



MIDDLE EAST TECHNICAL UNIVERSITY
Disaster Management Implementation and Research Center

Disaster Management Strategies: Financial Perspectives/TCIP

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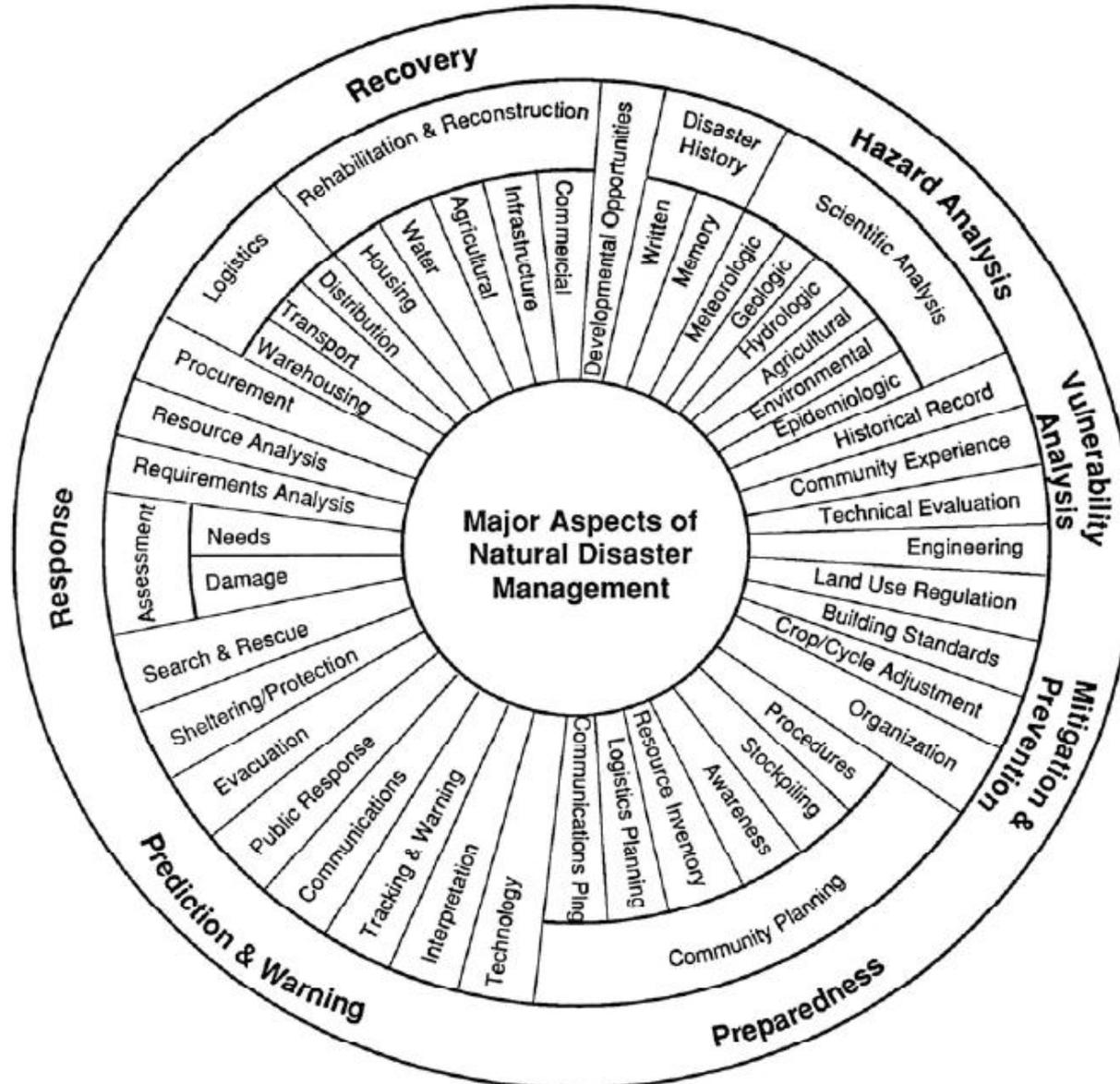
06.05.2014, IAM-Ankara

Outline

- Disaster Management
- Disaster Statistics 2012
- Insurance / Wrap up



Disaster Management Cycle / Disaster Continuum



PROFESSIONS ACTIVE IN VARIOUS PHASES OF DISASTER

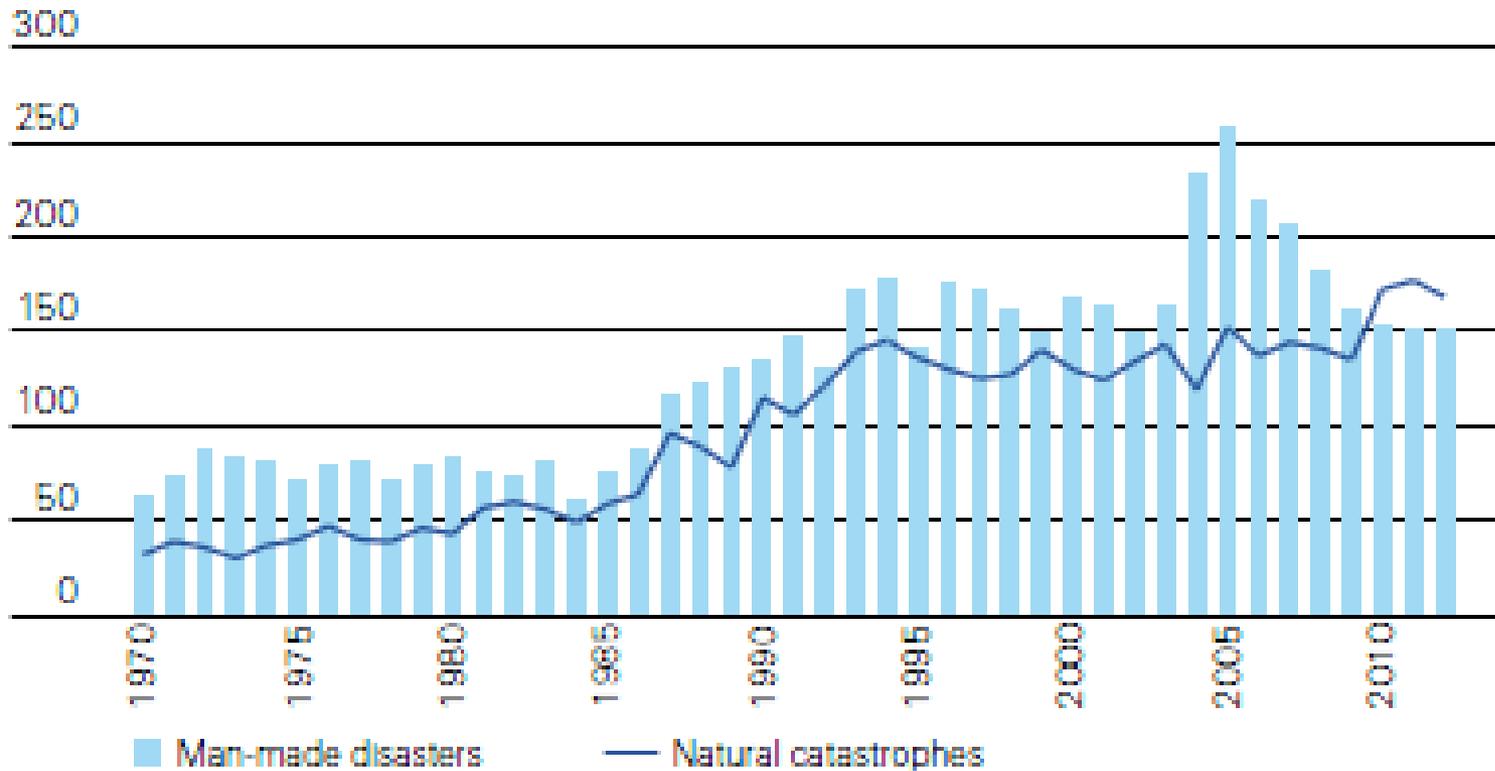
Types of Disasters	Prevention	Mitigation	Preparedness Planning	Emergency	Reconstruction
Drought	Climatologists Agronomists	Agronomists Agricultural Engineers & Extensionists Water Engineers	Water Engineers Agronomists Nutritionists	Nutritionists Physicians Nurses Social Workers	Agronomists Engineers Water Engineers
Earthquakes		Architects Engineers Contractors	Architects Engineers Physicians Nurses	Physicians Nurses Social Workers	Financial Specialists Architects Engineers Contractors
Floods	Engineers Rangeland Managers	Engineers Rangeland Managers	Engineers Planners		Architects Engineers Planners
Hurricanes		Engineers Architects Contractors Agronomists	Planners Nurses Physicians Meteorologists	Physicians Nurses	Engineers Architects Contractors Agronomists
Volcanoes		Planners	Planners		Planners
Insect Infestation	Entomologists Climatologists Meteorologists	Entomologists Agricultural Extensionists Agronomists	Chemical Engineers	Pesticide Applicators	Entomologists Agricultural Extensionists Agronomists

WB reports indicate:

- The economic losses from disasters over the past 30 years are estimated at 3.5 USD tn.
- In 2011, estimated losses of around 380 USD bn occurred .
- Floods in Thailand cost the equivalent of 5 % of the country's Gross Domestic Product (GDP)
- Economic losses of Japan's earthquake and tsunami were estimated as equivalent to 4 % of GDP.
- The economic impact of the Haiti earthquake in 2010 was equal to 120 % of its GDP
- The 2004 Grenada hurricane caused losses equivalent to more than 200 % of GDP.

- Mitigate  save many!
- Mitigate  response faster/better
- Mitigate  recover faster/stronger

Number of events 1970-2012

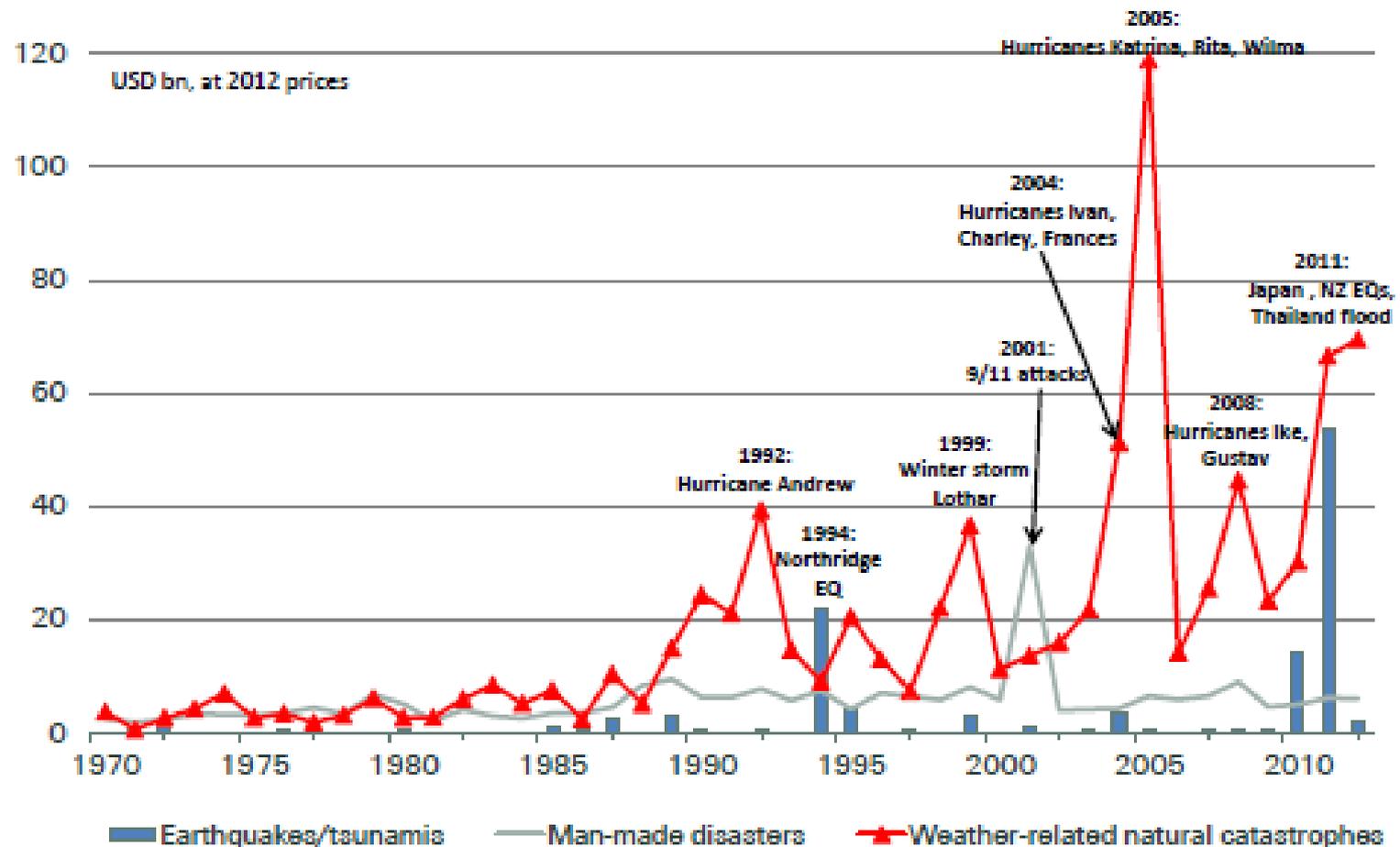


Source: Swiss Re Economic Research & Consulting

2012 Economic Losses by Region (Source: Swiss Re)

Region	No. of events	Victims	Insured loss in USD bn	Total Loss in USD bn	% of GDP
North America	43	560	64.6	118.5	0.68 %
Latin America and Caribbean	30	1167	0.9	4.2	0.08 %
Europe	33	1480	5.5	26.8	0.13 %
Africa	53	2300	0.2	1.5	0.08 %
Asia	115	7177	3.4	30.5	0.13 %
Oceania	7	97	0.3	1.1	0.07 %
Seas/Space	37	1148	2.4	3.1	-
Total	318	13929	77.2	185.7	0.13 %

Insured catastrophe losses 1970-2012



Source: Swiss Re, sigma No2/2013

	Number	in %	Victims ²⁵	in %	Insured loss ²⁶ (In USD m)	in %
Natural catastrophes	168	52.8%	8 948	64.2%	71 278	92.3%
Floods	63		2 979		2 712	
Storms	61		3 129		54 065	
Earthquakes	15		717		1 787	
Droughts, bush fires, heat waves	8		139		11 524	
Cold, frost	13		1 806		250	
Hail	5				900	
Other natural catastrophes	3		178			
Man-made disasters	150	47.2%	4 981	35.8%	5 960	7.7%
Major fires, explosions	40	12.7%	1 367	9.8%	2 933	3.8%
Industry, warehouses	19		497		1 137	
Oil, gas	12		94		1 696	
Department stores						
Other buildings	5		454			
Other fires, explosions	4		322		100	
Aviation disasters	11	3.5%	449	3.2%	557	0.7%
Crashes	8		449		142	
Explosions, fires						
Damage on ground						
Space	3				415	
Maritime disasters	43	13.5%	1 701	12.2%	2 208	2.9%
Freighters	4		14		224	
Passenger ships	26		1 679		719	
Tankers	3		6		130	
Drilling platforms	6		2		929	
Other maritime accidents	4				206	
Rail disasters (incl. cableways)	5	1.6%	141	1.0%		0.0%
Mining accidents	2	0.6%	66	0.5%		0.0%
Collapse of buildings/bridges						
Miscellaneous	49	15.4%	1 257	9.0%	262	0.3%
Social unrest	15		152		116	
Terrorism	25		785			
Other miscellaneous losses	9		320		147	
Total	318	100.0%	13 929	100.0%	77 238	100.0%

The 40 most costly insurance losses (1970-2012, Swiss Re)

Insured loss ²⁷ (in USD m, Indexed to 2012)	Victims ²⁸	Date (start)	Event	Country
76254 ²⁹	1 836	25.08.2005	Hurricane Katrina: floods, dams burst, damage to oil rigs	US, Gulf of Mexico, Bahamas, North Atlantic
35 735	19 135	11.03.2011	Earthquake (M _w 9.0) triggers tsunami; aftershocks	Japan
35 000 ³⁰	237	24.10.2012	Hurricane Sandy: floods	US et al
26 180	43	23.08.1992	Hurricane Andrew: floods	US, Bahamas
24 349	2 982	11.09.2001	Terror attack on WTC, Pentagon and other buildings	US
21 685	61	17.01.1994	Northridge earthquake (M 6.6)	US
21 585	136	06.09.2008	Hurricane Ike: floods, offshore damage	US, Caribbean: Gulf of Mexico et al
15 672	124	02.09.2004	Hurricane Ivan: damage to oil rigs	US, Caribbean: Barbados et al
15 315	815	27.07.2011	Floods caused by heavy monsoon rains	Thailand
15 315	181	22.02.2011	Earthquake (M _w 6.3), aftershocks	New Zealand
14 772	35	19.10.2005	Hurricane Wilma: floods	US, Mexico, Jamaica, Haiti et al
11 869	34	20.09.2005	Hurricane Rita: floods, damage to oil rigs	US, Gulf of Mexico, Cuba
11 000 ³¹	123	15.07.2012	Drought in the Corn Belt	US
9 784	24	11.08.2004	Hurricane Charley: floods	US, Cuba, Jamaica et al
9 517	51	27.09.1991	Typhoon Mireille/No 19	Japan
8 467	71	15.09.1989	Hurricane Hugo	US, Puerto Rico et al
8 421	562	27.02.2010	Earthquake (M _w 8.8) triggers tsunami	Chile
8 205	95	25.01.1990	Winter storm Darla	France, UK, Belgium, Netherlands et al
7 994	110	25.12.1999	Winter storm Lothar	Switzerland, UK, France et al
7 453	354	22.04.2011	Major storm with wind up to 340km/h, over 355 tornadoes	United States (Alabama et al)
7 198	155	20.05.2011	Major tornado outbreak, storms with winds up to 405km/h	United States (Missouri et al)
6 748	54	18.01.2007	Winter storm Kyrill: floods	Germany, UK, Netherlands, Belgium et al
6 264	22	15.10.1987	Storm and floods in Europe	France, UK, Netherlands et al
6 255	38	26.08.2004	Hurricane Frances	US, Bahamas
5 952	55	22.08.2011	Hurricane Irene, extensive flooding	United States et al
5 607	64	25.02.1990	Winter storm Vivian	Europe
5 568	26	22.09.1999	Typhoon Bart/No 18	Japan
5 263	-	04.09.2010	Earthquake (M _w 7.0), over 300 aftershocks	New Zealand
4 972	600	20.09.1998	Hurricane Georges: floods	US, Caribbean
4 673	41	05.06.2001	Tropical storm Allison: floods	US
4 622	3 034	13.09.2004	Hurricane Jeanne: floods, landslides	US, Caribbean: Haiti et al
4 357	45	06.09.2004	Typhoon Songda/No 18	Japan, South Korea
4 000	45	02.05.2003	Thunderstorms, tornadoes, hail	US
3 890	70	10.09.1999	Hurricane Floyd: floods	US, Bahamas, Columbia
3 775	59	01.10.1995	Hurricane Opal: floods	US, Mexico, Gulf of Mexico
3 724	6 425	17.01.1995	Great Hanshin earthquake (M 7.2) in Kobe	Japan
3 489	25	24.01.2009	Winter storm Klaus, wind up to 170km/h	France, Spain
3 308	45	27.12.1999	Winter storm Martin	Spain, France, Switzerland
3 119	246	10.03.1993	Blizzard, tornadoes, floods	US, Canada, Mexico, Cuba
2 947	38	06.08.2002	Severe floods	UK, Spain, Germany, Austria et al

Financial Management of Disaster Impacts

- Returning to better conditions than pre-disaster conditions, in the shortest possible period of time after a disaster occurs
- Optimum use of scarce resources

Mainly three types of effects are observed:

1- Direct

2- Indirect

3- Secondary = 1+ 2

Direct effects:

- Structural damage
- Wage losses
- Damage to infrastructure (e.g. railways, highways, telecommunication)
- Damage to public goods (e.g. schools, **hospitals**)
- Production losses (e.g. loss of cattle, shutdown of small businesses)
- Expenses for emergency sheltering

Indirect effects:

Observed as a result of direct effects.

- Reduction in production demand
- Changes in GDP per capita
- Increased transport cost

Secondary effects:

Observed after a while of disaster occurrence. Combined direct + indirect effects.

- Epidemics
- Budget deficit
- Changes in the environment (e.g. nuclear leak, effect of oil pipe leakage in the agricultural products)
- Import / export

Some figures on 1999 Marmara Earthquake

- 5-7 % of GDP around 20 USD bn in 45 seconds!
- At sectoral level:
 - Industrial facilities: 2 USD bn
 - Structure: 5 USD bn
 - Railways: 1 USD bn
 - Highways/roads: 0.2 USD bn
 - Ports: 0.2 USD bn
 - Telecommunication: 75 USD m
 - Energy: 3 USD m

Economic mitigation

Mitigation of the impacts of hazards can be adopted through normal planning (Ministry of Development / Former State Planning Organisation-SPO) are:

- **Adjusting normal development programs to reduce losses.**

For example, certain varieties of crops that are more wind- or flood-resistant can often be introduced in areas prone to floods or cyclones.

- **Developing "disaster resistant" economic activities within a region.**

For example:

Coconut palms are more suitable than citrus or other fruit trees in cyclone-prone coastal areas.

- ❖ Efforts should be made to identify and to encourage the development of enterprises that are less vulnerable to the hazards.

- **Economic Incentives**

Governments are often able to extend a number of economic incentives to people and organizations in order to encourage development away from hazardous areas.

For example: loans, grants, taxation, technical assistance

- **Economic Mitigation**

Aim: to reduce the disaster's impact on the economy and on the economic well-being of the disaster survivors.

- Strengthen those sectors of the economy that are particularly vulnerable to disasters,
- Diversify the economy,
- Introduce or expand "disaster-resistant" economic activities, and
- Spread or relocate economic activities to less vulnerable areas so that not all the principal enterprises would be affected at the same time.

Insurance or other economic risk-spreading activities are also possible.

- **Insurance can be a major tool to mitigate disaster losses.**

Insurance

- Effective way of mitigation
- **Risks are insured if:**
 - They can be named/defined
 - quantitative

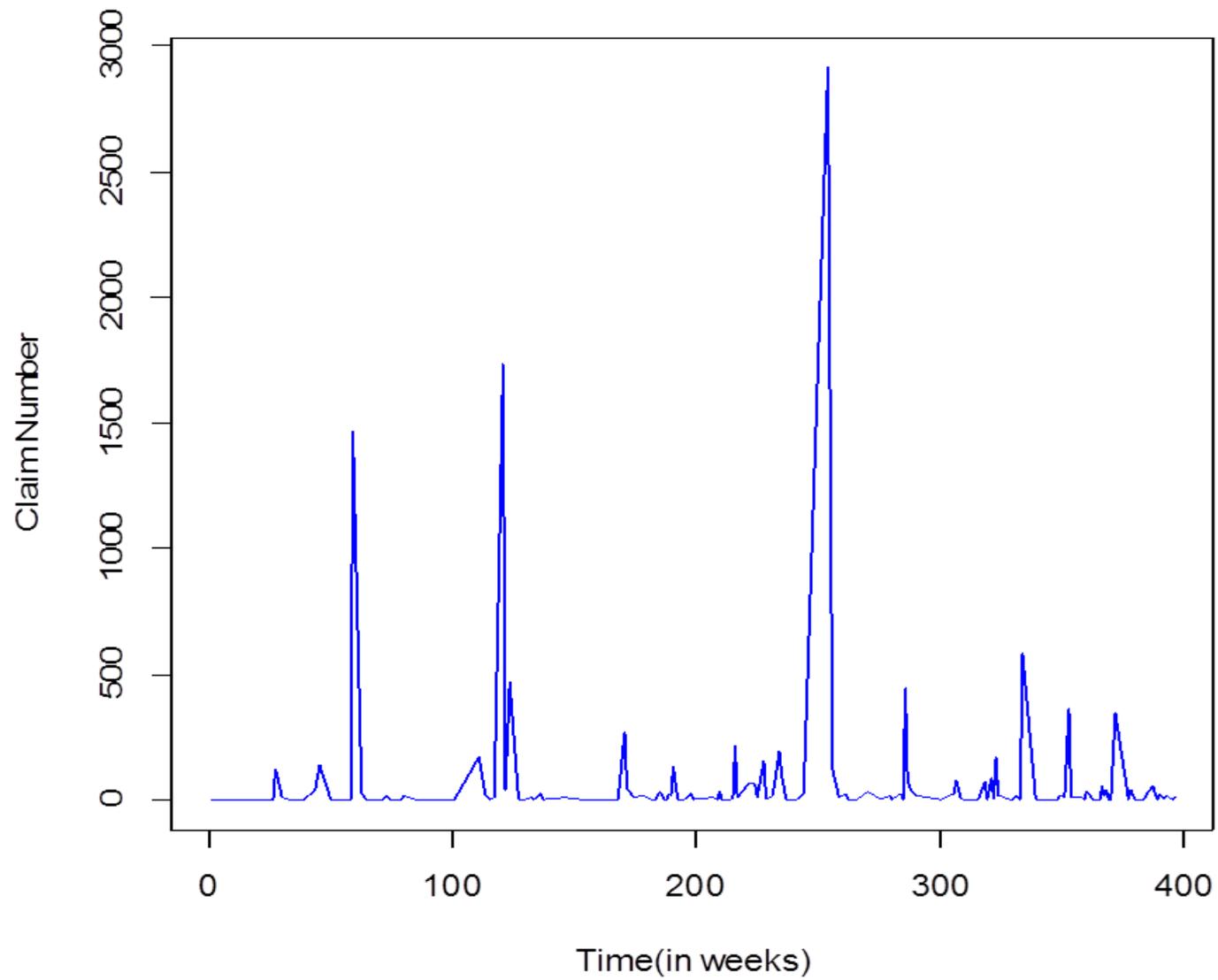
- In most of the developed countries, there exist well-developed insurance culture
 - USA, France, Norway, New Zealand, Japan
- One of the best practices:
 - The Turkish Catastrophe Insurance Pool (TCIP/DASK)
3P/ PPP in an emerging economy

TCIP in Figures

As of May 2014:

- The total number of policies: 6,2 million
- Number of earthquakes generating claims: 432
- Number of claims: 20,730
- Total paid claims: 157 million TL
- Penetration rate: 35.6 %

<http://www.tcip.gov.tr/>



The Black Swan

Taleb, N.N. (2007). *The Black Swan: The Impact of the Highly Improbable*. New York: Random House.

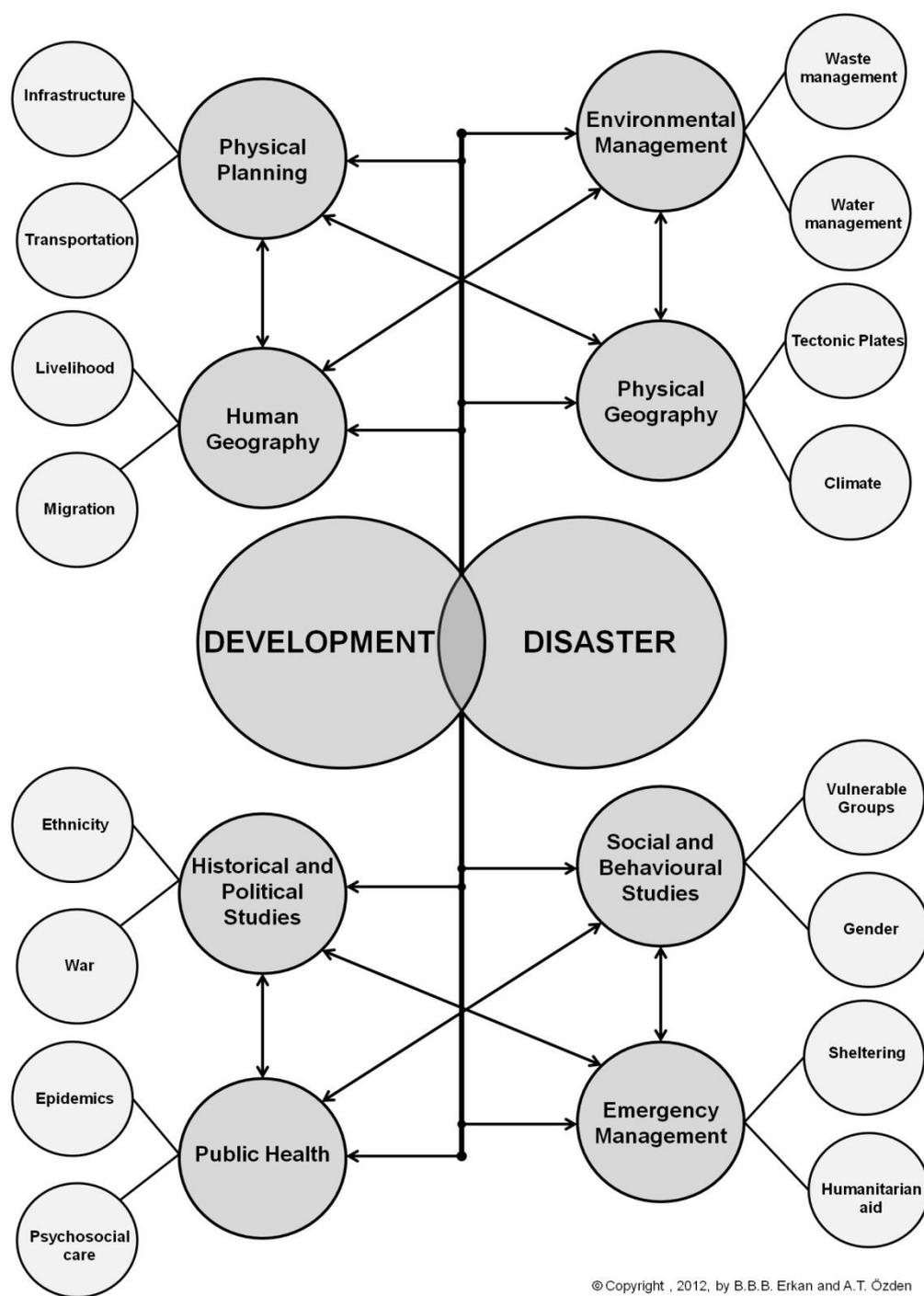
- Comes as a surprise
- Major impact

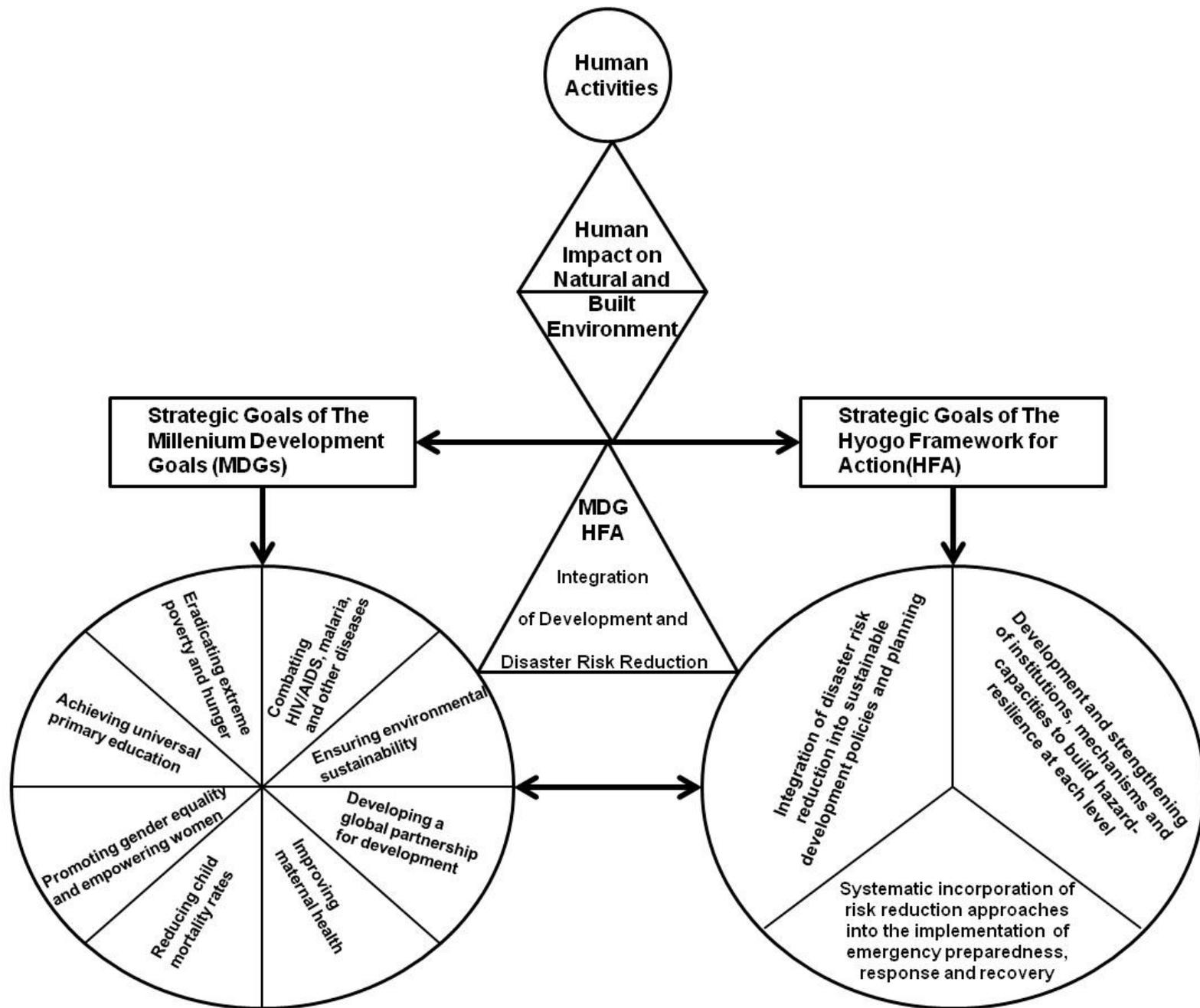
Integrated Contemporary Disaster Risk Management

- Mitigation/Planning/Response/Recovery
- Many sectors are affected: Industry, Education, Health, Justice, Construction, Environment...
- Bottom-up / Decentralised OR Top-down / Centralised
- An event changes all!
- Disasters or / and Development?

Very crucial

- Robust and Sustainable Statistics / Data Collection
- Vulnerability and Hazard Analysis by using Data
- Model and estimate --- all models change in time!
- State / Private sector and NGOs act together





Thank You!

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- 2- The New Yorker, December 3, 2012.
- 3- The University of Wisconsin Disaster Management Center
- 4- Benson and Clay, 'Understanding the Economic and Financial Impact of Natural Disasters', the World Bank, 2004.
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- 6- Own research work