IMPACT AND RESILIENCE OF NATURAL DISASTER IN INDONESIA

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26 Desember, 2004: Earthquake with 8.9 RS trigerred giant tsunami causing death/ missing 167,540 people (4% of Aceh province populatin)

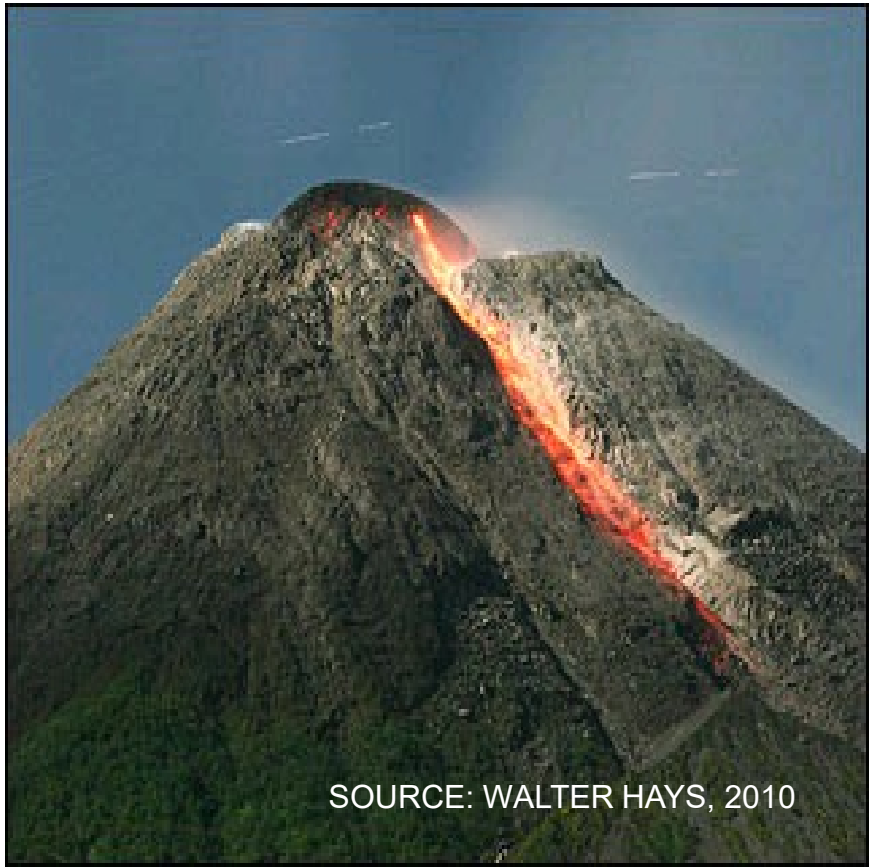
Nias earthquake

(8.7 SR pd 28 Mar 2005; almost : 700 died & 3500 injured).

Padang earthquake

(7.6 RS in 30 Sept, 2009; almost 1200 died, almost 300 injured and about 255.000 house damaged)

Kelud, Merapi and Sinabung volcanos eruption



Definitions:

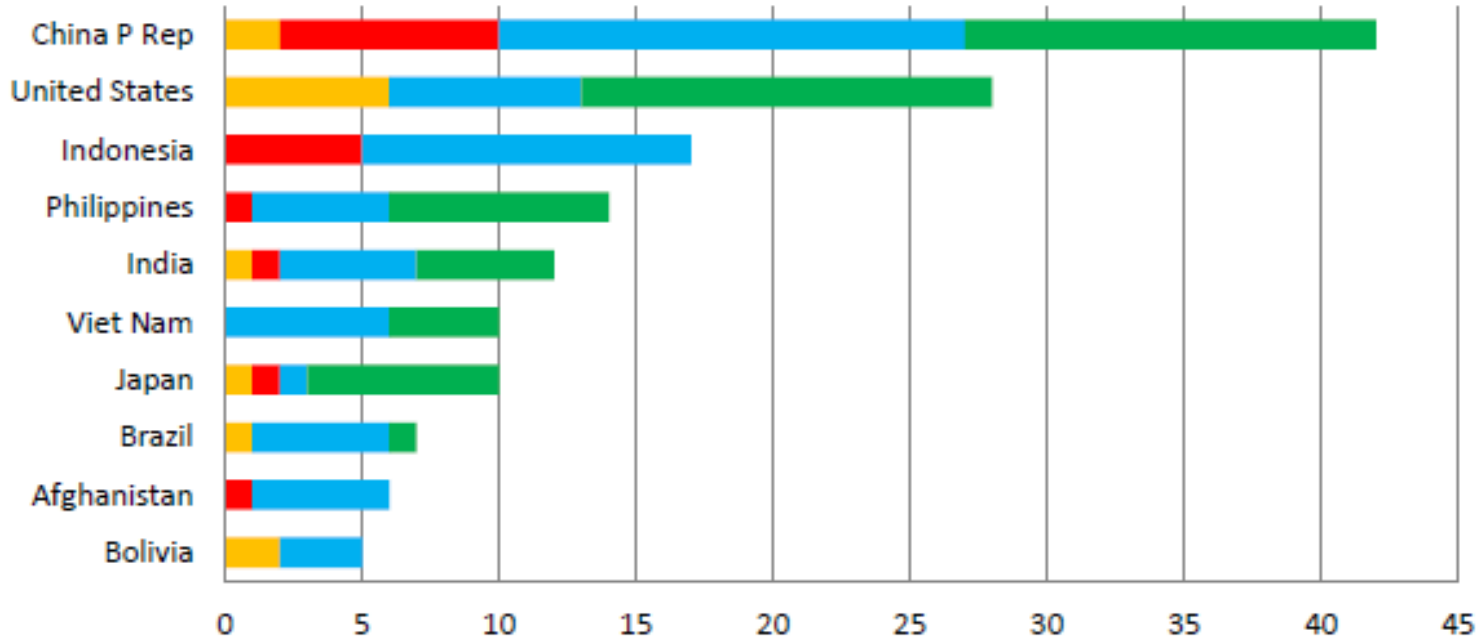
- "A *disaster is the result of a vast ecological breakdown in the relation between humans and their environment, a serious and sudden event (or slow, as in a drought) on such a scale that the stricken community needs extraordinary efforts to cope with it, often with outside help or international aid*" (Noji, Gunn and Lechat)

- "*A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources*" (UNISDR, 2009)

Definition in Act (UU) no. 24/ 2007 (About Disaster Management in Indonesia)

"*Bencana adalah peristiwa atau rangkaian peristiwa yang mengancam dan mengganggu kehidupan dan penghidupan masyarakat yang disebabkan, baik oleh faktor alam dan/atau faktor nonalam maupun faktor manusia sehingga mengakibatkan timbulnya korban jiwa manusia, kerusakan lingkungan, kerugian harta benda, dan dampak psikologis*."

Figure 3 – Top 10 countries by number of reported events in 2013



	Bolivia	Afghanistan	Brazil	Japan	Viet Nam	India	Philippines	Indonesia	United States	China P Rep
Climatological	2		1	1		1			6	2
Geophysical		1		1		1	1	5		8
Hydrological	3	5	5	1	6	5	5	12	7	17
Meteorological			1	7	4	5	8		15	15

Source: Guha-Sapir D, Hoyois Ph.,Below.R.
Annual Disaster Statistical Review 2013:The Numbers and Trends. Brussels: CRED; 2014."

Figure 6 – Top 10 countries by damages in 2013 and distributed by disaster type

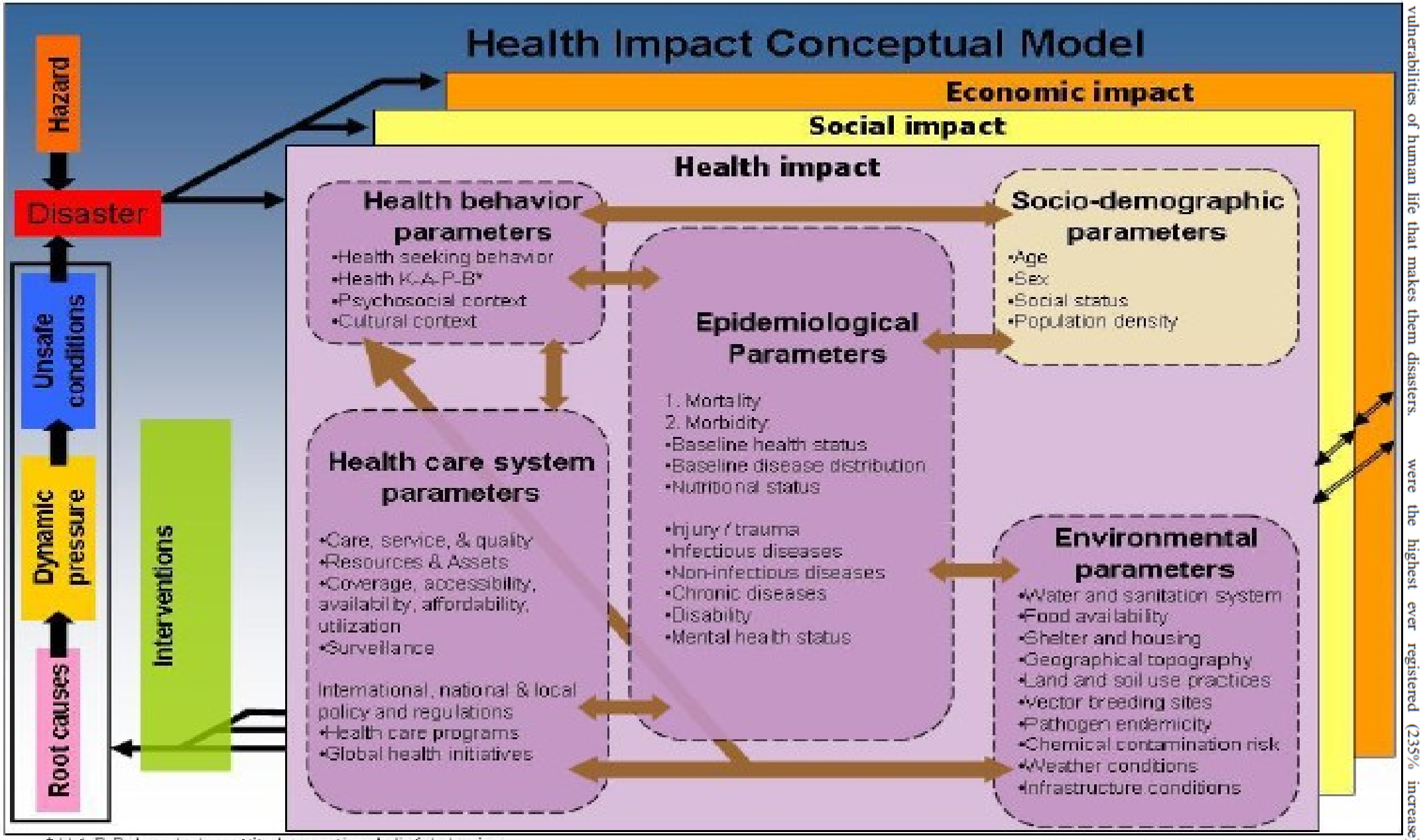
Country	Disaster distribution	Damages (US$ bn.)	Country	Disaster distribution	% of GDP
China P Rep		35.41	Philippines		4.57
Germany		17.70	Cambodia		3.28
United States		17.58	Lao P Dem Rep		1.09
Philippines		12.42	Viet Nam		0.91
Canada		7.11	Niger		0.88
Mexico		5.70	Seychelles		0.73
Indonesia		3.13	Pakistan		0.68
India		2.38	Armenia		0.58
Australia		2.37	Bahamas		0.54
Pakistan		1.60	Namibia		0.51

Source: Guha-Sapir D, Hoyois Ph.,Below.R.
Annual Disaster Statistical Review 2013:The Numbers and Trends. Brussels: CRED; 2014."

INVITED EDITORIAL

Integrated health, social, and economic impacts of extreme events: evidence, methods, and tools

Disasters are rarely natural, hazards always are! Extreme weather events are natural physical phenomena, but it is their interactions with vulnerabilities of human life that makes them disasters. accounted for 57% of total disaster victims in 2011. Fourth, the estimated economic losses from natural disasters are rising in an unprecedented way. They were the highest ever registered (235% increase) in



* K-A-P-B: knowledge, attitude, practice, belief, behavior

Mortality due to volcanoe

Gunung Api	Lokasi	Tanggal Letusan	Korban Jiwa
Merapi	Jawa Tengah	03 November 2010	138
Kelut	Jawa Timur	10 Februari 1990	35
Galunggung	Jawa Barat	05 April 1982	68
Merapi	Jawa Tengah	06 Oktober 1972	29
Kelut	Jawa Timur	26 April 1966	212
Agung	Bali	17 Maret 1963	1,148
Merapi	Jawa Tengah	25 November 1930	1,369
Kelut	Jawa Timur	19 Mei 1919	5,110
Awu	Sulawesi Utara	07 Juni 1892	1,532
Krakatau	Selat Sunda	26 Augustus 1883	36,600
Galunggung	Jawa Barat	08 Oktober 1822	4,011
Tambora	Sumbawa	10 April 1815	71,000+

Source: http://www.indonesia-investments.com

Mortality due to earthquake & tsunami

Pulau	Tanggal	Kekuatan	Korban Jiwa
Sumatra	02 Juli 2013	6.1	42
Sumatra	25 Oktober 2010	7.7	435
Sumatra	30 September 2009	7.6	1,117
Jawa	02 September 2009	7.0	81
Sumatra	12 September 2007	8.5	23
Sumatra	06 Maret 2007	6.4	68
Jawa	17 Juli 2006	7.7	668
Jawa	26 Mei 2006	6.4	5,780
Sumatra	28 Maret 2005	8.6	1,346
Sumatra	26 Desember 2004	9.2	283,106

Source: http://www.indonesia-investments.com

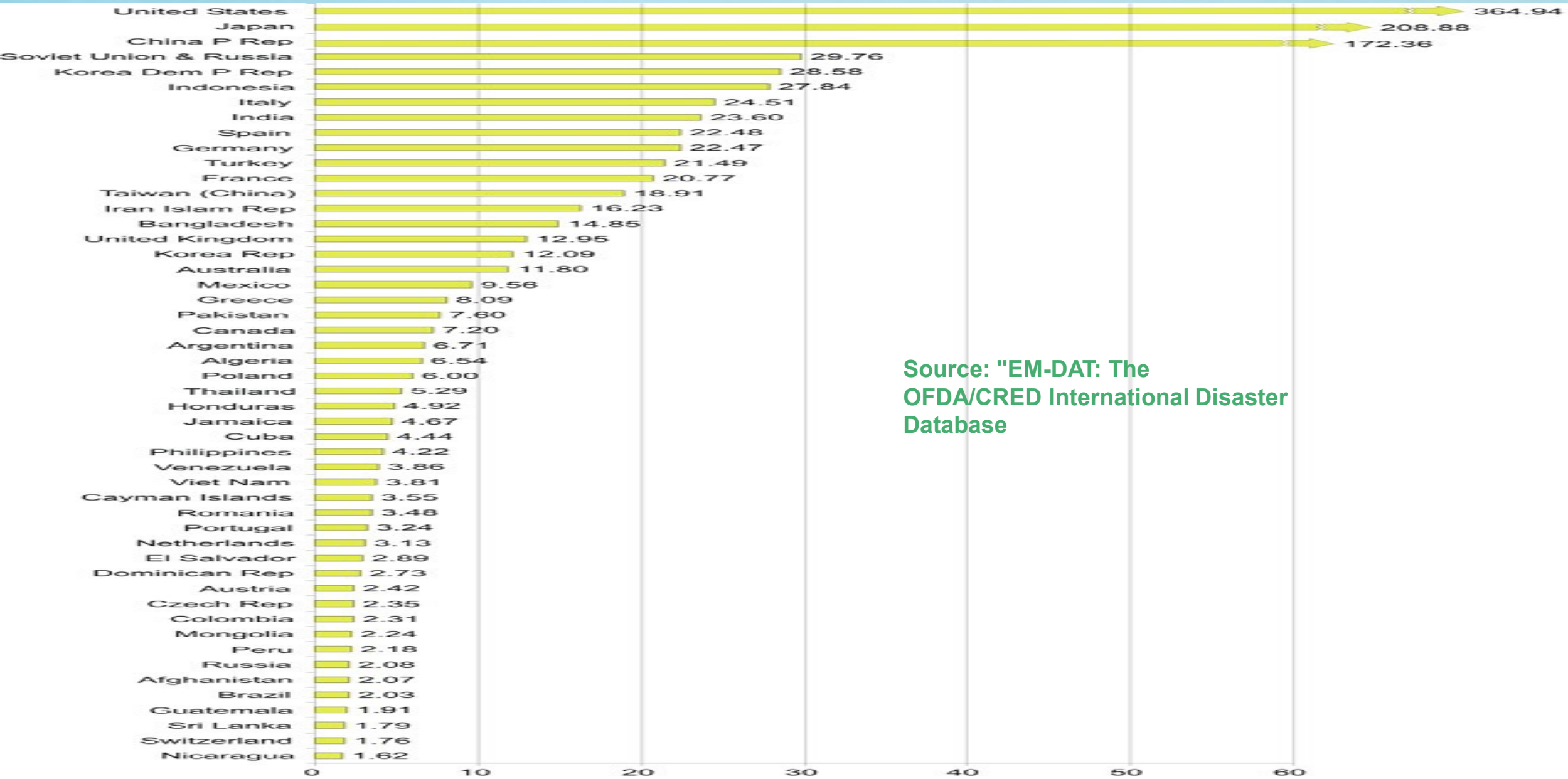
Source: **http://www.preventionweb.net**

Mortality, physical damage and economic loss

8-year moving average 2005-2013	
Deaths	1,760.00
House destroyed	66,948.10
House damaged	106,553.50
Injured people	26,070.13
Displaced people	762,790.25
Combined economic loss (US$)	2,058,687,174.00

Source: **http://www.preventionweb.net**

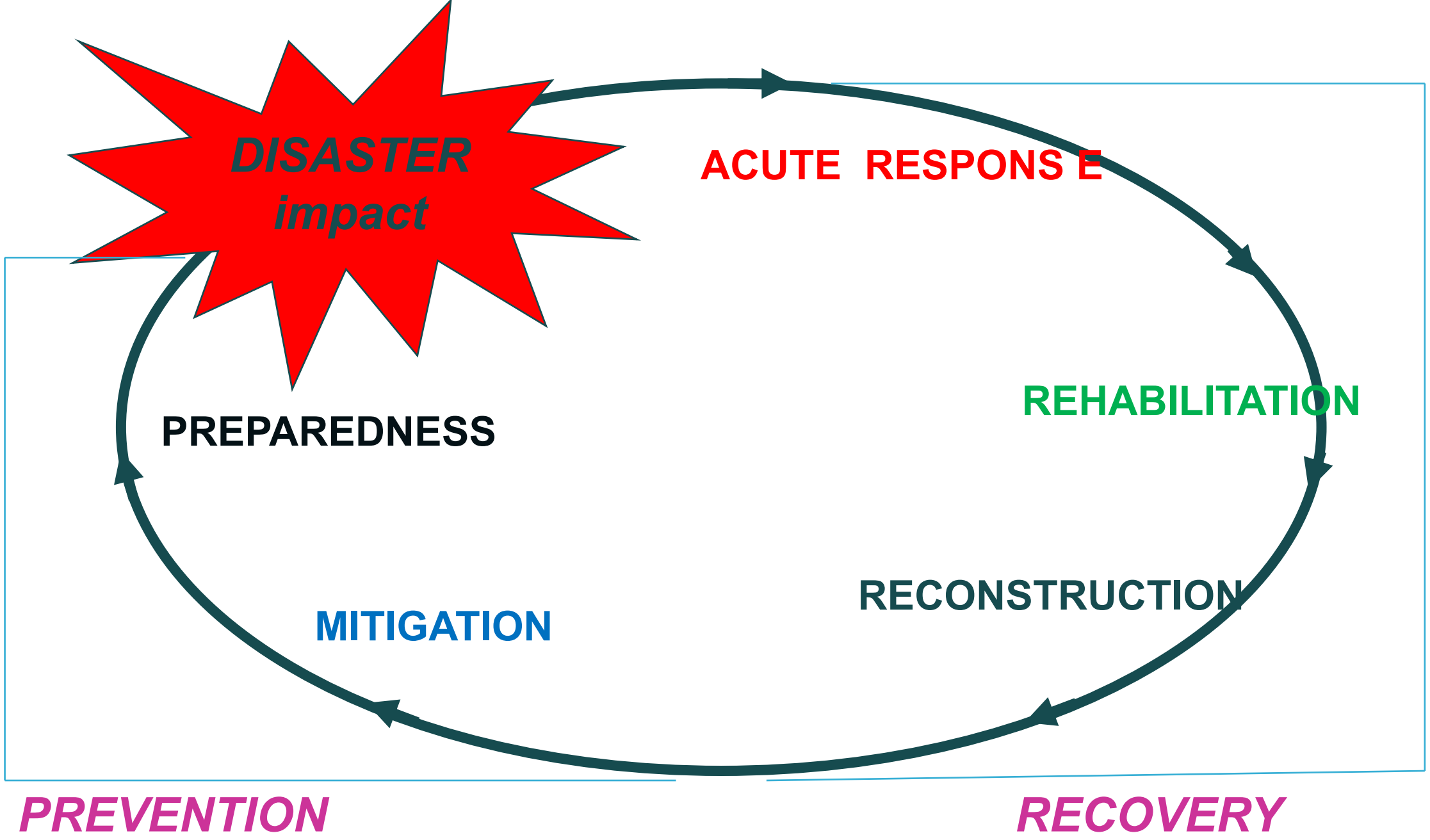
Total amount of reported economic damages : all natural disasters 1991 - 2005 (2005 US $ billion)



Source: "EM-DAT: The OFDA/CRED International Disaster Database

YEAR	COUNTRY	NAME	ALL TERMS	DAMAGE (US$m)	LOSSES (US$m)	TOTAL (US$m)
2010	Haiti	Haiti earthquake 2010	Earthquake	4,245.3	3,517.3	7,762.6
2004	Indonesia	Indonesia tsunami 2004	Tsunami	3,371.5	1,765.4	5,136.9
2008	Myanmar	Cyclone Nargis Myanmar 2008	Hurricane/cyclone/storm	1,773.1	2,328.2	4,101.3
2001	India	Gujarat (India) earthquake 2001	Earthquake	2,609.9	802.1	3,412.0
2006	Indonesia	Indonesia earthquake 2006	Earthquake	2,637.1	739.3	3,376.4
2005	Pakistan	Pakistan earthquake 2005	Earthquake	2,549.6	645.0	3,194.6
2004	Thailand	Thailand tsunami 2004	Tsunami	587.3	1,950.0	2,537.3
2007	Bangladesh	Cyclone Sidr Bangaldesh 2007	Hurricane/cyclone/storm	1,211.3	540.6	1,752.0
2004	Sri Lanka	Sri Lanka tsunami 2004	Tsunami	1,320.0	357.7	1,677.7
2004	India	India tsunami 2004	Tsunami	663.5	748.8	1,412.3
2008	Haiti	Hurricane Gustave Haiti	Hurricane/cyclone/storm	458.6	435.4	894.0
2009	Indonesia	West Java quake 2007	Earthquake	760.8	20.3	781.1
2000	Mozambique	Floods Mozambique 2000	Flood	304.6	357.9	662.5
2010	Indonesia	Indonesia volcanic eruption 2010	Volcanic eruption	126.5	343.3	469.8
2004	Haiti	Hurricane Jeanne Haiti 2004	Hurricane/cyclone/storm	210.3	91.1	301.4
2006	Indonesia	Aceh floods 2006	Flood	195.9	30.4	226.2
2007	Indonesia	West Sumatra quake 2007	Earthquake	172.9	2.8	175.6

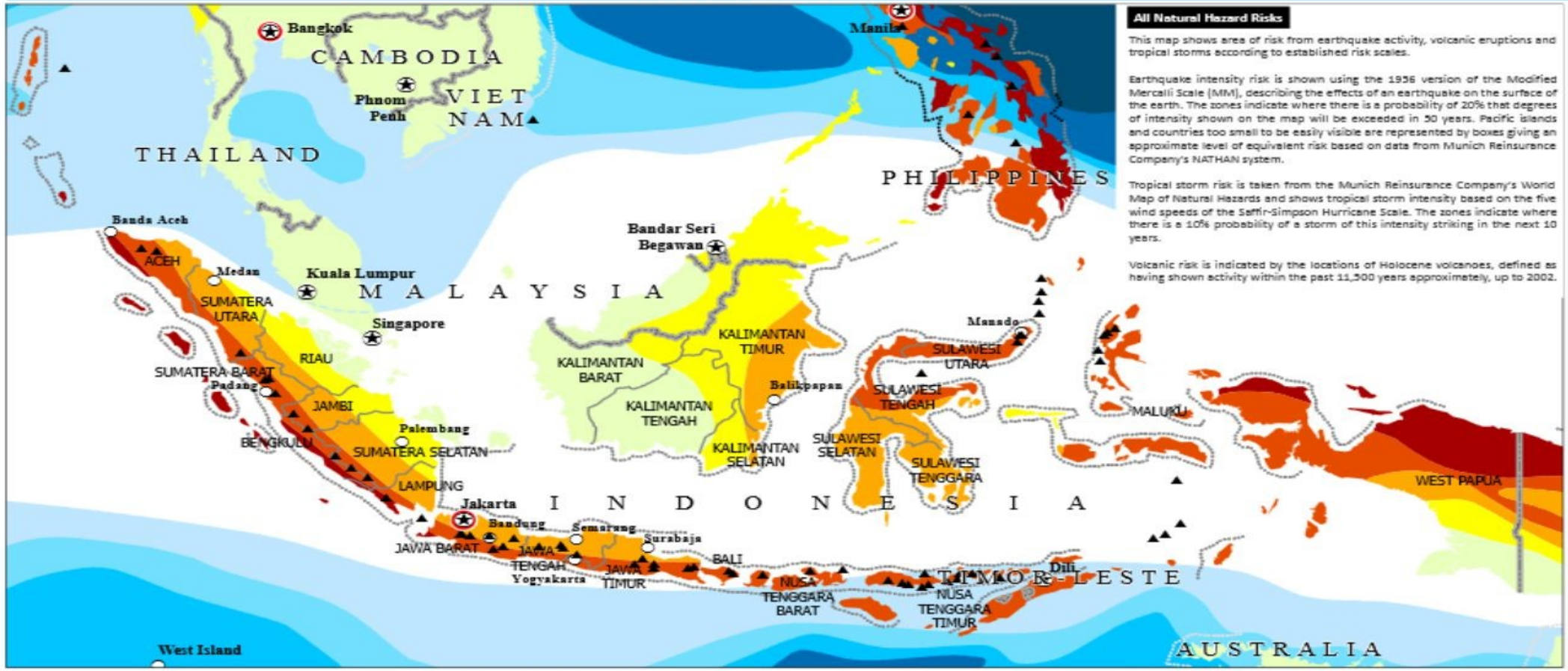
Source: Jan Kellett & Dan Sparks (2012). Disaster risk reduction. Spending where it should count



Siklus & fase manajemen bencana

OCHA Regional Office for Asia Pacific
Indonesia: Natural Hazard Risks
Issued: 01 March 2011

OCHA Regional Office for Asia-Pacific



All Natural Hazard Risks

This map shows area of risk from earthquake activity, volcanic eruptions and tropical storms according to established risk scales.

Earthquake intensity risk is shown using the 1956 version of the Modified Mercalli Scale (MM), describing the effects of an earthquake on the surface of the earth. The zones indicate where there is a probability of 20% that degrees of intensity shown on the map will be exceeded in 50 years. Pacific islands and countries too small to be easily visible are represented by boxes giving an approximate level of equivalent risk based on data from Munich Reinsurance Company's NATHAN system.

Tropical storm risk is taken from the Munich Reinsurance Company's World Map of Natural Hazards and shows tropical storm intensity based on the five wind speeds of the Saffir-Simpson Hurricane Scale. The zones indicate where there is a 10% probability of a storm of this intensity striking in the next 10 years.

Volcanic risk is indicated by the locations of Holocene volcanoes, defined as having shown activity within the past 11,500 years approximately, up to 2002.

Legend

- OCHA office or presence
- Country capital
- Major town or city
- International boundary
- Province boundary
- Holocene volcano

Tsunami Hazards

- Storm surge
- Tsunami
- Tsunami and Storm surge

Earthquake Intensity

Modified Mercalli Scale

- Degree I-V
- Degree VI
- Degree VII
- Degree VIII
- Degree IX-XII

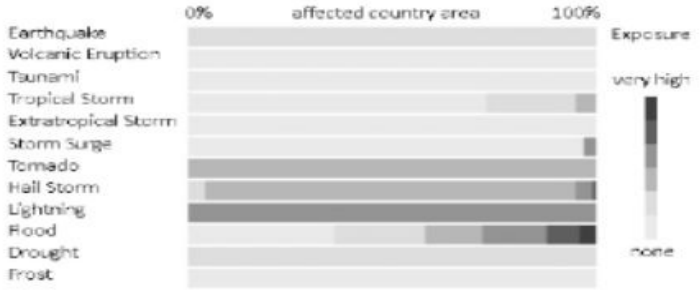
Tropical Storm Intensity

Saffir-Simpson Scale

- One: 118-153 kmh
- Two: 154-177 kmh
- Three: 178-209 kmh
- Four: 210-249 kmh
- Five: 250+ kmh

The bar chart shows the degree of exposure to natural hazards and the percentage of area affected (per country). Tsunami and storm surges are a threat to coastal regions, particularly gulfs, bays, and estuaries. The flood hazard results from river floods and torrential rain. The hazard of dryness and drought is caused by major deviations from the normal amounts of precipitation. The frost hazard depends on the elevation and the latitude.

0 — 15,000 — 30,000 Kilometers



(c) 2009, Munich Reinsurance Company, Munich Re Geo Risks Research Department

Map data source(s):
UN Cartographic Section, Global Discovery, Indonesia National Statistical Office, Smithsonian Institute, Pacific Disaster Center, UNISYS, Munich Reinsurance Group

Disclaimers:
The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Map Doc Name:
- OCHA_ROAP_Hazards_v4_110606

GLIDE Number:
- n/a

Creation Date:
- 22 March 2011

Projection/Datum:
- Behrmann

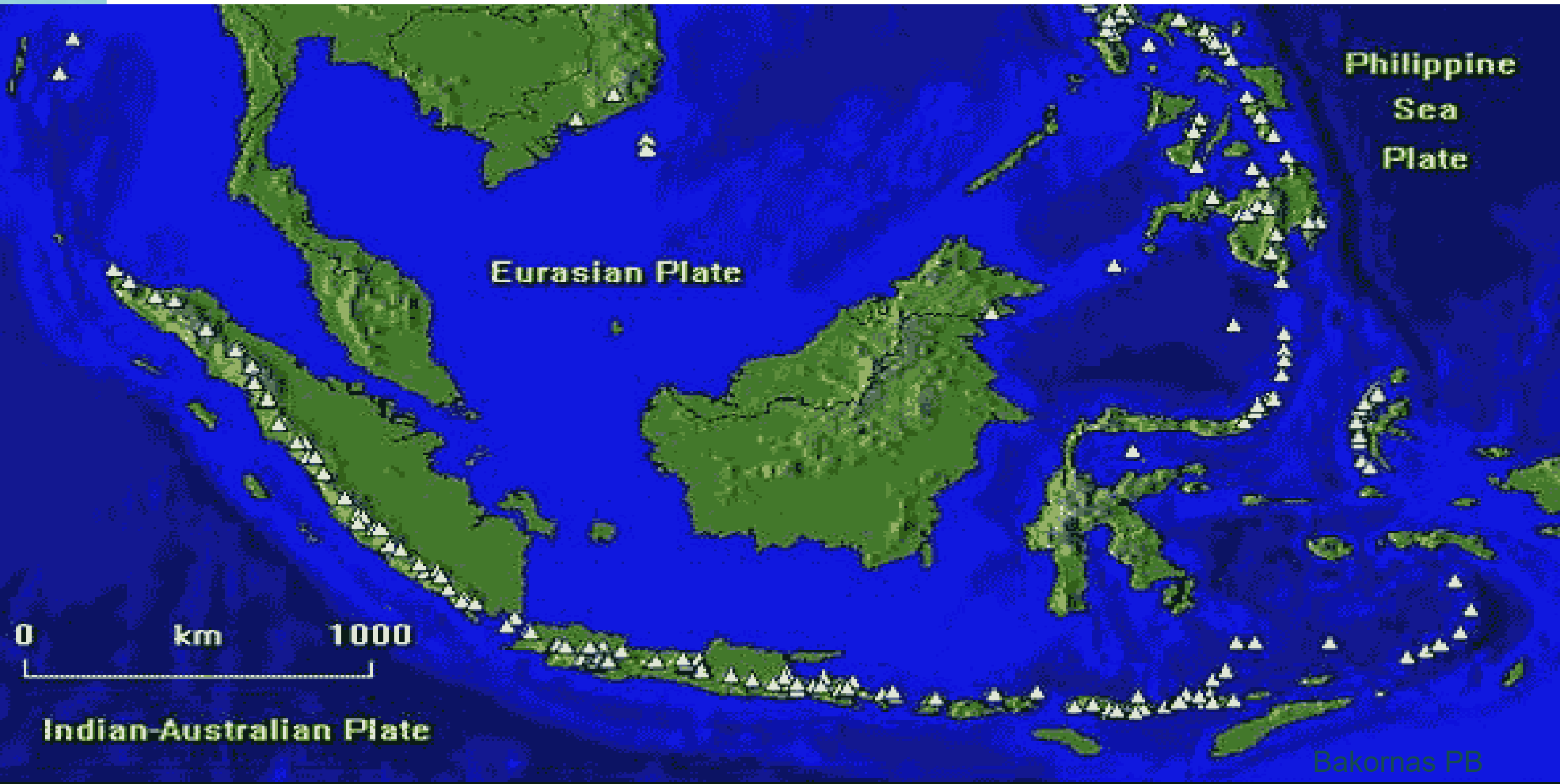
Web Resources:
- http://ochaonline.un.org/roap

Nominal scale at A4
- 62,000,000

Tsunami hazard map of Indonesia

Source: Bakornas PB

Volcano Hazard map of Indonesia

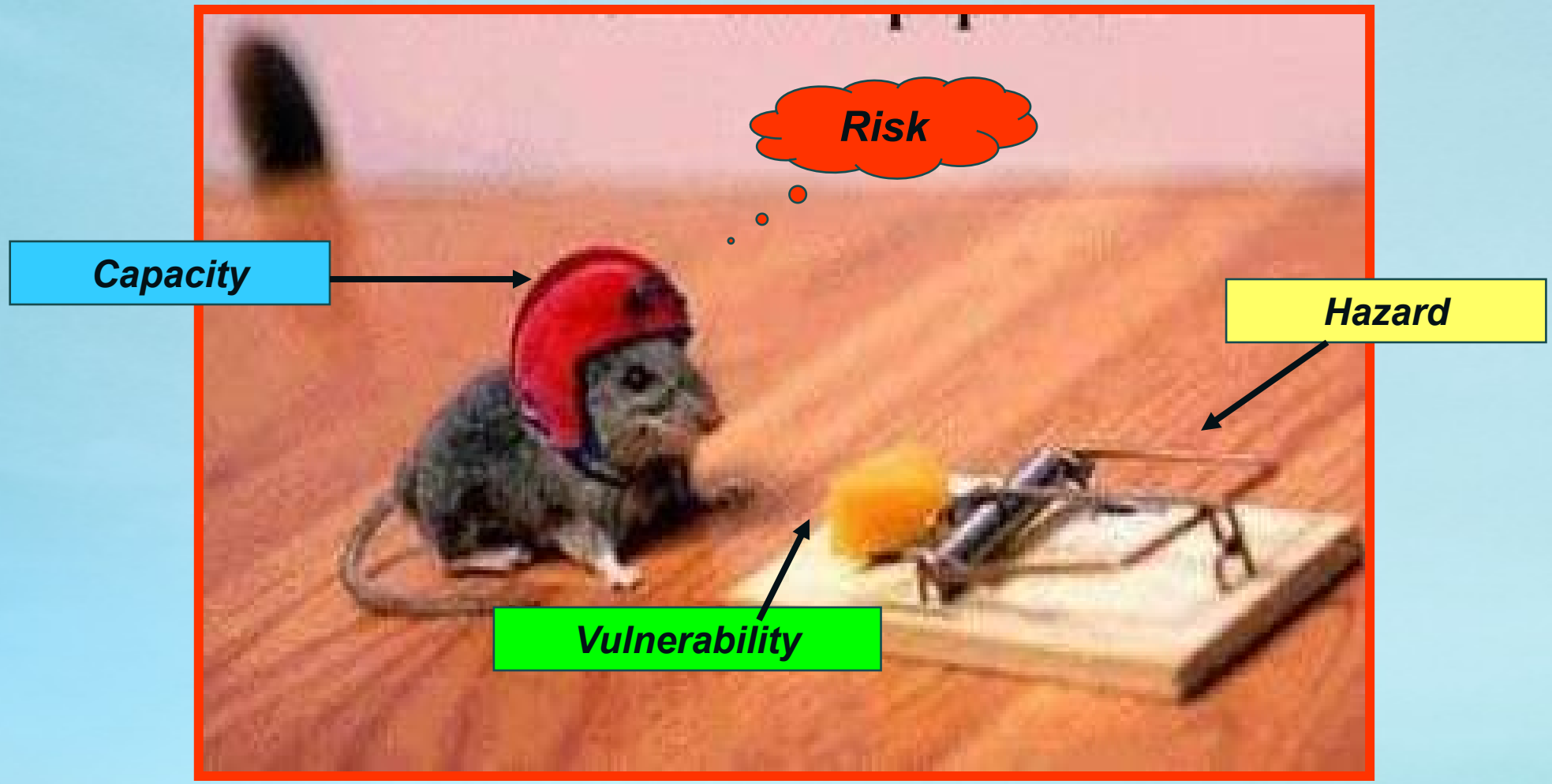


Bakornas PB

Earthquake Hazard map of Indonesia

Bakornas PB

Diaster Risk Estimate

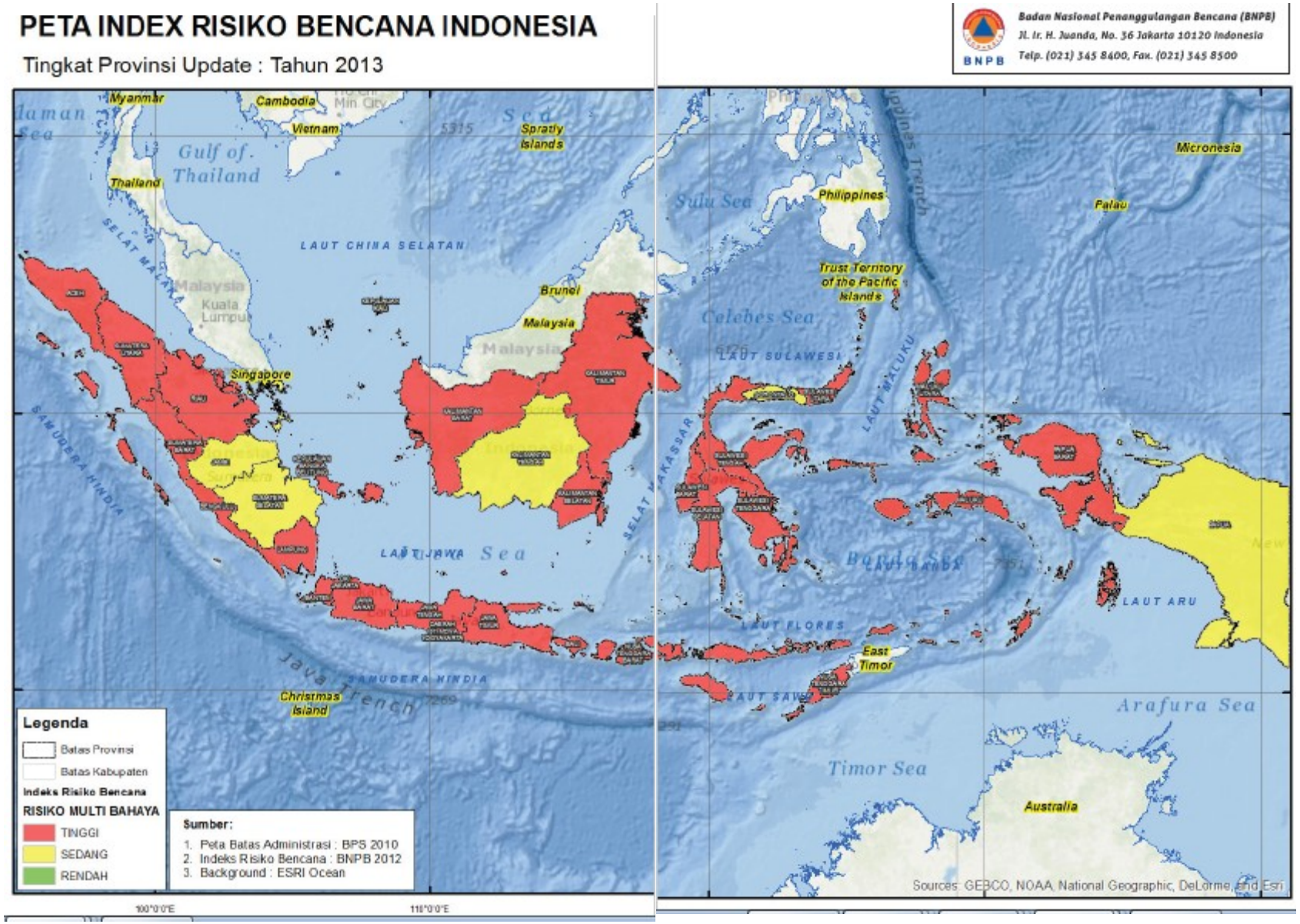


Risk = (Hazard x Vulnerability) / Capacity

Slide: Modifikasi slide Dr. Vijay' (WHO)

Map of Disaster Risk (Multi Hazard) in Indonesia 2013

(source: BNPB, 2014)



Parameters in IRBI (Indonesian Disaster Risk Index), 2014

1. Multi Hazards:
    1. Flood
    2. Earthquake
    3. Volcano eruption
    4. Landslide
    5. Storm
    6. Tsunami
    7. Residential and forest Fire

2. Vulnerability:
    1. Number of affected people per km2
    2. Economic lost in Million Rp. (Rupiahs)
    3. Degree of enviromental damage in HA (hectars) per type of disaster

3. Capacity:
    1. Government capacity in each District/ City

Vulnerability

Physical

Environmental

Socio-demography

Economic

Custom & Culture

RISK

of

Disaster

Hazard

Flood

Cyclone

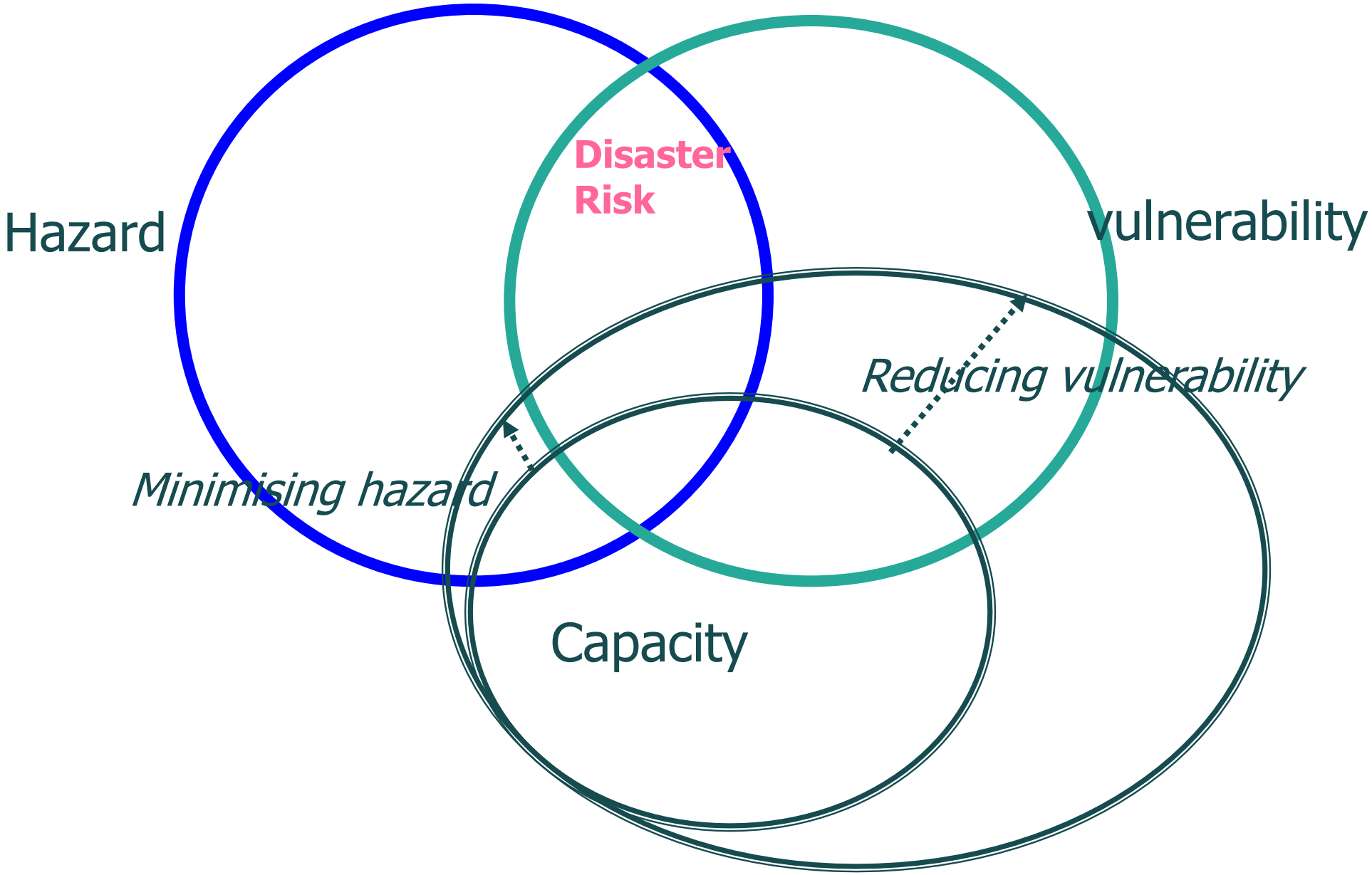
Earthquake

Vulcanic eruption

Tsunami

Etc.

Modified from BNPB, 2014 : the model of method to assess disaster risk


Hazard
Disaster
Risk
vulnerability
Reducing vulnerability
Minimising hazard
Capacity

National Policy (1)

- In National Midterm Development Plan (Rencana Pembangunan Jangka Menengah Nasional/ RPJMN) 2015-2019, the strategy of priority in disaster management is to increase capacities of
  - Central government
  - Local governemnt
  - Community
- increasingcapacities and reducing vulnerability of community → strengthening community resilience
- Key of succes of national policy in disaster risk reduction is to support concrete action in the level of community to strengthen its resilience (Sutopo P Nugroho, BNPB)

"*Governments, disaster management agencies and the community are increasingly accepting that the proper focus of disaster management is <u>not the hazard agent in itself</u>….but rather the community and the consequences for individuals, groups and communities.*

Successful application of this approach requires a better understanding of the resilience and vulnerabilities of various levels of human systems and social activity" (Buckle, 2003: 110)

Resilience

The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions. (UNISDR, 2009)

National Policy (2)

- Indonesia follows the global commitment of the Sendai Framework for Disaster Risk Reduction 2015-2030, Foccusing actions in four priority areas:
  - Priority 1: Understanding disaster risk.
  - Priority 2: Strengthening disaster risk governance to manage disaster risk.
  - Priority 3: Investing in disaster risk reduction for resilience.
  - Priority 4: Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction.

Some research findings:

- **Endarty, Sudaryo, Ronoatmodjo, (2016):** individual and community resilience affects the health related quality of life of people living around Mount Kelud, East Java Indonesia
- Individual resilience /endurance is constructed by:
  - Socio-demographyic and economic backgrounds
  - Psycholoical factors
  - Disaster related experiences
- Family resilience is constructed by:
  - Faith and believe system
  - Psycholoical factors
  - Oragnizatioal pattern of the family
  - Communication and solution approach in the family

Some research findings

- Family resilience is constructed by:
  - Economic factors; e.g. GDP, employment rate, poverty
  - Physical factors; e.g. infrastructure and public facilities
  - Social factors; e.g. education, culture, religion
  - Demographic factors; e.g. age n sex distribution, population grwth and density
  - Institution; e.g. governance, coordiation
  - Environmental factors: e.g. hazards, wheater and climate, water n sanitation
- **Sudaryo & Mahkota (2015):** Faith and role of head of survivor family after earth quake in Padang played important roles in strenthening the resilience and coping mechanism
- **Adisty (2016):** risk management and community resilience of people living near Mt. Merapi was developed , based on not only modern empirical knowledge but also local traditional knowledge

Some research findings

Disaster Med Public Health Prep. 2016 Feb;10(1):11-5. doi: 10.1017/dmp.2015.91. Epub 2015 Jul 21.

Health-Related Quality of Life in the Aftermath of the L'Aquila Earthquake in Italy.

Gigantesco A[1], D'Argenio P[1], Cofini V[2], Mancini C[3], Minardi V[1].

Author information

Abstract

OBJECTIVE: A recent article reported a reduction in the suicide rate in the inhabitants of L'Aquila (Italy) in 2009, when on the night of April 6, a devastating earthquake struck the city. The potential implications of the role of resilience in the aftermath of natural disasters, together with the limitations of existing evidence on this topic, suggest a need for more research. We aimed to retrospectively investigate the impact of the L'Aquila earthquake on a standardized self-reported measure of health-related quality of life (HRQoL).

METHODS: HRQoL data were collected through 2 separate cross-sectional surveys conducted during 2008 and 2010, before and after the earthquake that occurred in 2009, on 2 random samples of adults living in L'Aquila.

RESULTS: The data seemed to suggest no decrease in the inhabitants' HRQoL level after the disaster, which may suggest the role of resilience in supporting survivors' HRQoL. The findings were also consistent with previous observations of a reduction in the suicide rate in the same inhabitants after the earthquake.

CONCLUSIONS: After a natural disaster, people likely activate personal resources and protective social factors that result in better subjective outcomes.

Gigantesco, et al. (2016): Community resilience supports health related quality of life of the survivors

TERIMA KASIH BANYAK

THANK YOU VERY MUCH