WHO/EHA

EMERGENCY HEALTH TRAINING PROGRAMME FOR AFRICA

2. TOOLS

2.3. Risk Assessment for Emergency Management

Panafrican Emergency Training Centre, Addis Ababa, July 1998

WHO/EHA/EHTP

2.3. Risk Assessment for Emergency Management Overhead Transparencies

2.3.1. Assessment in Emergency Management
2.3.2. Risk, Definition
2.3.3. Risk is Different from Hazard
2.3.4. Risk is Hazard plus Vulnerability
2.3.5. Hazard, Definition
2.3.6. Vulnerability, Definition
2.3.7. Vulnerability is about Susceptibility and Resilience
2.3.8. 'Problem' is Hazard plus Vulnerability plus Expectations
2.3.9. Risk Assessment: The Process
2.3.10. Hazard Assessment
2.3.11. Vulnerability Assessment
2.3.12. Loss Parameters for Risk Analysis
2.3.13. Presentation of Risk
2.3.14. Potential Loss, Map
2.3.15. Keep the data disaggregated
2.3.16. From Assessment to Planning, The Participatory Approach

2.3. Risk Assessment for Emergency Management
Trainers' Guide

Objective:
To familiarise participants with the differences between the concepts of risk, hazard, vulnerability, problem, with definitions and factors of vulnerability and capacity, and the basic elements of risk assessment. **(Knowledge/Skills)**

Key-message:
Risk assessment is different from Needs Assessment. Risk is different from hazard. Look around for Hazards and make calculations for Risk. It is impossible to plan by problems. Assessing a hazard is relatively easy; assessing vulnerability is more difficult. Assessing a problem may be impossible because problems imply a subjective view of the situation.

2.3.1. Assessment in Emergency Management

Present and clarify. *Risk Assessment comes before an emergency and is different from Needs Assessment, which comes after the impact of the hazard or anyway in the emergency proper. They must not be confused.*

2.3.2. Risk, Definition

Present and discuss; ask for the opinion of epidemiologists' in the audience. *Hazards and vulnerability are Factors of Risk.*

2.3.3. Risk is Different from Hazard

Present and discuss. *Risk is a* ***probability*** *and can be calculated. Hazard is a* ***potentia****l: it can be assessed but not 'calculated'. The two concepts are different. A certain town is situated on the line of two tectonic plates; the hazard of an earthquake is present. The risk or the probability that an earthquake happens cannot be calculated because there is no record of past events.*

2.3.4. Risk is Hazard plus Vulnerability

Present and discuss. *Risk results from the combination of two factors: hazard and vulnerability.*

2.3.5. Hazard, Definition

Present and discuss. *A Hazard is a Threat. Hazards are events (e.g. storm), biological entities (e.g. bacteria, or physical agents (e.g. heat). Hazards have the*

potential to cause damage. Hazards cause disasters only when they affect people: 1. human life, 2. property, 3. human activities.

2.3.6. Vulnerability, Definition

Present and discuss. *Vulnerability is* a Condition. *Vulnerability is Predisposition. It applies to individuals, groups of individuals or communities, but it can be used also when referring to structures, etc. The poorer one is, the more one is predisposed to suffer damage when a negative event occurs.*

2.3.7. Vulnerability is about Susceptibility and Resilience

Clarify. *Susceptibility is the fact of being exposed. You can be susceptible but not vulnerable. E.g. the landslide is threatening a house but the owners have built a wall to protect it and to divert the landslide. Susceptibility is also 'Exposure': it is fairly easy to assess. Resilience is a capacity to adjust and recover. E.g. the owners of the house threatened by a landslide have a second house in town. One can be susceptible, but if he/se is resilient, one is not vulnerable. Resilience is made of many things: it implies access to resources, individual skills, beliefs, etc. It is more difficult to assess.*

2.3.8. 'Problem' is Hazard plus Vulnerability plus Expectations

Present and discuss. *Problem is different from Risk. Perceiving a Problem implies a* ***comparison*** *between certain* ***expectations*** *and a given reality. It add another, subjective dimension to one's analysis, and this subjective perception is very difficult to assess*. Use this transparency to introduce the concept of 'Stake-holders'.

2.3.9. Risk Assessment: The Process

Present. *Risk assessment is a process analysing three sets of variables one analysis the different elements shown: 1. what are the hazards, 2.* ***who*** *or* ***wha****t is at risk, 3. what are the factors of vulnerability of the elements at risk?*

2.3.10. Hazard Assessment

Present and discuss. *This is a semi-quantitative method to prioritise between different hazards. Four questions can help clarify the meaning of each characteristic and focus the discussion until one rating is attribute: 3, 2 or 1. The hazard with the highest total score is the one that deserves priority attention (Source: the Australian Emergency Management Society).*

2.3.11. Vulnerability Assessment

Present and discuss. *This is a semi-quantitative method to prioritise target groups or areas for prevention or response activities. It is a logarithmic table. Each of the four levels of susceptibility (Very Low, Low, Medium and High) can meet with any of the four levels of resilience (High, Medium, Low and Very low). Vulnerability results from the combination of susceptibility and resilience. If susceptibility is very low and resilience very high, one has minimum vulnerability ('1'). When Susceptibility is high and resilience very low, one has maximum vulnerability ('65536'). E.g. take a displaced population: in an emergency settlement, susceptibility to measles is very high. If all children are immunised, resilience is high, and the vulnerability score is 4. If the children are not immunised, resilience is very low and the vulnerability score is 65536 (Source: the Australian Emergency Management Society).*

2.3.12. Loss Parameters for Risk Analysis

Present and discuss and ask for the audience's contribution. *The table gives a summary of various features that can be expected in an emergency, how they can be measured and what they represent in terms of losses, either tangible (i.e. that can be measured) or intangible (that cannot be measured).*

2.3.13. Presentation of Risk

Introduce the concept. *Three types of risk maps*.

2.3.14. Potential Loss, Map

Present and discuss. One type of Risk-map. *The first map shows the hazards; the second map shows the elements at risk, the third map shows what are the different levels of vulnerability. By superimposing the three maps one obtains a picture of the areas where casualty risk exists and can plan prevention and preparedness activities*

2.3.15. Keep the data disaggregated

Present and discuss. *Each country has its own administrative division: disaggregate the data accordingly*.

2.3.16. From Assessment to Planning, The Participatory Approach

Present and discuss. *First the problem should be discussed with the stakeholders. After hazards, vulnerabilities, capacities and expectation have been analysed one*

can identify priorities and plan accordingly.

Stand-alone.

Essential Reading:

- UN-DMTP Training Modules, UN-DMTP, 1990
- Risk Assessment, Vulnerability and hazard analysis, WHO/PTC, 1996
- Disasters in Africa, Old and new hazards and growing vulnerability, WHO/PTC, 1996
- Africa, Hazards, Vulnerabilities and the Role of the Health Sector in EM, WHO/PTC 1997
- The Public Health Consequences of Disasters, E.K. Noji, Oxford University Press, 1998
- Hazards, Vulnerabilities and Emergency Health Priorities in Africa, WHO/PTC 1998

ASSESSMENT IN EMERGENCY MANAGEMENT

Two main types of "assessment":

1. Risk Assessment, for **Preparedness** (i.e. Hazard and Vulnerability)

2. Need ("Rapid") Assessment, for **Response**

RISK

A statistical concept:

the probability that a negative
event or condition have to
affect an individual in a
given time and space.

Hazards and Vulnerability
are factors of risk

2.3.3. Risk is Different from Hazard

RISK:

a **possibility**,
in **a given** space
and **a given** time

HAZARD:

a **potentiality**,
at **any** time

2.3.4. Risk is Hazard plus Vulnerability

“RISK”=HAZARD + VULNERABILITY

HAZARD

A natural or human-made event that threatens to adversely affect human life, property or activity to the extent of causing a disaster.

VULNERABILITY

the predisposition
to suffer damage
due to external events

2.3.7. Vulnerability is about Susceptibility and Resilience

VULNERABILITY

is about

1. Susceptibility:

i.e. Proximity and Exposure

... easy to map

2. Resilience:

i.e. access to resources, capacities and capabilities
... more difficult to assess...

2.3.8. ‘Problem’ is Hazard plus Vulnerability plus Expectations

“PROBLEM” =

HAZARD

+VULNERABILITY

+ EXPECTATIONS

RISK ASSESSMENT

1. Consider the hazards
    - natural
    - man-made
2. Count the elements at risk
    - population
    - physical structures, etc
3. Assess their vulnerability:
    - age, sex, income, etc
    - type of construction, etc

HAZARD+

ELEMENTS AT RISK +

VULNERABILITY

= RISK

HAZARD ASSESSMENT
S.M.U.G. PRIORITY SCORE

Characteristics	Rating		
	High	Medium	Low
SERIOUSNESS How serious is it? Can it kill?			
MANAGEMEABILITY How manageable is it? Do counter measures exist? Are they affordable?			
URGENCY How urgent it is? Can prompt action limit damage? Are there signs of panic in the community?			
GROWTH What are the trends? Is it going to get worse?			

VULNERABILITY ASSESSMENT

SCORE TABLE

SUSCEPTIBILITY	RESILIENCE	VULNERABILITY
Very Low	High	1
Very Low	Medium	2
Very Low	Low	4
Very Low	Very Low	16
Low	High	2
Low	Medium	4
Low	Low	16
Low	Very Low	256
Medium	High	3
Medium	Medium	9
Medium	Low	81
Medium	Very Low	6561
High	High	4
High	Medium	16
High	Low	256
High	Very Low	65536

SUSCEPTIBILTY: Exposure to danger

RESILIENCS: Adaptability, capacity to review

VULNERABILITY: Predisposition to suffer damage due to external

2.3.12. Loss Parameters for Risk Analysis

Vulnerability Evaluation

	Principal vulnerable elements	
	Tangibles	Intangibles
Floods	Everything located in flood plains or tsunami areas. Crops, livestock, machinery, equipment, infrastructure. Weak buildings.	Social cohesion, community structures, cohesion, cultural artefacts
Earthquakes	Weak buildings and their occupants. Machinery and equipment, infrastructure. Livestock. Contents of weak buildings	Social cohesion, community structures, cohesion, cultural artefacts
Volcanic eruption	Anything close to volcano. Crops, livestock, people, combustible roots, water supply.	Social cohesion, community structures, cohesion, cultural artefacts
Land instability	Anything located on or at the base of steep slopes or cliff tops, roads and infrastructure, buildings on shallow foundations	Social cohesion, community structures, cohesion, cultural artefacts
Strong winds	Lightweight buildings and roots. Fences, trees, signs: boats fishing and coastal industries.	Social cohesion, community structures, cohesion, cultural artefacts
Drought/ desertification	Crops and livestock. Agricultural livelihoods	Destruction of the environment. Cultural losses. Possible population disruption.
Technological disasters	Lives of those involved or in the vicinity. Buildings, equipment, infrastructure, crops and livestock	Destruction of the environment. Cultural losses. Possible population disruption.

PRESENTATION OF RISK

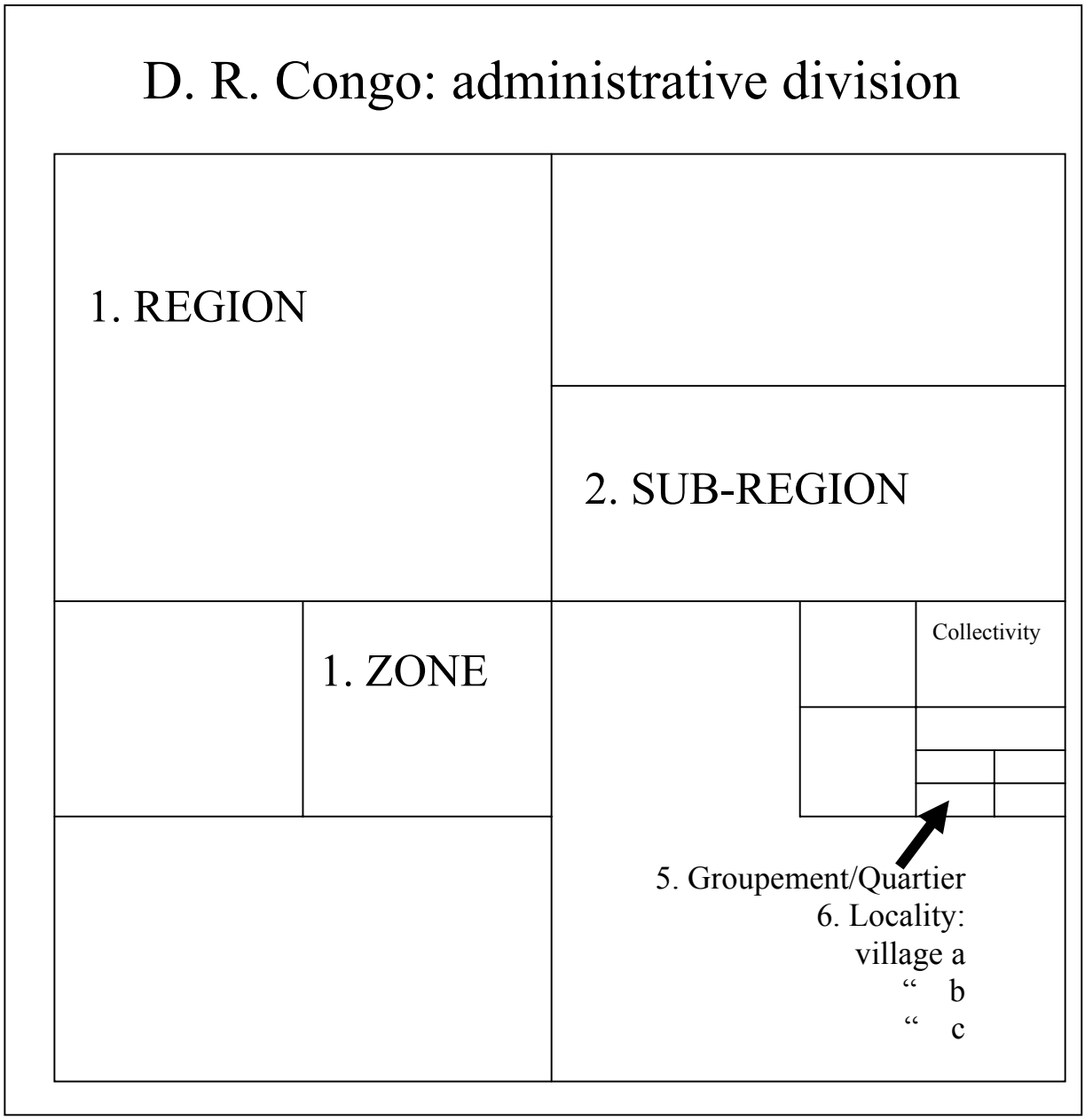
Three Types of Risk Maps

- Scenario mapping
- Potential loss mapping
- Annual risk mapping

2.3.14. Potential Loss, Map

2.3.15. Keep the data disaggregated

KEEP THE DATA DISAGGREGATED ACCORDING TO THE COUNTRY'S ADMINISTRATIVE DIVISION



FROM ASSESSMENT TO PLANNING

The Participatory Approach

1. Discuss 'the Problem'
   with those affected and with those who want to assist in solving it (i.e. *the stakeholders*)

2. See how much of the problem can be related to
   - Hazards
   - Vulnerabilities
   - Capacities
   - Expectation

3. See with the stakeholders what to address:
   - because it is MORE SECURE
   - because it is EASIER to fix