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Mexico's Experience on Emergency Response, Evacuation Planning and Shelter Management



***National Center for
Disaster Prevention
(CENAPRED)***

Mexico

Ministry of the Interior

May, 2011

Prof. Marcos Hernandez



Increasing Vulnerability



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Numbers

Mexico's surface: 1,964,375 km²

Republic: 31 States & 1 FD

Federal District's surface: 1,479 km²

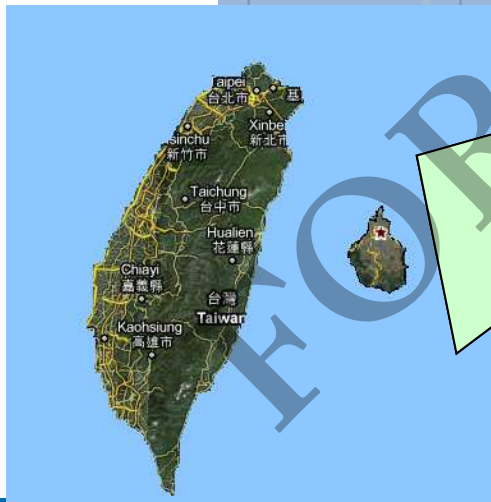
Population of Mexico: 112,336,538

Population of the FD: 8,851,080

With surrounding areas: **> 20 million**

Taiwan's surface: 36.000 km²

Taiwan's population: **22,400,000 (2001)**



Disasters cannot be considered as a divine action nor is it produced by the force of mother nature; **disasters are not natural** they are mainly a consequence of physical and social vulnerability which is basically man-made

Main Hazards in Mexico



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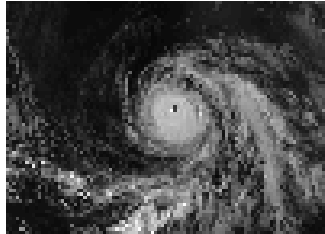
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HURRICANES

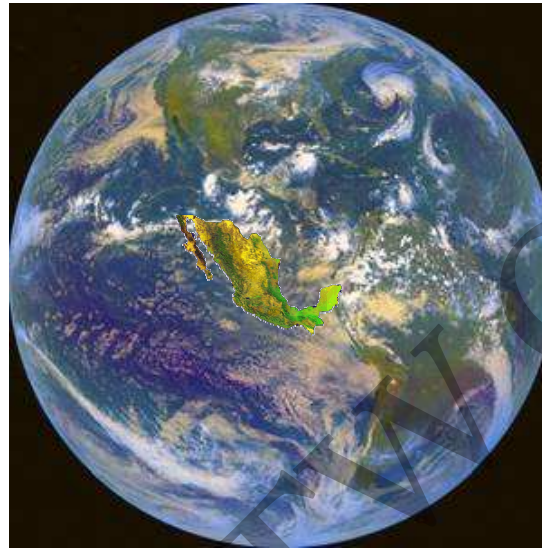


VOLCANOES



EARTHQUAKES

OTHER PHENOMENA:
Land slides, forest fires
droughts, etc.



**Disaster are the product of incorrect policies, measures
and actions taken by the society and its governments.**

**A disaster does not occur ...
a disaster results !**

Risk agenda and exposure to phenomena



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	January	February	March	April	May	June	July	August	September	October	November	December
Hurricanes	Green	Green	Green	Green	Yellow	Red	Red	Red	Red	Red	Yellow	Green
Floods	Yellow	Yellow	Green	Green	Yellow	Red	Red	Red	Red	Red	Yellow	Green
Winter systems	Red	Red	Yellow	Green	Green	Green	Green	Green	Green	Green	Red	Green
Droughts	Yellow	Yellow	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Yellow	Yellow
Forest Fires	Green	Red	Red	Red	Red	Yellow	Yellow	Green	Green	Green	Green	Green
Earthquakes	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Tsunamis	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Volcanoes	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Landslides	Yellow	Yellow	Yellow	Yellow	Yellow	Red	Red	Red	Red	Red	Yellow	Yellow
Chemical accidents	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow



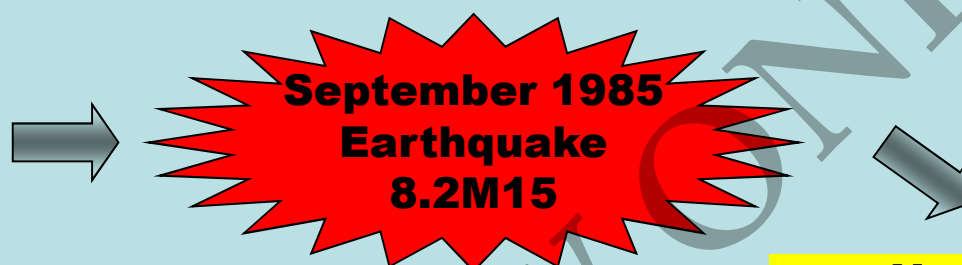
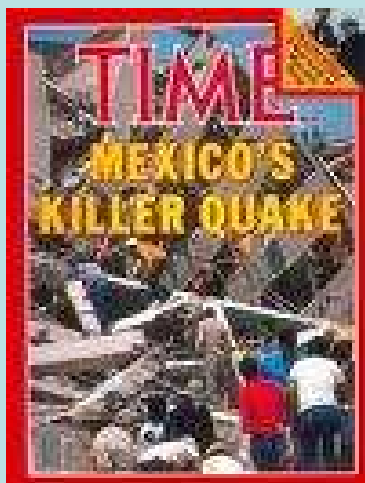
phenomena	Area (km ²)	% of the territory	Inhabitant (millions)
Rain, hurricanes and floods	815'353	41%	31.3
Earthquakes	540'067	27%	31.0
Freezing	633'827	32%	21.3
Droughts	573'300	29%	21.2
Fires	747'574	37%	28.4

National System for Civil Protection in Mexico



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**September 1985
Earthquake
8.2M15**

**National
Commission for
Reconstruction
October 9, 1985**

**Bases for the Establishment of
the National System for Civil
Protection in Mexico
6/MAYO/1986**

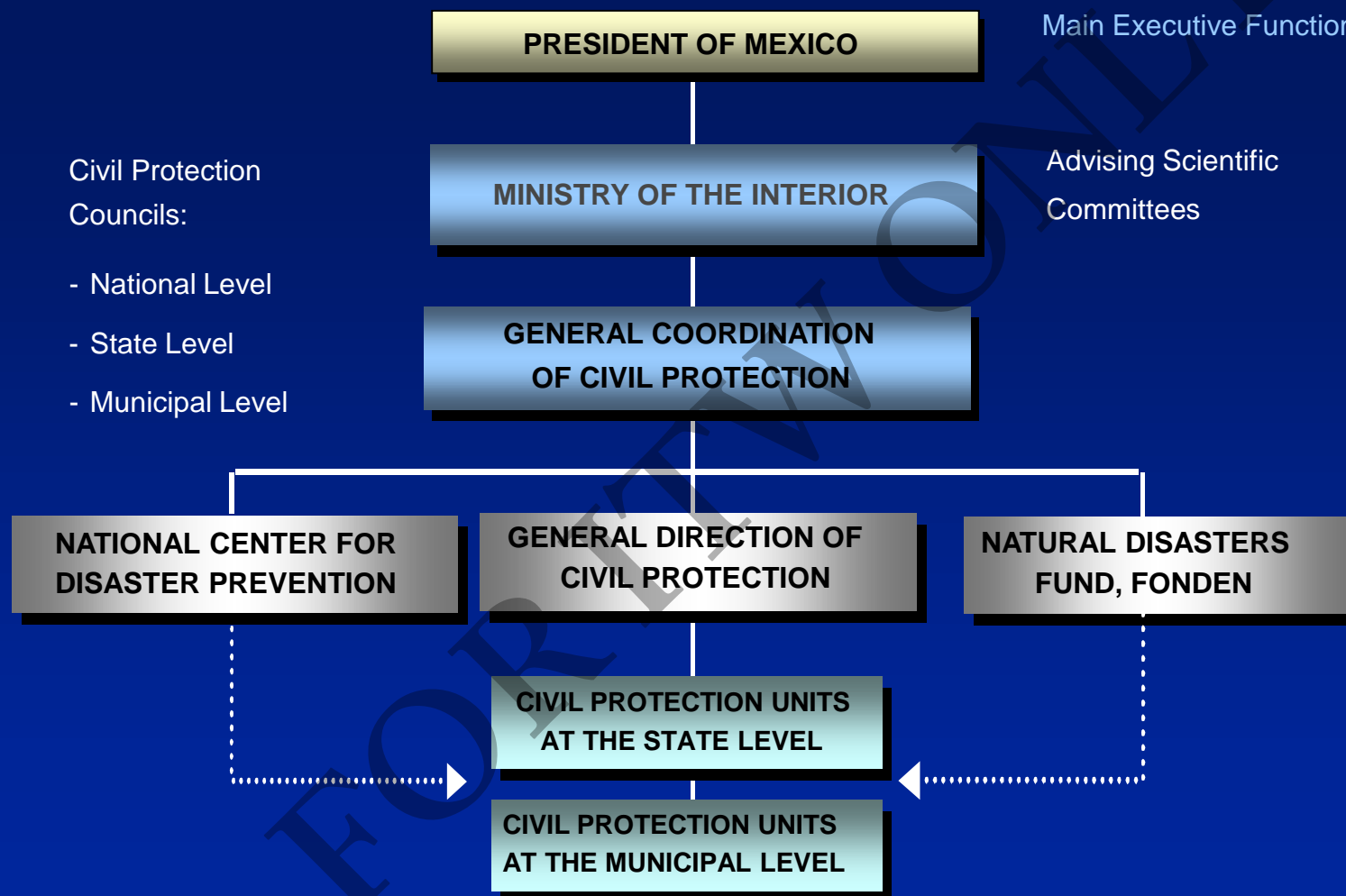


National Framework in Mexico for Disaster Management



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Mexican Institutions Which Participate in Evacuation Planning and Shelter Management

SEDENA SECRETARÍA DE LA DEFENSA NACIONAL	PGR PROCURADURÍA GENERAL DE LA REPÚBLICA	SSP SECRETARÍA DE SEGURIDAD PÚBLICA	SEP SECRETARÍA DE EDUCACIÓN PÚBLICA	SRA SECRETARÍA DE LA REFORMA AGRARIA
SEGOB SECRETARÍA DE GOBERNACIÓN	SFP SECRETARÍA DE LA FUNCIÓN PÚBLICA	SEMAR SECRETARÍA DE MARINA	SEDESOL SECRETARÍA DE DESARROLLO SOCIAL	SAGARPA SECRETARÍA DE AGRICULTURA, GANADERÍA, DESARROLLO RURAL, PESCA Y ALIMENTACIÓN
SE SECRETARÍA DE ECONOMÍA	SRE SECRETARÍA DE RELACIONES EXTERIORES	SHCP SECRETARÍA DE HACIENDA Y CRÉDITO PÚBLICO	SALUD SECRETARÍA DE SALUD	PRESIDENCIA OFICINA DE LA PRESIDENCIA DE LA REPÚBLICA
SCT SECRETARÍA DE COMUNICACIONES Y TRANSPORTES	SECTUR SECRETARÍA DE TURISMO	SENER SECRETARÍA DE ENERGÍA	STPS SECRETARÍA DEL TRABAJO Y PREVISIÓN SOCIAL	SEMARNAT SECRETARÍA DE MEDIO AMBIENTE Y RECURSOS NATURALES



CRUZ ROJA MEXICANA

Groups of Volunteers

Ministries of the Interior, Defense, Navy, Public Safety, Social Development, Energy, Health, Environment and Natural Resources, Communications and Transportation, Public Education, Finances, Mexican Red Cross, etc.



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Disaster Impact in Mexico 1980-2009



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Period	People Killed	Damage Amount (Millions of US Dollars)	Annual Death Average	Annual Damage Average (Millions of US Dollars)
1980-1999	10,114	14,027	506	701
2000-2010*	1,702	13,461	170	1,346
1.- Para el periodo 1980-1999 se calcularon los daños directos en 10,390 millones de dólares y se aplicó un factor del 35% para estimar los efectos indirectos en dicho periodo conforme a estudios de la CEPAL. El total de daños estimado fue de 14,027 millones de dólares.				
2.- Para el periodo 2000-2010 únicamente se cuantificaron los daños y muertes ocasionadas por fenómenos de origen natural (hidrometeorológicos y geológicos)				
*/ El 2010 muestra cifras preliminares sujetas a revisión				

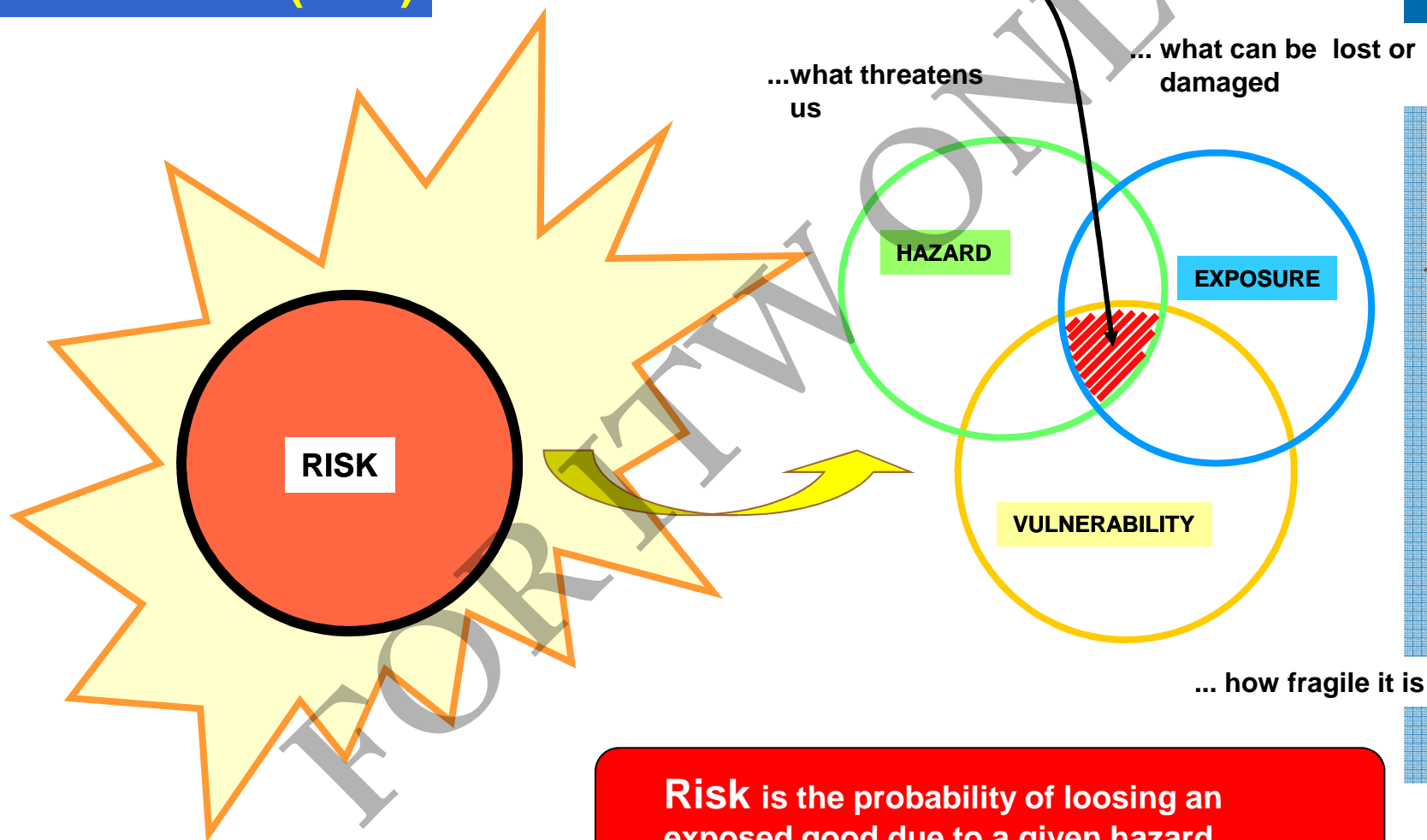
These losses mostly impacted **more unprotected and vulnerable groups** of the population.



Risk

$$R = f(\text{Hazard} * \text{Exposure} * \text{Vulnerability})$$

DISASTER = f (Risk)



Risk is the probability of losing an exposed good due to a given hazard



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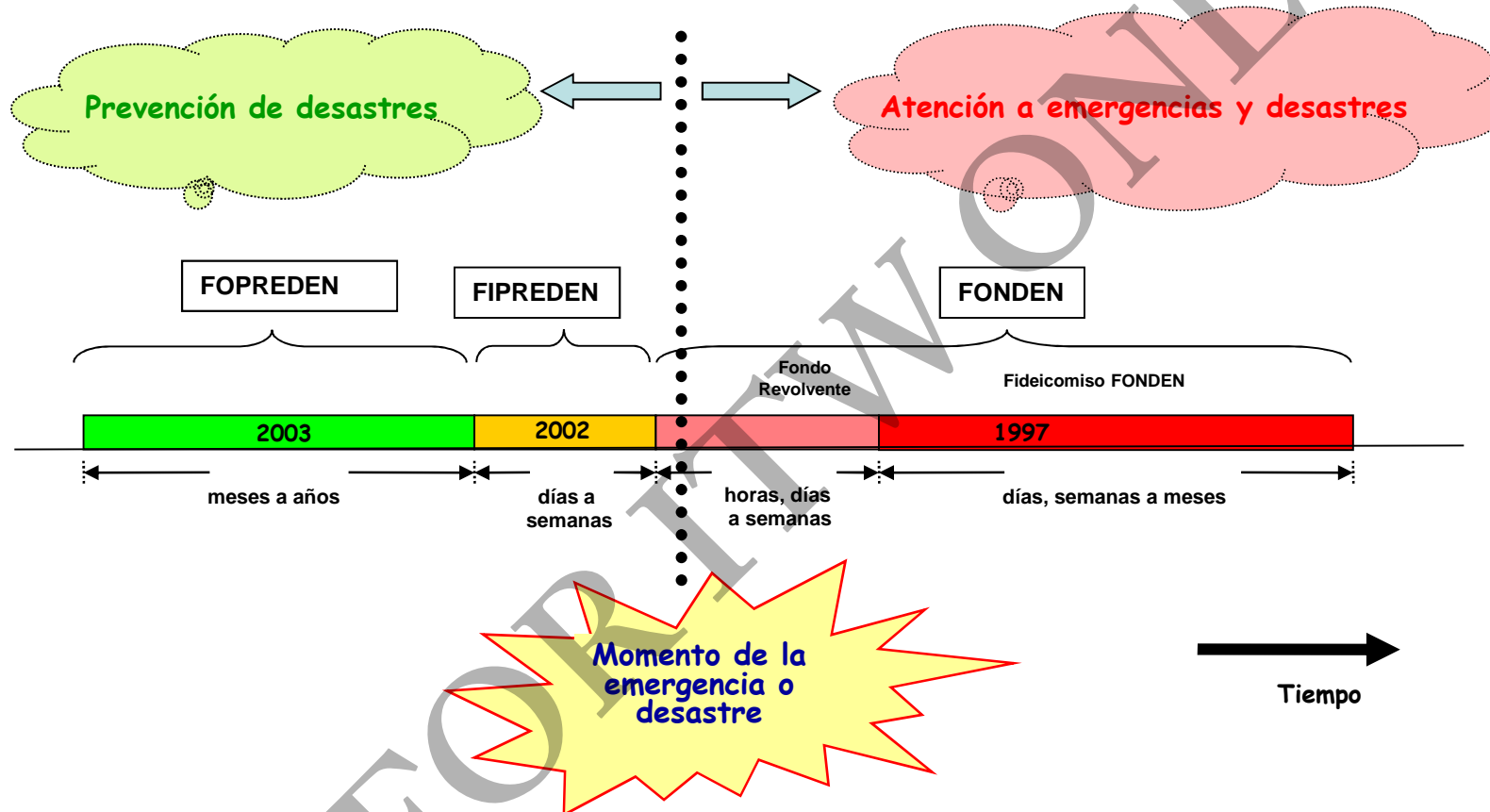
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Structure of Emergency and Disaster Funds



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+ Catastrophic Bonds which financially covers us for major seismic and hydrometeorologic disasters



Evacuation Planning

Evacuation planning is the preventive plan for moving people to safe areas (less risk) in an organized, structured and coordinated way.



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Evacuation Planning

Evacuation plans must be specific, according to the place where they are instrumented and to the incidence of phenomena. Examples: Popo & PERE.



The development of these plans are normally executed by Civil Protection staff.



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Desired behavior of people for a timely evacuation:

- Create behavior, safety and self-control habits
- Avoid panic in emergency situations
- Try not to be a hero
- Do not obstruct evacuation routes
- Internal and external communication
- Obey instructions
- Etc.



Success of an evacuation plan largely depends on training of both response groups and population.



Decision Taking for Evacuation

- **Focus on the situation**
- **Identify the problem**
- **Determine objectives**
- **Identify necessary resources**
- **Develop an action plan**
- **Take related decision**
- **What has to be decide?**
- **What is the right moment to evacuate?**
- **Who must participate in the procedures?**
- **Is transportation enough for evacuation?**
- **What to do in case the plan fails?**

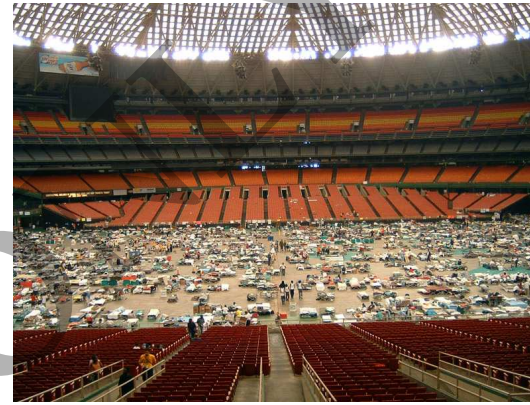
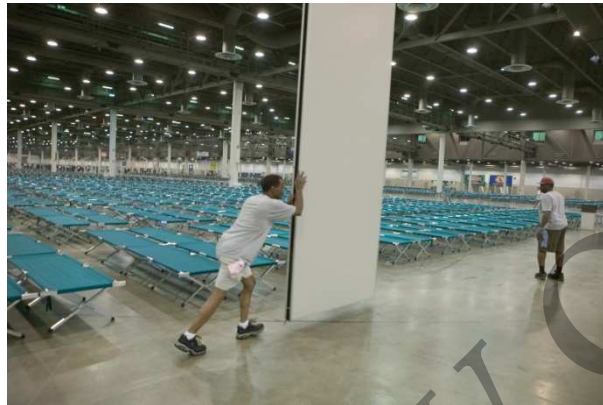


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Example of a Huge Shelter: Louisiana



Hurricane "Katrina", August 2005



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Temporary Shelter Management Techniques (Not Refuge)



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Fixed
Shelters

- Schools
- Churches
- Auditoriums

Types
of
Shelters



Long-time
Shelters

Camps with
Tents

Outdoors shelters
with services, to be
left as soon as
possible



- Improvised services
- Prefabricated materials
- Used for a long time

Stages in Temporary Shelter Management



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Close and Evaluation

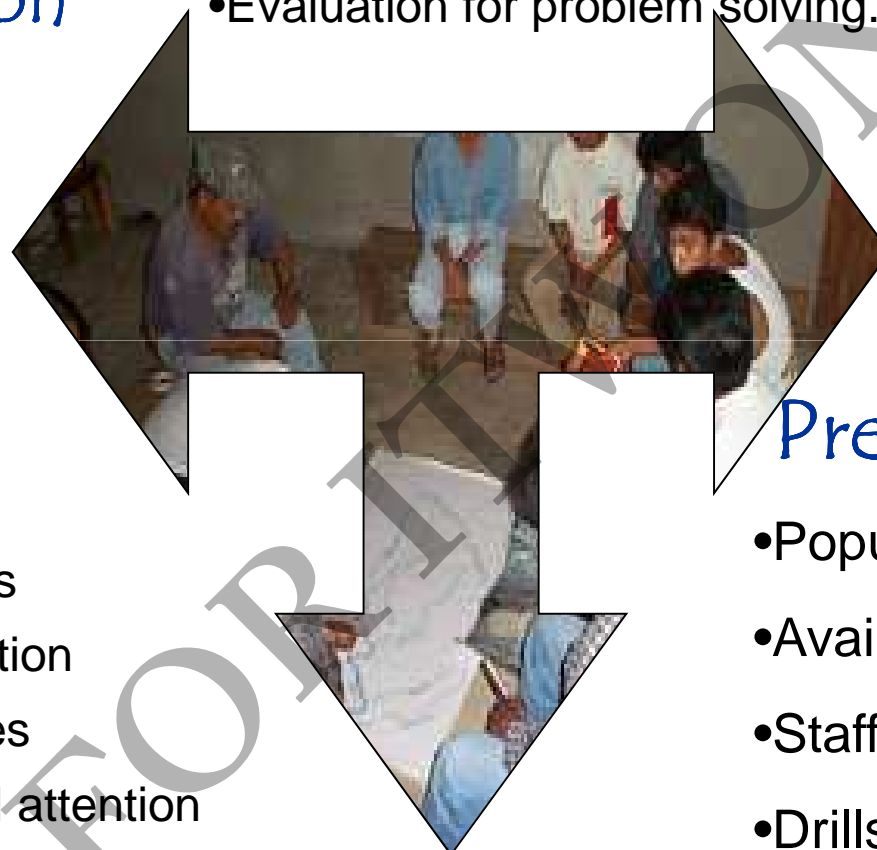
- Do people have where to go?
- Is it necessary to close the shelter?
- Evaluation for problem solving.

- Notification
- Distribution
- Registration
- Basic services
- Medical attention
- Social services
- Psychological attention

Preparedness

- Population counting
- Available facilities
- Staff training
- Drills & Exercises

Operation



The Mexican National Defense Ministry (SEDENA) Providing Shelters

According to Civil Protection related regulations, SEDENA gives support when disasters occur:

- **Medical and dentist services**
- **Vaccines**
- **Electric appliances repairing**
- **Haircuts**
- **Maintenance services**
- **Plumbing, masonry & ironworks services**



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The Mexican National Defense Ministry (SEDENA) Providing Shelters



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Results for each activity	2007	2008	2009	Total
Beneficiary persons	52,294	28,370	0	80,664
Medical and dentist consultation	19,445	7,571	0	27,016
Vaccines	153,875	81,696	80,172	315,743
Medicines	16,406	6,177	0	22,583
Haircuts	10,790	5,233	0	16,023
Square meters of painting	14,243	11,960	611,090	637,293
Repaired electric appliances	3,368	2,110	0	5,478

People's Participation



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GOVERNAMENTO ITALIANO
PROTEZIONE CIVILE



Examples of Co-participation and Shared Responsibility



Taiwan's Efforts for a Prevention and Self-Protection Culture



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CENAPRED's Contribution to Mitigation, Preparedness, Response and Recovery



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- *Warn on the risks of phenomena*
- *Identify the vulnerability condition*
- *Identify risk conditions*
- *Propose mitigation measures*
- *Evaluate the impact of disasters*
- *Train on Civil Protection and Disaster Prevention subjects*
- *Disseminate a Culture of Prevention*



Products:

- *National Risk Atlas*
- *Mexican Earthquake Network*
- *Training (Popo and PERE)*
- *Earthquake-resistant Structures*

Products:

- *Monitoring of Active Volcanoes*
- *Early Warning System for TC*
- *Technology Transferring*
- *Scientific-Technical Advisory*

Thank you very much!



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