

Humanitarian Operations

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Humanitarian

- What is humanitarian?
 - Webster : a person promoting human welfare and social reform
- Promoting Human Welfare
“Doing Good with OR”



Humanitarian Assistance

- Humanitarian aid is material or logistical assistance provided for humanitarian purposes, typically in response to humanitarian crises including natural disaster and man-made disaster.
- The primary objective of humanitarian aid is to save lives, alleviate suffering, and maintain human dignity.
- It may therefore be distinguished from development aid



Humanitarian Assistance

- Objectives:
 - save lives,
 - alleviate suffering and maintain human dignity during and in the aftermath of man-made crises and natural disasters,
 - Prevent and strengthen preparedness for such situations.
- Guided by the humanitarian principles of
 - humanity,
 - impartiality,
 - neutrality,
- Includes
 - protection of civilians and those no longer taking part in hostilities
 - provision of food, water and sanitation, shelter, health services and other items of assistance

Defining Humanitarian



- Humanity: meaning the centrality of saving human lives and alleviating suffering wherever it is found (Will assist everyone in need wherever found)
- Neutrality: meaning that humanitarian action must not favor any side in an armed conflict or other dispute where such action is carried out (Process without bias or affiliation to a party)
- Impartiality: meaning the implementation of actions solely on the basis of need, without discrimination between or within affected populations

Humanity

Humanitarian space

Neutrality

Impartiality

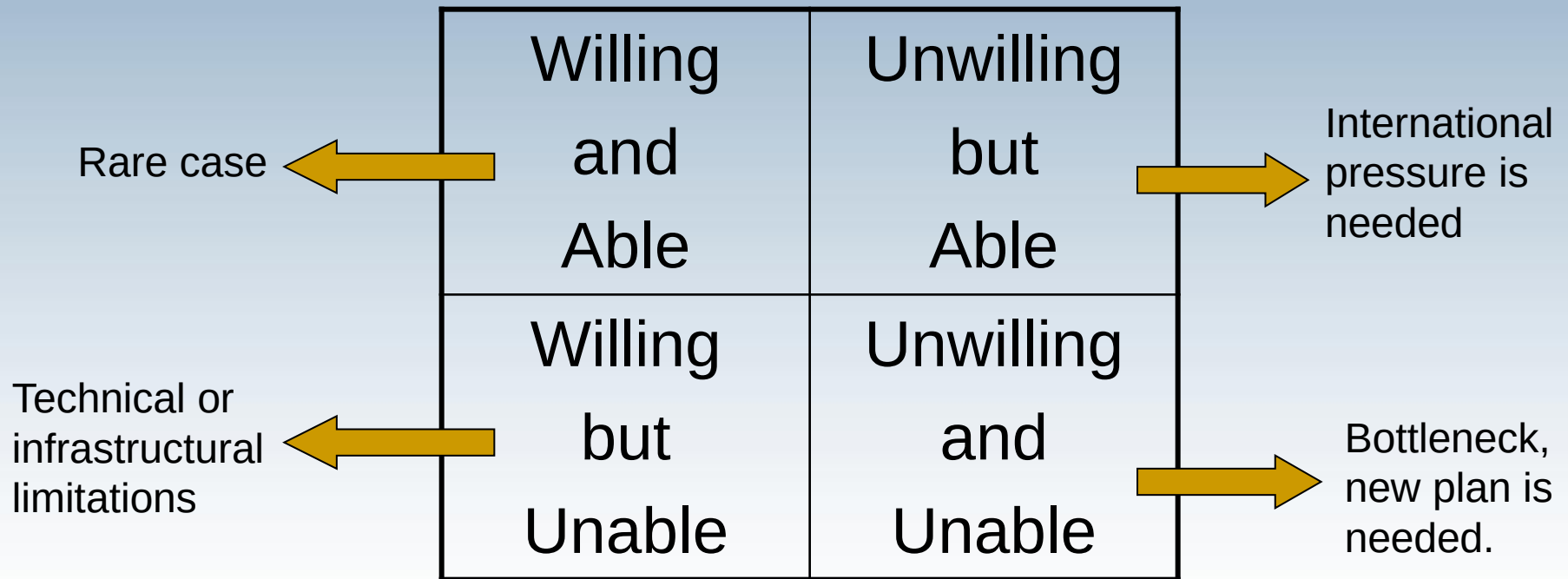


The Humanitarian Challenge

- 1- Ambiguous Goals
 - Operationalizing 3 principles at the same time can be ambiguous.
- 2- Impact
 - It is hard to predict long-term results.
- 3- Levels of Influence
 - At what level (local, national or international) should the impact be measured?
- 4- Political-Humanitarian Relations
 - Politics always take role in some part of humanitarian actions. However, they must be ruled out.
- 5- Funding
 - Adequate funding is needed to send aid.
 - Donors tend to respond short-term needs rather than long-time needs
- 6- Willingness and Consent

The Humanitarian Challenge

- 6- Willingness and Consent





Humanitarian Actions

- Humanitarian operations are not judged by speed or cost but by their impact.
- Fully adhering to humanitarian principles can be very expensive, controversial and/or challenging



Food Aid (Some Facts)

- The dominant response to food crisis
- Constitutes over half of all UN consolidated emergency appeals
- 17% of non-food needs identified in the recent UN appeals for Kenya, for example, were funded, compared to 46% of food needs
- Imported food aid can take up to 4-5 months to arrive
- Food aid may cost as much as 50% more than local food, and may be nutritionally limited and culturally inappropriate
- In 2004, Canada spent up to 40% of its food aid budget on transportation before policy change.

79% of food aid is sourced in donor countries

US sources 99% of food aid domestically

Denmark, France, Italy largely support food aid domestically

US Food Aid



- USAID – cost of transportation is 65% of the total expenditure for emergency food
- Buying locally saves approximately 50% of total cost
- US food aid system set up to benefit US business interests, rather than to deliver aid effectively.
- Some US NGOs have a conflict of interest regarding commodity food aid, since they rely on sales of food aid to finance development programs

source: Sophia Murphy & Kathy McAfee, US Food Aid: Time to Get It Right, Institute for Agriculture and Trade Policy, July 2005, <http://www.tradeobservatory.org/library.cfm?refid=73512>

source: Causing Hunger: an overview of the food crisis in Africa, Oxfam briefing paper, 24 July 2006

Example

- Because of administration and transportation costs, less than half of the money spent on USAID food aid actually goes to pay for food.
- 2005 USAID FOOD AID BUDGET \$1.6B
- | | | |
|---|----------------|-----|
| Administrative costs -- | \$81 million: | 5% |
| Overland transportation -- | \$141 million: | 9% |
| Ocean shipping from U.S. -- | \$341 million: | 21% |
| Transportation and storage
in destination country -- | \$410 million: | 26% |
| Food cost -- | \$654 million: | 40% |



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Disasters; Natural and Manmade

Ongoing Problems (Public Sector Applications)

Disaster



“A Serious disruption of the functioning of the society, causing widespread human, material, or environmental losses that exceed the ability of the affected society to cope using only its own resources” UNDHA (United Nations Department of Humanitarian Affairs)

“Result of a vast ecological breakdown in the relationship between man and his environment, a serious (sudden or slow) disruption on such a scale that the stricken community needs extraordinary efforts to cope with it” WHO



Disasters:

- CDR : Crude Death Rate (per 10K persons per day)
- U5DR : Under-Five Death Rate
- Emergency: if CDR doubles
- Extreme emergency: if CDR quadruples
- Thresholds depend on baseline CDR
- Thresholds differ by country/region

Source: Medecins Sans Frontieres, Refugee Health, An Approach to Emergency Situations, MacMillan Education Ltd, London, 1997; and Salama Spiegel et al, Lessons Learned From complex Emergencies Over the Past Decade, The Lancet 364 (9447): 1801-1813, 2004



IFRC categorizes disasters into 10?

- Hurricanes, cyclones, typhoons
- Floods
- Drought
- Earthquakes
- Volcanic Eruption
- Epidemic
- Famine and food insecurity
- Man-made disaster (terrorist attacks, wars)
- Population movement
- Technological disaster (bioterrorism, nuclear accidents..)

Classification ??





Classification Keywords

- Disasters
- Public Applications
- Process related ...

Public Sector Examples



- Improving the performance of fire and police departments
- Delivery of meals to senior citizens (Meals-on-Wheels)
- Delivery of blood to hospitals
- Housing
- Drug Policy – Enforcement vs Treatment?
- Guns and violence
- Public transportation

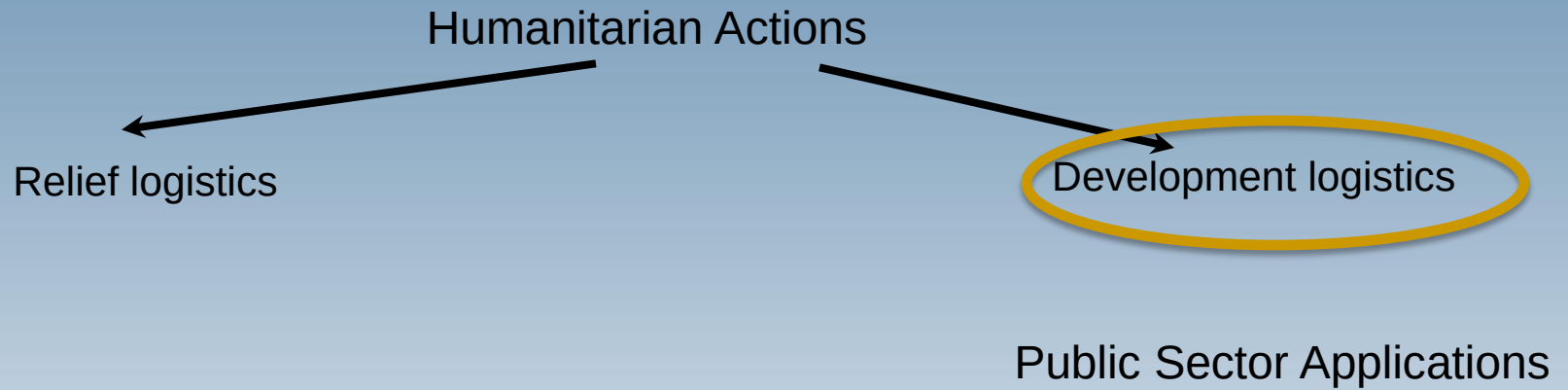
Routine events vs Disasters

Classification

- Disaster Relief
- Continuous Actions



Humanitarian Actions



Humanitarian Actions

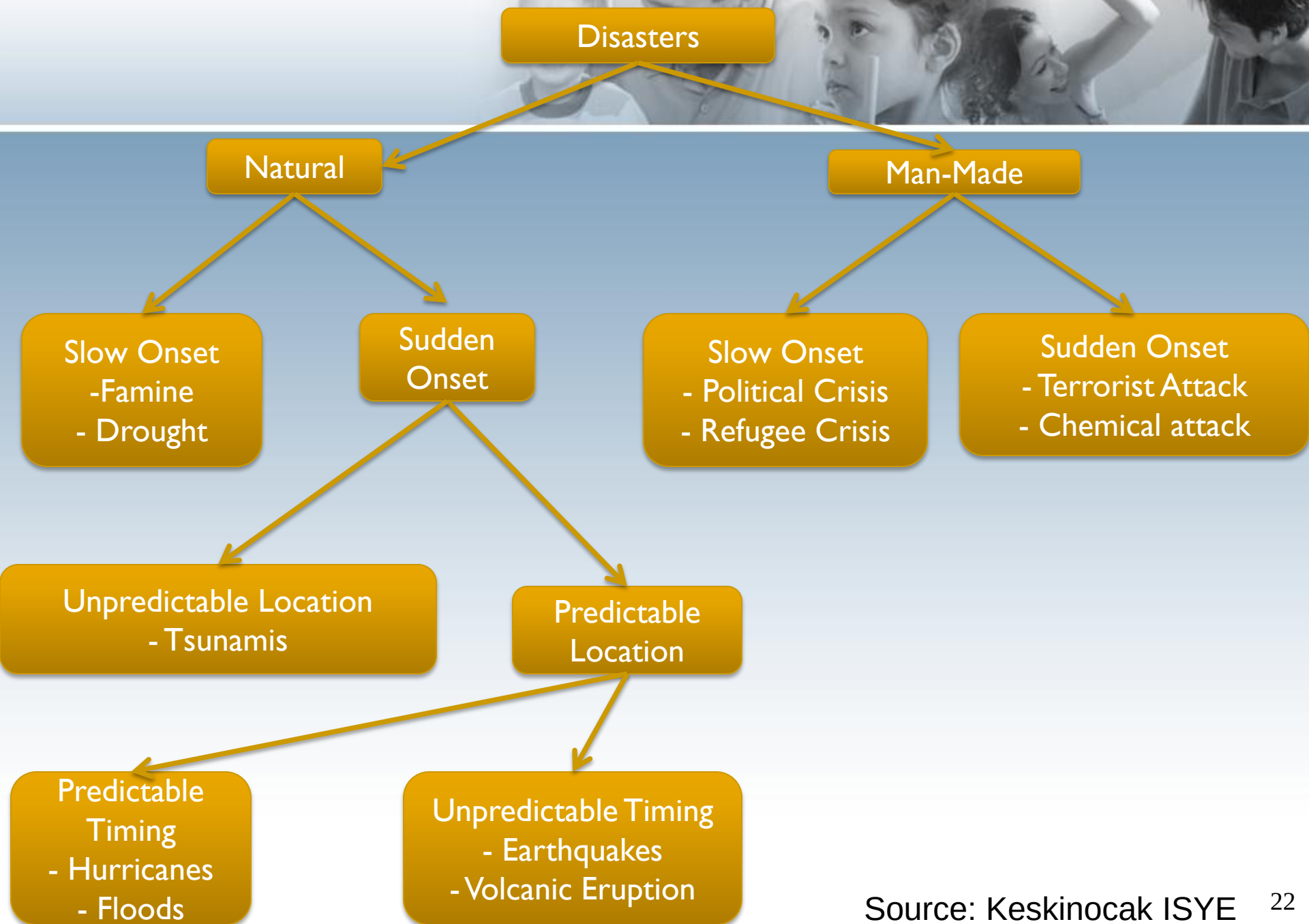
Humanitarian Actions

Relief logistics

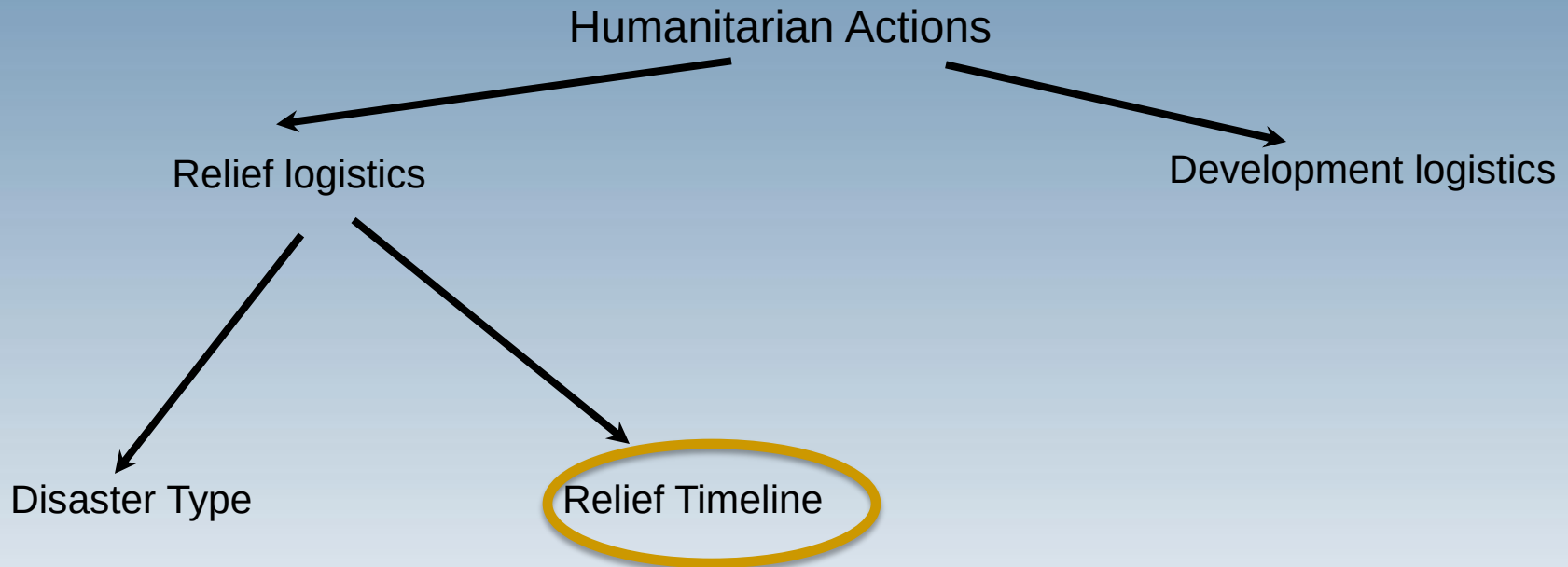
Development logistics

Disaster Type

Relief Timeline



Humanitarian Actions



Disaster Timeline



Pre-disaster

Mitigation & Preparedness

- Assessment
 - Risk Factors
 - Vulnerability
- Planning
 - Infrastructure
 - Policy Making
 - Capacity building
 - Pre-positioning resources
- Training / Education

Disaster

Response

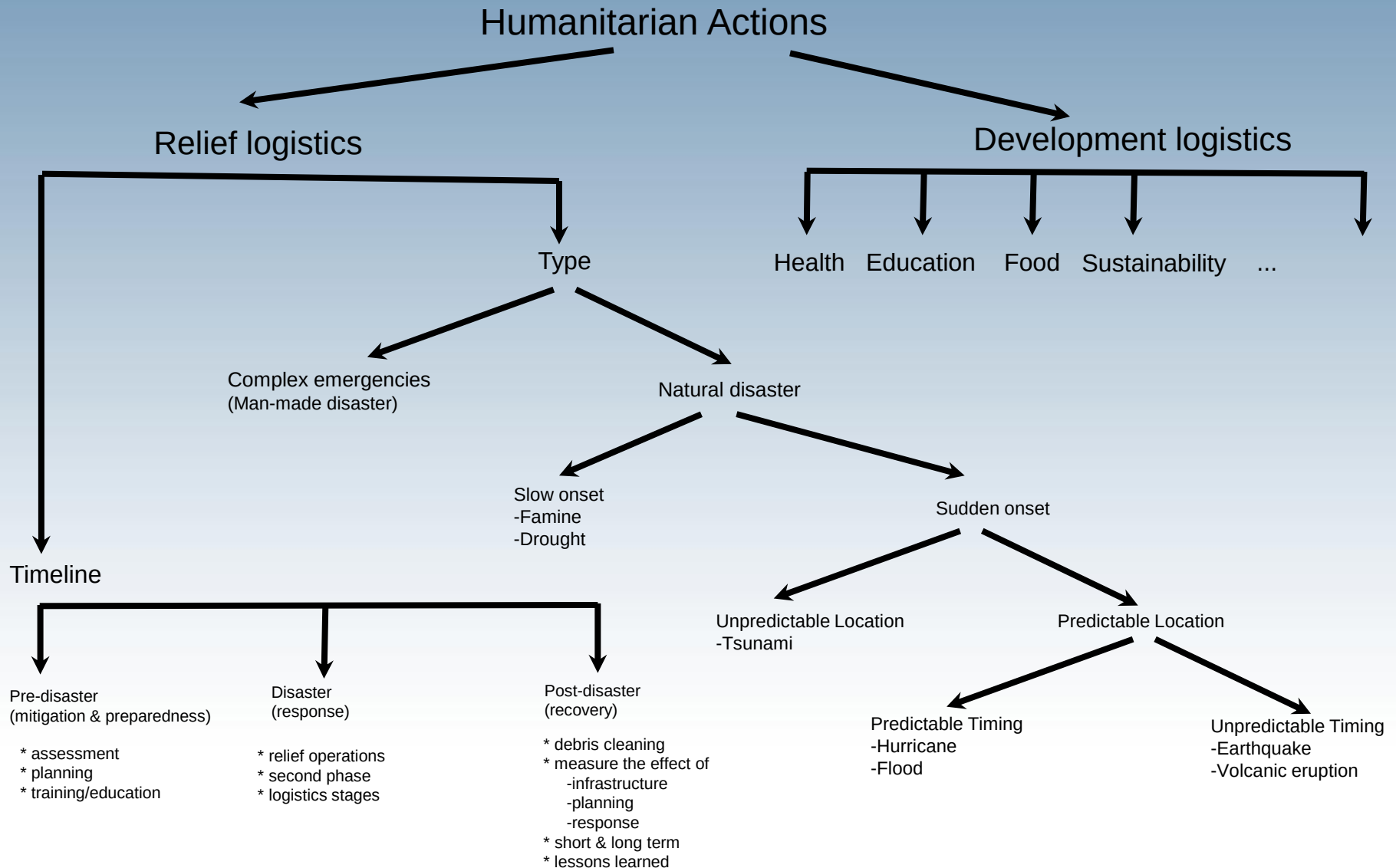
- Relief Operations:
- First phase
 - Medics, food, shelter
 - Second phase
 - Housing
 - Food supply chain building
- Logistics stages:
- Mobilization and procurement,
 - Long haul
 - The last mile

Post-disaster

Recovery

- Debris cleaning
 - Infrastructure rebuilding
 - Re-establishing communities
- Measure the effects of
- Infrastructure
 - Planning
 - Response
 - Short and long term
- Lessons learned,
Feedback to planning and response

Humanitarian Actions





Humanitarian Actions

- Analysis depends on where we are
- Relief Logistics is mainly humanitarian supply chain
- Development Logistics has many different OR problems



Development Logistics

- Continuous Improvement
- Projects for 3rd world countries



Projects for 3rd World Countries

- Hunger
- Health
 - Malaria, HIV, ..
- Education
 - Children, Adults, ...
- Water
- ...

Many specialized NGOS

**e.g Tutu Foundation for HIV
Malaria Foundation International
...**

Many OR problems

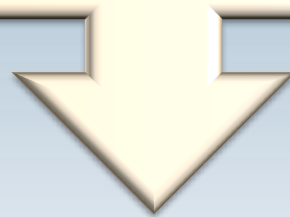


Development Logistics

- Continuous Improvement:
 - Hospital, ambulance coverage
 - Fire station coverage
 - Senior Citizen Services (E.g. Meals-On-Wheels)
 - Sustainability (e.g. energy consumption, green logistics)
 - Education
 - Districting, school sites...
 - Healthcare
 - Hospital logistics,
 - Blood Logistics,
 - Mobile Primary Healthcare
 - Childcare, maternal care especially for rural areas
- Many OR problems

HUMANITARIAN LOGISTICS : Definition

- World Food Programme (WFP)
- United Nations Children's Fund (UNICEF)
- United Nations High Commissioner for Refugees
- Medecins Sans Frontieres



“Humanitarian logistics is the process of planning, implementing, controlling the efficient, cost effective flow and storage of goods and materials, as well as related information, from point of origin to point of consumption for the purpose of meeting the end beneficiary’s requirements.”



Humanitarian Actions

Relief logistics

Development logistics

Type

Complex emergencies
(Man-made disaster)

Natural disaster

Slow onset
-Famine
-Drought

Sudden onset

Unpredictable Location
-Tsunami

Predictable Location

Predictable Timing
-Hurricane
-Flood

Unpredictable Timing
-Earthquake
-Volcanic eruption

Timeline

Pre-disaster
(mitigation & preparedness)

- * assessment
- * planning
- * training/education

Disaster
(response)

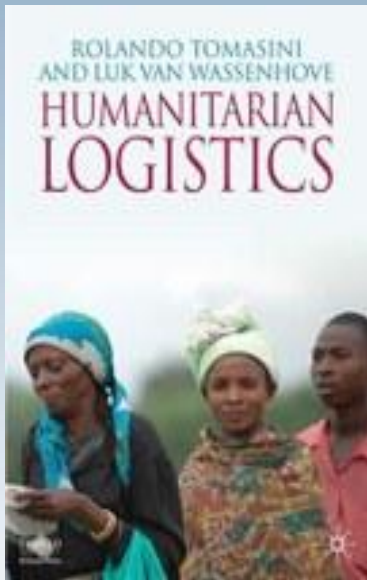
- * relief operations
- * second phase
- * logistics stages

Post-disaster
(recovery)

- * debris cleaning
- * measure the effect of
 - infrastructure
 - planning
 - response
- * short & long term
- * lessons learned

Disaster Timeline





PREPAREDNESS

**Based on “Humanitarian Logistics”
by R. Tomasini and Luk Van Wassenhove**





HURRICANE MITCH

- Roads are washed out, 400 bridges are destroyed in the region
- 10,000 death and 2 million homeless
- Nothing went right in response of IFRC
- Staff and relief delegates arrived unreasonably late
- Emergency Response Unites (ERU) deployed too late
- IFRC caught unprepared, failed to coordinate and consider prepositining
- Successful responses are not improvised = Firefighting

FIREFIGHTING



- There is not enough time to solve all the problems
- Solutions are incomplete
- Problems recur and cascade
- Urgency supersedes importance
- Many problems become crises
- Performance drops

DISASTER MANAGEMENT CYCLE





FULL CYCLE OF DISASTERS

1. Mitigation
 - Laws and mechanisms that reduce vulnerability
2. Preparedness
 - Putting in place the response mechanisms to counter factors
3. Response
 - Acquiring data, planning and sending aid
4. Rehabilitation
 - To restore some form of normality to the victims' lives



PREPAREDNESS CHALLENGES

Materials

- To get the right goods to the right place at the right time
- SC studies show that 95% of time and resources wasted in waiting
- Reduction of this percentage can save lives

Information

- Very limited at the beginning
- Critical to understand impact on specific areas
- Important in designing an effective SC

Funds

- Finding funds to support preparedness is difficult
- Media exposure is able to raise funds
- Liquidity (disaster response fund-raising) is important.

People

- Getting trained staff to the disaster areas is not easy.
- Possibility of exhaustion under high physical and emotional demands

Knowledge

- Specialized knowledge is required to make quick decisions under uncertainty
- Opportunity for knowledge transfer and capacity building from every disaster



5 KEY BUILDING BLOCKS OF PREPAREDNESS

1. Human Resources

Well selected, adequately trained people.

2. Knowledge Management

Collecting, using and sharing data

3. Logistics

Determining the strategies to send aid (warehouse management, training, reporting)

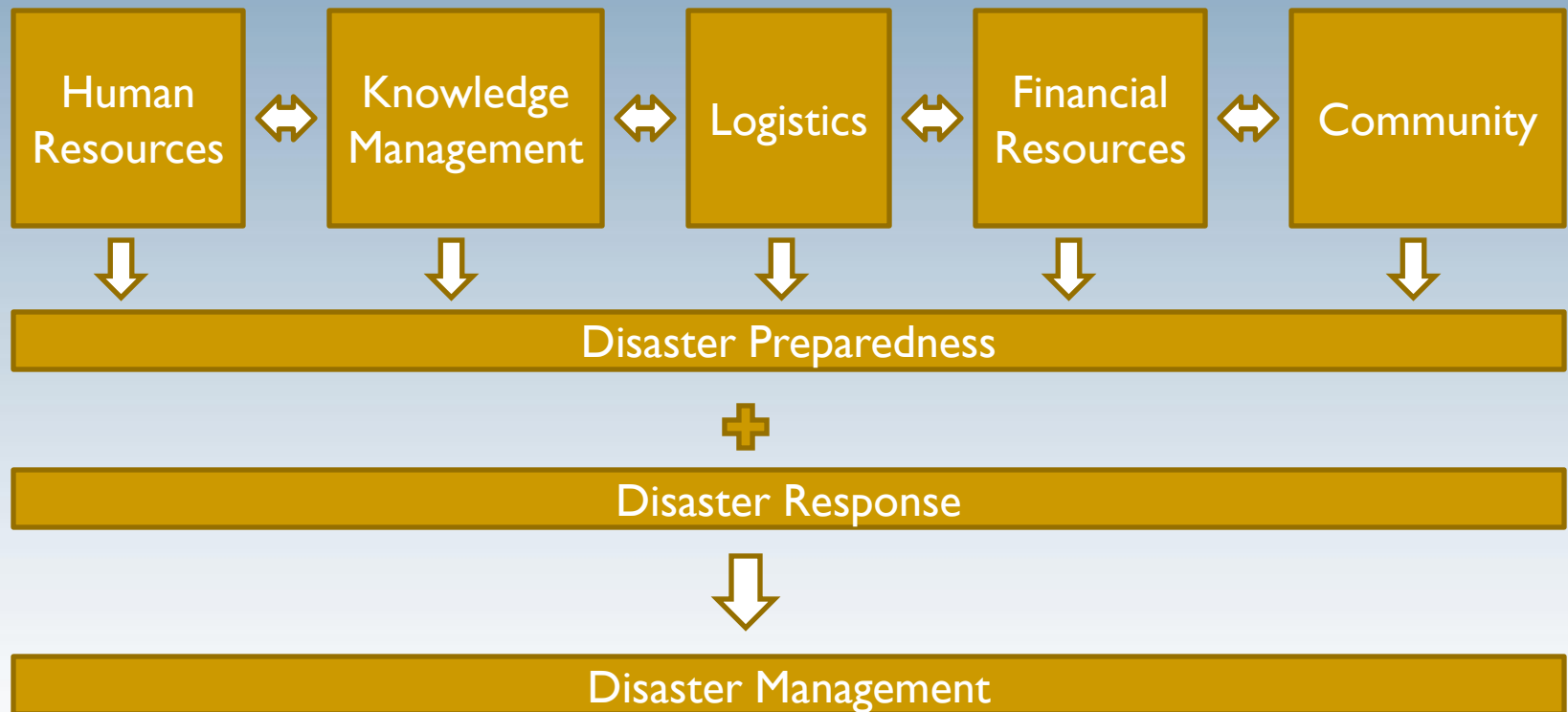
4. Financial Resources

Liquidity, fundraising and budget forecasting

5. Community

Finding effective ways of collaborating with other key players

5 KEY BUILDING BLOCKS OF PREPAREDNESS





PUT AN END TO FIREFIGHTING

- TACTICAL:
 - Add problem solvers with relevant skills
 - Shut down operations that worsen process
 - Select and prioritize problems
- STRATEGICAL:
 - Change design strategy
 - Outsource with right capacity and skills
 - Cluster problems to solve in groups
- CULTURAL:
 - Do not tolerate firefighting and enforce objectives
 - Do not push deadlines at all cost and try to understand changing conditions in the field



CONCLUSION

- ✓ Being prepared increases the response capacity
- ✓ A well-prepared response is much more effective
- ✓ SC should be at the center of preparedness strategy of any organization to improve flows
- ✓ These flows will be supported by organization's
“5 Building blocks of preparedness”

Disaster Timeline



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Post-disaster

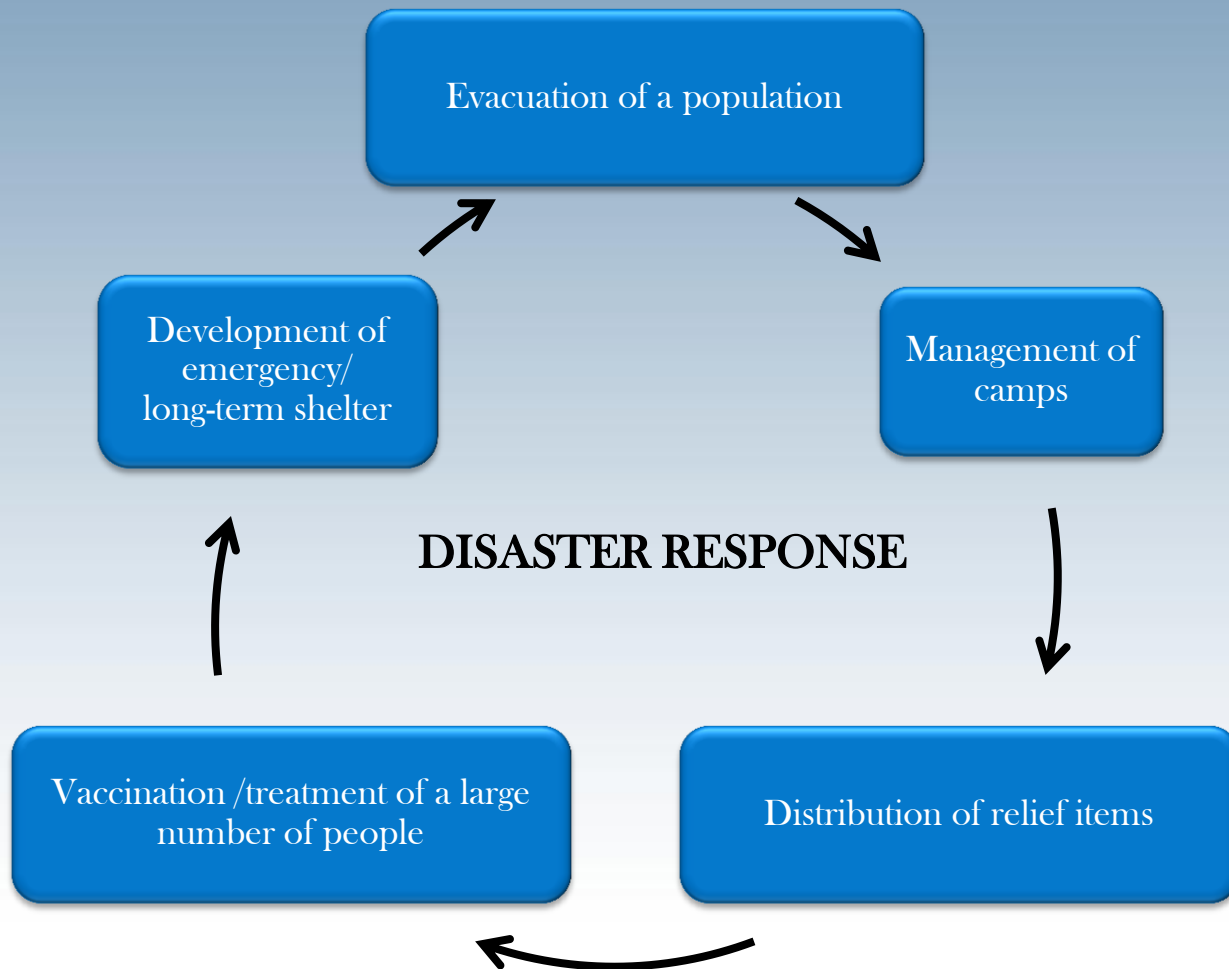
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RESPONSE



DISASTER RESPONSE



DISASTER RESPONSE



Differing / overlapping aid assessments logically cause problems of oversupply / inappropriate supply.

1988 Armenian Earthquake

- Tons of drugs & other medical supplies expired, unused.

Famine in southern Africa in 2002

- Well-meaning organizations donated tons of genetically modified food

Tsunami in southeast Asia

- Large amounts of donated clothing were not needed & caused problems for aid agencies (transportation-storage)

HUMANITARIAN RELIEF SUPPLY CHAIN

HOW Humanitarian organizations form part of a supply chain (SC) ???

Donors

- Governments
- Foundations
- Corporations
- Individuals

Money
Gifts in kind

Aid Organizations

- International (e.g. WFP)
- National (e.g. FEMA)
- Local (e.g. churches)

Relief items
Personnel

Affected population

Victims of natural and
manmade disasters

Disaster
occurs

Money & supplies
Procured

Aid organizations
mobilized

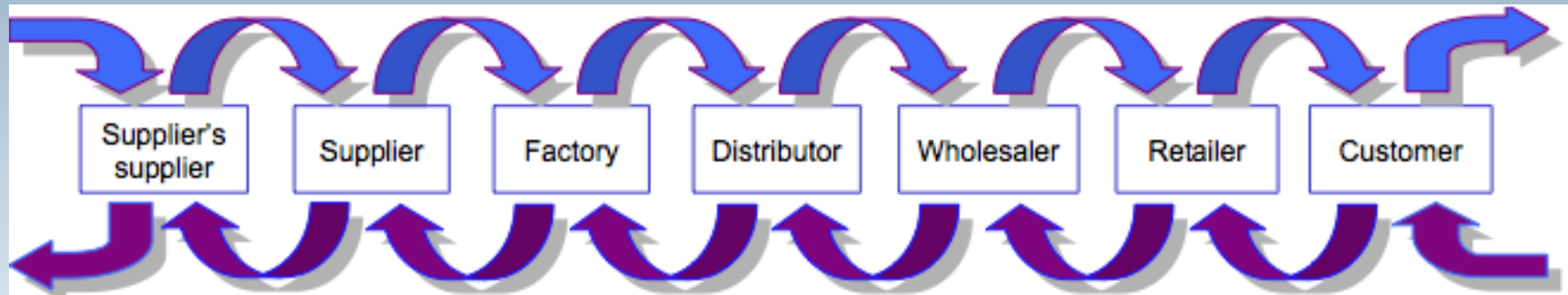
Relief provided

Humanitarian Assistance Supply Chain View

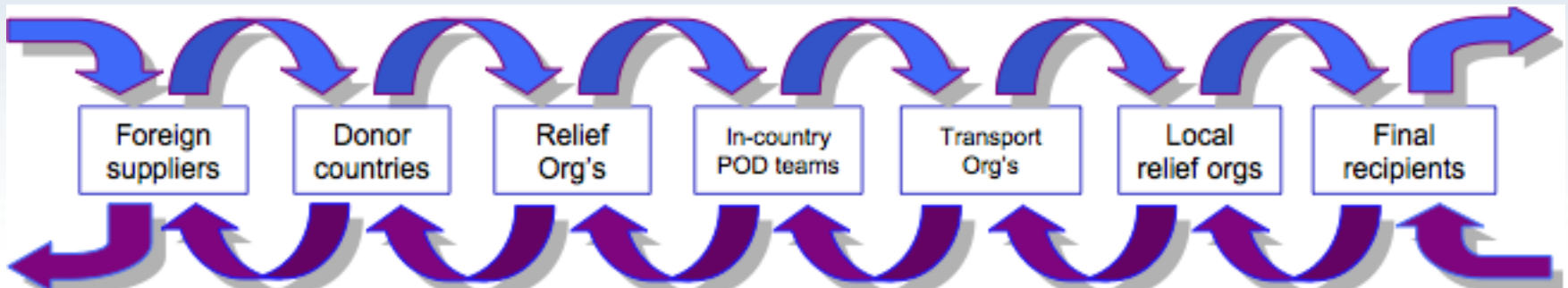


Business SC vs. Humanitarian SC

- Supply Chain: The system of organizations, people, technology, activities, information and resources involved in moving a product or service from supplier to customer.



- “Products” are relief supplies arriving in-country





Business SC vs. Humanitarian SC

- Business supply chain is
 - Demand driven.
 - Planning is made according to business needs.
- Humanitarian supply chain is
 - Supply driven.
 - Planning is made according to on hand stock (donations).



Characteristics of Humanitarian SC

- Ambiguous Objectives
- Limited Resources (Human, Capital, Infrastructure)
- High Uncertainty
- Urgency
- Politicized Environment



Business SC vs. Humanitarian SC

- Business SC: Min cost, max speed, quality and flexibility
- Humanitarian SC: Acute emergency, speed minimization.
 - Reduce waiting time, delays, excessive control and bureaucratic processes
 - Also, poor collaboration leads to delays



Risks within Humanitarian SC

- Disruptions
 - As SCs become more global, they grow more complex and geographically dispersed.
- Coordination
 - Risks of matching supply and demand with the given budget constraints



Players / Stakeholders

Donors & Suppliers

- Government
- Foundations
- Companies

Recipient agency

- NGOs
- IFRC
- Word Vision
- WFP
- CARE
- RedCross
- ...

Governments

....

Delivering agency

- Global or local NGOs
- Local organizations or governments
- Military

People in need

Coordination and collaboration is key!



Demand Drivers

- Type, magnitude, location of the disaster
- Vulnerability
 - Local infrastructure
 - Education
 - Local economy
 - Access to resources
 - Local government and institutions,
 - Population size,
 - Recent events
- Local capacity

Supply Types



- Relief items
- Personnel / volunteers
- Other resources



Supply Sources



- Procure after the fact
 - Most donations are earmarked for a particular disaster
- High uncertainty in the quantity, timing, and the type of donations.
- Competition among NGOs for supply sources
- Trade-off in the choice of suppliers
- Supply availability highly depend on the location

Delivery



- Long haul and last mile
 - Financial, staff, equipment, supplies
- Transportation & Communication infrastructure
 - Highly dependent on the location
 - May be damaged or disrupted
 - Dynamically changing conditions
- Political situation in the affected area and around

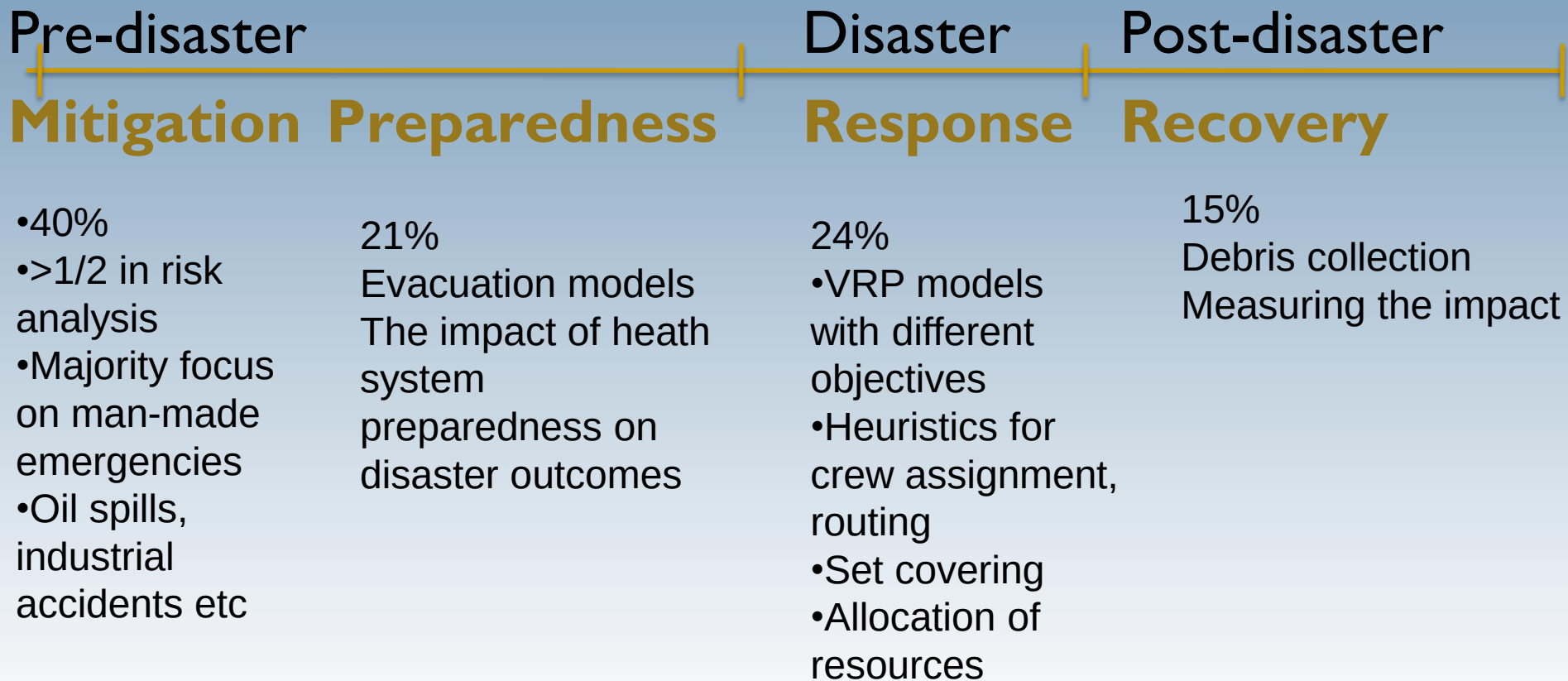


Challenges with Donations

- Right product? Right place?
 - South African Food Crisis in 2002
 - Worst food crisis in Africa in a decade
 - Most of the food donated by the US government
 - Rejected by local governments, stockpiles at ports or in transit
 - Inappropriate donations can cause bottlenecks in the supply chain



OR / MS research Across Disaster Timeline



12% on natural disasters, 48% on man-made emergencies, 40% general methods

Source Altay and Green (2005)

Summary of Problem Characteristics



- High complexity
- High uncertainty
 - Dynamically changing environment
 - Information may not be available or reliable
- Timing is key for decisions and actions
- Multiple players, multiple perspectives, multiple objectives

Summary of Problem Characteristics



- Difficult (but very important!) to assess the potential impact and consequences of actions (short term and long term)
- Important to consider the human/social/behavioral component
- Interdisciplinary nature
- Lost of opportunities for utilizing OR / MS tools

Potential topics to be covered



Facility Location

Prepositioning of Inventory

Disaster Response Cases

Big Depot and Waffle House Cases

Potential topics to be covered



Resource Allocation for Malaria Prevention in Africa

Modeling pandemic influenza, intervention strategies, and food distribution

Routing system for Meals-On-Wheels

Building a Smarter Healthcare System

Debris Management