasters, there exists an increasing trend in the occurrence of natural and man-made disasters of sufficient scale that warrant responses from outside the affected area. According to Anisya Thomas and Laura Kopczak“ disaster relief is and will continue to be a growth market. Both natural and man-made disasters are expected to increase another five-fold over the next fifty years” (Thomas & Kopczak, 2005). With such developments, arise a call for more efficient and effective handling of disaster relief operations. Efficient and effective relief management is based on anticipating problems and identifying them as they arise and providing specific supplies at the right time where they are needed the most.

In emergency relief operations, logistics is required to support the organisation and implementation of response operations in order to ensure their timeliness and efficiency. A logistics system maximises effectiveness by supporting the mobilisation of staff, equipment and goods of disaster relief organisations, the evacuation of the injured or the resettlement of those directly affected by the disaster. Logistics is a fundamental component of emergency response plans at both state and national levels to ensure availability of the right commodity in the right location at the right time and in the right quantities. One of the notable aspects of the relief efforts following the 2004 Asian Tsunami was the public acknowledgement of logistics in effective relief. Logistics is central to disaster relief for several reasons, logistics is crucial to the effectiveness and speed of response for major humanitarian programs such as health, food, shelter, water and sanitation. Secondly, logistics usually is one of the most expensive part of a relief effort, as it deals with procurement and transportation. Thirdly, as logistics department handles tracking of goods through the supply chain, it is a repository of data that can be analysed to provide post-event learning. The data from logistics reflects all aspects of execution, from the effectiveness of suppliers and transportation providers, to the cost and timeliness of response, to the appropriateness of donated goods and the management of information. Therefore, it is critical to the performance of both current and future operations and programs (Thomas & Kopczak, 2005).

CHAPTER ONE

Relief Standards

Relief entails the delivery of a specific quantity of quality goods to a qualified group of beneficiaries according to selection criteria that identify actual needs, and the groups that are least able to provide for themselves. The provision of essential, appropriate and timely assistance to those affected by a disaster, based on an initial rapid assessment of needs designed to contribute effectively and speedily to their early recovery is the essence of relief (International Federation of Red Cross and Red Crescent Societies, 2019).

The Disaster Management Act, 2005 (Section 12) mandates National Disaster Management Authority to recommend guidelines for minimum standards of relief to be provided to persons affected by disaster which shall include:

(a) The minimum requirements to be provided in relief camps in relation to shelter, food, drinking water, medical cover, sanitation
(b) Special provisions to be made for widows and orphans,
(c) *Ex gratia* assistance on account of loss of life as also assistance on account of damage to houses and for restoration of means of means of livelihood
(d) Such other relief as may be necessary (National Disaster Management Authority, 2016).

Shelter

- In relief centres, 3.5 sq.m of covered area per person with basic lighthing facilities.
- Special arrangements should be made for differently abled persons, old and medically serious patients. Special care shall be taken for safety and privacy of women and children.

Food

- It shall be ensured that men and women are supplied food with minimum calorie of 2400 kcal per day. In respect of children/ infants, the food to be supplied would be 1700 kcal per day.
- Milk and other dairy products shall be provided for children and lactating mothers.

Water

- The minimum supply of 3 litres per person per day of drinking water shall be made available in relief camps.
- Maximun distance from relief camp to nearest water point shall not be more than 500 mtrs. if tapped water supply is available.

Sanitation

- One toilet for 30 persons may be arranged /built. Atleast 15 liters of water per person needs to be arranged for toilet/bathing purposes. seperate toilet and bath area be catered to women and children.
- Toilet shall not be more than 50 mtrs away from relief camps. Pit latrines and soaks ways shall be atleast 30 mtrs from ground water source and bottom of any latrine has to be 1.5 mtrs above the water level. Drainage or spillage from defecation system shall not run towards any surface water source or shallow ground water source.

Medical Cover

- Mobile medical teams shall visit relief camps to attend to affected people. Steps shall be taken to avoid spread of communicable diseases and safe delivery of pregnant women.
- Psychosocial care shall be made available to affected people.
- Relief/shelters shall be adequately publicised with a hotline for details of the same.
- Contingency plan shall be developed for mass casulty. Advance tie up with hospitals shall be undertaken with transport facility for referrals.

Widows & Orphans

- Record keeping of women who are widowed and children who are orphaned shall be done and certificate shall be issued.
- Financial compensation and other goverment assisatance need to be arranged within 45 days of the disaster to widows and orphaned children.

In the humanitarian context, the Sphere Project and its Handbook are well known for introducing considerations of quality and accountability to humanitarian response. The Sphere Project -or- 'Sphere' was started in 1997 by a group of humanitarian non-governmental organisations and the International Red Cross and Red Crescent Movement. Their aim was to improve the quality of their actions during disaster response and to be held accountable for them. The Sphere's philosophy is based on two core beliefs: first, that those affected by disaster or conflict have the right to life with dignity and, therefore, a right to assistance; and secondly, that all possible steps should be taken to alleviate human suffering arising out of disaster or conflict. Striving to support these two core beliefs, the Sphere framed a Humanitarian Charter and identified a set of minimum standards in key life-saving sectors which are now reflected in the Handbook's four technical chapters: water supply, sanitation and hygiene promotion; food security and nutrition; shelter, settlement and non-food items; health and action. The minimum standards are evidence based and represent sector-wide consensus on best practices in humanitarian response.

The Sphere Handbook is designed for planning, implementation, monitoring and evaluation during humanitarian response. It is also an effective advocacy tool when negotiating for humanitarian space and for the provision of resources with authorities. Furthermore, it is useful for disaster preparedness activities and contingency planning. The principle users of the Sphere Handbook are practitioners involved in planning, managing or implementing a humanitarian response. This includes staff and volunteers of local, national and international humanitarian agencies. Other actors, such as government and local authorities, the military or private sector, are also encouraged to use the Sphere Handbook. It may be useful in guiding their own actions, but also in helping them to understand the standards used by the humanitarian agencies with whom they may interact (Sphere Handbook: Humanitarian Charter and Minimum Standards in Disaster Response, 2004).

It is beyond the scope of this section to explain in detail the minimum standards as outlined in the Sphere Handbook. However, it is feasible to provide a few examples of the Sphere standards.

Examples:

- Sector: Water and sanitation

  Specific topic: Water supply

  Average water use for drinking, cooking and personal hygiene in any household is at least 15 litres per person per day.

Simplified table of basic survival water needs		
Survival needs: water intake (drinking and food)	2.5-3 litres per day	Depends on: the climate and individual physiology
Basic hygiene practice	2-6 litres per day	Depends on: social and cultural norms
Basic cooking needs	3-6 litres per day	Depends on: food type, social as well as cultural norms
Total basic water needs	7.5-15 litres per day	

- Sector- water and sanitation

  Specific topic- Toilets at Public Places and Institutions in disaster situation

Institution	**Short term**	**Long term**
Market areas	1 toilet to 50 stalls	1 toilet to 20 stalls
Hospital/medical centres	1 toilet to 20 beds or 50 out-patients	1 toilet to 10 beds or 20 out-patients
Feeding centres	1 toilet to 50 adults, 1 toilet to 20 children	1 toilet to 20 adults 1 toilet to 10 children
Reception/ transit centres	1 toilet per 50 people 3:1 female to male	
Schools	1 toilet to 30 girls 1 toilet to 60 boys	
Offices		1 toilet to 20 staff

- Sector- Food Security, Nutrition and food aid

Specific topic- Nutritional requirement in the initial stage of disaster

Nutrient	Mean population requirements
Energy	2,100 kcals
Protein	10-12% total energy (52 g-63 g), but ,15%
Fat	17% of the total energy (40 g)
Vitamin A	1.666 IU (or 0.5 mg retinol equivalents)
Thiamine (B1)	0.9 mg (or 0.4 mg per 1,000 kcal intake)
Riboflavin (B2)	1.4 mg (or 0.6 mg per 1,000 kcal intake)
Folic acid	160 µg
Niacin (B3)	12.0 mg (or 6.6 mg per 1,000 kcal intake)
Vitamin B12	0.9 µg
Vitamin C	28.0 mg
Vitamin D	3.2-3.8 µg calciferol
Iron	22 mg (low bio-availability i.e. 5-9 %)
Iodine	150 µg
Magnesium*	201 mg
Zinc*	12.3 mg
Selenium*	27.6 µg
Vitamin E*	8.0 mg alpha -TE
Vitamin K*	48.2 µg
Biotin*	25.3 µg
Pantothenate*	4.6 µg

*Provisional requirements.

There are two important points to consider before using the requirements listed above. Firstly, the mean per capita requirements for population groups incorporate the requirements of all age groups and both sexes. They are therefore not specific to any single age or sex group and should not be used as requirements for an individual. Secondly, these requirements are based on a particular population profile, as follows:

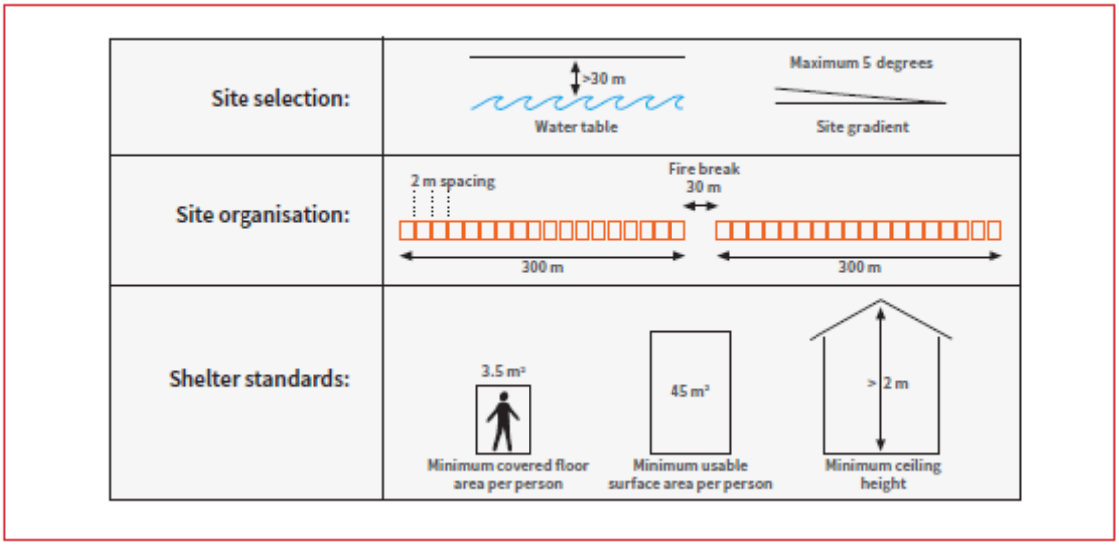
Group	% of population
0-4 years	12
5-9 years	12
10-14 years	11
15-19 years	10
20-59 years	49
60+ years	7
Pregnant	2.5
Breastfeeding	2.5
Male/female	51/49

As the demographic structure of different populations varies, this will affect the nutritional requirements of the population concerned. For example, if 26% of a refugee population is aged under five, and the population consists of 50% males and 50% females, the energy requirement is reduced to 1,940 kcals. Energy and protein requirements should be adjusted for the following factors: – the demographic structure of the population, in particular the percentage of those under five years old and the percentage of females (this may change in populations affected by HIV/AIDS); – mean adult weights and actual, usual or desirable body weights. Requirements will increase if the mean body weight for adult males exceeds 60kg and the mean body weight for adult females exceeds 52kg;

- activity levels to maintain productive life. Requirements will increase if activity levels exceed light (i.e. 1.55 x Basal Metabolic Rate for men and 1.56 x Basal Metabolic Rate for women);
- average ambient temperature and shelter and clothing capacities. Requirements will increase if the mean ambient temperature is less than 20°C;
- the nutritional and health status of the population. Requirements will increase if the population is malnourished and has extra requirements for catch-up growth. HIV/AIDS prevalence may affect average population requirements. Whether general rations should be adjusted to meet these needs will depend on current international recommendations.

If it is not possible to incorporate this kind of information into the initial assessment, the figures in the table above may be used as a minimum in the first instance.

- Sector- Shelter, Settlement and non-food items
  Specific topic- shelter
  - Sphere physical shelter standards



Source: Humanitarian standards in urban, post-disaster context: a study of sphere shelter standards in Haiti (Hooper & Pym, 2017).

- Sector: Shelter, Settlement and non-food items

  Specific topic: Non- food items personal hygiene

  - Each person has access to 250g of bathing soap per month;
  - Each person has access to 200g of laundry soap per month;
  - Infants and children up to two years old have 12 washable nappies or diapers where these are typically used;
  - women and girls should receive appropriate material for menstruation. It is important that these materials are appropriate and discreet and that women are involved in making decisions about what is provided;
  - Subject to availability, these items per person per month could include 75ml/100g of toothpaste; one toothbrush; 250ml of shampoo; 250ml of lotion for infants and children up to two years old; one disposable razor. Per household they could also include one hairbrush and/or comb, and nail clippers.

- Sector- Health services

  Specific topic- Health information system

  The health information system builds upon the pre-existing surveillance system whenever possible. In some emergencies, a new or parallel system may be

required and this is determined in consultation with the lead health authority. The health information system should be designed to be flexible and should evolve over time. During the disaster response health data should include, but not be limited to, the following:

a. crude mortality rate
b. under-5 mortality rate
c. proportional mortality
d. cause-specific mortality rate
e. incidence rates for most common diseases
f. health facility utilisation rate
g. number of consultations per clinician per day

Formulas for calculating rates of Mortality and Morbidity:

Crude Mortality Rate

Definition: The rate of death in the entire population, including both sexes and all ages. The Crude Mortality Rate can be expressed with different standard population denominators and for different time periods, e.g. deaths per 1,000 population per month or deaths per 1,000 population per year.

Formula most commonly used during disasters:

Total number of deaths during time period 10,000 persons

Total population x No. days in time period= deaths/10,000 persons/day

Under-5 Mortality Rate

Definition: The rate of death among children below 5 years of age in the population. Formula most commonly used during disasters (age-specific mortality rate for children less than 5 years):

Total number of deaths in children 10,000 persons
<5 years during time period

Total number of children <5 years x No. days in time period= deaths/10,000 /day

Incidence Rate

Definition: The number of new cases of a disease that occur during a specified period of time in a population at risk of developing the disease.

Formula most commonly used during disasters:

Number of new cases due to specific disease in time period / 1,000 persons

Population at risk of developing disease x No. months in time period

= new cases due to specific disease/1,000/month

Case Fatality Rate

Definition: The number of people who die of a disease divided by the number of people who have the disease.

Formula:

Number of people dying from disease during time period

People who have the disease during time period x 100 = x%

Health Facility Utilisation Rate

Definition: The number of out-patient visits per person per year. Whenever possible, a distinction should be drawn between new and old visits, and new visits should be used to calculate this rate. However, it is often difficult to differentiate between new and old visits, so they are frequently combined as total visits during a disaster.

Formula:

Total number of visits in one week

Total population x 52 weeks= visits/person/year

Number of Consultations per Clinician per Day

Definition: Average number of total consultations (new and repeat cases) seen by each clinician per day.

Formula:
Total number of consultations (new and repeat) ÷ Number of days health
Number FTE* clinicians in health facility open per week

* FTE ('full-time equivalent') refers to the equivalent number of clinicians working in a health facility. For example, if there are six clinicians working in the out-patient department but two of them work half-time, then the number of FTE clinicians = 4 full-time staff + 2 halftime staff = 5 FTE clinicians (Sphere Handbook: Humanitarian Charter and Minimum Standards in Disaster Response, 2004).

The Handbook was first piloted in 1998, with revised editions published in 2000, 2004, 2011 and fourth edition in 2018. This fourth edition marks the 20th anniversary of The Sphere Handbook, it reflects changes in the humanitarian sector over that time. It contains new guidance for working in urban settings, for addressing Minimum Standards in protracted crises, and for delivering assistance through markets as a way to meet the standards. All technical chapters have been updated to reflect current practice, and the harmonised Core Humanitarian Standard replaces the previous Core Standards. The same is available online at: https://spherestandards.org/wp-content/uploads/Sphere-Handbook-2018-EN.pdf

CHAPTER TWO

Coordination:

When disaster strikes, any number of groups from government and military agencies to non-government and voluntary agencies organisations respond, usually with different mandates and working methods. Coordination among these organisations is critical to achieving mutually shared goals of providing disaster relief to vulnerable population affected by a disaster. A lack of coordination may have an undesirable impact on provision of care to disaster victims, may lead to duplication of efforts and waste of valuable resources. In order to prevent these challenges, it is important that organisations share information, agree on common priorities, develop common strategies, identify their respective strengths and explore ways of collaborating and supporting each other.

The tools and systems currently in place to facilitate coordination may be divided into two categories: centralised and decentralised systems, depending on the presence of a central player with authority to direct the entire relief operation. According to Dolinskaya et al. in a centralised system, a single agency has the authority to direct the relief effort coordination. In such a setting, coordination is usually executed with a command approach, wherein the central agency controls the logistical resources, gathers information centrally and makes decisions for the collaborating partners. The United Nation agencies often play the role of a central actor in the centralised coordination system. It takes charge of the logistical coordination decisions, effectively coordinating the humanitarian organisations by command. An example is when the World Food Programme and the United Nation High Commissioner for Refugees took charge of the usage of available logistical vehicles and arranged the schedule for the supply deliveries in the 2000 Mozambique floods.

The United Nations in 1991 established the Office for the Coordination of Humanitarian Affairs, an organisation specially focused on facilitating coordination of humanitarian response. Its main strategies for coordination include planning, information sharing and task division. It conducts need and damage assessment in the

affected region post disaster which is further shared with other agencies. It also develops plans to facilitate operations of agencies, and develops coordination tools to address specific aspects and needs of relief operations. In connection, the Humanitarian Civil -Military Coordination facilitates the coordination between the civilian and military organisations involved in relief. An On-Site Operations Coordination Centre is usually established in the region immediately following the disaster and serves as a "local headquarter" for disaster management operations. The Central Register of Disaster Management Capacities serves as a central database" of all specialised personnel and teams of technical specialists, as well as relief supplies, equipment and services available within the United Nation agencies, Non-Government and Government organisations.

In a majority of humanitarian relief operations, no single organisation or agency, which includes the United Nations, has authority over other involved parties. In theory, the government of the affected region can have authority to coordinate the relief; however, disasters are often overwhelming to an extent that local government might not be fully functional or functional at all following the crisis. In such scenarios, the logistical coordination follows a decentralised system and is conducted by consensus, where each relief organisation makes its own decision to share information, expertise and responsibilities with other actors. An example wherein a decentralised system for coordination was implemented is the 2004 Asian Tsunami. The magnitude of the disaster was so overwhelming that the United Nation lacked sufficient relief capacity and therefore, unable to lead the coordination (Dolinskaya, Shi, Smilowitz, & Ross, 2011).

Regardless of the arrangement involved, the task of coordinating relief efforts must be viewed from a cross-sectoral, inter-institutional, and interdisciplinary perspective. The task of coordinating relief starts long before a crisis takes place and be reinforced during the catastrophic event. As per the joint publication of the Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organisation and the Department of Emergency and Humanitarian Action of the

World Health Organisation, some of the key activities during these two crucial stages in the coordination process include:

A. During the preparedness phase
    - Determine who is supposed to do what in the context of humanitarian intervention: which national, international, governmental, non-profit organisations are present in the country, and what are their specialities 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 organisations 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 organisations or come from another source.

B. 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 organisations involved;
    - Share among the organisations the results of any assessments and findings with a view to finding fields of action where the strengths of various organisations can complement each other;
    - Share information about the activities undertaken and planned by each organisation, to prevent duplication of efforts;

- Promote exchange of resources among the organisations, as well as the development and implementation of cooperation agreements;
- In emergency situations that require a complex response, establish specialised working groups with representatives from all relevant organisations. Example include a water and sanitation group, or a medical assistance group (Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organization & Department of Emergency and Humanitarian Action of the World Health Organization, 2001).

Successful coordination among organisations is dependent on equitable participation, decision making, taking and accepting responsibility. Practices that can be adopted to promote effective coordination include:

- Establishing regular dialogue between key actors, to reduce adverse institutional attitudes and suspicions, agree on standards of assistance and encourage teamwork and creative thinking.
- Adopting a "collaborative leadership" approach: view other organisations and their personnel as pathways to strengthening response in your sector, not as competitors or obstacles. Your ability to lead and coordinate will depend on the trust and relationships you build and the services or value you provide to other parties, rather than on line authority. Listen, ask and consult rather than direct or command.
- Concentrate on, and help other parties recognise their common goals, common interest and mutual interdependencies. Ensure that meeting provide added value to those participating.
- Base your partnerships on the following principles endorsed by the Global Humanitarian Platform-

  Equality: equality requires mutual respect between members irrespective of size and power. Organisations must respect each other's mandates, obligations and independence and recognise each other's constraints and commitments.

Mutual respect must not preclude organisations from engaging in constructive dissent.

Transparency: transparency is achieved through dialogue (on equal footing), with an emphasis on early consultations and early sharing of information. Communications and transparency, including financial transparency, increase the level of trust among organisations.

Result-oriented approach: effective humanitarian action must be reality-based and action-oriented. This requires result-oriented coordination based on effective capabilities and concrete operational capacities.

Responsibility: organisations have an ethical obligation to each other to accomplish their task responsibly, with integrity and in a relevant and appropriate way. They must make sure they commit to activities only when they have the means, competencies, skills, and capacity to deliver on their commitments.

Complementarity: the diversity of the humanitarian community is an asset if we build on our comparative advantages and complement each other's contributions. Local capacity is one of the main assets to enhance and on which to build. Whenever possible, organisations should strive to make it an integral part in emergency response. Language and cultural barriers must be overcome.

- Engaging partners in assessing the effectiveness of the partnership and in providing feedback on how to strengthen it. Such an assessment can be done spontaneously and build upon the tips and principles noted above. The strength of a partnership comes from hard work and from continually applying the principles of collaboration. Routinely examining "what's working" and "what's not working" is essential to building and sustaining partnerships that can achieve mutually desired results (Logistics Operational Guide, Partnership, 2015).

CHAPTER THREE

Emergency supplies:

The purpose of logistics in a disaster is to acquire and deliver the resources (material and human) to the right place, in the right quality and quantity, in the right time and at the right price, to meet the needs of the affected population. Emergency materials and supplies can cover vast range of items such as food, clothing, rescue equipment, medicines and drugs, construction materials, generators and tools among others. Organisations such as Red Cross have standardised equipment and materials to be used for disaster response, influencing three of the five "rights" for good logistics: right time, right quality and right price. The United Nations Development Program's Inter-Agency Procurement Services Office (UNDP/IAPSO) has published a series of practical handbooks or catalogues on the availability, technical aspects, and use of standardized equipment and materials that can be used for disaster response by humanitarian organizations (Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organization & Department of Emergency and Humanitarian Action of the World Health Organization, 2001). The *Compendium of Generic Specifications*, contains information on emergency items for humanitarian relief such as:

- Telecommunications equipment;
    - Handheld satellite terminal Thuraya 2510
    - BGAN Terminal Thrane & Thrane Explorer 500
    - BGAN Terminal Thrane & Thrane Explorer 700
    - GPS receiver, basic Garmin GPS60
    - GPS receiver, advanced
    - VHF portable radio kit Motorola GP360
    - Handheld satellite terminal Iridium 9555
    - HF radio base kit Codan NGT-SRx
    - Cisco UC 520 W series Model

- Megaphone, hand-grip type
- Megaphone, shoulder type
- Public Address (PA) Set, Mobile
- Public Address (PA) set fixed installation
- Transceiver-Radio Voice System
- Transceiver, Transportable
- Broadband Antenna
- Automatic Antenna Tuner
- Inmarsat Standard B
- VSAT
- Solar Power Supply Kit
- Portable Generators, 0.5 kVA
- Diesel Generating Sets, 5 kVA
- Diesel Generating Sets, 60 kVA

- Shelter, housing, and cooking equipment;
  - Family Tent
  - School Tent
  - Hospital Tent
  - Reinforced Plastic Tarpaulins Sheets
  - Reinforced Plastic Tarpaulins in Rolls
  - Fleece Blankets
  - Woven Dry Raised Blankets
  - Kitchen Set
  - Synthetic Sleeping Mat
  - Semi-Collapsible Jerrycan
  - Bucket, Plastic
  - Dual Purpose Stoves
- Water, sanitation and Hygiene
  - Water Purification (NaDCC) 33 mg tabs/PAC-50
  - Hygiene kit, Adult
  - Chlorine test, DPD Nº1, tablets/PAC-250

    - Calcium hypochlorite 65-70%
    - Electrical Dewatering Pump with Genset, Petrol/Diesel
- Material handling
    - Gantry Crane
    - Ball Bearing Trolley
    - Chain Pulley Block
    - Jack Ropes
    - Hand Truck
    - Drum Truck
    - Platform Truck
    - Cage Truck
    - Pallet Truck, Manual
    - Forklift Truck, Light Duty
    - Forklift Truck, Medium Duty
    - Dolly
    - Boat, Inflatable
    - Life-Jacket
    - Protective Mask
    - Working Gloves
    - Safety Helmet
    - Hearing Protector
    - Shoes, Safety
    - Hand Saw
    - Circular Saw
    - Snow Chains for Vehicles
    - Roller Crowbar

The objective of this compendium is to contribute to enhancing the capacity for immediate crisis response and early recovery and to make the tools and guidelines available to practitioners to facilitate more effective and efficient deployment of goods

and services in crisis and/or emergency situations. The compendium is also intended to encourage the standardization of items in the different categories included. The analysis of the response to a few recent emergency situations discovered that a lot of effort and time are frequently spent in clarification of aspects related to technical specifications of required goods, hampering, therefore an efficient and expeditious response. The 2010 edition of the Compendium compiles standardized generic technical specifications made available for procurement practitioners for efficient sourcing of emergency goods in crisis situations and early recovery activities (Emergency Relief Items Compendium of Generic Specifications, 2010). It is available online at:

https://www.ungm.org › Shared › Knowledge Center › Document

The *Compendium of Basic Specifications* lists basic specifications for Medical Supplies and Equipment, Selected Essential Drugs, Guidelines for Drug Donations, Guidelines for the Safe Disposal of Unwanted Pharmaceuticals, The New Emergency Health Kit. The contents include:

- Catheters, tubes and drains
- Dressings
- Injection supplies
- Medical supplies
- Linen and operative field
- Medical equipment
- Sterilisation
- Surgical instruments
- X-Ray materials
- Laboratory equipment
- Sutures and surgical needles
- Anaesthesia materials
- Contraceptives

- Selected essential drugs for the early phase of emergencies
- New Emergency Health Kit
- Reproductive Health Kits for Emergencies
- Revised guidelines for Drug Donation
- Guidelines for the safe disposal of unwanted Pharmaceuticals in and after emergencies

The compendium lists by product the complete basic specification for all selected items, together with information on shipping weight/volume. It intends to facilitate acquisition of suitable relief items from as many qualified suppliers as feasible, in a cost-effective manner (Emergency Relief Items : Compendium of Basic Specifications, 1999). It is available online at:

http://www.iapso.org/pdf/erc_vol2.pdf

The Emergency Item Catalogue of International Federation of Red Cross and Red Crescent Societies and the International Committee of the Red Cross list all the items that respect Red Cross standards. The catalogue describes in great detail the specifications of all the items such as the item code, size, quality, estimated price, packaging, weight, volume, accessories, ideas and options on how to use the item. The catalogue makes the selection of items easy and helps in planning, budgeting and implementation of any program in disaster preparedness and disaster response (A Logistics Handbook : For Disaster Prepardness and response, 2012). The catalogue is available:

- In book form or on CD (ask headquarters, International Federation of Red Cross and Red Crescent Societies and the International Committee of the Red Cross)
- Online at: http://www.ifrc.org/emergency-items

CHAPTER FOUR

Assessing Logistical and Supply Needs:

Needs assessment in the context of logistics enables organisations to understand the impact of disaster on the environment, how the impact affects the population and how logistics services are to be provided. The results from the logistics assessment are vital in enabling appropriate decision making, planning and organising for effective disaster response. To effectively support a response to any disaster it is important to consider preparing an in-depth logistics assessment before the crisis. However, if there is no room for preplanning, ensure that a logistic assessment is performed during the early stages of a crisis, either as a standalone exercise or as a logistic component within a general assessment format such as the Multi Cluster/Sector Initial Rapid Assessment. An assessment would ideally address the following objectives:

- identify impact on infrastructure etc.;
- identify the most urgent needs (prioritisation);
- identify the most affected areas (so as to enable positioning of hubs etc.);
- define levels of response depending on complexity;
- highlight special concerns; identify any other assessment that needs to be undertaken and also to provide a baseline data to benchmark and monitor.

In terms of planning a logistics assessment, the following basic principles are ideally meant to be put to practice:

- Use multiple sources and methods. In order to achieve an adequate and accurate understanding quickly and economically.
  Use both qualitative and quantitative methods and information.
  Use both secondary data (existing reports) and primary data (new information specifically gathered for the assessment).
  Compare information from different sources to get as complete and balanced a picture as possible.

- Seek participation and collaboration. As much as possible involve other entities in the process of gathering information. Get consensus on: what are the risks? and what are the assessment objectives?
- Ensure transparency and provide feedback with conclusions and recommendations.
- Reference the sources of information in all documentation.

Key considerations in the assessment include:

- Numbers and figures regarding affected population
- Distribution plans
- Where to access: materials required (commodities and supplies); electric power, hydro facilities, water/sewage infrastructure, airports, railroads, warehousing.
- Accessibility of: roads and bridges, transfer points etc.
- Local truck capacity
- Communications
- Coordination capacity

In the context of post-disaster logistics assessment, key considerations include:

- Sensitivity to local culture and customs- Identifying the population's dietary habits, including the types of food they will not consume for religious, cultural, or traditional reasons, 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. Find out what type of clothes are used, and which ones are not worn due to cultural or environmental reasons. Identify the most common types of housing and construction materials, including the cultural or environmental reasons, if any, for such buildings and building practices.
- Identify local capacities- in terms of infrastructure, the state of roads, bridges, waterways and other transport infrastructure needed to guarantee the arrival of emergency supplies in the region that has been affected. Are there any

restrictions on their effective use, such as the threat of landslides blocking access to a town/village, 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 cyclone? Further, identify supply storage facilities and transport that exists and are available locally. Identify local and regional producers before asking for food assistance or negotiating the acquisition of food in other regions.

- Consider the requirements of all sectors activated and the response of other agencies to avoid duplication.
- Coordinate and work with other entities. Form multi-disciplinary teams with non-government and voluntary organisations etc. whenever possible. Coordinate efforts to get information from a cross section of all localities as quickly as possible. If possible, agree on common definitions, methods and data collection formats so that information from different teams will be comparable.
- Define terms of reference and specific information needs. Define the purpose and scope of each assessment mission clearly, and specify appropriate report headings.
- Share and supply accurate and credible information to enable rapid response and effective coordination.
- Use standardised assessment procedures.
- Identify a way of ensuring that there is a continuous re-assessment to facilitate relevant action for the changing context and needs.
- Include status report on some of the vital components required to enable a successful response:
  - Financial resources- available and any restrictions or provisions pegged to it;
  - Staffing- in numbers and skills;
  - Ability to collaborate with other stakeholders;
  - Complexities or challenges arising due to the nature of the emergency whether a slow onset; sudden onset or complex emergency. This determines the speed

of response required and therefore, the type of assessment or response that will be done.

- Select sources of information carefully to ensure that they are reliable and up-to-date. Consider the accuracy- the likely margin of error in the data and its significance for the conclusions being drawn or calculations being made. Highlight information/data that may misrepresent a situation.
- Be cautious about generalising: the situation and needs may vary considerably over short distances within the affected area and different locations.
- Be sensitive to possible biases in people's perception and reports (including those of the assessment team). Information for emergency assessments must come from different sources to provide a relatively accurate assessment of the situation.

Assessment should be continuous in nature to enable organisations to monitor changes as a response or intervention evolves. The assessment cycle begins with clarifying the nature of the intervention, in which we seek to identify the information needs as well as reliable sources ranging from inter-agency groups, humanitarian actors among others, as well as verifying information from alternative sources. The next step in the cycle is collecting data and information, the aim is to identify baseline data if available and build on existing collection system. The following step is to analyse and interpret the data and information gathered and evaluate against a baseline, it involves cross-checking and comparing reports from different sources; if possible, update information continuously as need changes and report conclusions to relevant sectors who draw on the logistics services. Finally, the next step involves aligning objectives to program needs, identifying and allocating resources and developing a monitoring and evaluation process (Logistics Operational Guide, Assessment and Planning, 2010).

CHAPTER FIVE

Procurement:

Procurement is one of the crucial elements of relief logistics. Various procurement decisions made by relief organisations can have varying impacts on transport, storage, and distribution of relief items. These factors can ultimately influence the performance of relief supply chain and the delivery of relief items (Torabi, Aghajani, & Baghersad, 2012).

In India, public procurement is yet to be governed by a comprehensive central legislation. However, all procurement processes must adhere to

- The General Financial Rules, 2017;
- The Manual for Procurement of Goods, 2017;
- Sector specific procurement rules contained in manuals published by the relevant ministry;
- State specific legislations on transparency in procurement.

The aim and objectives of procurement is to carry out activities related to procurement in such a way that the goods and services are procured according to the "Five Rights." These "Five Rights" are:

- Right Quality: technical specifications is the most vital ingredient.
- Right Quantity: the right quantity should be procured which balances extra cost associated with larger or smaller quantities.
- Right Price: The price should be just right for the quality, quantity and other factors involved. The concept of price can further be refined to take into account not only the initial price paid for the requirements but also other costs such as maintenance costs, operational costs and disposal costs.
- Right Time and Place: If a material is required by an organisation in three months' time it will be costly to procure it too late or too early. An unrealistic time schedule for completion of service may lead to delays, claims and disputes.

- Right Source: The source of delivery of Goods, Works and Services of the requirement must have just the right financial capacity and technical capability for our needs (demonstrated through satisfactory past performance of contracts of the same or similar nature) (Manual for Procurement of Goods, 2017).

The "Five Rights" can inform the procurement process and includes:

- Buying quality materials, items and services economically from reliable sources;
- Ensuring timely delivery through the selection of capable and efficient suppliers;
- Continuously locating, evaluating and developing economical and reliable supply sources;
- Buying in accordance with the organisations policies;
- Estimating, positioning and monitoring appropriate levels of stocks based on estimated needs, operational policy, objectives and priorities, estimated time for replenishment and availability of funds; and
- Participating in planning and coordinating purchasing needs to make the best use of money spent (Logistics Operational Guide Response, 2010).

As per the Manual for Procurement of Goods, 2017; the various modes of procurement that can be used in public procurement are:

i) *Open Tenders*

a) Open Tender Enquiry (OTE); and

b) Global Tender Enquiry (GTE)

ii) *Procurement through Selected Suppliers*

a) Limited Tender Enquiry - LTE (up to Rs. 25 (Rupees Twenty-Five) lakh); and

b) Special Limited Tender Enquiry SLTE above Rs. 25 (Rupees Twenty-Five) lakh (under special circumstances)

iii) *Nomination Basis Tenders*

a) Proprietary Article Certificate (PAC); and

b) Single Tender Enquiry (STE) without PAC

iv) *Procurements without Calling Tenders*

a) Withdrawals against Rate Contracts (RC);

b) Direct Procurement without Quotation;

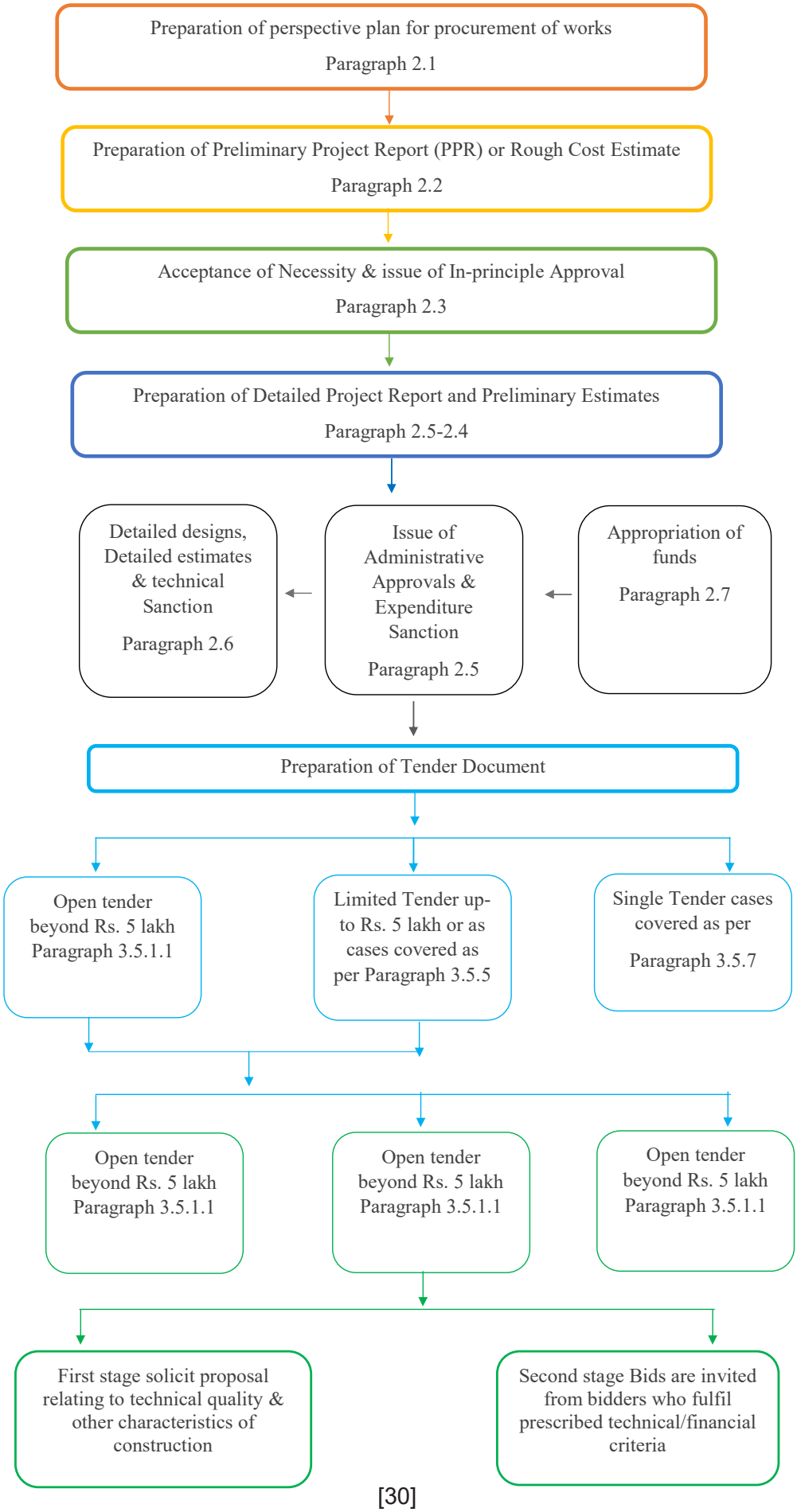
c) Direct Procurement by Purchase Committee;

d) Purchases through Central Purchase Organisation (DGS&D) or other such agencies

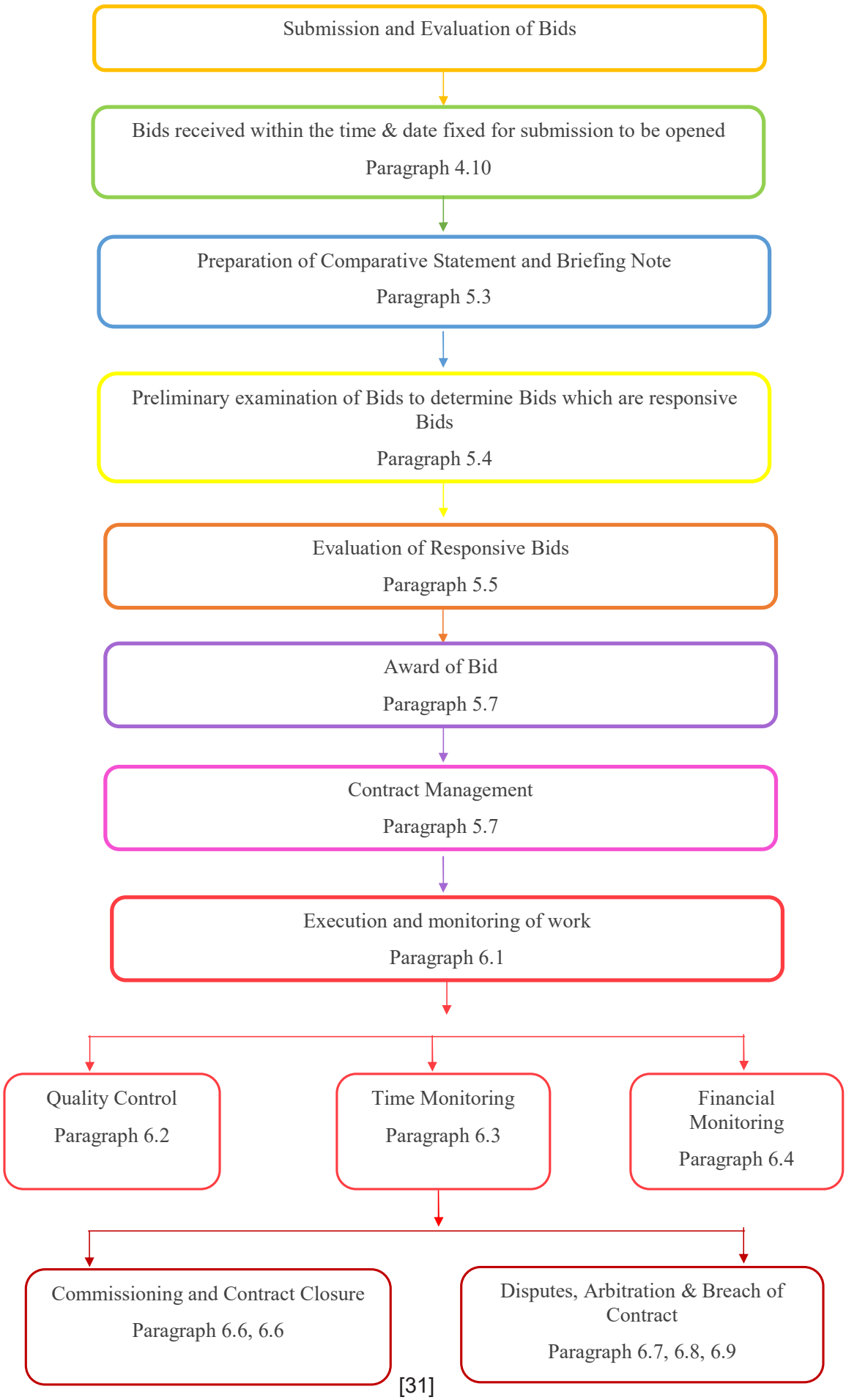
v*) Mandatory Procurement of Goods and Services for Goods or Services available on GeM* (Rule 158 of GFR 2017)(Manual for Procurement of Goods, 2017).

The Ministry of Finance, Department of Expenditure in their 2019 publication titled 'Manual for Procurement of Works' elaborates on the following flow chart to detail the process of procurement of works:

Refer Paragraph 1.11



Procedure for submission and evaluation of Bids



Initially, with a view to improving transparency in decision making in public procurement and reducing the scope for subjectivity, Department of Expenditure in 2006 had prepared a set of three Manuals on Policies and Procedures for Procurement of Goods, Works and hiring of Consultants, in conformity with the General Financial Rules (GFR), 2005. Over the years, these Manuals have served as a guide book for procurement. The 2019 edition 'Manual on Procurement of Goods' has been extensively revised in keeping with GFR 2017 and in consonance with the fundamental principles of transparency, fairness, competition, economy, efficiency and accountability(Manual for procurement of works, 2019).

The Manual is available online at:
https://doe.gov.in/sites/default/files/Manual%20for%20Procurement%20of%20works%202019.pdf

In the context of procurement in urgencies/Emergencies and Disaster Management, Clause No. 8.2 of the Manual for Procurement of Goods 2017 of Department of Expenditure, Ministry of Finance provides for the following:

> …There are sufficient fast track procurement modalities to tackle procurements in urgent/emergent and Disaster Management situations. Enhanced delegations of procurement powers in Schedule of Procurement Powers (SoPP) maybe considered to handle such situations. Use of following modes of procurements may be utilised in order of speed (under Disaster Management situations, threshold limits of modes of procurement may be increased for higher level of officers, with the sanction of Secretary of the Department):
>
> i) Direct Procurement Without Quotation
>
> ii) Direct Procurement by Purchase Committee
>
> iii) SLTE/Limited/Single Tender Enquiry, with reduced time for submission of Bids…(Manual for Procurement of Goods, 2017).

Likewise, several Rules of the General Financial Rules 2017 of Department of Expenditure, Ministry of Finance provide as follows:

Rule 162 Limited Tender Enquiry.

> …(iii) Purchase through Limited Tender Enquiry may be adopted even where the estimated value of the procurement is more than Rupees twenty-five Lakhs, in the following circumstances. (a) The competent authority in the Ministry or Department certifies that the demand is urgent and any additional expenditure involved by not procuring through advertised tender enquiry is justified in view of urgency. The Ministry or Department should also put on record the nature of the urgency and reasons why the procurement could not be anticipated…

Rule 166 Single Tender Enquiry.

Procurement from a single source may be resorted to in the following circumstances:

"(ii) In a case of emergency, the required goods are necessarily to be purchased from a particular source and the reason for such decision is to be recorded and approval of competent authority obtained."

Rule 194 Single Source Selection/Consultancy by nomination.

The selection by direct negotiation/nomination, on the lines of Single Tender mode of procurement of goods, is considered appropriate only under exceptional circumstance such as:

"(ii) in case of an emergency situation, situations arising after natural disasters, situations where timely completion of the assignment is of utmost importance"
(General Financial Rules, 2017).

- Direct Procurement without quotation:
  Direct procurement of goods without formal quotations is normally done for the smallest value procurements. This is also called petty purchase. It should be used for off-the-shelf goods of simple and standard specifications. The procedure is the simplest and quickest but Value for Money (VfM) maybe

poor; hence it is suitable only in very low value, urgent and simple requirements in the following situations:

i) Procurements do not exceed the threshold (for each requirement) of Rs. 25,000 (Rupees Twenty-Five thousand) for each case;

ii) The requirement is urgent but was not covered in the procurement plan; and

iii) The requirement is for off-the-shelf goods of simple and standard specifications. Examples of procurement are day-to-day needs of the office and field units, and so on. (Rule 154 of GFR 2017)

Terms and Conditions

i) The competent officer of the Procuring Entity[1] can initiate and complete this purchase after diligent enquiries from the market and filling the certificate prescribed (Annexure 3). Such powers to a limited extent can also be given to various user sections for operational needs;

ii) Normally an imprest amount (with facilities for cheque payments) sufficient for two months' estimated procurements can be sanctioned for such officers to handle such procurements. The imprest amount can be recouped on monthly basis by submission of expense vouchers;

iii) In a summary form, records should be kept of the vendors/contractors approached and prices indicated by them;

iv) Selection of seller by diligent market enquiry is of essence of this mode of procurement;

v) In larger cities, the presence of reputed Shopping Malls may also be included in the market survey. Reputed internet shopping portals may also be explored.

[1]"Procuring Entity" means any Ministry or Department of the Central Government or a unit thereof or its attached or subordinate office to which powers of procurement have been delegated

Direct Procurement without Quotations - Risks and Mitigations:

RISK	MITIGATION
The main risk is splitting of demand to avoid higher approvals or higher modes of procurements.	Supervisors should carry out periodic review of such procurements to ensure that the demand is not split into small quantities for the sole purpose of avoiding the necessity of getting an approval from the higher authority required for sanctioning the purchase of the original demand or for avoiding Limited Tender Enquiry (LTE)or Open Tender Enquiry(OTE) mode of procurement. An annual review of such procurements shall be carried out to ensure that future anticipated requirements are clubbed and procured through LTE/OTE/RC. To keep a better control, an annual ceiling may be fixed for each office for such a mode of procurement say. Rupees five Lakh for each office per year. Each office should maintain records to monitor such limits.
Over a period of time intentionally or otherwise, the due diligence of enquiries from market may degenerate into a mechanical obtaining of quotations, leading to development of nexus and crony suppliers. Vendor selection may actually be manipulated with fake supporting vouchers. Since such small value materials do not undergo accounting and inventory control, the risk of development of a nexus, leak ages and fake procurements and payments are there. The same set of vendors may get patronised repeatedly for a wide variety of requirements. Since only cursory visual inspections are done, quality may be at risk.	Supervisors should cross check a percentage of cases in the market for prices, fake vouchers, and so on. Supervisors should also check that the same vendor(s) is not being patronised repeatedly. For the sake of transparency, payments should be made by cheque or through Electronic Clearance Service except that cash payment may be allowed up to Rs. 5,000 (Rupees Five thousand). Staff involved with such procurements should not continue in the same role for long and should be rotated frequently.

- Direct Procurement by Purchase Committee

  This mode of procurement is used for procurements valued above Rs. 25,000 (Rupees Twenty-Five thousand) and up-to Rs. 2,50,000 (Rupees Two lakh fifty thousand) only on each occasion. It is made by a local purchase committee constituted by Head of Department. This mode of procurement is described in

parlance of procurement of goods; however, in principle, it is equally applicable to contingency expenditure on small works/services also. This procedure is slightly more complex and is likely to provide better VfM than direct procurement without quotation and hence is suitable for marginally higher thresholds. (Rule 155 of GFR 2017)

Terms and Conditions

i) The controlling Ministry may lay down an annual ceiling value per office/unit for such procurements;

ii) In case of emergency procurement, facility of withdrawing requisite advance cash amount and its subsequent account may also be considered;

iii) This is intended to be fast track, simple mode of procurement. The committee will survey the market to ascertain the reasonableness of rate, quality and specifications and identify the appropriate supplier;

iv) Selection of suitable product and supplier by actual market survey (not by calling of tenders like a mini LTE) is of essence of this mode;

v) Before recommending placement of the purchase order, members of the committee will jointly record the certificate prescribed (Annexure 4); and

vi) In larger cities, the presence of reputed Shopping Malls may also be included in the market survey. Reputed internet shopping portals may also be explored.

Direct Procurement by Purchase Committee risks and mitigation.

RISK	MITIGATION
Risks are the same as in the case of direct procurement without quotation mentioned above, with mitigation due to involvement of three members. Over a period of time intentionally or otherwise, the due diligence of enquiries from market may degenerate into a system of floating and obtaining of limited tenders, leading to delays, development of nexus and crony suppliers.	Mitigation strategies are also the same as in direct procurement without quotation.

- Limited Tender Enquiry (LTE)

  LTE (Annexure 1) is a restricted competition procurement, where a preselected list of vendors is directly approached for bidding; bids[2] from uninvited bidders are treated as unsolicited and are normally not entertained, except in special circumstances. This mode provides a short and simple procedure, but may not provide as good a VfM as in case of open tendering – still a good balance for procurements below a threshold. LTE procedures should be default mode of procurement when the estimated value of procurement is between Rs. 2.5 lakh to Rs. 25 lakh (Rupees Two and a half lakh to Twenty-Five lakh). The bidding documents should be simple normally consisting a single page with terms and conditions printed overleaf. (Rule 162 of GFR2017)

  Terms and Conditions

  i) Copies of the bidding documents should be sent free of cost (except in case of priced specifications/drawings) directly by speed post/courier/e-mail to firms which are registered vendors/contractors. Further, Procuring Entity should also mandatorily publish its limited tender enquiries on Central Public Procurement Portal (CPPP). Apart from CPPP, the organisations should publish the tender enquiries on the Department's or Ministry's web site.

  ii) A simplified single Page Bid Document should be used, instead of a detailed Bid Document. The minimum number of bidders to whom LTE should be sent is more than three. In case less than three approved vendors/contractors are available, LTE may be sent to the available approved vendors/contractors with approval of the competent authority, duly recording the reasons. The requirement should then be marked for development of more sources by the Supplier Registration section.

  LTE risk and mitigation.

[2]"Bid" (including the term 'tender', 'offer', 'quotation' or 'proposal' in certain contexts)means an offer to supply goods, services or execution of works made in accordance with the terms and conditions set out in a document inviting such offers.

RISK	MITIGATION
Major risk in this mode is that the demand may be artificially split to avoid OTE or higher-level approvals	The e-Procurement portal maybe programmed to raise an alert if the same item is attempted to be procured through LTE repeatedly. Audit should take up a larger percentage of cases in LTE for review.
There is a risk that LTE may not attract sufficient number of bids and sometimes there may be a single acceptable offer. This may be because of an insufficient data base of registered/known vendors. It could also be due to bid documents not reaching the targeted bidders – intentionally or otherwise. It could also be due to bidders not getting adequate time for submission of bids. On the other hand, unsolicited bidders may also quote – causing a transparency dilemma about consideration of such offers.	Maintenance of list of registered suppliers is a sine-quan on for LTE. The List of registered vendors needs to be reviewed perpetually to ensure adequate number of qualified suppliers. To ensure sufficient response, in addition to mails/emails to selected vendors, web-based publicity should be given for limited tenders, with suitable clarifications that unsolicited bids shall not be considered. Further a limited or open tender which results in only one effective offer shall be treated as a single tender enquiry situation, with relevant powers of approval etc. Adequate time should be given for submission of quotes, which should not be less than three weeks. A longer period (six weeks) could be given in case of import of the materials and, in complex cases, if justifications are given and allowed.
There is also a risk that the selection of vendors may not be transparent. At the evaluation stage, some invited bidders may be passed over on grounds of being ineligible/unreliable.	All major procuring Departments must keep a list of registered bidders for use in restricted bidding. Suppliers or contractors should be selected in a non-discriminatory manner. All past successful vendors/bidders should invariably be invited. In case it is proposed to exclude any registered/approved vendor/contractor from being shortlisted for inviting LTE, detailed reasons, such as failure in supply, should be duly recorded and approval of the competent authority be taken before exclusion. The selection of bidders should be with due diligence, to ensure that bidders who do not meet eligibility criteria do not get shortlisted. At the evaluation stage, in LTE, passing over of a duly shortlisted bidder on grounds of poor past performance or eligibility may raise questions about transparency.

- Special Limited Tender Enquiry for Procurements More than Rs. 25 (Rupees twenty-five) Lakh:

  LTE mode, even for values higher than Rs. 25 lakh (Rupees Twenty-Five lakh) (Rule 162 of GFR 2017), where normally OTE should have been done, is permissible in certain special circumstances as follows. Powers to sanction procurement on LTE basis in such special cases may be laid down in SoPP based on a certificate of urgency signed by the indenter. This mode has the merit of being quicker but VfM obtained may be less than in case of OTE; hence it should be restricted to rare situations:

  i) The competent authority in the Ministry/Department certifies that there is an existing or prospective urgency for operational or technical requirements and any additional expenditure involved by not procuring through advertised tender enquiry is justified in view of urgency. The Ministry/Department should also put on record the nature of the urgency and reasons why the procurement could not be anticipated earlier;

  ii) There are sufficient reasons, to be recorded in writing by the competent authority, indicating that it will not be in public interest to procure the goods through advertised tender enquiry;

  iii) The sources of supply are definitely known and possibility of fresh source(s) beyond those being tapped is remote;

  iv) Nature of items to be procured is such that pre-verification of competence of firm is essential, hence requires registration of firms; and

  v) Government policy designates procurement from specific agencies.

  Terms and Conditions

  i) The tendering process would be same as in the case of a normal LTE described above. However, the bidding documents are more detailed as in the case of OTE; and

  ii) The indenter should certify that there is an existing or prospective urgency for operational or technical requirements and any additional expenditure involved by not procuring through an advertised tender enquiry is justified in

view of urgency. The indenter should also put on record the nature of the urgency and reasons why the procurement could not be anticipated.

Special Limited Tender Enquiry risk and mitigation

RISK	MITIGATION
Risks as applicable in both LTE and OTE are also applicable here. In addition, there is a risk that this mode maybe used unjustifiably to avoid open tendering.	All mitigation strategies of LTE and OTE would apply here also. In addition, the systems of checks and balances should be tighter byway of enhanced and severely restricted delegation of powers in this regard for certification of urgency and approval of this mode of procurement. A system of reports from the authority signing the urgency certificate and post facto review of utilisation of received goods/works/services to tackle the expressed urgency may be laid down. Audit should take up the bulk of such cases for review to judge the genuineness of urgency certification.

- Proprietary Article Certificate (PAC):

  In procurement of goods, certain items are procured only from Original Equipment Manufacturers (OEMs) or manufacturers having proprietary rights (or their authorised dealers/stockists) against a PAC certificate (Annexure 2) signed by the appropriate authority. Once a PAC is signed at the designated level as per SoPP, the powers of procurement are the same as in normal conditions as per the delegation of powers. This mode may be shortest but since it may provide lesser VfM as compared to LTE/OTE and also strains the transparency principle, it should be used only in justifiable situations. (Rule 166 of GFR 2017)

  Terms and Conditions

  i) Users should enclose, with their Indent, a PAC certificate indicating the justification and approval at the appropriate level as per SoPP, for sourcing an item from OEM or PAC firms or their authorised agents;

  ii) Proprietary items shall be purchased only from a nominated manufacturer or its authorised dealer as recorded in the PAC certificate;

iii) In certain unavoidable cases, the procuring authority may have no alternative but to waive payment of Earnest Money Deposit (EMD)/Security Deposit (SD) for procurement on a proprietary basis;

iv) To the extent feasible, the firm may be asked to certify that the rates quoted by them are the same and not higher than those quoted with other Government, public sector or private organisations;

v) In case of PAC/single tender procurements:

a) Reports relating to such awards should be submitted to the Ministry every quarter;

b) Internal audit may be required to check at least 10 (ten) per cent of such cases; and

c) Details of such contracts should be published on the website of the Procuring Entity.

PAC risk and mitigation.

RISK	MITIGATION
There is a risk that this mode may get used unjustifiably to restrict competition. Such risks get aggravated, in case of secrecy about such procedures as alternative vendor/contractors may not even come to know about such opportunities	The delegation of powers should be restricted for signing of PAC. Audit may take-up 10(ten) per cent of cases of PAC procurements for review. Even in PAC procurements the Notice Inviting Tender (NIT)and the Award of Contract should be put on the website of CPPP and Procuring Entity
Once approved, there is a risk of a nexus getting developed and the mode may continue to be used for many years, without fresh application of mind.	No item should be procured on PAC basis for more than three years, after which a mandatory OTE mode may be used, to test the market.
The bidder may charge a price higher than the market	The firm should be asked to accept a "fall clause" undertaking that, in case it supplies or quotes a lower rate to other Governments, public sector or private organisations, it would reimburse the excess. Negotiations may be called for to get prices reduced.

- Single Tender Enquiry (STE) without a PAC:

  A tender invitation to one firm only without a PAC certificate is called a single tender. This mode may be shortest but since it may provide lesser VfM as compared to LTE/OTE and may also strain the transparency principle, it should be resorted to only under following conditions:

  i) In a case of existing or prospective emergency relating to operational or technical requirements to be certified by the indenter, the required goods are necessarily to be purchased from a particular source subject to the reason for such decision being recorded and approval of the competent authority obtained.

  ii) For standardization of machinery or components or spare parts to be compatible to the existing sets of machinery/equipment (on the advice of a competent technical expert and approved by the competent authority), the required goods are to be purchased only from a selected firm. (Rule 166 of GFR 2017).

  Terms and Conditions

  i) The reasons for a STE and selection of a particular firm must be recorded and approved by the CA as per the delegation of powers laid down at in Delegation of Financial Power/SoPP, prior to single tendering. Unlike in PAC, powers of procurement of STE are more restricted; and

  ii) Other terms and conditions of PAC procurement mentioned above would also apply in this case.

STE RISK	STE MITIGATION
Same but more heightened risks than PAC are present in this mode. Selection of a single vendor may be non-transparent and unjustified.	Same mitigation strategies as in the case of PAC should apply. Procurements on a STE basis should be made from reputed firms after determining reasonableness of rates. Powers of procurement of STE should be severely restricted.

(Manual for Procurement of Goods, 2017).

Sending of supplies:

Following standardised procedures to pack supplies helps in easing the task of delivering supplies in the disaster affected area. A few basic measures can have a

positive impact on how supplies are mobilised and received. Following are a few measures to keep account of:

- Packaging and labelling 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 colours system.

  - Green for drugs and medical equipment;
  - Red for food;
  - Blue for clothing and household items;
  - Yellow for equipment and tools.

  Each package should be clearly labelled 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").

- 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.

- 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:

  - 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;
  - Identify all the people who have been responsible for the shipment, from its point of origin to its final destination;
  - Have the necessary documents to keep track of the shipping and reception of the supplies.

Receiving 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.

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;
- 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.

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 sender or provider should be notified as soon as possible of any discrepancy or problem noted (Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organization & Department of Emergency and Humanitarian Action of the World Health Organization, 2001).

CHAPTER SIX

Storage:

Storing of relief items in strategic places in the state will enable quick response to any disaster. When selecting the site, 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 non-structural):

    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

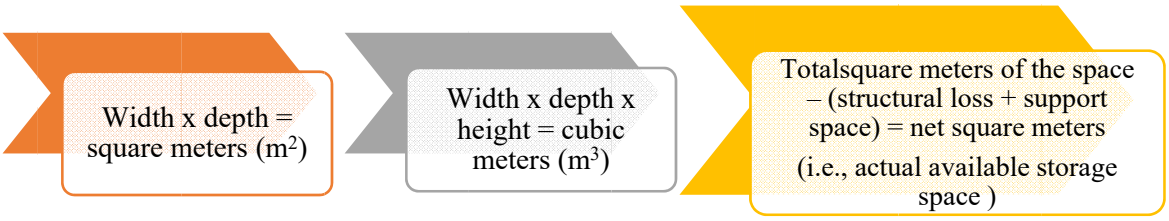
disposal sites, overgrown weeds and other deficiencies should be avoided or remedied. The social environment must also be evaluated to prevent any security problems that may arise.

The size of the warehouse needed depends on the quantity of supplies expected. It is 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.

In order to determine the useful capacity of a site, some basic variables must be known:

- 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, 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.).

➢ *Basic Formulas for measuring storage space*



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 displaced population may be well known, making it possible to predict the quantity of food supplies and the storage space needed. The following illustrates how to estimate the space needed for a known quantity of supplies.

Example 1: Determining the storage capacity needed –tents (Supplies and Food Aid Field Handbook, 1989):

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	

Example 2: Area estimate for 100 tons of rice with a storage height of two meters (Handbook for Delegates, 1997).

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

Example 3: Determining the storage capacity needed -kitchen-set (International Federation of Red Cross and Red Crescent Societies, 2019).

In any kind of warehouse:

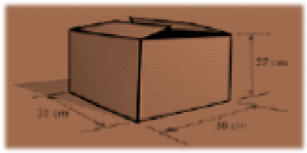
70% = storage space.

30% = open space for ventilation, passage ways, handling and repacking

Calculation of volume and available space

Volume of a box = length x width x height

IFRC kitchen-set



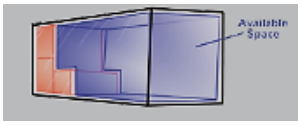
L= 0.3m (30 cm); W= 0.3m (30cm) H= 0.27m (27 cm)

- Unit volume= 0.3x0.3x0.27 = 0.0243 m^3
- Total volume of 50 kitchen-sets = 0.0243 m^3 x 50 = 1.215 m^3
- Total volume of all your items = sum of all total volumes per item

Available space = length x width x height of the empty space in your storage area

An example: internal of a 20 ft container: L = 5.87 m; W = 2.33 m; H = 2.35 m

- Total available space = 5.87 x 2.33 x 2.35 = 32.14 m^3 (This is completely filled!)
- Total space for storage = 70% of 32.14 m^3 = 22.49 m^3
- Total space available in a half-filled container =



- Sum of the volume of the empty spaces you can use for storage
- Or total space for storage – volume of space already occupied

The same rules apply when using feet, yards and cubic yards

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 Frontiers 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 (Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health

Organization & Department of Emergency and Humanitarian Action of the World Health Organization, 2001).

Warehouse Preparation Planning:

- Space Layout:

  The areas that should be planned are both the general storage areas and the areas for goods receipt, consignment picking and goods dispatch. It is also desirable that space should be set aside for the following activities:

  - equipment maintenance and parking;
  - an area for garbage disposal e.g. empty packaging;
  - a quarantine area for keeping rejected goods, goods to be sent back or destroyed;
  - washroom; and
  - an administration office.

- Planning

  It is worth keeping these requirements in mind during the planning of the main operating areas. Planning consideration needs to be given to the following:

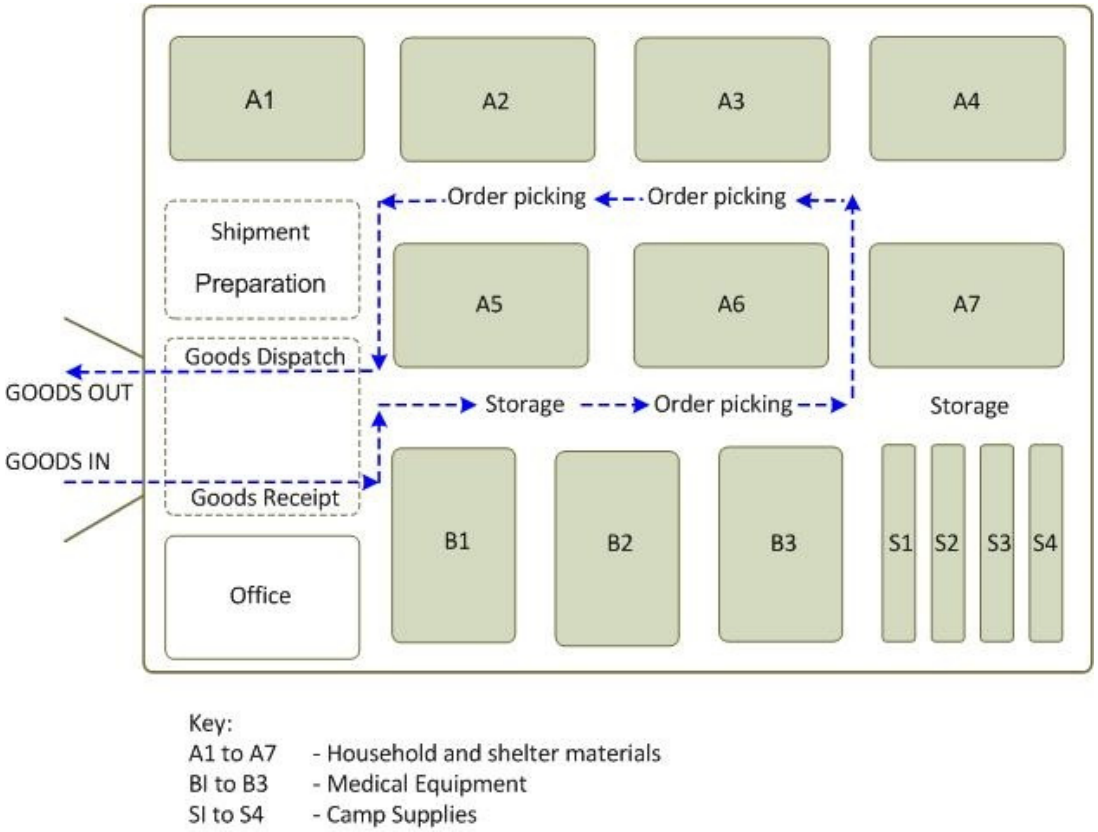
  - allocate space for each type of product and locating number;
  - allow sufficient space for easy access to the stacks for inspecting, loading and unloading. Stacks should be one meter from the walls and another meter between stacks;
  - sizing the goods receipt and despatch area;
  - allow space for storage of cleaning materials and supplies;
  - allocate areas for damaged items by consignment number;
  - allow sufficient space to repackage damaged items and place it in separate stacks;
  - sufficient free space is needed to operate a warehouse effectively. When planning the size of a warehouse consider: planning on having about 70-80% utilisation of available space, whilst considering:

    -throughput rate

-number of stock keeping units (SKU)

-handling characteristics of items, etc.

- Space Utilisation and Handling -Sample:



Key:
A1 to A7 - Household and shelter materials
Bl to B3 - Medical Equipment
Sl to S4 - Camp Supplies

(Logistics Operational Guide, Response, Warehousing and Inventory Management, 2015).

Factors that must be born in mind when planning how to use the space include:

- 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 to consider include:

- Cleanliness: 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;
- Storage: 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.

- Staff and equipment 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 soon). This team can comprise relief personnel, volunteers from community organizations, or even the victims themselves. 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.

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

  - A computer system
  - 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;
  - A generator;
  - 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;
- Safety gear for the workers;
- Weights and measures conversion tables (Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organization & Department of Emergency and Humanitarian Action of the World Health Organization, 2001).

- Characteristics of a good warehouse:
- Solid building with a flat, firm floor;
- Dry and well ventilated;
- Gives protection against animals, insects and birds;
- Gives protection against humidity, extreme temperature fluctuations and local weather conditions;
- Easy access for trucks;
- Easy loading and unloading;
- Secure against theft (locked gate, etc.);
- In an appropriate site (low disaster vulnerability) (International Federation of Red Cross and Red Crescent Societies, 2019).

CHAPTER SEVEN

Inventory management:

Inventory management ensures that stock is available to meet the needs of the disaster affected population as and when required. There should be a balance between supply and demand to make inventory available at the lowest possible cost. This can be achieved by establishing minimum holding stocks to cover lead times (time period between accepting an order and the actual delivery of that order). The warehouse must always have sufficient stocks to cover the lead-time for replacement stocks to avoid stock-outs.

Sound stock management and control depend on the quantitative measurement of stock changes and interpretation of data. It forms the foundation upon which a stock manager can base his/her decision. This may involve ordering further supplies: instructing a supplier to speed up or delay a delivery; reducing or increasing stock safety levels; expanding or reducing storage facilities; acquiring new handling equipment, etc. Some techniques for stock control include:

- ABC stock analysis

  ABC analysis is a means of identifying dominant stocks, which account for the heaviest investment of funds. A small percentage of the number of commodities normally stocked account for a large percentage of the total stock value. This is expressed in the 20/80 principle, which states that 20% of the items stocked account (on average) for 80% of total stock value. Expensive stock is referred to as category A, while the remaining stock is divided between categories B and C. A stock manager should give priority to category A products, while not neglecting categories B and C. (A category C product with a small stock value may, for example, be a key item.) It should also be borne in mind that products may change category, in the course of a refugee programme

for instance and for this reason this analysis should be made at least once a year. This analysis will permit a manager to take timely, appropriate action.

- Stock turnover rate

  This is an indicator that enables a manager to assess the speed at which stocks are exhausted. Turnover rate is the ratio of aggregate withdrawals for consumption in a stated period (yearly, half-yearly, quarterly) to the average value of stock during that period. The rate may be calculated on the basis of quantities or value.

- Stock coverage rate

  This is an indicator enabling managers to measure physical availability of stocks. The rate of coverage expressed in months is obtained by dividing stock at the end of a month by average monthly consumption.

- Stock out rate

  This indicator permits measurement of the number of stock outs (when stocks have been depleted) in a given period. The stock out rate expresses the number of unfulfilled requests as a percentage of the total number of withdrawals during a period (UNHCR Manual Chapter 8, 2003).

Establishing when to order (Order Point Calculation):

The components in the calculation to establish the point at which an order should be placed are covered by the following:

- Lead time

  The lead time is defined as the interval between deciding that an order needs to be placed and the order being physically available for issue. This should not be confused with supplier delivery time, which will cover a shorter period, but does not include the administrative processes prior to and following the delivery time as well as the physical activity of receiving and storing the stock. In most inventory systems the lead time is set to a fixed time period.

  The time period can be established through:

  - Agreement with supplier on delivery time plus the duration for raising and receiving an order.

- Analysis of lead time from past records to obtain the most likely period of time for placing and receiving an order. In this instance either the average time can be used or some arbitrary level set at a point higher than the average which will cover most lead time occurrences.

- Lead time variability

  Although most inventory systems tend to use a fixed lead time the measurement of lead time variability can be included in the calculation.

  It can be assumed that the spread and variability of lead time will follow a normal distribution pattern. It is therefore possible to calculate the standard and/or the mean absolute deviations to arrive at a more 'correct 'assessment of lead time.

  Example

  Average Lead Time = 21 Days

  Standard Deviation = 5 Days

  95% Lead Time Service Level = 1.64 Standard Deviations

  Therefore, Lead Time = 21 + (5 x 1.64) = 21 + 8.2 = 29.2 days.

  It can be seen from the example that significant fluctuations in lead time will have a major effect on the level of stock needed to cover the period of time. There is an alternative way to record the variation in the lead time. Usually this can be done by monitoring each order placed with a supplier, recording the overall lead time. Over time a table can be built as follows:

Total Lead Time	% of Orders Received in Lead Time
3 weeks	50
3.5 weeks	75
4 weeks	90
4.5 weeks	95
5 weeks	99
5.5 weeks	100

This is an example which shows an average lead time of 3weeks.Suppose we wish to cover 95% of the lead time, then we would need 4.5 weeks of cover. Since the average is 3 weeks, the variation is 4.5 -3 weeks or 1.5 weeks.

Lead Time Demand

In calculating the lead time demand two factors have to be considered.

- The average demand during the lead time.
- The variation in demand during the lead time.

The first of these is a straight forward calculation of multiplying the average demand by the lead time, for example.

Average Demand 100

Lead Time 3 weeks

Therefore, average demand during lead time is 100 x 3 = 300

The second calculation is to cover the variability of demand during the lead time and represents the buffer stock or safety stock to cover the uncertainty of demand and to provide a given level of service. Once again, the measurement is made using the standard or mean absolute deviation calculation.

Proceeding forward, it is also necessary to establish the position of the stock in hand with which to compare the order point trigger.

The transactions in any inventory system, manual or computerised, cover the general activities of Issue, Receipt, Order Placed, Adjustments etc. to achieve a current stock balance .However, the current stock balance may not indicate what can be described as the 'free stock' position, and it is this level of stock that is required to be measured against the order point trigger. To achieve this, it is necessary to adjust the current stock balance with the following:

- add stock on order from suppliers.
- add stock in transit from suppliers (if not included above).
- subtract stock allocated to beneficiaries from current stock balance.
- subtract stock on hand for future special requirements.

Only after these adjustments are made to the current stock balance, should a comparison with the order point trigger be made.

Establishing the order quantity:

The order quantity is the component of inventory that can be classified as the cycle or working stock.

Its purpose is to satisfy the average demands which the inventory system has predicted require to be met. In determining the order quantity, a number of factors have to be considered which ensure that inventory management continue to maintain an economic approach which will optimise the costs of the operation.

The three costs involved in establishing order quantities are:

- Average cost of placing an order

  The costs of placing an order include:

  - all the costs related to the decision process in identifying the time to place an order, this will include all the labour and equipment costs.
  - all the costs related to the actual process of planning an order together with any progressing and control activity.
  - all the costs related to receiving, inspecting and storage activity together with the administrative costs of notifying that stock is available.

  All the above costs are included when considering items purchased from suppliers.

- Average cost of holding stock

  The holding cost is usually expressed as a percentage of the unit cost of the item. The main components of the holding cost are:

  - interest on capital.
  - all costs related to tax, insurance etc.
  - all costs related to the storage i.e. provision of the facilities.
  - all costs allowed for deterioration, spoilage etc.

  The value of the cost of holding stock varies from 15% to 30% per annum but due to the difficulty in establishing an accurate guide it could be expected that it is often underestimated.

- Average cost of running out of stock.

  The stocking of an item implies that a cost is incurred whenever the item is not available. To establish these costs is extremely difficult as the assessment of the two factors are largely based on judgement. In general, therefore, although this can be included in the cost equation it is more generally ignored due to the uncertainty of the accuracy of assessment.

Order Quantities:

There are two methods mainly used to calculate order quantities.

- Economic Order Quantity (EOQ)

  The purpose of calculating an economic order quantity is to balance the costs of ordering and the costs of holding stock, such that the two costs are equal or that the sum of the two costs is the minimum total cost(Kyei, Boateng, & Gyimah, 2008).

  - Ordering costs:

    It is the costs that are incurred on obtaining additional inventories. They include costs incurred on communicating the order, travelling allowance and daily allowance to purchase officers, printing and stationery, salary of purchase department, cost of inspection, cost of receiving the material, transportation cost etc. all above cost, other than transport costs remain unchanged per order irrespective of the order size. Therefore, it is assumed that ordering cost per order remain constant. The more frequently orders are placed, and fewer the quantities purchased on each order, the grater will be ordering cost and vice versa.

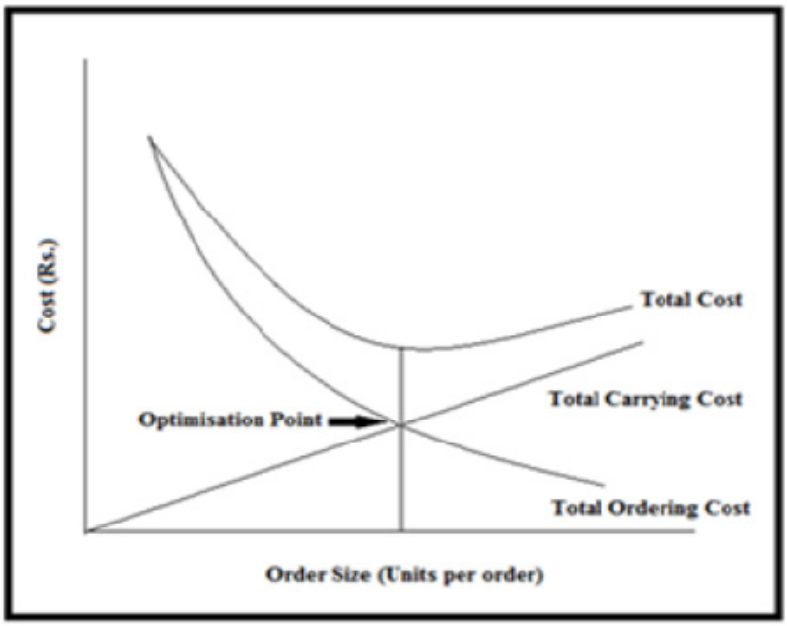
  - Holding stock costs:

    It is the cost incurred for holding inventory in hand. They include interest on the money locked up in stocks, storage costs, deterioration spoilage costs, insurance, evaporation, go down rent, pilferage, shrinkage, obsolescence, other overhead of stores department etc. They are assumed to be constant per unit of inventory. The large the volume

of inventory, the higher will be the inventory carrying cost and vice versa.

Ordering costs and carrying costs are quite opposite to each other. If we need to minimize holding stock costs, we have to place small order which increases the ordering costs. If we want minimize our ordering costs, we have to place few orders in a year and this requires placing large orders which in turn increases the total holding stock costs for the period. We need to minimize the total inventory costs; thus, EOQ is determine by the intersection of ordering cost curve and carrying cost line. At this point total ordering cost is equal to total carrying cost, and the total of the two costs is the least this is shown below:

- Economic order quantity



  - Sensitivity analysis:

    In sensitivity analysis we take a given scenario and make changes to the variables built into that scenario to establish that the changes made will significantly affect the outcomes. This model is generally insensitivity to change around the EOQ, small error in the numbers to be ordered do not make much difference to the overall result.

- Mathematical Formulation of EOQ

  The above graphic method of determining EOQ may not provide the most accurate result. Economic order quantity can be calculated mathematically with a great degree of accuracy as given below:

  Formula

  EOQ = √(2×A×O)/C

  Where,

  EOQ = Economic order quantity

  A = Annual demand in units

  O = Cost incurred to place a single order

  C = Holding stock cost per unit per year

  This formula is derived from the following cost function:

  At EOQ, Total Holding Stock Cost = Total ordering Cost

  Holding stock cost per unit = C

  Average inventory = EOQ / 2

  Holding stock cost of average inventory = (EOQ /2) ×C

  Cost incurred to place a single order = O

  Order size = EOQ

  Annual demand in units = A

  Total number of order for the period = A / EOQ

  Total ordering cost for the period = (A / EOQ) × O

  At EOQ, Total Holding Stock Cost = Total Ordering Cost

  (EOQ /2) × C = (A / EOQ) × O

  EOQ × EOQ = (2 × A × O) / C

  EOQ = √ (2×A×O)/C

  We can say, Total ordering cost + Total holding stock cost = √(2×A×O×C)

- Assumptions in EOQ Model:

The formula is based on the following assumptions. Without these assumptions, the EOQ model cannot work to its optimal potential.

1. The demand rate for the year is known and evenly spread throughout the year.

2. There is no time gap between placing an order and receiving its supply.

3. Ordering cost very directly with the number of orders.

4. Carrying cost very directly with the average inventory.

5. There is no quantity discount.

- Advantages of EOQ:

  The EOQ is very useful tool for inventory control it may be applied to finished goods inventories, work-in-progress inventories and raw material inventories. It regulates purchase and storage of inventory in such a way so as to maintain an even flow of production at the same time avoiding excessive investment in inventories.

- Limitations:

  The assumptions made in the EOQ formula restrict the use of the formula (Kumar, 2016).

  Note that economic order quantity (EOQ) in practice only works in a fairly stable environment where demand variability and replenishment lead-time are reasonably stable and predictable. This is not the case in an emergency. Economic order quantity is applicable in more stable environments such as refugee camps and perhaps later in a relief/recovery phase (Logistics Operational Guide, Response, Warehousing and Inventory Management, 2015).

- Coverage Analysis

  The use of coverage analysis as an alternative method of obtaining an optimum ordering policy has the advantages, over the EOQ approach, of not having to collect data related to establishing the average order cost.

  The process is carried out in two stages namely:

- Stage 1 Establishing the optimum ordering policy subject to placing the same total number of orders as at present.
- Stage 2 Adjusting the total number of orders to minimise the total cost (Kyei, Boateng, & Gyimah, 2008).

Stock Management: Do's and Don'ts

- Register all entries to and dispatches from the warehouse on Stock Cards (Annexure 7).
- Keep signed copies of the Goods Received Note in the warehouse. They certify receipt or dispatch of goods.
- Check the quantity and quality of all incoming and outgoing goods before they are accepted or sent out. Write any problems on the appropriate document.
- Dispatch goods from the warehouse only after receipt of a Requisition/authorisation of dispatch (Annexure 8).
- Always apply the rule FIFO: "first in – first out" unless newer goods are in poorer condition than the old stock.
- Make sure you use the goods before they become unfit for use or consumption. For example: donate the rice you have in store before it expires.
- Conduct a Physical Inventory (stock take) regularly, checking the condition of the boxes and the goods.
- If items such as cloths and blankets are damp or wet, hang them to dry and repack them.
- Write Stock Reports (Annexure 9) and send them regularly to concerned authorities.
- Request for replenishment when your stock levels are reaching the stock minimum (International Federation of Red Cross and Red Crescent Societies, 2019)

CHAPTER EIGHT

Transport /Fleet Management:

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. 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?

  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

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 is shown below:

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?

No. of possible trips per vehicle = Period / Duration of round trip

No. of loads = Total No. of tons / Vehicle capacity

No. of vehicles = No. of loads / No. of possible trips / vehicles

Add 25% extra time for contingencies.

This above calculation 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. 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.

- Feasible forms of transport — What means of transport are available? 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 (Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organization & Department of Emergency and Humanitarian Action of the World Health Organization, 2001).

In general, factors to consider while developing a transport strategy includes:

- how to identify transport service providers;
- how to manage the function; i.e. whether to lease, outsource or manage own fleet;
- capacity of transport modes available;
- quantities requiring movement over a period of time;
- nature of goods/products/supplies to be transported;
- distances to be covered;
- environmental issues such as climate, infrastructure, taxes etc;
- number of destinations, hubs and pre-positioning locations;
- origins and routes;
- available transport modes & their relative costs;
- human resources;
- terrain;
- security; and
- circumstances – such as Nature of disaster (Logistics Operational Guide, Response, Transport, 2015).

Fleet management

Fleet management is the function that oversees, coordinates and facilitates various transport and transport related activities. Fleet management underpins and supports transport related activities through the management of the assets that are used. Effective fleet management aims at reducing and minimizing overall costs through maximum, cost effective utilization of resources such as vehicles, fuel, spare parts, etc. Aspects of fleet management include:

- Identifying needs

  Identification of fleet needs is dependent on the nature of emergency and operations, and the size and area of operation - urban operations could utilise smaller cars whereas remote field operation may require larger four-wheel drive vehicles for extreme terrain. Vehicle selection criteria are guided by:

  - Funding agency's criteria applicable to the purchase;
  - uniformity of fleet;
  - the appropriate vehicle type for local fuel availability;
  - the purpose of the vehicle (cargo or passenger);
  - the terrain in which the vehicle will operate;
  - acquisition cost;
  - availability of local dealers;
  - local availability of spare parts for the intended vehicle;
  - warranties; and
  - local availability of competent mechanics.

    Depending on the level of emergency the criteria may vary.

- Acquisition Process

  A vehicle policy may be put in place, wherein aspects of acquisition etc. is appropriately addressed. A vehicle policy will provide specific guidelines for the management and use of vehicles and other mobile assets. Policies are designed to facilitate and encourage accountability, monitoring of usage and costs, provide internal control and to serve as a management tool for better decision.

  A basic vehicle policy would have the following inclusions amongst others:

1. Introduction
2. Purpose
3. Scope
4. Objectives
5. Planning, approval and budget process
6. Procurement
7. Approved types for vehicles

8. Ordering of vehicles process
9. Assignment of vehicles
10. Personal use of vehicles by staff
11. Management of vehicles:
    control of fuel, maintenance/repairs of vehicles
    vehicle insurance scheme
    vehicle replacement
    sale of vehicles
12. Guidelines for drivers:
    assignment of Motorcycles
    security
    environment
    reports
    revisions
13. Conclusion

- Insurance

  Careful consideration should be given to the form of insurance selected for the vehicles belonging to the organisation. The minimum legal requirements must always be complied with; this is usually at least third-party cover. To ensure compliance with the vehicle insurance requirements, all personnel using operation vehicles under the responsibility of the organisation must be fully conversant with accident and incident reporting procedures for vehicles and personal injury.

- Vehicle leasing

  "A vehicle or asset lease is a contract by which one party lets vehicles or assets to another party for a specified period of time".

  Or

  "A lease is a written agreement by which one party agrees to let another party have the use of specified assets for a period of time for a fixed amount of money".

  In an external leasing option, the ownership could:

- remain with the leasing company or entity, but the rights for use are passed on to the lessee for the period of the lease;
- in other cases, at the expiry of the lease, the ownership is transferred to the lessee; and
- the ownership remains with the lessee, but management of some aspects such as maintenance, could remain with the leasing company depending on negotiations.

However Internal leasing is different. The organisation itself owns the vehicles which are centrally managed and issued to programs on a cost recovery basis. Organisations therefore budget for leasing costs only.

Features of an external leasing agreement:

- Lease agreement is drawn up between the organization and the leasing company clearly specifying the terms of agreement.
- In some cases, the lessee may pay a monthly bill irrespective of mileage covered or a fixed amount with additional costs per kilometre outside of a specified range.
- Depending on nature of agreement the less or may be responsible for:
    1. repair and maintenance at agreed intervals;
    2. insurance;
    3. in some cases, the vehicle may come with a driver.
- The lessee is responsible for:
    1. provision of competent drivers;
    2. monthly payment; and
    3. managing routing of vehicle.
    4. The lessee's drivers will be responsible for good driving.

The contents of the agreement will depend largely on the negotiating power of the lessee.

- Advantages of leasing
    1. Routine repair or maintenance costs are built into leasing costs.
    2. No overheads in garage set-up and maintenance.
    3. No high initial purchase items in lessee's books.

4. The less or bears most of the risk.
5. The organisation is able to focus on core business.

- Disadvantages of leasing

1. The organisation losses control of some aspects of its fleet management.
2. Discontinuation of services by the service provider can cause huge disruptions in the day-to-day operations.
3. If the leasing contract is cancelled for any reason, the organisation may have to make heavy investments in vehicle purchases or temporary hire to ensure business continuity.
4. The organisation would not be able to build up any institutional capacity in fleet management.

- Outsourcing

The nature of the contract is dependent on the ownership status which could be:

1. an external company is contracted to supply and manage the vehicles;
2. an external company supplies the vehicles but the management remains with the organisation; and
3. the vehicles are owned by the organisation and an external company undertakes the management of the fleet.

In emergency situations outsourcing and external leasing are common practices. In a rapid on-set emergency, it takes time to ship-in or purchase vehicles for use in the response. Organisations are sometimes left with the option of outsourcing or leasing vehicles or trucks from the local market. In the initial days of the emergency, this can prove to be an expensive option. In emergency situations, there are usually very many organisations and very few assets. The high demand may cause price increases (Logistics Operational Guide, Response, Fleet management, 2015).

- Vehicle management

  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 petrol 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 check-ups that are needed and the attendant maintenance needs, as well as about their responsibilities and expected behaviour.

- 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:

- Daily Vehicle Review

1. Amount of fuel
2. Oil level
3. Radiator water
4. Battery water level
5. Windshield cleaner
6. Brake fluid
7. Tire pressure (including spare tire)
8. General state of the lights
9. Tension of the fan belt
10. Basic tools (Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organization & Department of Emergency and Humanitarian Action of the World Health Organization, 2001).

Vehicles are regularly maintained for optimum performance, and kept in good repair. Vehicle maintenance schedules must be drawn up together with, and published by the manager as part of the vehicle planning. All members of the management team must make a commitment to respecting the scheduled dates for maintenance. A master vehicle inspection and servicing schedule should be drawn up for one year – a wall chart is recommended. This chart can also be used to show road tax renewal, annual inspection dates, etc.

Vehicle servicing is a compromise between inadequate attention, resulting in progressive deterioration in condition and the ensuing serious consequences, and too much attention, which is costly and unnecessary. The person responsible for the condition of the vehicles must decide the scope of the servicing work required and how often this should be carried out; taking into account the manufacturer's guidelines and kilometres travelled and in which type of environment the vehicle has been used.

Maintenance done on a monthly basis may cover the following:

- the vehicle supervisor should periodically organise a test drive each vehicle and report on its condition and also ensure that normal/regular service has been done for all vehicles;
- tyres: any abnormal wearing should be reported to the manager and cleaning of the engine at least once a month.

In emergency situations, in the absence of local facilities, the organisation would have to undertake its own maintenance and ensure that:

- an experienced mechanic is hired;
- a secure workshop area is identified or set up;
- the necessary tool and equipment are available;
- there is continuous performance monitoring and a system for measuring & monitoring:

1. fleet performance;
2. costs and performance (Logistics Operational Guide, Response, Fleet management, 2015).

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 mileage record must be established based on the routes taken.

Fuel consumption/ Mileage form

Refuel date Mileage Quantity Average	Mileage	Quantity and type of fuel	Average Consumption (km/litre)

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 (Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organization & Department of Emergency and Humanitarian Action of the World Health Organization, 2001).

Average fuel consumption per 100 km (Supplies and Food Aid Field Handbook, 1989).

Petrol 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 18-28 liters
	(3.5 to 8 tons)

- Health and safety aspects in fleet management

  The key to successful observance of health and safety is the development of an organisational culture of awareness of, and compliance with health and safety issues. To ensure that this is possible the Health & Safety policy document must be practical and be incorporated within day to day tasks.

  Some organisations manage their own routine minor repairs and vehicle service workshops. Some basic health and safety measures for workshops would be:

  - clear environments around work stations;
  - completed risk assessments and action taken where risks are highlighted;

- inductions;
- practice drills for fire evacuation; and
- availability of and mandatory use of safety equipment such a goggle, boots, gloves, etc.

There are five areas specific to transport management where local health and safety procedures will probably need to be agreed and documented by the fleet technical staff:

- Fuel stores
- Safe operation of vehicles
- Accident and incident procedures for vehicles
- Vehicle workshops
- Security of vehicle assets.

CHAPTER NINE

Distribution:

In the context of disasters and emergencies, distribution is viewed from three perspectives:

- movement of goods from the point of purchase or transfer of ownership (vendor to organisation) to the point of final use. This is common in sudden on-set emergencies where goods are often taken straight to end user. The internal distribution occurs at the point the commodity or goods are being handed over to the beneficiary;
- movement of goods from one location within the organisation to another location within the same organisation. For example, from hub to hub, or hub to end user point; this is common when resources are being mobilised to strategic locations for onward movement to point of use as in the case of preparedness for an anticipated emergency; or,
- the point at which the goods are handed over by the organisation to beneficiaries or partner organisation. For example, World Food Programme food distribution direct to beneficiaries or partner agency conducting the distribution exercise (Logistics Operational Guide, Response, Distribution , 2015).

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. Key principles in distribution include:

- 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 assistance.
- 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.
- Assistance should be delivered only to those who truly need it, in direct proportion to their needs.
- 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.
- 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.
- Assistance must be relevant, appropriate, and adapted to local customs and environmental conditions.
- 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 assistance is a highly complex activity that demands a great deal of expertise. Before engaging in the distribution of relief assistance, it is important to haven 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 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 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 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 centres, or even finding out that they exist. Such cases must be monitored to prevent exclusion.

  Equity in distribution and protection of supplies are key responsibilities in ensuring that the assistance is not managed unscrupulously for political or financial gain (Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organization & Department of Emergency and Humanitarian Action of the World Health Organization, 2001).

  Recipient registration:

  Registration of beneficiaries should be undertaken as soon as possible and ideally prior to any distributions. Often in an emergency, an immediate distribution of relief items is required before a complete registration process

can be undertaken. 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.

If registration is not possible at the outset of emergency response, use a best estimate of the number of people in a particular neighbourhood within a village or settlement, and calculate a bulk ration for that neighbourhood, in consultation with the community representatives. This initial figure may come from previous census data, community or local government leaders. The closer to the community this figure is obtained, the higher the likelihood that the population figure will be reasonably accurate. Neighbourhood representatives should then present themselves and receive the goods and instruction on how to distribute them; in other words, how much to give to each person in their neighbourhood.

A recipient registration system provides:

- a reliable and repeatable method to identify individuals eligible to receive distributed goods or commodities and prevent disputes among communities;
- reliable data for planning anticipated resource requirements;
- a means to identify duplicate registrations in an existing registered population;
- information for reports.

Information on procedures for registration is available online at:
https://www.careemergencytoolkit.org/programme-support/19-distribution/5-recipient-registration/5-2-procedures/

As the registration process is frequently a target of corruption (which can result in large-scale misappropriation of goods and commodities), pay special attention to the following potential types of abuses:

- female or adolescent-headed households and other socially or politically vulnerable individuals omitted from registration lists (often those most in

need of assistance are also the most vulnerable to exploitation and corruption by controlling elites);

- multiple registration of household members at one distribution site;
- registration of household members at more than one distribution site;
- inflation of household size;
- registration of non-eligible individuals;
- registration of non-existent or phantom families;
- sale of recipient documents;
- the control of registration lists and ration cards by elites (Distribution, 2020).

Distribution Planning:

- Distribution systems

Distribution systems and their advantages and disadvantages:

MECHANISM	ADVANTAGES	DISADVANTAGES
Through local government	• Quick and efficient when local infrastructure is sufficient; • Builds local capacity.	• Government capacity may be limited; • High cost when local infrastructure needs to be reinforced; • Government (or officials) may have financial or political motives for controlling distribution.
Through traditional leaders	• The social and cultural values of the population are respected • Easy in the initial stages of emergency and for dispersed populations; • Low-cost and quick; • No external registration is needed.	• Knowledge of social structures and power relations is essential; • Effective only in small intact communities; • Risk of abuse if social structures are broken down or are replaced by abusive leadership; • Difficult to monitor.
Through new groups or committees	• Undermines abusive power relations and has a lower risk of abuse; • Agency understanding of the local society; • Some community participation, particularly women's representation occurs; • Self-monitoring; • Low-cost.	• External registration is needed in some cases; • Appropriate in stable situations only; • Groups must be elected so that they truly represent communities; • Resentment from traditional leadership; • Extensive information campaigns are needed.
Direct to households in groups or individually*	• Efficient for large unstructured populations; • Initial control over beneficiary numbers; • Undermines abusive power relations and leadership; • Less risk of unequal distribution; • Easy to monitor.	• High-cost (staff, materials, time); • Little beneficiary participation; • Registration is necessary.
Direct to individuals	• No scope for manipulation or discrimination; • Self-targeting; • No registration is needed; • Easy to monitor; • Overcomes problems of limited fuel, utensils, water.	• Extremely high-cost (staff, materials); • Time-consuming; • Possible only for small groups (eg.1,000 per kitchen) • Risk of creating population concentrations.

*** Where distribution is to households:**

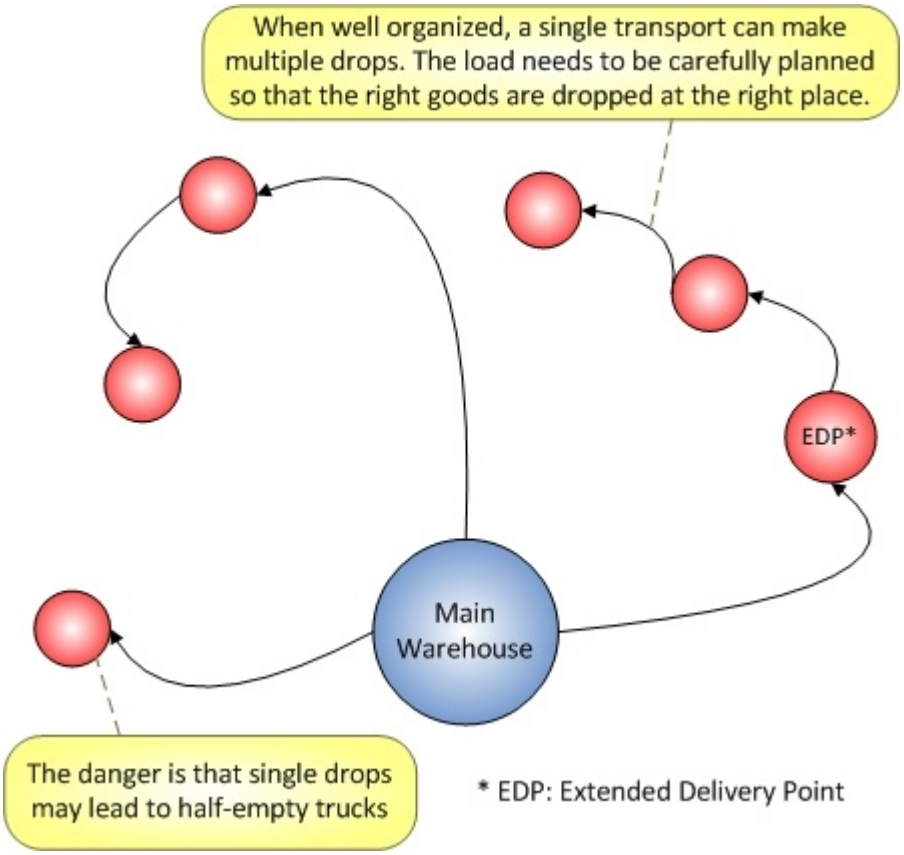
- distribution to representatives of individual households assures more direct agency control but requires considerable resources;
- distribution to pre-defined groups of households is less resource-intensive and less demeaning for beneficiaries, but is feasible only where there is good registration and homogeneous groups can be identified.

A good distribution system has the following characteristics:

- Fairness: Rations and allocations are based on an objective assessment of need. Distribution is made according to household size. The receipt of agreed allocations is monitored.
- Accountability to beneficiaries: The distribution system takes account of social, ethnic and political divisions within the population. Socially and politically vulnerable people are identified and arrangements are made to ensure that they receive their entitlements. Beneficiary committees are established to communicate beneficiaries' views on distribution processes and any complaints. Independent monitoring during and after distribution may be carried out.
- Accountability of organisations: There is regular reporting and analysis of the quantities being distributed and the numbers of beneficiaries.
- Transparency: Information on entitlements and the method and timing of distributions is widely disseminated. Distributions are made openly in a public place. Beneficiaries are informed in advance of any problems in relief supply, changes in rations or distribution schedules, etc.
- Respect: The distribution process recognizes the physical and psychological vulnerability of those being assisted and is specifically designed to preserve their dignity and self-respect.
- Gender sensitivity: Women are represented on committees. Distributions are planned to avoid interfering with women's other domestic responsibilities and putting them at unnecessary risk (WFP Emergency Field Operations Pocketbook, 2002).

- Distribution models:
  - Direct delivery:

    When goods are delivered to a secondary point from a central point it is referred to as direct drop. Very often, goods need to be dropped by the same truck in different or multiple locations. The multiple locations are lumped together in clusters. This can be illustrated thus:



Direct Delivery, adapted from UNICEF In-Country Logistics Guide 2006

Characteristics of direct deliveries from a single point

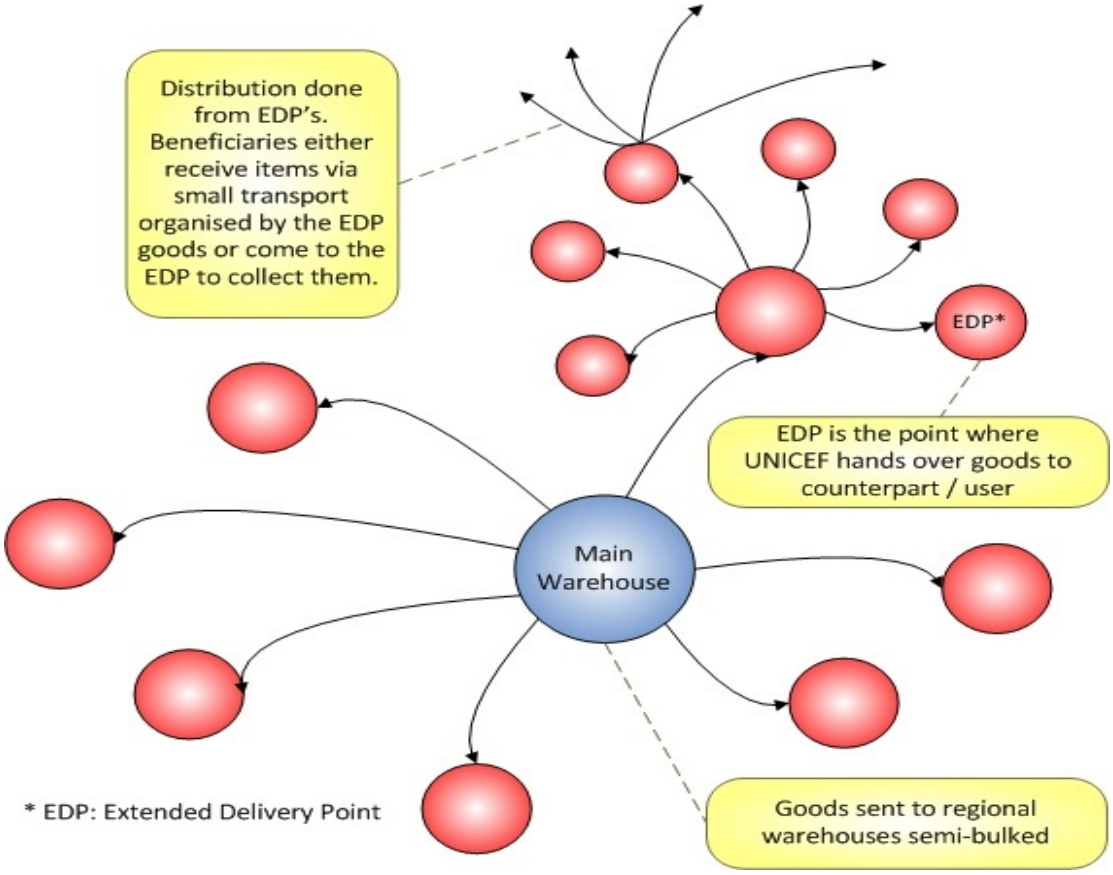
1. Reduces number of storage facilities.
2. All deliveries to individual Extended Delivery Point (EDP) are managed from a single point. But can be overwhelming if there are too many EDPs.
3. Only one transport contract needed from the main warehousing point. High risk of less than a full truck loads going, especially when delivering to isolated areas.
4. Higher risk of errors when loading/ unloading, e.g. items ending up in the wrong place.
5. Bulk goods need to be broken down into distribution-ready packages at the main warehouse. Breaking bulk earlier means that overall transport

costs will increase exponentially with the number of EDP's directly served. This might be offset by the saving in warehouse structure.

This model is recommended for smaller distribution operations, where the number of EDP's is easy to handle, and where the geographical area is not large.

- Distribution Centre Network

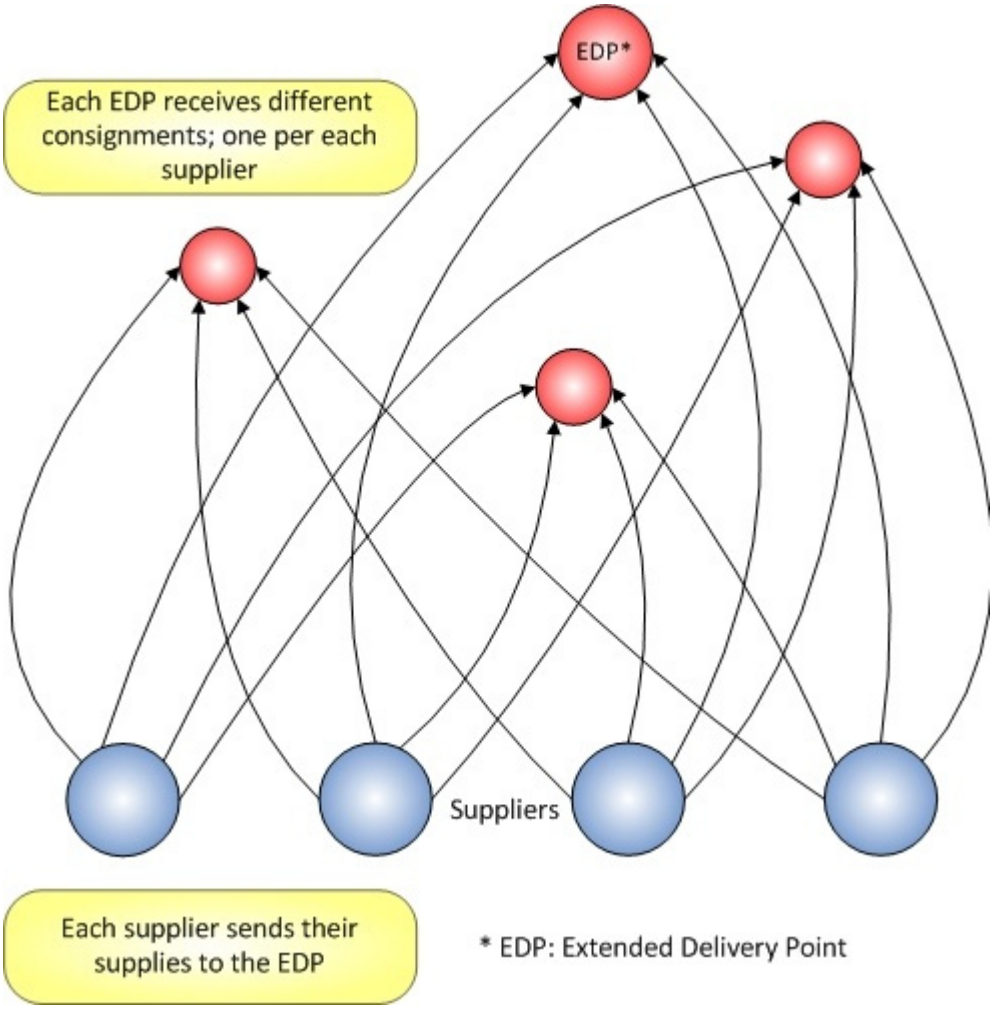
  This is sometimes referred to as the 'Hub-and-Spoke' model. The warehouses are in hubs, transport from the warehouses is represented by the spokes. At the end of each spoke is the EDP. This can be illustrated as follows:



Distribution Centre Network, adapted from UNICEF In-Country Logistics Guide 2006.

- Supplier Milk Run

  The Supplier Milk Run sometimes referred to as the direct delivery from supplier's model. In this process the EDP's receive supplies directly from suppliers as below depicted below:



The Supplier Milk Run, adapted from UNICEF In-Country Logistics Guide 2006 (Logistics Operational Guide, Response, Distribution , 2015).

- Selecting distribution sites:

  Distribution sites are the physical sites where goods or commodities are distributed to recipients. They are generally identified during the programme planning phase. UNHCR recommends that there should be at least one site per 20,000refugees and that people should not have to travel more than 5 to 10 km (for dispersed populations) to reach the site. Sites should be as close to the beneficiaries as is feasible, but a multiplicity of sites should be avoided on account of costs and the difficulties of monitoring and of preventing people from presenting themselves at (and benefiting from) several different sites.

Choice of site:

In general, especially in any area of high population density:

- Sites should be in open areas well away from crowded places such as markets or hospitals and, preferably, at some distance from dwellings and food stores; they must be easily accessible for deliveries during all seasons.
- Sites should be enclosed by a fence and partitioned with separate areas for queuing, distribution and stocks; there should be emergency exits.
- Water, shelter, sanitation facilities and first aid services should be available for beneficiaries as well as staff (WFP Emergency Field Operations Pocketbook, 2002).
- Provision for evacuation route for staff, in case of security problems should be made.

Organizing the distribution site from a logistician's perspective:

1. coordinate with providers of the goods to be distributed. Delays in the initial delivery can create security issues later in the process;
2. ensure that the quantity of goods available on the day is enough to supply the needs of all those eligible. A perceived shortage could cause tension or a disturbance. Work with programs according to quantities in their distribution plans;
3. the distribution must be carried out in an efficient and organized manner. Try to minimize the amount of time which beneficiaries will need to spend queuing – consider what the cost of that time will be to the beneficiaries;
4. a distribution site should be divided into a registration area, where beneficiaries report and are checked against names on a list. This is for ease of accounting for supplies issued out;
5. the actual distribution zone should be adjacent to the registration site but with controlled access, so that only registered people line up for distribution. This may well require a substantial crowd control

element as well as barriers (make use of ropes, trucks, available walls, insides of buildings);

6. where possible, have the labour force that unloaded the trucks to double as security, to prevent unauthorized access and possible swarming and looting of the goods. An incentive may need to be given for this work;
7. spend time at the beginning organizing your site; and
8. spend time days in advance to streamline and verify your beneficiary list. Ensure that enquiries are directed at registration staff, not at distributors. Tension will occur when there are people not on the list, or if the list is done poorly, or when there is a delay in the smooth flow of people through the distribution site (Logistics Operational Guide, Response, Distribution , 2015).

- Distribution frequency and scheduling

  The frequency of distributions must be considered carefully from the perspectives of both beneficiaries and the implementing organization. Advantages and disadvantages of short and long distribution intervals include:

Short Distribution Intervals (e.g. weekly)	Long Distribution Intervals (e.g. bi-weekly or monthly)
Advantages	
• Each distribution takes less time; • Beneficiaries have smaller to carry and store – less risk in a conflict situation; • Greater flexibility when deliveries are uncertain; • Some items can be distributed less frequently (e.g. at every second distribution).	• Better when beneficiaries have far to travel or many other things to do; • Less effort and cost for the distributing organization.
Disadvantages	
• Beneficiaries have frequently to devote time to supply collection; • Distributing organization has to arrange deliveries, distribution and monitoring more frequently; • Beneficiaries may be encouraged to abandon their homes and settle around the distribution sites.	• Distributions take more time; • Beneficiaries have larger quantities to carry and store at home; • More likely that items will be sold by, or stolen from, beneficiaries; • Short-term delivery problems are more serious for the beneficiaries; • More likelihood that bandits or militias will raid sites.

If the situation is stable and there are to be frequent distributions, it may not be necessary to distribute every item at each distribution. Logistics may be simplified and costs be reduced by adopting a staggered distribution schedule as in the example below (WFP Emergency Field Operations Pocketbook 2002):

Item	Daily ration (g)	Quantities distributed per person for each 7-day period (g)				4-week total (g)
		Week 1	Week 2	Week 3	Week 4	
Cereal	400	2800	2800	2800	2800	11200
Pulses	60	420	420	420	420	1680
Oil	25	700	-	-		700
Fortified blend	50	-	700	-	700	1400
Sugar	15	105	105	105	105	420
Salt	5	-	-	150	-	140

- Information campaigns

  Information campaigns are vital: it is crucial to inform refugees before distribution about what will be distributed, how and when, to whom.

  Make use of a range of channels, including community leaders and an information board; take account of the context, and aim to reach 100% of those who require assistance.

  During an information campaign, you will need to indicate clearly:

  - Distribution is free of charge;
  - How beneficiaries can report any abuses by the staff who manage distributions;
  - Who will receive the commodities that are to be distributed, and selection criteria (if relevant);
  - What items beneficiaries are entitled to receive (quality and quantity);
  - When distributions will occur (date and time);
  - The location of distribution centres and the areas (populations) that each will cover;
  - How distributions will be organised and how those who receive distributions should behave;

- The purpose and use of the items distributed (to avoid misuse or undesired effects);
- When future distributions are planned, and their frequency, so that beneficiaries can plan ahead (Commodity distribution (NFIs, food), 2015).

Information on commodity distribution: a practical guide for staff, published by the Division of Operational Support, UNHCR is available online at: https://www.unhcr.org/3c4d44554.pdf

In a disaster context, multi agencies will be involved in distribution of supplies, it is therefore, imperative that a coordinated and collaborative operation be put in place. In this regard, a multi-agency distribution of emergency supplies plan is vital. A template has been developed to enhance coordination and collaboration among stakeholders which is available online at: http://www.nationalmasscarestrategy.org/wp-content/uploads/2015/06/Multi-Agency-Distribution-of-Emergency-Supplies-Plan-Template-2015.pdf

Quality Control Monitoring:

The distribution of goods and commodities is the final output of a long and costly supply chain operation. Distribution is the point where the impact of the entire operation is registered by the recipient population. There are three major elements of monitoring, in terms of distribution and providing added value in terms of programme success.

- Supply tracking

  Documentation for the arrival of loads at the storage centres, dispatch of supplies from these centres 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 such as the sample beneficiary record. 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 centre, its inventories must always be kept up to date (Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organization & Department of Emergency and Humanitarian Action of the World Health Organization, 2001).

- Performance measurement:

  Both in terms of logistics performance against logistics targets, and as a measure of logistics contribution to programme success, the basic performance measures for logistics are:

  - speed or timeliness measures
  - cost measures
  - compliance measures
  - quality measures

  Measures require clear information, which should not be too difficult to acquire. Clear responsibilities for obtaining and holding data must be assigned and the logistics system must be designed in such a way as to enable data to be created. Measures should reflect the strategy of the logistics organization, and the goals of the programme. Some examples of measures are given below.

  - reliability of delivery (items delivered against items committed to be delivered);
  - inventory accuracy (number of errors in records as a percentage of total);
  - vehicle utilization (number of full loads as a percentage of total loads);
  - logistics cost (as a percentage of total value of program materials (PGMs) handled by logistics); and
  - quality of delivery (loads with loss/damage as a percentage of total loads delivered).

  Different measures target activities that have been assigned the most importance by both logistics and programme sections. If cost is the overriding factor due to budget cuts, focus on cost. If quality of delivery has become the biggest issue, focus on quality measures. Be prepared to review your measure

annually, and to readjust them to focus on the changing strategic priorities of the programme.

- End user monitoring

  Aiming to improve programme/supply planning for the next distribution cycle by providing feedback on quality, efficiency and impact of supply component of programmes. This is done by doing the following:

  - assess quality, effectiveness and appropriateness of supplies;
  - assess timeliness of delivery;
  - assess whether and how supplies are being used;
  - assess durability and suitability of the supplies;
  - determine the impact of a product on their users;
  - determine whether an input should continue, be amended or stopped; and
  - check logistics chain (breaks, lead time)(Logistics Operational Guide, Response, Distribution , 2015).

Reverse Logistics

Reverse logistics was traditionally defined as the process of moving a product from its point of consumption to the point of origin to recapture value or ensure proper disposal. Reverse logistics includes activities to avoid returns, to reduce materials in the forward system so that fewer items flow back, and to ensure the possible reuse and recycling of materials and packaging.

Types of Reverse Logistics

Reverse logistics covers a broad range of items and activities which includes:

- Movement of capital items and equipment to the next emergency response;
- Removal of containers and packaging from response area;
- Destruction of spoiled food commodities and out of date pharmaceuticals;
- Return of rejected goods to the suppliers;
- Movement of excess or over-supplied goods to other programmes or organisations.

Reverse logistics occurs when there is:

- Downscaling of activities: goods have to be moved to different programmes or disposed, evacuation due to insecurity which may result in the suspension of activities when goods have already been purchased and have to be returned to the supplier or used in other programmes;
- Closure of programmes or handover of emergency response phase;
- Product recalls (goods re-called by the manufacturer);
- Rejected goods returned to the vendor:
  - wrong orders,
  - wrong deliveries,
  - deliveries delayed and goods no longer useful to the programme,
  - damaged goods,
  - goods on warranty or going for repair;
  - back-trucking of packaging materials for re-use or disposal.

In all instances listed above, there are cost implications that should be taken into consideration during the budgeting and planning period.

Aspects of Reverse Logistics

- Packaging

  Where possible, packaging materials could serve dual purposes as in the case of large bladders, wooden pallets, cooking drums, fuel drums, etc. Some examples are listed below.

  Pillows/bladders

  As goods are mobilised through various modes of transport in response to emergencies, the bracing in ship and rail containers can be done with “pillows” which are basically large bladders filled with air.

- The bracings can then be further used at distribution sites for water storage (or fuel storage if they are correctly lined).
- These “pillows” filled with air also weigh less than traditional wood bracing and thus lower the weight of the shipment and the cost.

- The lower weight means less fuel is consumed to move the goods, with a positive impact on the environment.

  Wooden pallets vs. plastic pallets
- Wooden pallets, though less expensive, may contain pests which can devastate indigenous agricultural industries.
- Many countries have now restricted the clearance for wooden pallets from many areas to combat the pest issue.
- Wooden pallets have to be treated with chemicals limiting the burning of these for firewood as toxic and not environmentally friendly.
- Plastic pallets can ensure a multiple reuse by the local population.

  Cooking oil drums and fuel drums
- These can usually be converted into barbecues or water storage containers on site.
- Local population will benefit from possible reuse and agencies will ensure a more efficient approach.

  Plan to Back Ship: Most of the goods in the humanitarian world are consumable and thus are on a one-way trip.
- Packaging may be able to be disposed, recycled or reused in the bigger cities where specific facilities exist, while it may not be possible in remote field locations.

  Return shipping is not considered expensive, as trucks and aircraft usually have to return empty after the distribution. In order to capitalise on such opportunities, the programme requires appropriate planning in advance (Logistics Operational Guide, Reverse Logistics, 2015)

Peretti et al. notes that 'in light of the generally increased awareness of the need to reduce the environmental footprint as well as improving the social and economic impacts of their supply chain activities, there is likely to be increasing pressure on aid agencies to adopt reverse logistics practices' (Peretti, Tatham, Wu, & F.Sgarbossa, 2015). Embracing reverse logistics practices will improve the sustainability of aid agencies' disaster preparation and response activities.

CHAPTER TEN

Telecommunication:

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 (Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organization & Department of Emergency and Humanitarian Action of the World Health Organization, 2001).

Timely deployment and use of telecommunication resources play a crucial role in saving life, disaster mitigation and relief operations. The section below highlights the major telecommunication network technologies currently available and in use in India:

- Satellite Communications: Satellite communication offers an economical solution for covering large areas, especially connecting remote areas, for providing instant broadband coverage without communication media problems relating to last mile connectivity;
- Optical fibre communication: Optical fibre communication provides large bandwidth (in the range of terabits) at an economical tariff with the introduction of Dense Wave Division Multiplexing (DWDM), which is a wire line technology with voice, video and data transmitted as optical signal through an optical fibre.
- Cellular mobile communication: Cellular Mobile communication has introduced the concept of communication from any place at any time. It offers communication on the move, without being tied down to a traditional telephone at a location. Two kinds of international standards for cellular mobile exist, viz

GSM (Global System for Mobile) and CDMA (Code Division Multiple Access). Systems have evolved over the years, denoted by their Generation of evolution (1G, 2G, 3G), relating to technological progress in providing more and more enhanced services from voice to multimedia support.

- Wireless Fidelity (Wi-Fi): WiFi is the beginning of wireless data transmission especially within a building providing, data access without the need of physical wiring. Wireless Fidelity technology provides data (Internet) access limited to a few hundred meters.
- Worldwide Interoperability of Microwave Access (WiMax): WiMax is a wireless access service designed to provide IP connectivity over wide geographical areas, serving large number of users at low cost. WiMax is emerging as a wireless technology providing voice, video and data based on open standards, promising low-cost solutions for rural broadband connectivity to eliminate the last mile connectivity problems. Added advantage of WiMax technology is its suitability for producing portable equipment, which can be set up at short notice for establishing communication facilities at disaster affected site.
- Public Mobile Radio Trunking System (PMRTS) is a two-way radio employing "one - to- many", "point -to- multipoint" type of calling system. Captive Networks can use this technology, as it offers certain features such as fast call set-up time, excellent group communication support etc, which are not possible in public cellular network. They also offer modular system, which can be easily deployed for disaster situations compared to public cellular network. VHF systems are ideal for short distance wireless communication and these have been traditionally used in group communication due to their ruggedness and simplicity of operation.

Establishment of the National Disaster Communication Network (NDCN)

The idea behind the establishment NCDN is to address the risk of failure of existing terrestrial communication networks during a disaster. NDCN was planned as a network of networks utilizing the existing National, State and District level

Communication Infrastructure to the maximum possible extent. This network is a dedicated (with respect to bandwidth availability), reliable, multi-layered, inter-operable network with adequate redundancy and diversity for converged (Voice, Data & Video) services spread over the nation with a distributed architecture. The Network is hosted on the existing terrestrial backbone (optical fibre/microwave) with added satellite media as its backup to ensure fail-safe character and the last mile connectivity would be based on satellite and VHF links with evolution towards Wi- Fi systems/ WiMax/ micro-cellular. The NDCN network comprises of vertical and horizontal connectivity. The vertical connectivity consists of Emergency Operations Centres across national, state, district and incident area levels. The horizontal connectivity consists of connectivity with various stakeholders, who need connectivity to NDCN for effective Disaster Management.

The primary purpose of designing NDCN is to ensure communication link in the incident area within the earliest time possible by establishing last mile connectivity. The communication build-up is carried out in a graded manner i.e. immediate voice communication on reaching the site and subsequent scaling up to video and data communication in a short period. The communication support is established in a phased manner as briefed below:

Phase-1: The district authorities are equipped with a portable Mini Mobile Communication Pack (MMCP), which will consist of satellite phones (INMARSAT/INSAT) and VHF radios. The Incident Commander, nominated by District authority, will transport the portable MMCP to the disaster site and establish the first communication link with District authorities within 15 minutes after reaching the site using MMCP.

Phase-2: NDRF are provided with satellite phones (INMARSAT/INSAT), VSAT terminals for INSAT, full complement of VHF system, cameras, laptop etc in a Mobile Emergency Operation Centre (MEOC) duly wired up and kept in ready-to-use condition, which would be transported to the site. MEOC is established at the site ranging from ½ an hour to 3 hours in a graded manner (after reaching the site).MEOC will provide fail- safe communication through satellite with sufficient

bandwidth to send pictures and data in addition to voice. The complete need for the NDRF battalions as well as for the important local authorities would be fully taken care of by the MEOC.

Phase-3: Depending upon the extent of damages, restoration of normalcy in communication at disaster site would be restored with the assistance from the telecom service providers operating in the area within 2 to 7 days (National Disaster Management Information and Communication System (NDMICS) 2011, 2012).

Emergency Telecommunication Cluster (ETC)

In the humanitarian context, the 'Emergency Telecommunication Cluster' has been called upon to provide vital communication services since 2005, and it has responded to over 40 humanitarian crises around the world. The ETC is a global network of organisations led by the World Food Programme who work together to provide shared communication services in emergencies.

Within 48 hours of a disaster, the ETC provides vital security communications services and voice and internet connectivity to assist humanitarian workers in their life-saving operations. Within four weeks, ETC services are expanded for continued emergency relief. Services are deployed in defined 'common operational areas', i.e. areas approved by the Humanitarian Country Team in which the majority of UN agencies & Non- Governmental Organisations are based.

The ETC provides the following services in emergencies:

- Voice and Data Communications services
    - Shared wireless internet connectivity from 'hotspot'
    - Basic voice telephony
- Security Communications services
    - Two-way VHF radio networks to cover common operational areas
    - Security compliant Communications Centres
    - Radio frequency and call-sign coordination
    - Training of radio operations and users.

- Customer Support services
  - Help desk for technical assistance
  - Basic printing, copying, scanning
  - Charging capability.
- Coordination services
  - Liaison with government authorities for ETC related matters
  - Development of all project related documents
  - Regular meetings and collaboration with existing groups
  - Transition to post-emergency / reconstruction phase.
- Information Management services
  - Dedicated ETC information-sharing and collaboration platform
  - Standards for common ICT equipment and procedures
  - Platform for directory services containing contact information
  - Standardized and interoperable platforms and procedures.

Communications services provided by the ETC in the different phases of an emergency operation are outlined in the Emergency Telecommunications Cluster Service Catalogue (Logistics Operational Guide, Operational Environment, Emergency Telecommunication Cluster, 2015). Information on ETC is available online at: https://www.etcluster.org/

BIBILIOGRAPHY

(2012). *A Logistics Handbook : For Disaster Preparedness and Response.* New Caledonia: French Red Cross and Australian Red Cross.

Commodity distribution (NFIs, food). (2015). Retrieved January 20, 2020, from UNHCR Emergency Handbook: https://emergency.unhcr.org/entry/43130/commodity-distribution-nfis-food

Distribution. (2020). Retrieved January 17, 2020, from Care Emergency Toolkit, Programme Support : https://www.careemergencytoolkit.org/programme-support/19-distribution/#annexes

Dolinskaya, I., Shi, Z., Smilowitz, K., & Ross, M. (2011). Decentralized Approaches to Logistics Coordination in Humanitarian Relief. *61st Annual IIE Conference and Expo Proceedings.* Reno, NV: Institute of Industrial Engineers.

(2001).Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organization & Department of Emergency and Humanitarian Action of the World Health Organization. *Humanitarian Supply Management and Logistics in the Health Sector.* Washington, D.C.: Pan American Health Organization.

(1999). *Emergency Relief Items : Compendium of Basic Specifications* (Vol. 2). New York: United Nations Development Programme.

(2010). *Emergency Relief Items Compendium of Generic Specifications* (Vol. 1). New York: United Nations Development Programme.

(2017).*General Financial Rules.* New Delhi: Government of India, Ministry of Finance, Department of Expenditure.

(2016). *Guidelines on Minimum Standards of Relief*. Retrieved December 12, 2019, from NDMA Guidelines: https://ndma.gov.in/images/guidelines/guideline-on-minimum-standard-of-relief.pdf

(1997). *Handbook for Delegates.* Geneva: International Federation of Red Cross and Red Crescent Societies (IFRC).

Hooper, M., & Pym, M. (2017). Humanitarian standards in urban, post-disaster context: a study of sphere shelter standards in Haiti. *Humanitarian Exchange Magazine, 69*, pp. 31-34.

Kumar, R. (2016). Economic Order Quantity (EOQ) Model. *Global Journal of Finance and Economic Management, 5*(1), 1-5.

Kyei, J. O., Boateng, S., & Gyimah, P. (2008). *Principles and Techniques of Managing Inventory.* James Benjamin Annan: Ministry of Health Ghana Pharmacy Unit (GHS) & Procurement & Supplies.

Logistics Operational Guide[3], Operational Environment, Emergency Telecommunication Cluster. (2015). Retrived February 7, 2020, from Global Logistic Cluster Support Cell &World Food Programme: https://dlca.logcluster.org/display/LOG/Emergency+Telecommunications+Cluster

Logistics Operational Guide, Operational Environment, Partnership. (2015). Retrived December 21, 2019, from Global Logistic Cluster Support Cell &World Food Programme: https://dlca.logcluster.org/display/LOG/Partnerships

Logistics Operational Guide, Response, Assessment Planning. (2015). Retrieved December 28, 2019, from Global Logistics Cluster Support Cell & World food Programme: https://dlca.logcluster.org/display/LOG/Assessment+and+Planning

Logistics Operational Guide, Response, Procurement. (2015). Retrieved January 12, 2020, from Global Logistics Cluster Support Cell & World food Programme: https://dlca.logcluster.org/display/LOG/Procurement

Logistics Operational Guide (LOG), Response, Warehousing and Inventory Management. (2015). Retrieved January 22, 2020, from Global Logistic Cluster Support Cell & World Food Programme: https://dlca.logcluster.org/display/LOG/Warehousing+and+Inventory+Management

Logistics Operational Guide, Response, Distribution . (2015). Retrieved January 30, 2020, from Global Logistic Cluster Support Cell & World Food Programme : https://dlca.logcluster.org/display/LOG/Distribution

Logistics Operational Guide, Response, Fleet management. (2015). Retrieved January 23, 2020, from Global Logistic Cluster Support Cell & World Food Programme: https://dlca.logcluster.org/display/LOG/Fleet+Management

Logistics Operational Guide, Response, Transport. (2015). Retrieved January 23, 2020, from Global Logistics Cluster Support Cell & World Food Programme: https://dlca.logcluster.org/display/LOG/Transport

[3]The Logistics Operational Guide is a live document and therefore, subject to change. You are requested to view the link below for updated content.
https://dlca.logcluster.org/display/LOG/Logistics+Operational+Guide+%28LOG%29+Home

Logistics Operational Guide, Reverse Logistics . (2015). Retrieved January 30, 2020, from Global Logistics Cluster Support Cell & World Food Programme : https://dlca.logcluster.org/display/LOG/Reverse+Logistics

(2017). *Manual for Procurement of Goods.*New Delhi: Government of India, Ministry of Finance, Department of Expenditure.

(2019).*Manual for procurement of Works.* New Delhi: Government of India, Ministry of Finance, Department of Expenditure.

(2012).*National Disaster Management Information and Communication System (NDMICS) 2011.* New Delhi: National Disaster Management Authority, Government of India.

Peretti, U., Tatham, P., Wu, Y., & F.Sgarbossa. (2015). Reverse logistics in humanitarian operations: challenges and opportunities. *Journal of Humanitarian Logistics and Supply Chain Management, 5*(2), 253-274. doi: https://doi.org/10.1108/JHLSCM-07-2014-0026

Services for the disaster-affected: Relief. (2019). Retrieved December 12, 2020, from International Federation of Red Cross and Red Crescent Societies: https://www.ifrc.org/en/what-we-do/disaster-management/responding/services-for-the-disaster-affected/relief/

(2004).*Sphere Handbook: Humanitarian Charter and Minimum Standards in Disaster Response.* Geneva: The Sphere Project.

(1989). *Supplies and Food Aid Field Handbook.*Geneva: UNHCR.

Thomas, A. S., & Kopczak, L. R. (2005). *From Logistics to Supply Chain Management: The path forward in the humanitarian sector*. Retrieved from http://www.fritzinstitute.org/PDFs/WhitePaper/FromLogisticsto.pdf

Torabi, S., Aghajani, M., & Baghersad, M. (2012). *A novel procurement model for humanitarian relief supply chains.* RetrievedJanuary 12, 2020, from University of Tehran: https://pdfs.semanticscholar.org/9c72/fe0ed04dd9fc81b90712d122372a5c72446a.pdf

UNHCR Manual Chapter 8. (2003). Retrieved January 28, 2020, from United Nations High Commissioner for Refugees: https://cms.emergency.unhcr.org/documents/11982/33363/UNHCR%2C+Manual%2C+Chapter+8/82b58bad-8988-49e4-86bd-03b483b235b1

(2002). *WFP Emergency Field Operations Pocketbook.* Rome: United Nations World Food Programme.

ANNEXURES

Annexure 1: Limited Tender Form (LTE)

Source: (2017). Manual for Procurement of Goods. New Delhi: Government of India, Ministry of Finance, Department of Expenditure.

*Name of Procuring Entity*_____

Firm's Reference			**Date**	
Firm Registration No. (if any)			PAN (attach photocopy)	
TIN/VAT/CST No.		LIMITED TENDER FORM	Address:	
Phone				
Fax				
Email				
M/s:		Enquiry No. and Date		
		Date of Tender Opening		
		The tender would be opened at three pm on the date of tender opening above, at the address mentioned above.		

Please submit on or before 3:00 pm on the date of tender opening, your quotation for the following goods, in accordance with the terms and conditions printed overleaf, in a sealed cover, marked on top with – Enquiry No; Date of Tender Opening.
Yours Sincerely
Procuring Officer

Tender Schedule: all rates in figures and in words in rupees

Sr No.	Description and Specification	Qty	Unit	Delivery terms	Rate per unit	Taxes & duties	Packing/ forwarding	Total rate per unit	Total value

Delivery Schedule:

Enclosed specifications/ drawing /special conditions of contract:

Item/ tender specific conditions of this contract:

I/we engage to supply the material(s) to your office and comply the following:
1. Tender schedule and technical specification indicated.
2. Item/tender specific conditions for this tender.
3. Terms and conditions printed overleaf.
4. General conditions of contract signed by me at the time of supplier registration (for registered suppliers).
5. I/we confirm that set off for the ED, VAT, etc. Paid on the inputs have been taken into consideration in the above quoted price and further agree to pass on such additional duties as sets offs

as may become available in future under VAT, etc. 6. This offer is valid for 90 (ninety) days from the date of opening of the tender. 7. That we have not been debarred by any Government/Undertaking. 8. That the rates quoted are not higher than the rates quoted for same item to any Government/ Undertaking. 9. That the bid submitted by us is properly sealed and prepared so as to prevent any subsequent alteration and replacement			
Signature & Seal Place & Date:		Name of Authorised Signatory:	
Address:		Tel. No./Fax. No./Mobile No. Email Id:	

Terms and Conditions of Limited Tender

i) The quotation must be in the form furnished by Procuring Entity and should be free from corrections/erasures. In case there is any unavoidable correction it should be properly attested. If not, the quotation will not be considered. Quotation written in pencil will not be considered.

2. Quotation will be opened on due date at 3.00 pm at the indicated venue in presence of the tenderers or their representatives who may wish to be present.

3. The Government of India reserves the right to accept the offer by individual items and reject any or all tenders without assigning any reason thereof and does not bind itself to accept lowest quotations.

4. Participation in this tender is by invitation only and is limited to the selected Procuring Entity's registered suppliers. Unsolicited offers are liable to be ignored. However, suppliers who desire to participate in such tenders in future may bring it to the notice of procuring Entity and apply for registration as per procedure.

Note: to get registered as an approved supplier with the Procuring Entity, please download supplier approval form from _____ and submit.

5. Manufacturer's name and country of origin of materials offered must be clearly specified. Please quote whether your organisation is large scale industry or small-scale industry. If you have NSIC/MSE/MSI/DGS&D Certificate, please attach it to the quotation. Mention your registration details.

6. Complete details and ISI specification if any must accompany the quotation. Make/brand of the item shall be stated wherever applicable. If you have got any counter offer as suitable to the material required by us, the same may be shown separately.

7. Samples must be submitted where specified along with the quotations. Samples must be carefully packed, sealed and labelled clearly with enquiry number, subject and sender's name for easy identification. Rejected samples will be returned at your cost if insisted.

8. All drawings sketches and samples, if any, sent along with this enquiry must be returned along with quotations duly signed.

9. All supplies are subject to inspection and approval before acceptance. Manufacturer/ supplier warranty certificates and manufacturer/Government approved lab test certificate shall be furnished along with the supply, wherever applicable.

10. The Government of India reserves the right to modify the quantity specified in this enquiry.

11. The prices quoted should be firm till the supplies are completed. Please quote the rates in words and figures. Rates quoted should be free delivery at destination including all charges otherwise the quotation is likely to be rejected. Prices quoted for free delivery at destination will be given preference. If there is no indication regarding the FOR, in the quotation, then it will be considered as FOR destinations. Price quoted should be net and valid for a minimum period of three months from the date of opening of the quotation.

12. In case the items in the enquiry are covered by any rate contract or running contract finalised by the DGS&D or any other state or central Government, is should be specified in your quotation and accepted contract rates should also be mentioned. It should be confirmed whether you could supply at the RC rates outside rate contract.

13. Payment of sales tax is primarily the responsibility of the seller and will not be paid unless the percentage value is clearly mentioned in the quotations. If no indication regarding CST/ST is recorded in the quotation, the CST/ST will be considered as included.

14. Delivery period required for supplying the material should be invariably specified in the quotation.

15. In case your quotation is accepted and order is placed on you, the supply against the order should be made within the period stipulated in the order. The Government of India reserves the right to recover any loss sustained due to delayed delivery by way of penalty. Failure to supply the material within the stipulated period shall entitle Procuring Entity for the imposition of penalty without assigning any reasons @ 1/2% (half percent) of the total value of the item covered in order as penalty per day subject to a maximum of 5% (five percent) unless extension is obtained in writing from the office on valid ground before expiry of delivery period.

16. If the deliveries are not maintained and due to that account Procuring Entity is forced to buy the material at your risk and cost from elsewhere, the loss or damage that may be sustained there by will be recovered from the defaulting supplier.

17. Dispute clause: Any dispute relating to the enquiry shall be subject to the jurisdiction of the court at [indicate Place] only.

18. Our normal payment terms are 100% (hundred percent) within 30 (thirty) days on receipt and acceptance of material at our site in good condition.

Annexure 2: Proprietary Article Certificate (PAC)

Source: (2017). Manual for Procurement of Goods. New Delhi: Government of India, Ministry of Finance, Department of Expenditure.

Valid for the Current Financial Year

File Number and Date Reference			
1	Description of article		
2	Forecast of quantity/annual requirement		
3	Approximate estimated value for above quantity		
4	Maker's name and address		
5	Name(s) of authorised dealers/stockists		
6	I approve the above purchase on PAC basis and certify that: -- Note- Tick to retain only one out of (b), (c-1) or (c-2) whichever is applicable and cross out others. Please do confirm (a) by ticking it – without which PAC certificate will be invalid		
6(a)	This is the only firm who is manufacturing/stocking this item. AND		☐
6(b)	A similar article is not manufactured/sold by any other firm, which could be used in lieu OR		☐
6(c-1)	No other make/brand will be suitable for following tangible reasons (like OEM/warranty spares): OR ……		☐
6(c)	No other make/brand will be suitable for following intangible reasons (if PACwas also given in the last procurement cycle, please also bring out efforts made since then to locate more sources): OR ……		☐
7	Reference of concurrence of finance wing to the proposal:	……	

History of PAC purchases of this item for past three years may be given below			
Name of the Supplier			
Order/Tender Reference& Date	**Quantity Ordered**	**Basic Rate on Order (Rs.)**	**Adverse Performance Reported if Any**

Signature of Approving Authority .....

Date ..... Designation of Officer .....

Annexure 3: Purchase without Quotation Format

Source:(2017). Manual for Procurement of Goods. New Delhi: Government of India, Ministry of Finance, Department of Expenditure.

Ref No.			
Place		Date	

"I, _____, am personally satisfied that the goods (described below) purchased are of the requisite quality and specification and have been purchased from a reliable supplier/contractor at a reasonable price."

Item:	
Quantity:	
Indenter:	
Unit Rate:	
Taxes/Duties:	
Other Charges:	
Total Unit Price:	
Total Price:	
Purchased from: M/S	
Vide Bill No.:	
Justification:	
Cheque may be drawn in favour of	
Name:	
Designation:	
Signature:	

Annexure 4: Purchase Committee Certificate Format

Source: (2017). Manual for Procurement of Goods. New Delhi: Government of India, Ministry of Finance, Department of Expenditure.

Ref No.			
Place		Date	

"Certified that we the undersigned, members of the purchase committee are jointly and individually satisfied that the goods recommended for purchase are of the requisite specification and quality, priced at the prevailing market rate and the supplier/contractor recommended is reliable and competent to supply the goods in question, and it is not debarred by Department of Commerce or Ministry/Department concerned." The details of recommended purchase are:

Item:						
Quantity:						
Indenter:						
Details of Prices Ascertained						
Bidder	**Unit Rate:**	**Taxes/ Duties:**	**Other Charges:**	**Total Unit Price:**	**Total Price:**	**Recommendations & Comments**
Selected Quotation						
Bidder						
Unit Rate, Taxes/Duties/Other Charges						
Total Unit Rate						
Total Value of Purchase						
Cheque may be drawn in favour of						
Signature:		**Signature:**		**Signature:**		
Name 1:		**Name 2:**		**Name 3:**		
Designation:		**Designation:**		**Designation:**		

Annexure 5: Progress of Supply Order Register

Source: (2017). Manual for Procurement of Goods. New Delhi: Government of India, Ministry of Finance, Department of Expenditure.

Progress of Supply Order Register											
Sr No	Supply order No. & date	Brief Description of material	Name of Supplier & Registration No.	Quantity & Due Date of Delivery		Quantity & Actual Date of Delivery		Whether delay was attributable to the Supplier or Procuring Entity	Whether Penalty is imposed or not?	Status of Security Deposit	Remarks
				Qty	Date	Qty	Date				
1	2	3	4	5	6	7	8	9	10	11	12

Office Superintendent Procuring officer

Notes:

1. The register will be viewed and signed by Head of Office every month.
2. A summary will be prepared and submitted to Head of Department every quarterly.

Annexure 6: Goods Receipt and Inspection Report

Source: (2017). Manual for Procurement of Goods. New Delhi: Government of India, Ministry of Finance, Department of Expenditure.

Purchase order No.			RR/GC No. & date				Procuring Entity:					
Name of Supplier M/s.			Date of clearance from Transporter				Goods Receipt and Inspection Report					
Indenter			Date of inspection and acceptance/rejection				Acceptance/Rejection		Part/Full Quantity			
Materials procured for project/scheme			Earlier GRIR No. for Part Supply				GRIR No.					
Allocation			Code No.				Date					
Nos.	Description of material	Code No.	Invoice No.	Qty. as per S.O.	Qty. Recd.	Qty. Inspected		Rate Unit	Amount	Taxes/duties	Packing/ forwarding	Total Amount
						Accepted	Rejected					
Copy to A/c Officer												
Indenting Officer			Inspected by me						Received above material of correct quantity and quality			
Procuring Officer			Sign						Sign			
Book-keeping			Inspecting Officer						Indenting/ Receiving Officer			
Inspecting officer									(Not below the rank of Supervisor)			
In case of rejected quantity: replacement required/not required ..... Rejected materials of local firms will normally be delivered at the designated consignee. Firms are required to arrange collection within 14 (fourteen) days from the date of rejection failing which Procuring Entity's responsibility will cease and after that time they will remain at supplier's entire risk and if not removed before a further period of seven days, Procuring Entity shall have the right to dispose of such stores as deemed fit at the supplier's risk and account without further reference to them and to recover thereafter from the supplier's as ground rent or demurrage at the rate of Rs. ..... per day for consignments occupying less that 0.2 (point two) cubic meters, or 50 (fifty) kilograms in weight and up to Rs. ..... per day for articles bulkier or heavier than above. Rejected materials of firm from outstation if not removed within 21 (twenty-one) days of the rejection will be dispatched to them by goods train freight to pay at public tariff rate. A/c Officer may please recover any advance payment or freight charges paid for such rejected quantity.													

Annexure 7: Sample Stock Cards

Source: (2012). A Logistics Handbook: For Disaster Preparedness and Response. New Caledonia: French Red Cross and Australian Red Cross.

Item Information		
Item Description	Item Code	Unit of Measure (e.g. piece, kg, litres etc.)
Commodity monitoring	Expiry Date	Stock Minimum

Date	Document Ref. No.	From/ To	Store No.	In	Out	Balance	Remarks

Annexure 8: Sample Requisition Form

Source: (2001). Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organization & Department of Emergency and Humanitarian Action of the World Health Organization. Humanitarian Supply Management and Logistics in the Health Sector. Washington, D.C.: Pan American Health Organization

Request for Supplies			
Request No.		**Place & date:**	
Deliver at:		Priority • Urgent • Normal Explain if necessary:	
Authorised Operator (name & signature)			
Requested item	**Characteristics & specification**	**Quantity**	

Annexure 9: Sample Stock Report Form

Source: (2001). Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organization & Department of Emergency and Humanitarian Action of the World Health Organization. Humanitarian Supply Management and Logistics in the Health Sector. Washington, D.C.: Pan American Health Organization

Warehouse:			**From (date):**			**To (date):**		
Product		Initial stock	Arrival (include dates)	Deliveries (include date)	Losses (if any)	Final balance of stock	Expiration date	Requirements
	Unit							
	Kg							
	Unit							
	Kg							
	Unit							
	Kg							
	Unit							
	Kg							
	Unit							
	Kg							
	Unit							
	Kg							
	Unit							
	Kg							
Explanation of losses:								
Remarks:								
Name & signature of responsible party:					**Date of the report:**			

Annexure 10: Suggested Readings

- Guidelines for State Disaster Response Fund (SDRF)
  Available online at:
  https://ndma.gov.in/images/pdf/SDRF.pdf
- Guidelines for operation and maintenance of the National Disaster Response Reserves (NDRR)
  Available online at:
  http://www.ndrf.gov.in/sites/default/files/13683%20-encl.pdf
- Indian Disaster Resource Network- Leaflet and User manual
  Available online at:
  https://idrn.gov.in/#
- SOP on effective coordination & cooperation during disaster response
  Available online at:
  http://www.ndrf.gov.in/sites/default/files/EFFECTIVE%20COORDINATION%20H.pdf
- The Environmental Procurement: Practice Guide Volume 1
  Available online at:
  http://www.greeningtheblue.org/sites/default/files/UNDP-Environmental%20procurement_0.pdf
- Disaster Waste Management Guidelines: State Emergency Management Plan-Part 4, DWM Capability Plan -Annex A, Government of South Australia
  Available online at:
  https://www.dpc.sa.gov.au/__data/assets/pdf_file/0005/38354/Disaster-Waste-Management-Guidelines.pdf
- Draft National Logistic Policy, February 2019
  Available online at:
  https://commerce.gov.in/writereaddata/UploadedFile/MOC_636850457336854610_Notification-Draft-05022019.pdf