

Overview of ICHARM's Case Studies on Disaster Management

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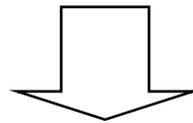
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An ICHARM Challenge: *localism*

Localism is a principle that takes into account local diversity of natural, social and cultural conditions, being sensitive to local needs, priorities, development stage, etc., within the context of global and regional experiences and trends. <snip> **To be needs driven rather than supply driven**, responsive to respective local realities. (ICHARM Strategies and Action Plan for 2006-2008, October 2006).



Research programs coupled with capacity building
Closely work with local engineers/scientists

Local studies and related disaster studies



Takemoto: Factor analysis of flood risks
To demonstrate a better analytical methodology to identify root causes of disasters



Chavoshian: Policy analysis of the past large floods in the world
To help new program/policy making by governments



Adikari: Vulnerability assessment with focus on socio-demography
To develop a new view and methodology for vulnerability assessment and contribution to UN-WWAP

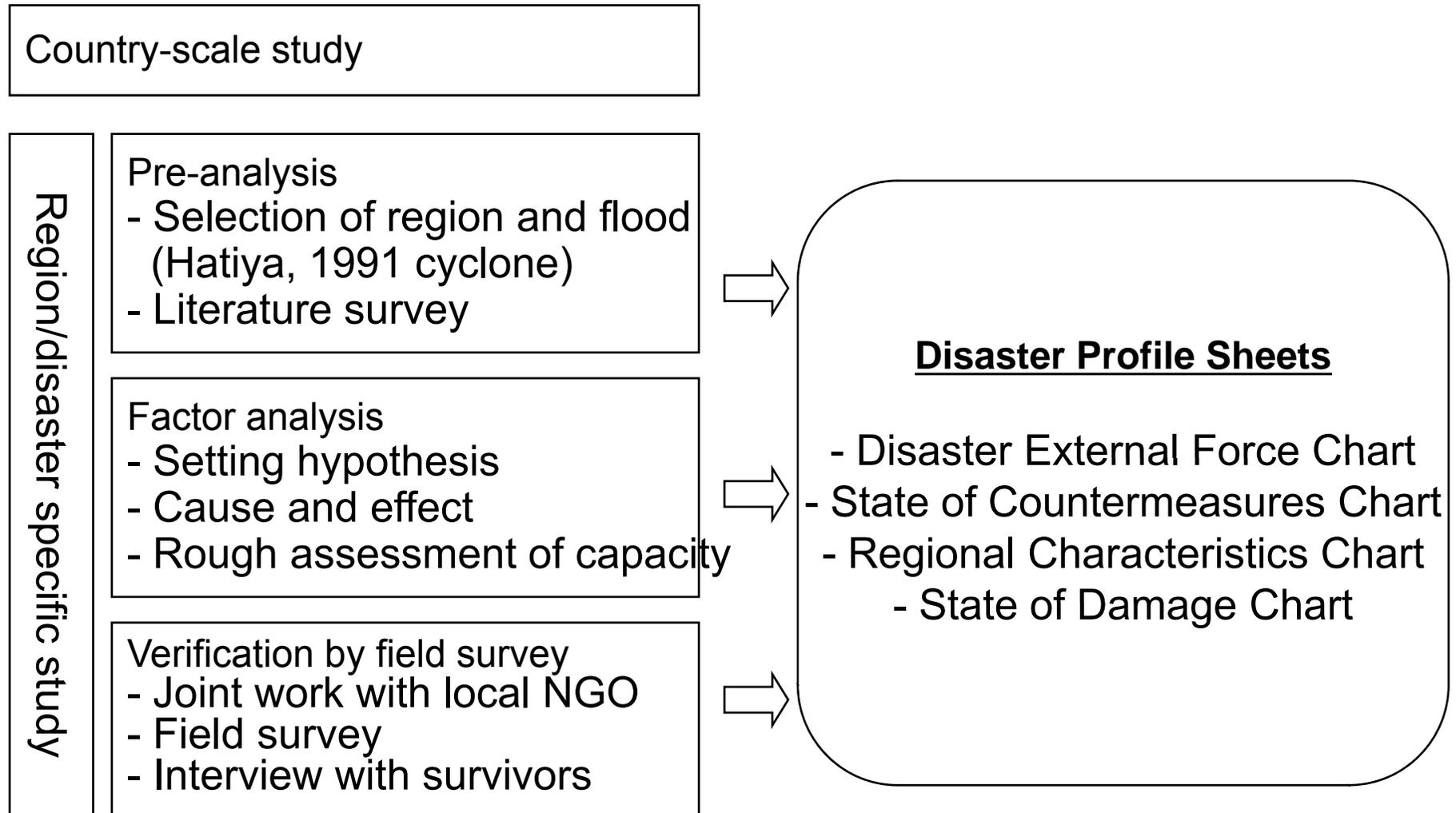


Osti: Local study for Banke District, Nepal, MEXT *Kakushin* Program
To support climate change adaptation planning

Watanabe: Demonstration of debrisflow dehydration break in the Philippines, Asian Development Bank's Pilot Demonstration Activities

Yoshitani: Series of symposiums on flood management policies in China, Thailand and Japan, JST/CREST Project

General study approach of risk factor analysis



Hypotheses and findings

	No.	Hypotheses	Verification Result	Remarks
How sacrificed?	1	Drowned when engulfed by the tidal surge.	○	Verified by field survey.
	2	Killed when struck by flying objects.	○	Verified by field survey.
Why people decided to remain home?	3	Because many cyclone warnings had been false alarms.	○	Verified by field survey.
	4	Because they feared that if they evacuated, their livestock and property might be stolen, so they remained to protect them.	●	Field survey discovered a new fact (not fear of theft, but fear their assets will be scattered.)
	5	Did not evacuate because there were no cyclone shelters near their homes.	○	Quantitatively verified using numerical values.
	6	The cyclone is the will of Allah	—	Unverifiable.
	7	Women cannot evacuate because of social and religious restrictions.	—	Unverifiable.
	8	If they evacuate, their family members might be separated.	—	Unverifiable.
	Why people were unable to evacuate?	9	Could not walk easily because the roads were muddy.	○
10		Because they would be asked to pay a fee to use the shelter.	—	Unverifiable.
Specific types of people sacrificed?	11	Most fatalities were concentrated among poor people on the ocean side of the dike on the south side (high risk zone).	○	Quantitatively verified using numerical values.
	12	90% of victims were women and children.	△	Documents obtained from the Japanese Red Cross Society
	13	From 30% to 40% of residents of a dike protected island died.	—	Unverifiable.

Legend

○: Facts ≐ hypothesis

●: Facts and hypothesis differed. New facts were discovered.

△: Can be confirmed only by using documents

—: Hypotheses for which data and testimony necessary for confirmation could not be obtained by this survey.

Factor Analysis Series

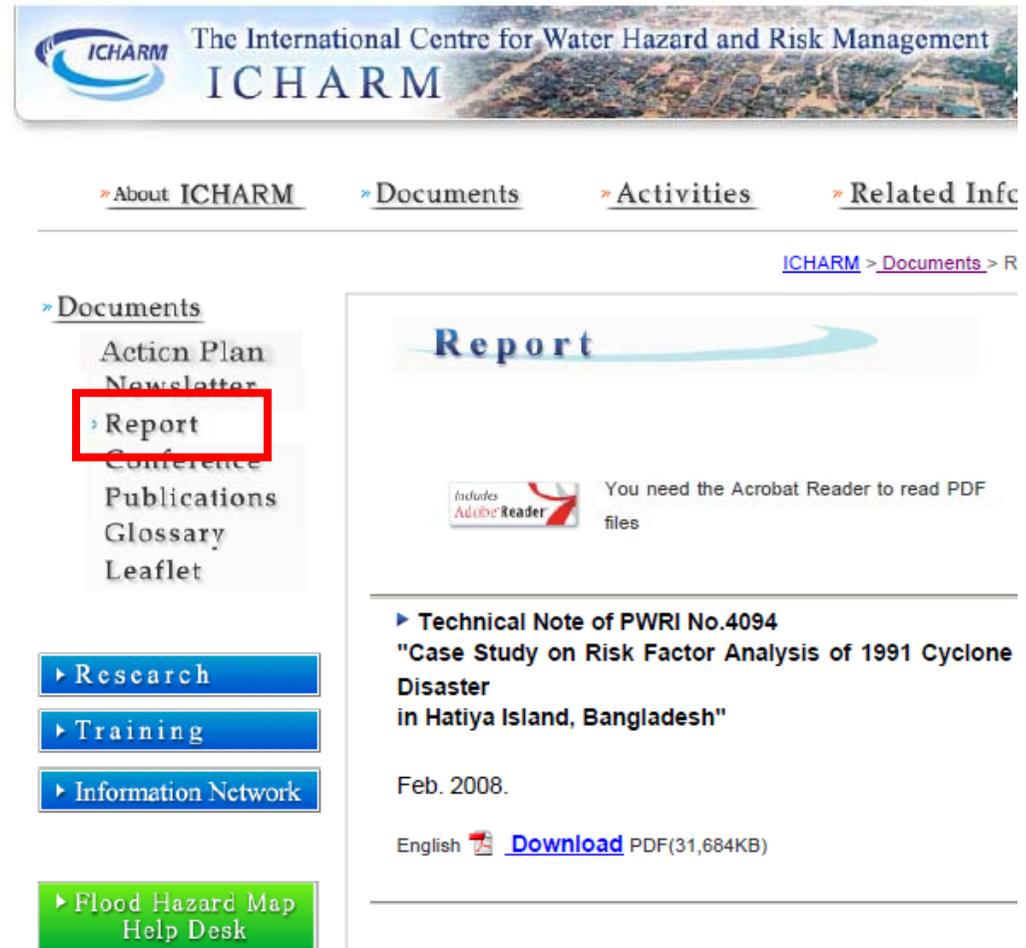
<http://www.icharm.pwri.go.jp/html/docu/report.html>

Reports published

- Bangladesh
- Sri Lanka
- The Philippines
- Hatiya Island, Bangladesh

Reports to be published

- Honduras
- Infanta, the Philippines
- **Factor analysis study guideline**



The screenshot shows the ICHARM website header with the logo and the text "The International Centre for Water Hazard and Risk Management ICHARM". Below the header is a navigation menu with links for "About ICHARM", "Documents", "Activities", and "Related Info". The "Documents" link is highlighted, and a dropdown menu is visible with options: "Action Plan", "Newsletter", "Report" (highlighted with a red box), "Conference", "Publications", "Glossary", and "Leaflet". Below the dropdown menu are several blue buttons: "Research", "Training", "Information Network", and a green button for "Flood Hazard Map Help Desk". The main content area displays the title "Report" in a large font, followed by a warning message: "You need the Acrobat Reader to read PDF files". Below this is a technical note titled "Technical Note of PWRI No.4094 'Case Study on Risk Factor Analysis of 1991 Cyclone Disaster in Hatiya Island, Bangladesh'" dated Feb. 2008. A "Download" link is provided for the PDF file (31,684KB).

Local Study Series

Large-scale Flood and Policy Effective Lessons

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Large-scale Flood Report

Objective

Large-scale floods have a significant effect on relevant disaster management policies

Telegraph

Home News Sport Business Travel Jobs Motoring

Gordon Brown announces flood review

The Prime Minister has announced a review into flood infrastructure and promised extra funds for barriers after heavy rains devastated parts of England.

S

Expected Outcomes

Worst Affected Countries in Recent Large-scale Flood in Africa



Lessons
learned

Policy Effective Flood Report

- **Including any policy relevant information regarding occurrence of flood such as**

Legal re-arrangement

Institutional framework

Institutionalization

Resources and action Plan

Vietnam

After major floods in 2000, the Government of Vietnam introduced the “Living with Floods” concept that became the strategy for disaster risk reduction in the Mekong river delta .

Bangladesh

The 1998 flood prompted the government to adopt an Integrated Water Resources Policy in the National Water Policy. Roles and responsibilities were reviewed and emphasis shifted toward preparedness, early warning and planning response .

How to identify large-scale flood?

Rating Flood Magnitude

- **Flood Return Period is widely used by hydrologist**
 - It doesn't give any sense of death toll and economic damage
- **Flood Magnitude and Severity Classes (Dartmouth Flood Obs.)**

Severity Class:

Class 1: large flood events: significant damage to structures or agriculture; fatalities; and/or 1-2 decades-long reported interval since the last similar event.

Class 1.5: very large events: greater than 20 yr but less than 100 year recurrence interval, and/or a local recurrence interval of at 10-20 yr.

Class 2: Extreme events: with an estimated recurrence interval greater than 100 years

$$\text{Flood Magnitude} = \text{LOG}(\text{Duration} \times \text{Severity} \times \text{Affected Area})$$

- There is little attention to death toll and flood damages.
- Estimation of severity class is based on personal judgment
- Using the same weight for the factors
- **EM-DAT**
 - In fact it is not a rating flood magnitude but criteria to register a flood event in the data base

ICHARM Rating Scale

- Easy to estimate
- Ubiquitous rating estimation
- Considering data availability
- Take into account policy related factors

- **Tangible damages (weight factor=4)**
 - Death toll
 - Economic damages
- **Intangible damages (Weight Factor=2)**
 - Affected area
 - Affected population
- **Mass media coverage (0 to 0.25)**

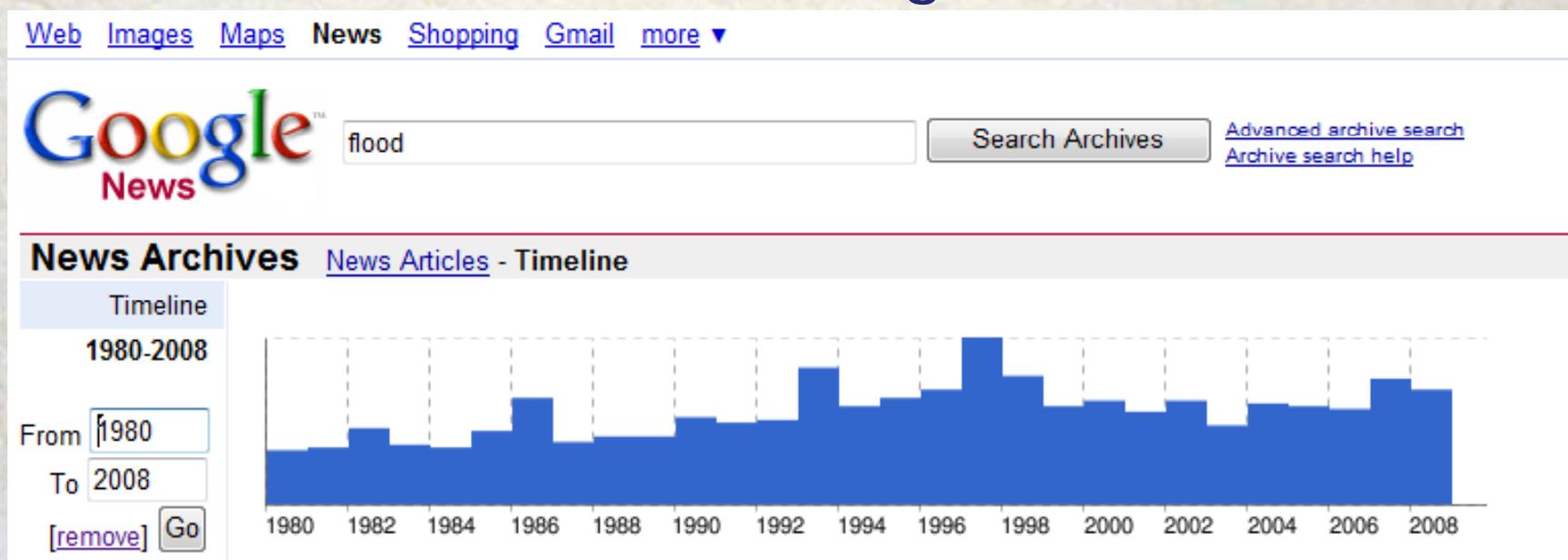
$$FS = (4 \times (\sum \text{Tangible DF}) + 2 \times (\sum \text{Intangible DF})) \times (1 + \text{Mass Media CF})$$

Estimation Method

- The factors are normalized between 0 to 1 using the following Eq.

$$\frac{(\ln(x_i) - \ln(\min(X)))}{(\ln(\max(X)) - \ln(\min(X)))}$$

- The ICHARM Flood Scale can be between 0.01 to 15 for the most severe flood event.
- Mass media coverage of each event is estimated using number of related news in Google news.





uk flood

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06/2007

- 08/2007

News Archives

Results 1 - 100 of about 1,630 for uk flood.

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2007

Other dates: [\[Hide\]](#)

2007-06

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[UK flood cleanup continues](#)

USA Today - Jul 27, 2007

LONDON (AP) — Flood-afflicted Britons kept a wary eye on the skies Friday, hoping they labored to dry out and clean up their homes and ...

[UK Floods Recede by Thames, Severn as Rain Abates...](#) - Bloomberg

[Two more die in UK floods](#) - stuff.co.nz

[NEWS.com.au](#) - [International Herald...](#) [All 146 related](#) - [Related web pages](#)

[UK flood levels reach 60-year highs \(+photos\)](#)

New Zealand Herald - Jul 24, 2007

By Darren Staples. A normal month's rain fell in just an hour in Gloucestershire, forcing highest level in over 60 years. ...

[Oxford residents evacuated as UK flood waters rise](#) - Reuters AlertNet

[Rivers still rising in UK flood crisis](#) - abc.net.au

[UK flood claims hit \\$2.3 billion](#)

NEWS.com.au - Jul 6, 2007

By Tim Castle in London. LAST week's floods could cost insurers £1.5 billion (\$2.3 billion) said, as the Government defended its response to ...

[Floods: The worst affected places](#) - BBC News

[Appeals set up for flood victims](#) - BBC News



Hurricane Katrina

08/2005

- 10/2005

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News Archives

Results 1 - 100 of about 156,000 for Hurricane Katrina.



China Flood

07/1998

- 09/1998

Search

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News Archives

Results 1 - 100 of about 1,350 for China Flood.



India Flood

08/2008

- 09/2008

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Results 1 - 10 of about 316 for India Flood.

Large-scale Floods and Cyclones in 2007~08

Event	Scale	Cause	Date
Nargis, Myanmar	13.35	Tropical cyclone	May 2008
Cider, Bangladesh	10.75	Tropical cyclone	Nov. 2007
China (Hanjiang, Beijiang, Xijiang, Pearl, Fangcheng, Huaihe. Fuhe. Xiaohong. Hongru)	9.98	Heavy rain	Jun ~ Aug 2007
Bangladesh, India	9.52	Monsoon rain	Jul ~ Oct. 2007
Africa (11 Countries)	8.78	Heavy rain	Jul ~ Oct. 2007
Philippines, Vietnam	8.67	Tropical cyclone	Sep. Oct. 2007
UK Flood	8.45	Heavy rain	Jun ~ Jul, 2007
Bolivia , Paraguay	8.32	Heavy rain	Dec. 07 to Apr. 08
Mexico	8.21	Heavy rain	Oct. ~ Dec 2007
India, Bangladesh	8.09	Monsoon rain	July 2008

Based on all the reported events in 2007~08, on average, there were 475 affected people, \$267,000 damage and 455 Sq.km affected area per death.

Policy effective local studies

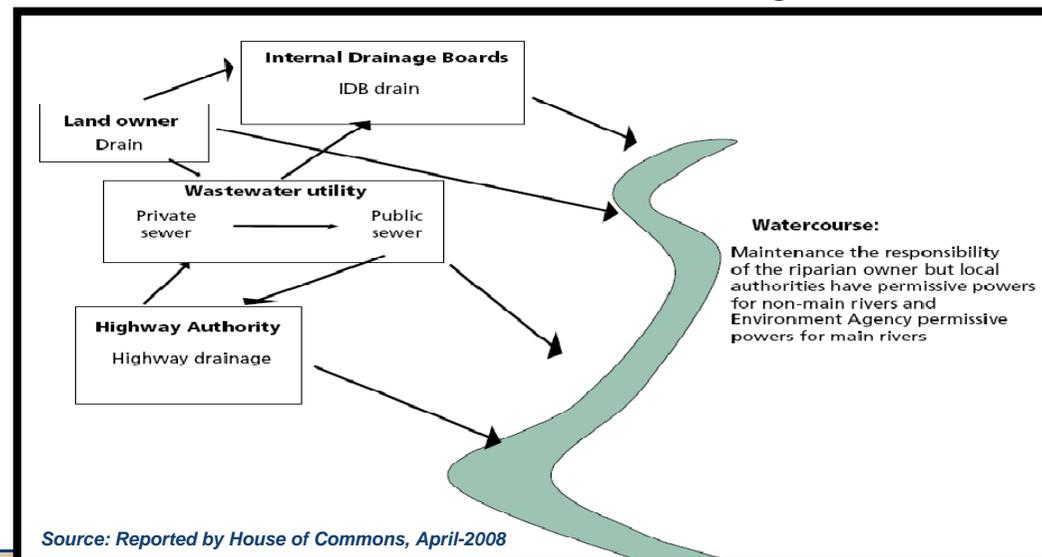
Policy Type		UK	DE	CN	IR	MX	KP	JP	AF	BD	IN	PH	US	VN	TH
Financial	Privatisation	■						■					■		■
	Tax		■										■		
	Insurance & Subsidy	■	■					■					■		
Socio-economics	Gender issue								■	■	■		■		
	Immigration					■			■	■	■				■
	Energy				■						■				
	Development			■	■		■		■	■				■	■
	Education	■			■			■					■		
Governance	War & Militarism			■			■		■						
	Decentralized Admin.	■		■				■							■
	Political Instability								■						
Miscellaneous	Climate Change	■	■					■					■		
	Int'l organization					■	■	■	■	■	■	■	■	■	■
	Land use policy	■	■	■	■			■		■		■	■	■	■
	Preparedness & Respon.	■	■	■	■			■		■			■	■	■

2007 UK Flood

- It was in fact series of destructive floods that occurred in various areas across the country during the summer of 2007.
- Two major flooding events occurred: one in late June, the other in late July.
 - heavy rain on 24–25 June. Up to 111 mm of rainfall fell, with some places receiving over four times the average monthly rainfall.
 - On 19–20 July, up to 157 mm of rain fell in 48 hours, with some places receiving nearly six times the average monthly rainfall.
- It was Britain's wettest May–July since records began (in 1776).
- Civil and military authorities described the June and July rescue efforts as the biggest in peacetime Britain.

A close look at the UK water privatisation policy and 2007 Flood

- ❖ **Water privatization in England** was undertaken in **1989** by the government of Margaret Thatcher.
- ❖ Managing surface water **flood risk is intrinsically linked to managing surface water drainage** at the local level.
 - **Who is responsible for drainage after privatisation?**
- ❖ Responsibilities for surface water drainage systems **are split** between various organisations, partly **as a consequence of the privatisation** of the water industry.





Lesson learned

- ❖ The current fragmented responsibilities for surface water drainage meant that measures to tackle flood risk were often applied in a piecemeal fashion. The current situation meant that the various organisations would simply “shift the problem from one place to another”.
- ❖ It is also highlighted some areas of the confusion with the current system. Water UK—who described the system as a “muddle”—said it was impossible to determine when, for example, a highway drain (the responsibility of the local authority as a highways authority) became a public sewer (the responsibility of a water company). Hull City Council had produced a map of the city’s drainage system since the summer floods, which showed there was “some ambiguity” about ownership of certain assets.
- ❖ As the conclusion local authorities, wanted an organisation to “take the lead” on coordinating surface water drainage in local areas. The law should be changed to grant top-level local authorities a power to take responsibility for surface water drainage.

Water-related disaster vulnerability: a socio-demographic challenge

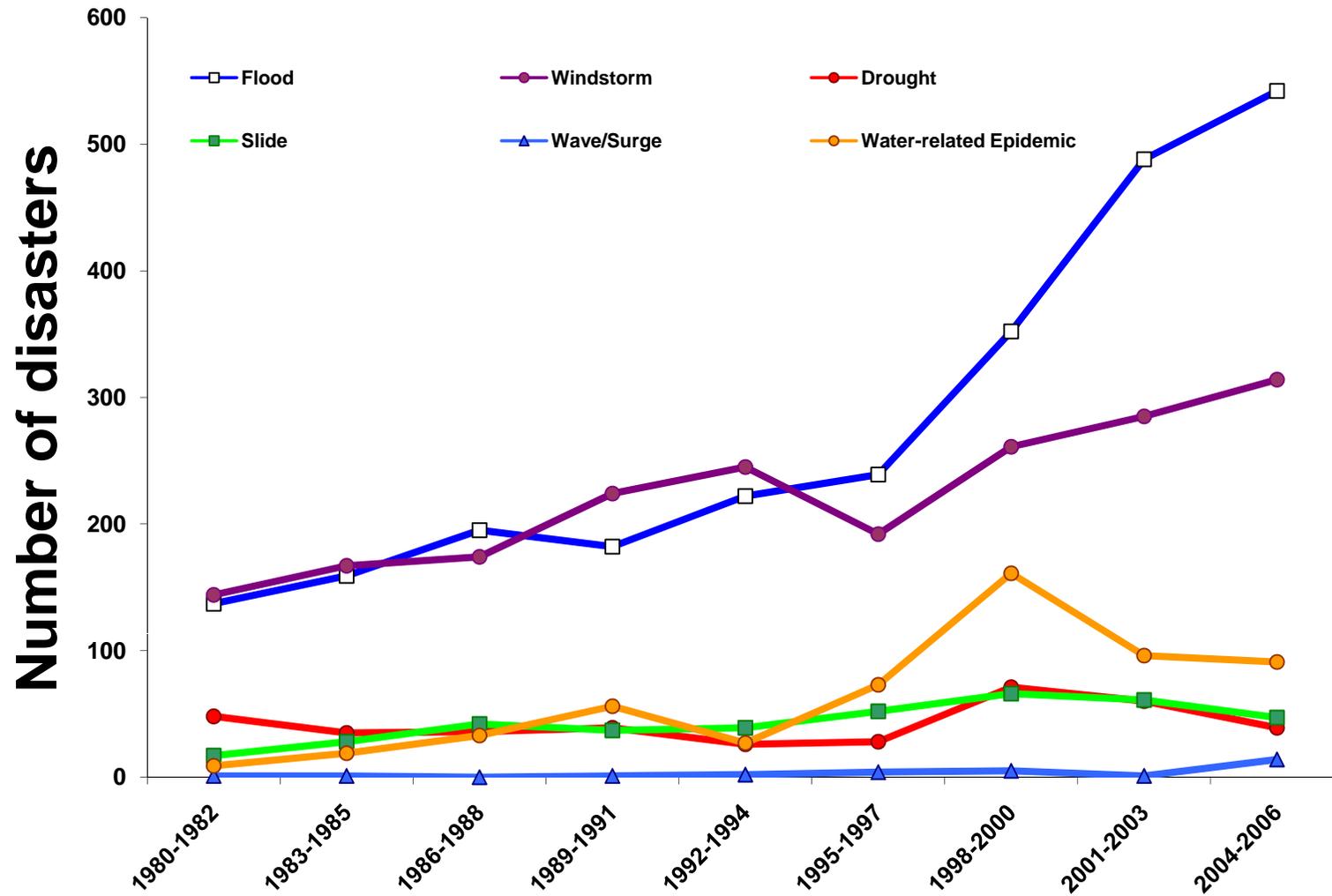
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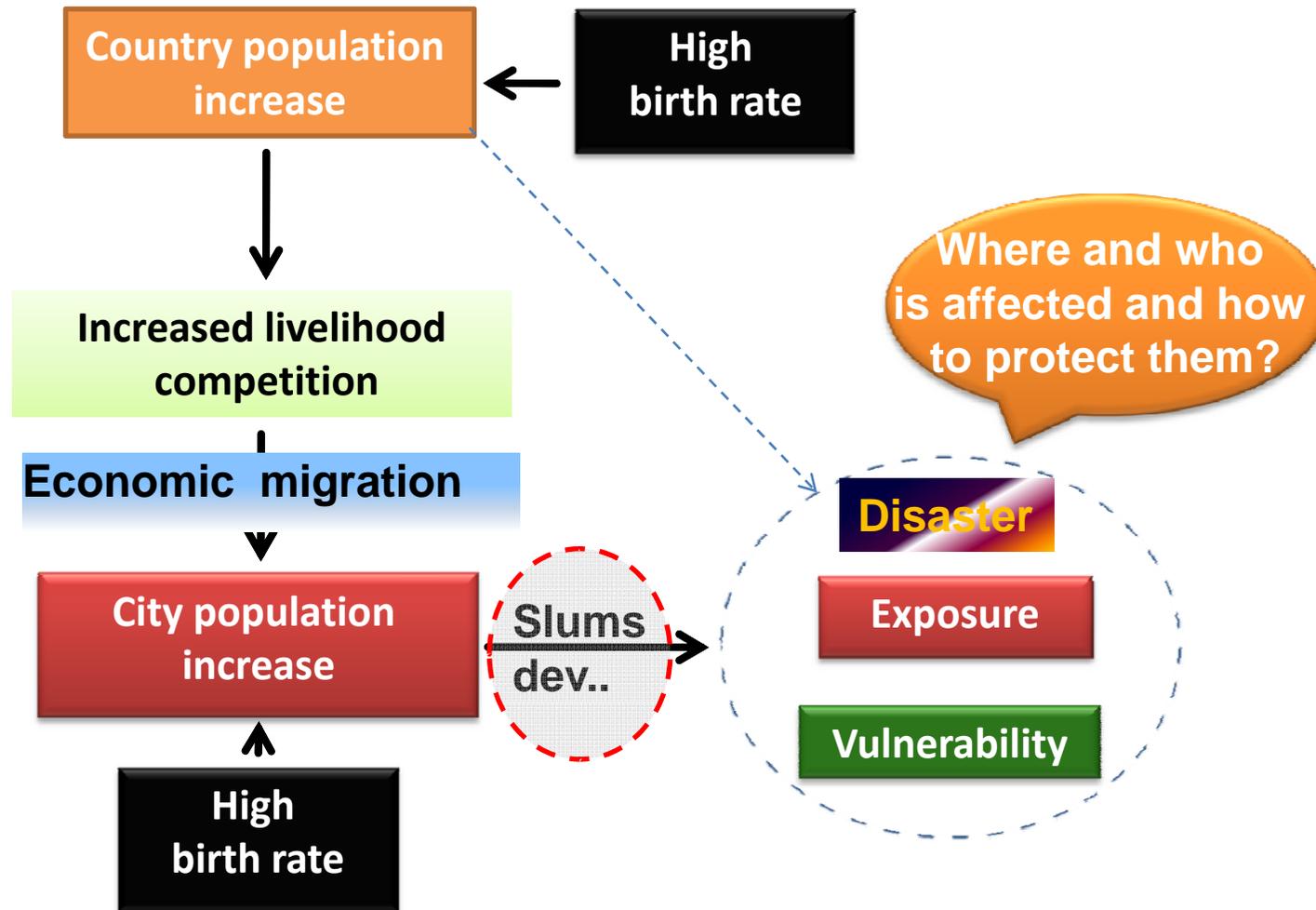
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Three year trend of water-related disasters since 1980 to 2006.

(Technical Note of PWRI No. 4088)



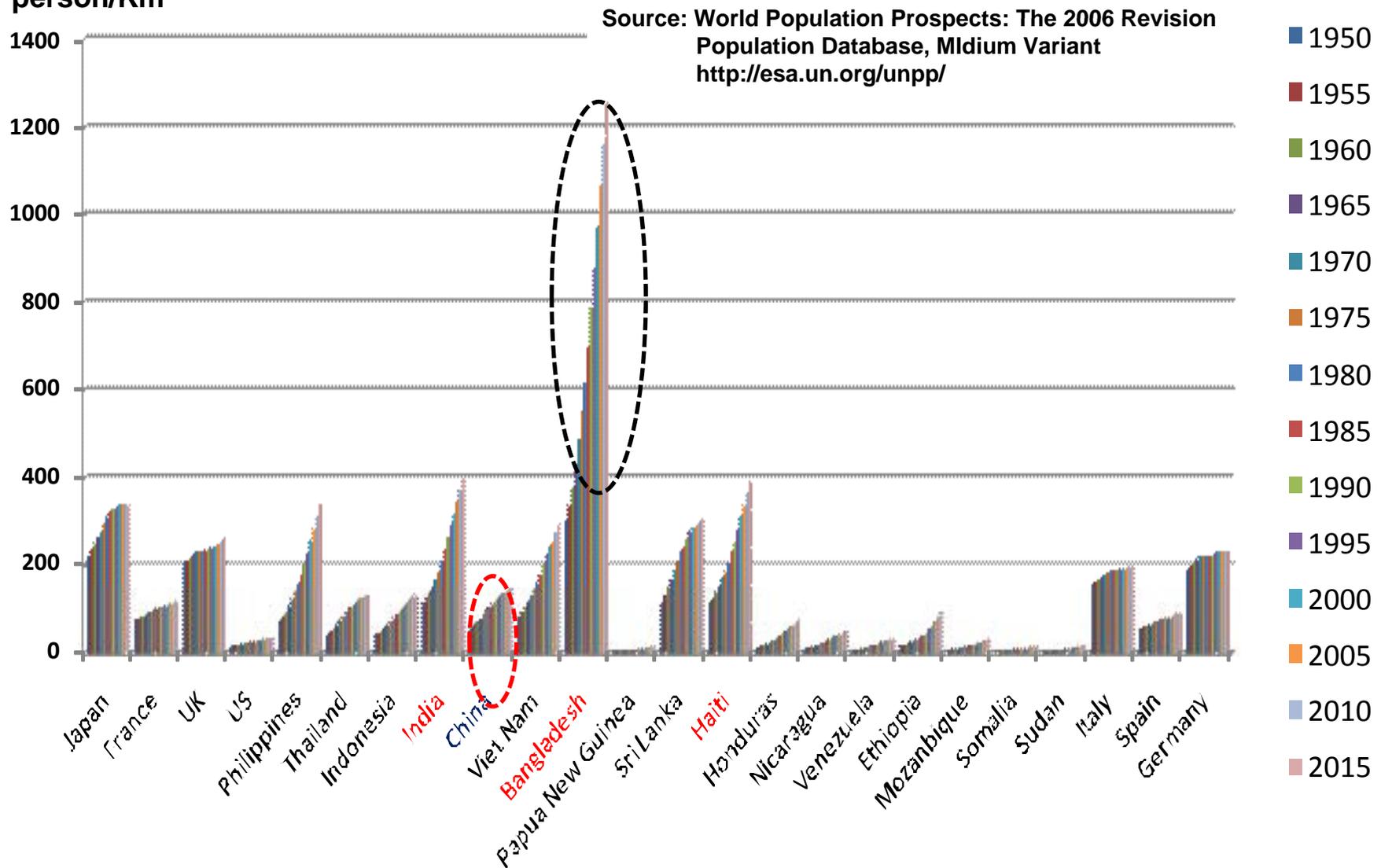
The concept of exposure and vulnerability from the view point of population increase

1. Slums
2. Vulnerable group (women, kids & elderly)

Definition: a slum household is a household that lacks any one of the following five elements (UN-HABITAT 2003c, p.7):

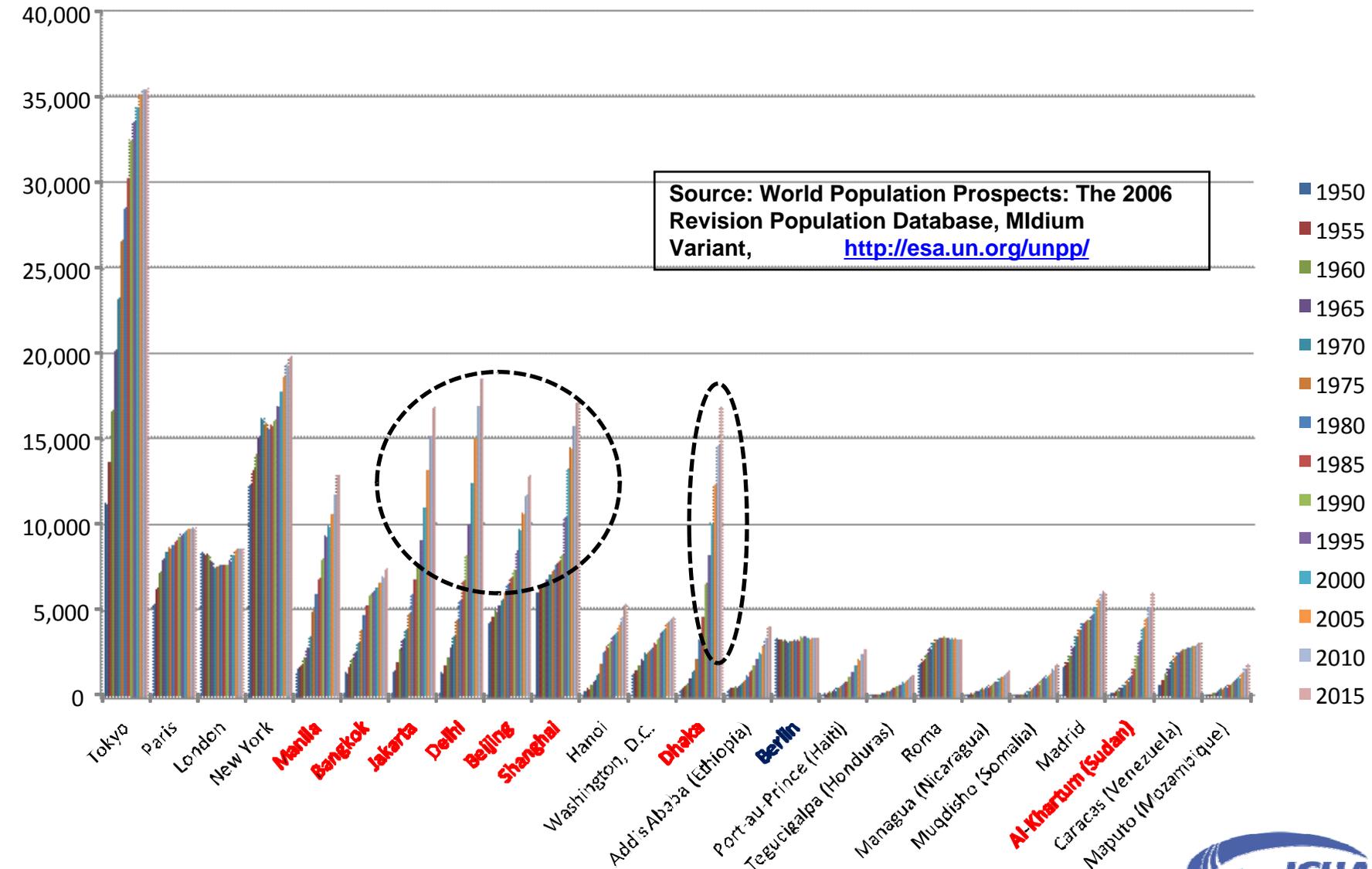
- ☞ Access to improved water,**
- ☞ Access to improved sanitation,**
- ☞ Security of tenure (the right to effective protection by the state against arbitrary, unlawful eviction),**
- ☞ Durability of housing (including living in a non-hazardous location) and**
- ☞ Sufficient living area (no overcrowding).**

person/Km²

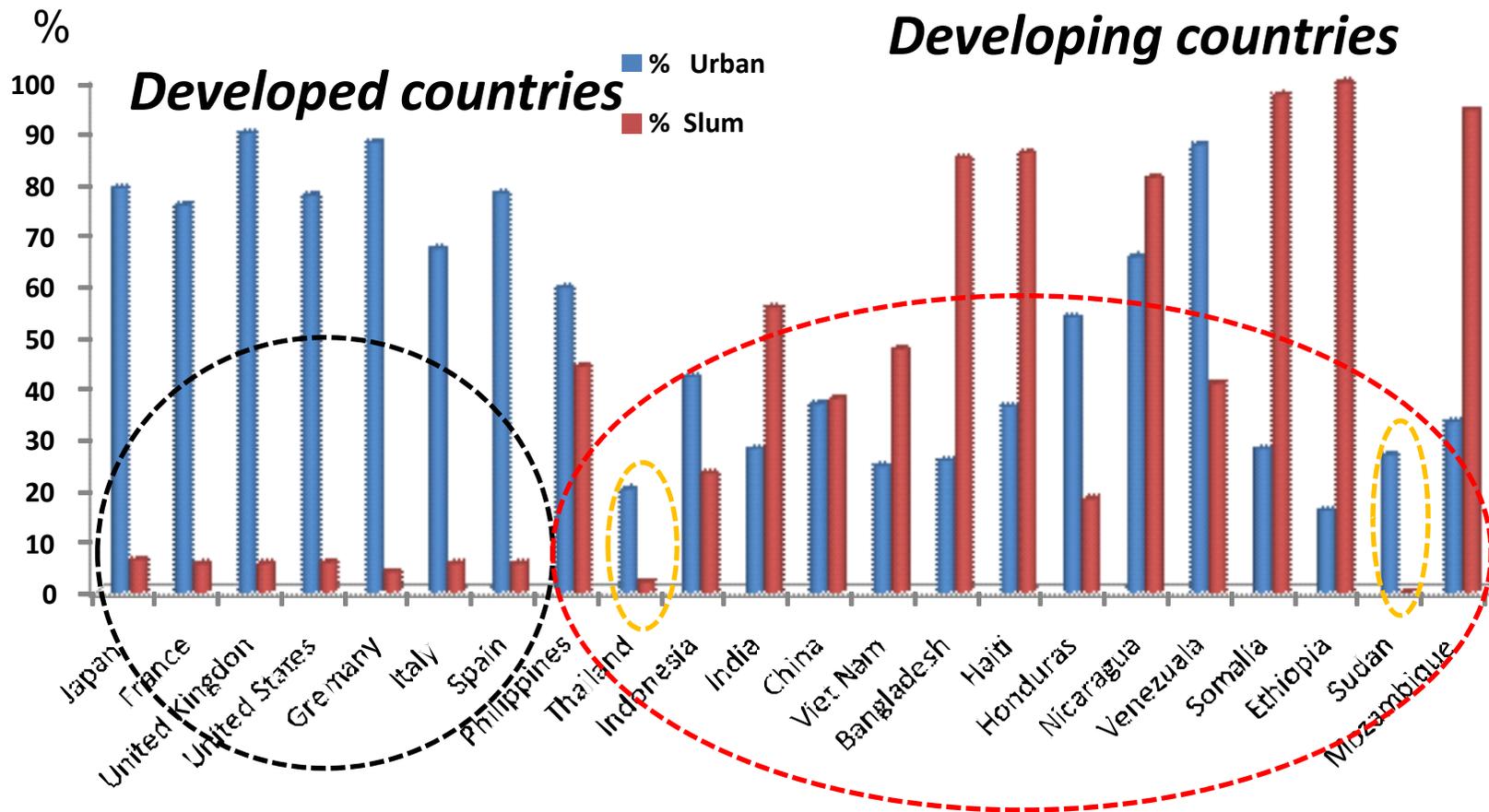


Population density increase in some selected countries since 1950 to 2015.

x 1000

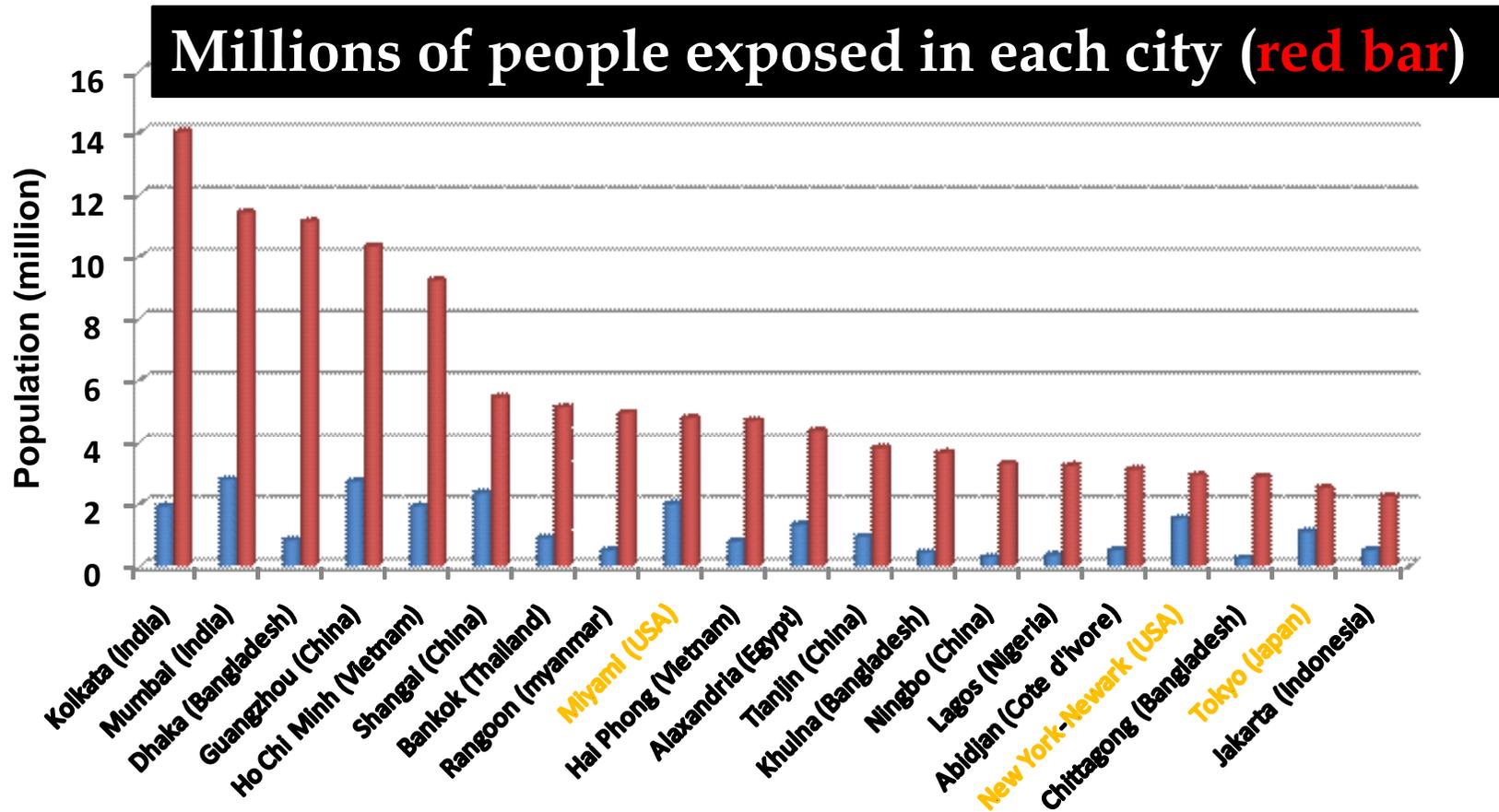


Major city population increase since 1950 to 2015



The percentage urban population of a country (blue) and percent slums (red) population in urban areas.

Source: UN-HABITAT



Top 20 cities ranked in terms of population exposed to coastal flooding in the 2070 (bars in red). Source: Nicholls et al, 2007, COED, Paris



When flooded who suffers where? to what extent the slums are exposed/vulnerable?

is an unknown fact.....

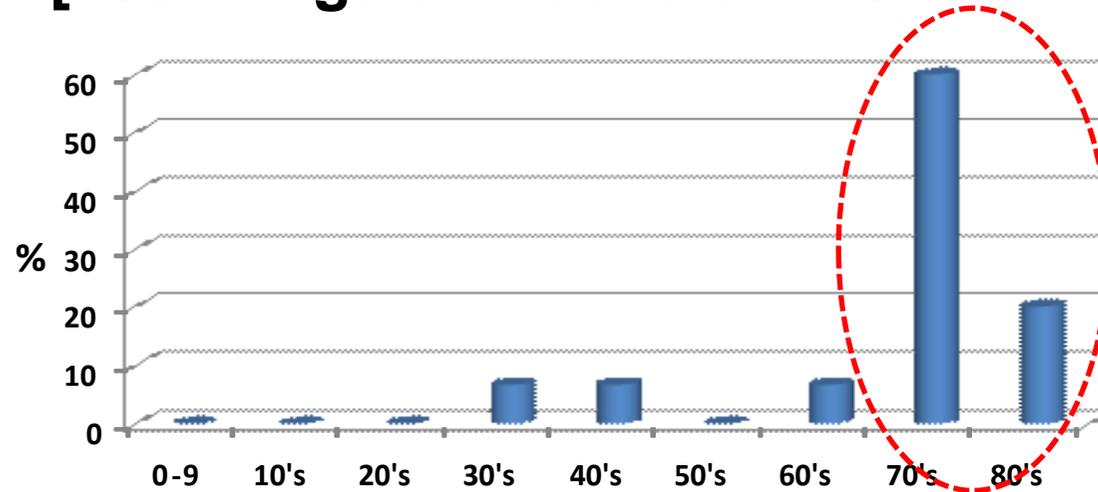
We have figures of fatalities but not always categorized into different groups or age classes....

Local realities are....

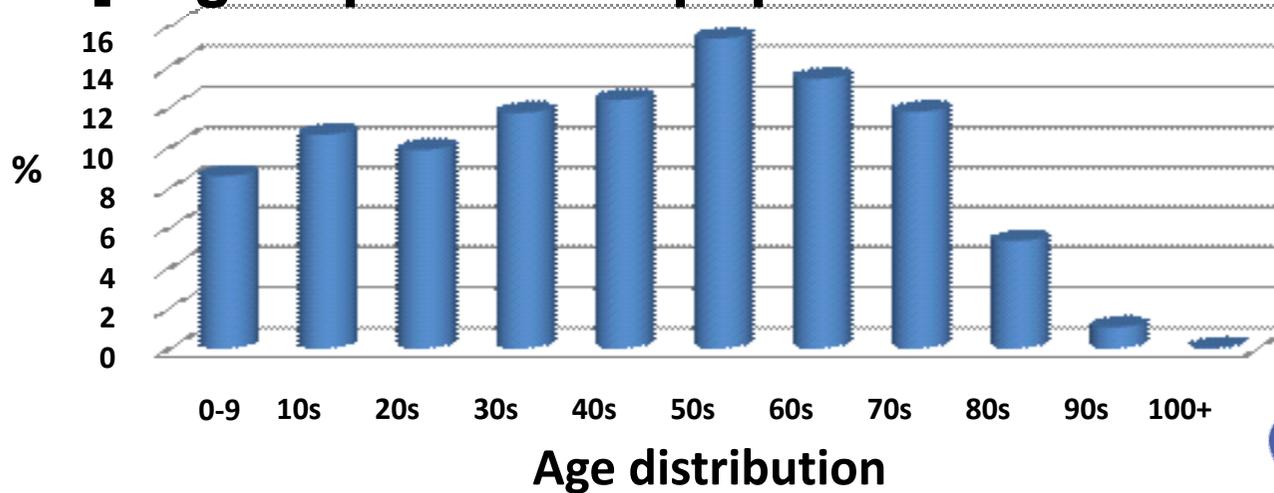


[2004 Niigata flood fatalities distribution]

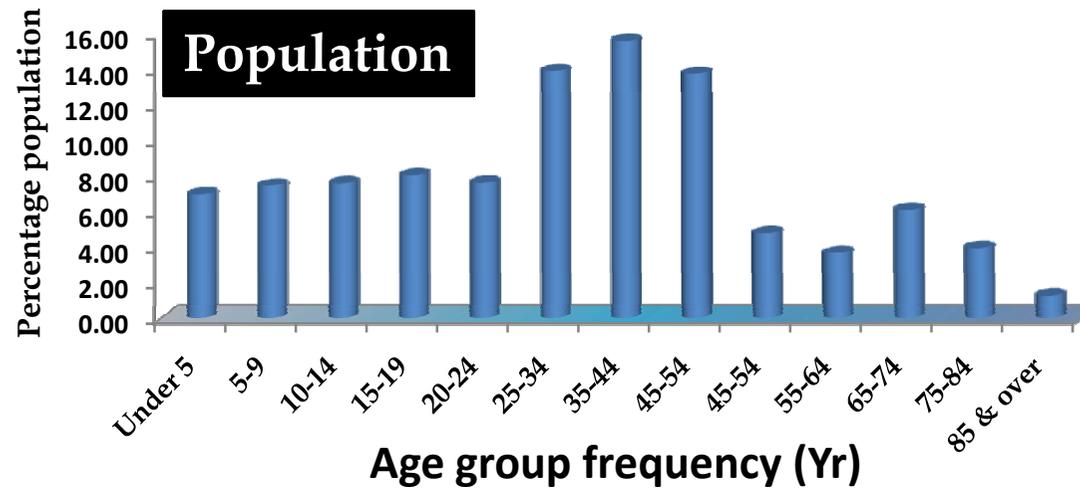
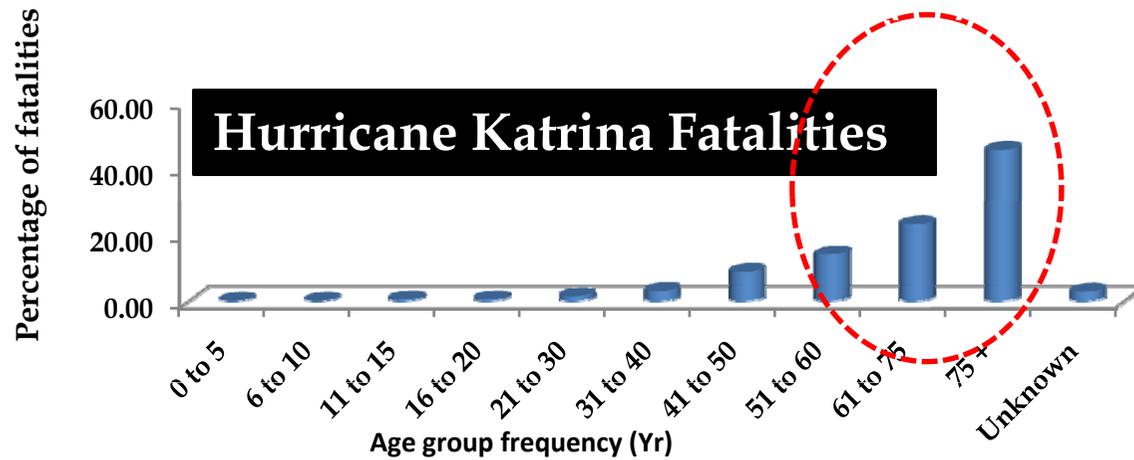
Developed country
JAPAN



[Niigata prefecture population distribution]



Developed country example
USA

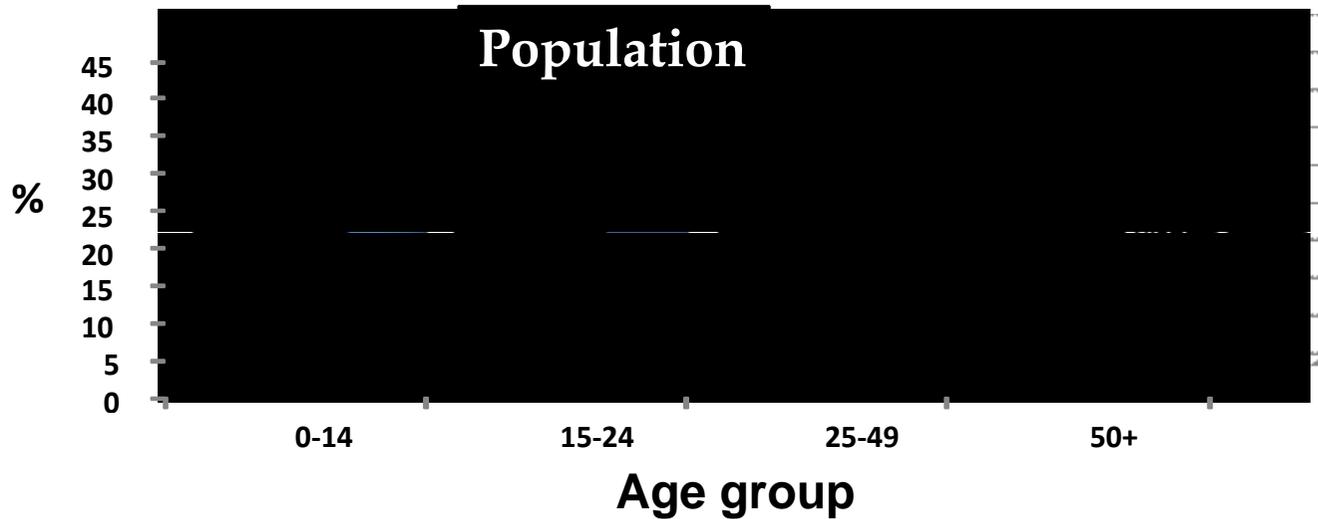
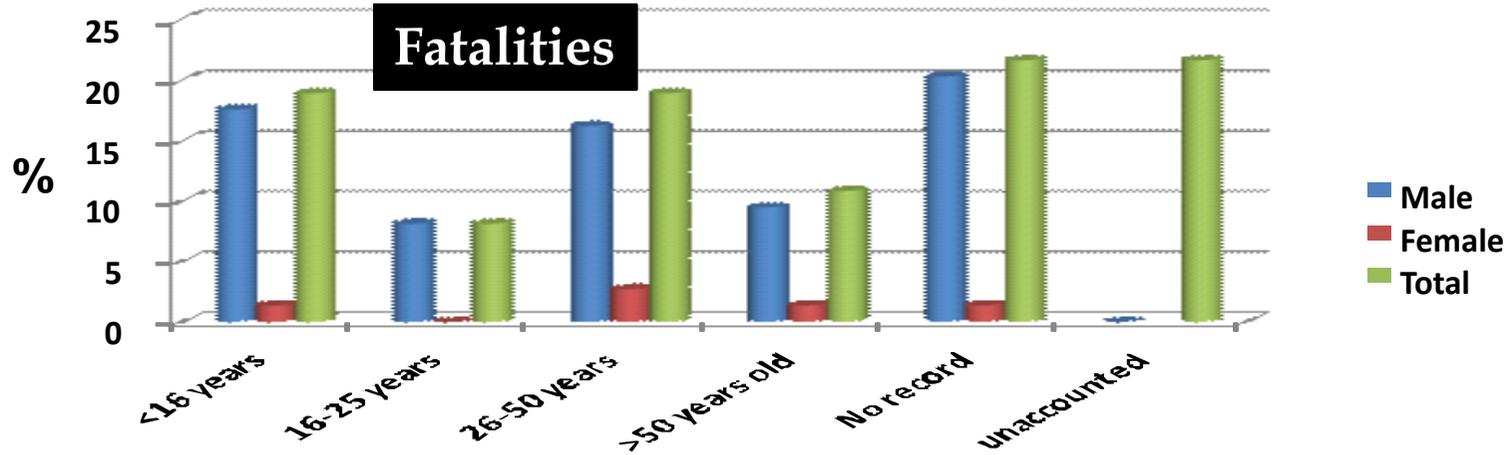


The percentage frequency distribution of (A) fatalities and (B) total population of *8 parishes hit by Hurricane Katrina , New Orleans, USA (note a significant number of old fatalities in fig A)

*8 Parishes: East Baton Rouge, Jefferson, Orleans, Plaquemines, St. Bernard, St. John the Baptist, St. Tammany and Washington Parishes
Source: U.S. Census Bureau,

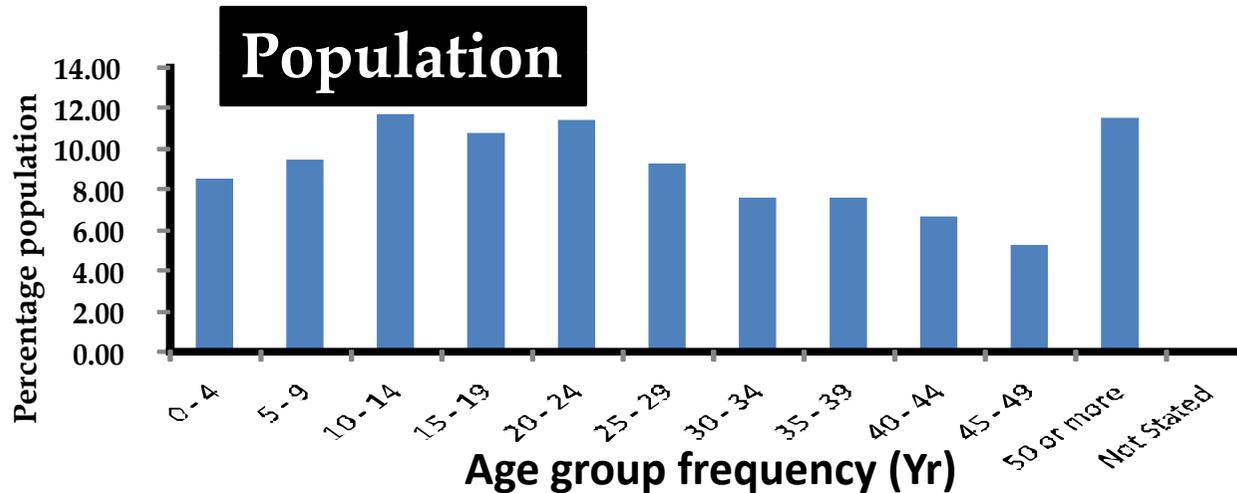
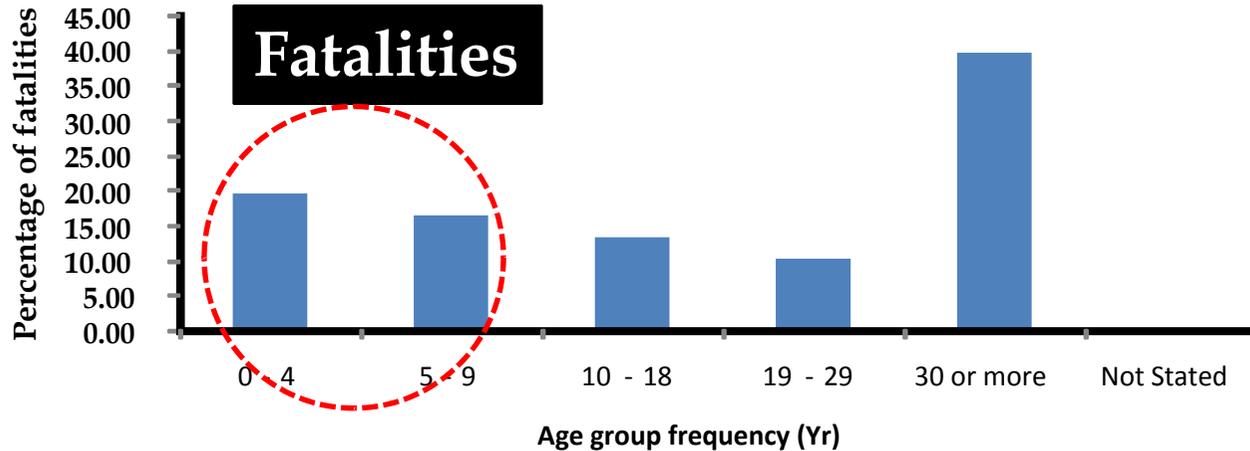


Developing country example
PAKISTAN



The age group and sex ratio of fatalities of 2001 flood [A] and population of Pakistan [B] in 1998.
 (note: the ratio of female is very low but usually we hear that women and children are most vulnerable)
 Source: JICA Report (A) and UN-population

Developing country example
SRI LANKA



The percentage frequency distribution of (A) fatalities of 2004 Indian Ocean Tunami and (B) total population of a small village in Ampara district, Sri Lanka. Note more than 35% of the victims are children less than 10 years old.

Data source: Source: Final Report - Census on the Buildings and People Affected by the Tsunami Disaster - 2004, Department of Census and Statistics of Sri Lanka



Finally:

there is a grave need to study the disaster vulnerability of slums especially against floods because most of the slums are located 1) along low lying flood plains in megacities and 2) coastal cities

grouping fatalities into various age groups gives us an idea that what group of people are exposed and vulnerable in which locality, country or region. With this information we will be able to recognize fatalities pattern that are linked to local economic development which may help coin future development planning; but the data until today is very scarce and unreliable thus we need to do an intensive study on these themes....

➤ last but not the least, I like to emphasize that slums population increase in low lying floodplains and high kids fatalities is one of the main factors for water-related disaster vulnerability in the cities and localities especially in developing countries

➤ our examples clearly show that kids are affected in developing countries whereas elderly in developed countries but is not sufficient to draw conclusions...

The way forward is a long and slippery dark trail.....we just started to collect basic information and considering further investigations.....

Thank you



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