



Hydro-Meteorological Disasters and their Impact on Sustainable Development : Asian Perspective

**-A Holistic Approach to Disaster Reduction &
Response for Sustainable Development Water
Resource Management-**

**December 13-14, 2004, ICLR, University of Western
Ontario, London, Canada**

**Dr. M. S. SriGowri Sanker
Researcher**

**Asian Disaster Reduction Center, Kobe, Japan
COE Researcher
Kobe University, Japan**

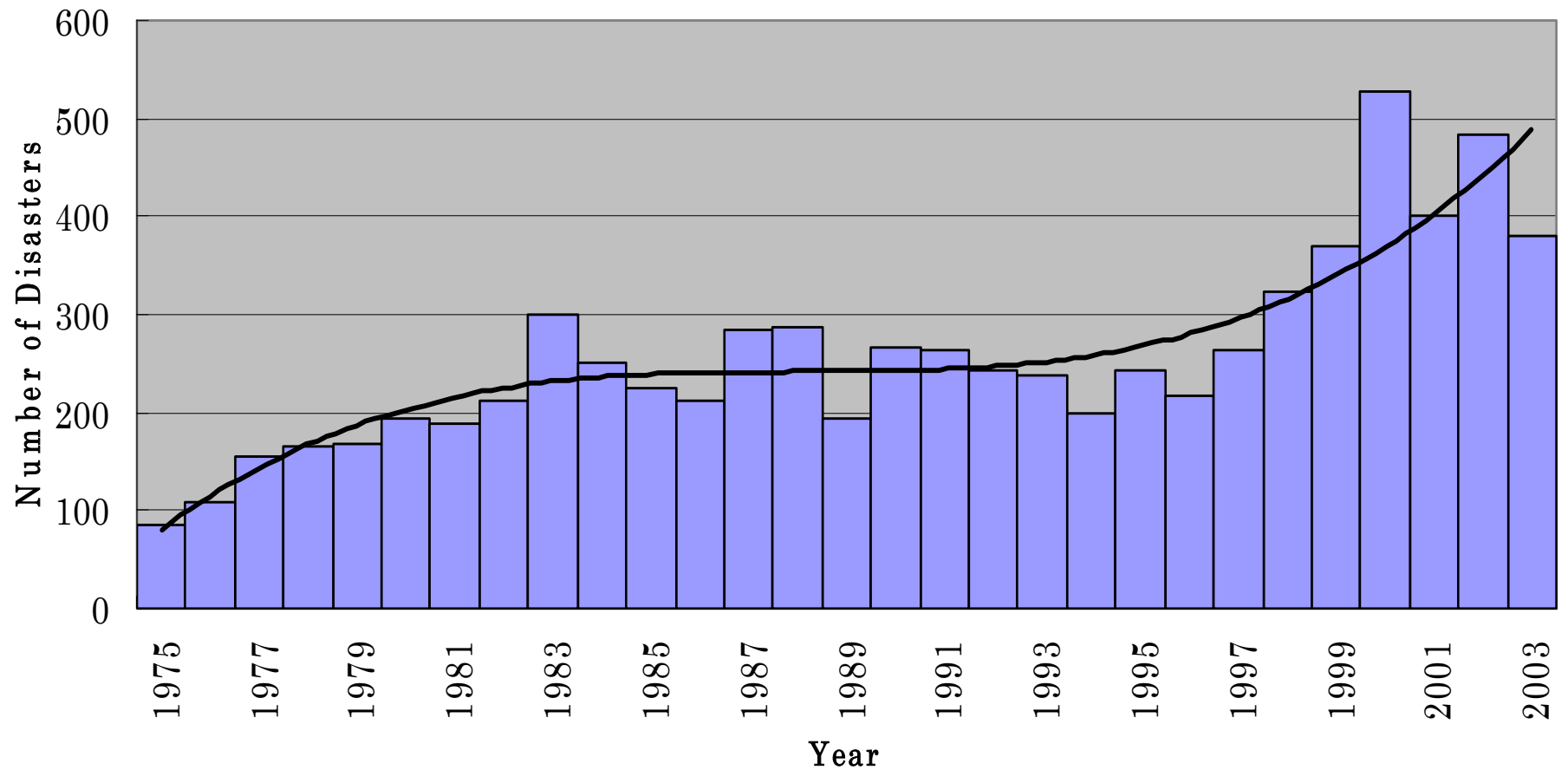
ADRC Member Countries : 24

Advisory Countries : 5





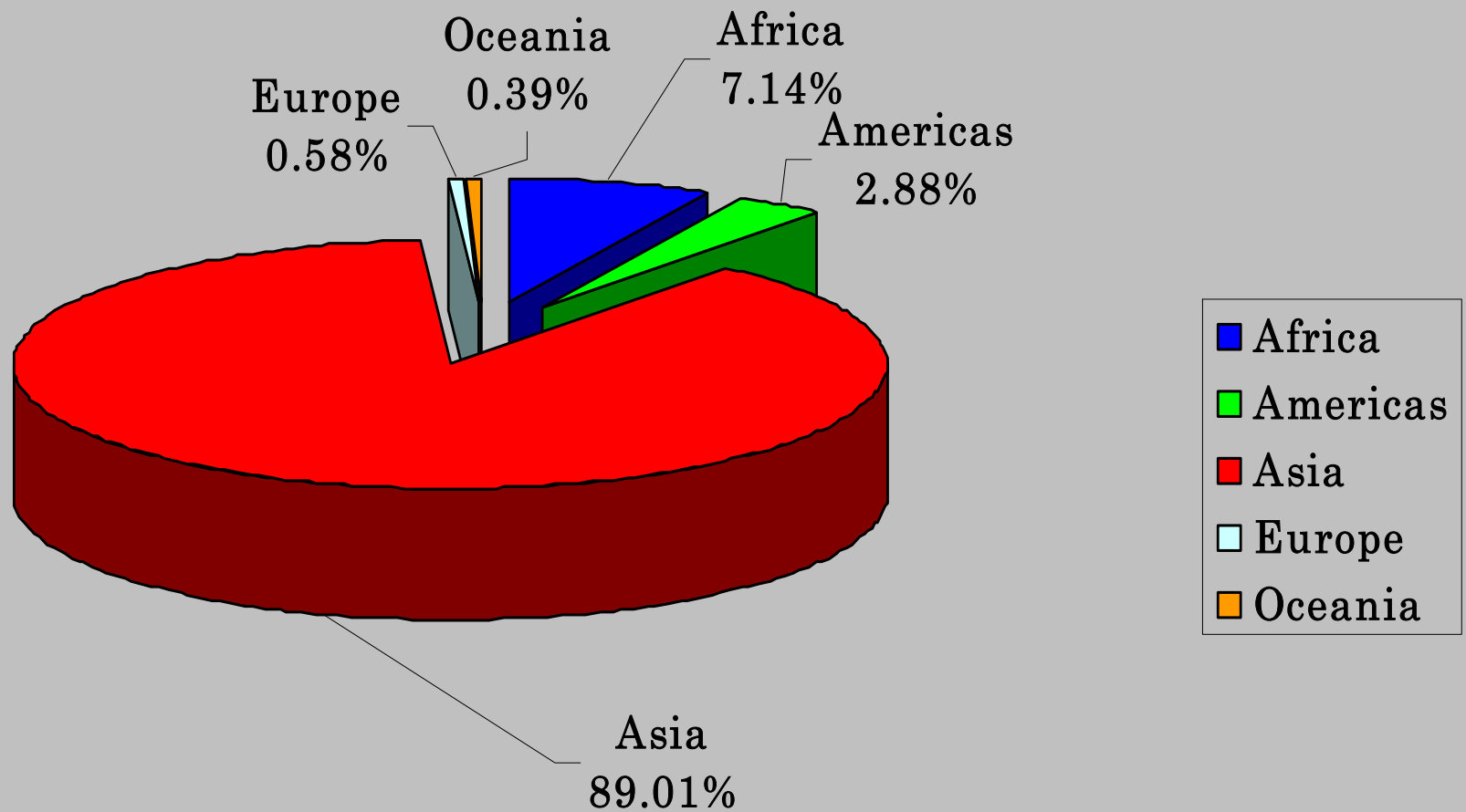
Number of Disasters (1975-2003)



Source: ADRC, Japan and CRED-EMDAT, Universite Catholique de Louvain, Brussels, Belgium, 2003



Totally Affected People by Natural Disasters (World) (1975-2003)





Summary of Natural Disasters (1975-2003)

	Number of Disasters Occurred	Number of Killed	Number of Totally Affected People	Amount of Damage (1,000 US\$)
World	7,455	1,852,187	5,038,727,744	993,574,838
Asia	2,783 (37.33%)	934,108 (50.43%)	4,184,967,385 (89.01%)	464,828,065 (46.78%)

Source: ADRC, Japan

CRED-EMDAT, Universite Catholique de Louvain, Brussels, Belgium, 2003



The Challenge we face in Asia

Disaster Reduction is a **MUST** for Sustainable Development in Asia

- A single disaster can wipe out annual GDP of a country.
- Natural Disasters can be the biggest obstacle to social security of a country and to the development initiatives.

Ratio of Amount of Damage to GDP (Asia) (1975-2002)

Rank	Country	ISO	Disaster	Year	Month	Day	Killed	TotAff	Damage (MnUSD)	GDP (MnUSD) BeforeYear	Damage/ GDP
1	Armenia	ARM	Earthquake	1988	12	7	25,000	1,642,000	20,500	* 1 2,257	908.35%
2	Mongolia	MNG	Forest	1996	4		25	5,061	1,713	893	191.83%
3	Mongolia	MNG	Winter	2000	1		4	500,000	875	906	96.63%
4	Lao PDR	LAO	Storm	1993	7		8	120	302	1,128	26.79%
5	Nepal	NPI	Flood	1987	8		188	351,000	728	2,851	25.52%
6	Georgia	GEO	Earthquake	1991	4	29	270	251,500	1,700	7,738	21.97%
7	Mongolia	MNG	Forest	1990	5				110	* 2 524	21.01%
8	Yemen, Rep	YMD	Flood	1982	3	29	482	350,000	975	* 1 4,828	20.20%
9	Nepal	NPI	Earthquake	1980	7	29	100	275,600	245	1,851	13.23%
10	Tajikistan	TJK	Flood	1992	5	25	1,346	63,500	300	2,536	11.83%
11	Jordan	JOR	Cold wave	1992	2	8	15		400	4,193	9.54%
12	Bangladesh	BGD	Flood	1988	8		2,379	73,000,000	2,137	23,781	8.99%
13	Tajikistan	TJK	Flood	1993	5	8	5	75,357	149	1,903	7.83%
14	Indonesia	IDN	Forest	1997	9		6	32,000	17,000	227,370	7.48%
15	Afghanistan	AFG	Flood	1988	6		6,345	166,831	260	* 3 3,479	7.47%
16	Bangladesh	BGD	Flood	1974	7		28,700	38,000,000	579	8,067	7.18%
17	Georgia	GEO	Drought	2000	8			696,000	200	2,803	7.13%
18	Pakistan	PAK	Flood	1973	8		474	4,800,000	662	9,309	7.11%
19	Iran, Islamic Rep	IRN	Earthquake	1990	6	1	40,000	605,000	8,000	122,952	6.51%
20	Tajikistan	TJK	Flood	1998	4	23	57	43,974	66	1,121	5.92%
21	Bangladesh	BGD	Cyclone	1991	4	30	138,866	15,438,849	1,780	30,129	5.91%
22	Nepal	NPI	Flood	1993	8	23	1,048	553,268	200	3,401	5.88%
23	Armenia	ARM	Drought	2000	6		0	297,000	100	1,845	5.42%
24	Tajikistan	TJK	Drought	2000	5			3,000,000	57	1,087	5.25%
25	Kyrgyz Republic	KGZ	Earthquake	1992	8	19	54	146,900	130	2,544	5.11%
26	Turkey	TUR	Earthquake	1999	11	12	845	209,948	10,000	199,580	5.01%
27	Mongolia	MNG	Flood	1966	7	11	57	270,000	25	* 2 524	4.78%
28	Bangladesh	BGD	Flood	1998	7	8	140	15,000,050	2,000	42,319	4.73%
29	Pakistan	PAK	Flood	1976	8	2	338	5,566,000	505	11,340	4.45%
30	China	CHN	Earthquake	1976	7	27	242,000	164,000	7,000	161,162	4.34%

Source: ADRC, Japan, based on EM-DAT, CRED, Belgium and WDI, World Bank 2002



Regional Patterns of Disaster Impact (1975-2003)

		Disaster Classification							
World Region	Data	Geo Physical Disasters		Hydro Meteorological Disasters		Others		Grand Total	
Africa	Sum of Killed	8,221	1.45%	577,398	51.78%	108,428	64.32%	694,047	37.47%
	Sum of TotAff	1,671,523	1.94%	315,836,850	6.46%	42,183,999	62.66%	359,692,372	7.14%
	Sum of DamageUS ('000s)	8,325,608	2.61%	9,672,733	1.50%	102,430	0.35%	18,100,771	1.82%
Americas	Sum of Killed	66,561	11.71%	88,937	7.98%	14,496	8.60%	169,994	9.18%
	Sum of TotAff	12,907,358	15.01%	129,171,200	2.64%	2,974,130	4.42%	145,052,688	2.88%
	Sum of DamageUS ('000s)	58,526,032	18.32%	221,066,403	34.28%	5,670,700	19.36%	285,263,135	28.71%
Asia	Sum of Killed	481,972	84.79%	407,635	36.55%	44,501	26.40%	934,108	50.43%
	Sum of TotAff	68,315,578	79.46%	4,398,091,526	90.02%	18,560,281	27.57%	4,484,967,385	89.01%
	Sum of DamageUS ('000s)	215,348,490	67.41%	230,238,751	35.71%	19,240,824	65.69%	464,828,065	46.78%
Europe	Sum of Killed	8,694	1.53%	39,754	3.56%	754	0.45%	49,202	2.66%
	Sum of TotAff	2,795,915	3.25%	22,966,049	0.47%	3,526,439	5.24%	29,288,403	0.58%
	Sum of DamageUS ('000s)	34,347,376	10.75%	164,132,052	25.45%	3,115,249	10.64%	201,594,677	20.29%
Oceania	Sum of Killed	2,975	0.52%	1,459	0.13%	402	0.24%	4,836	0.26%
	Sum of TotAff	287,855	0.33%	19,358,242	0.40%	80,799	0.12%	19,726,896	0.39%
	Sum of DamageUS ('000s)	2,907,400	0.91%	19,718,784	3.06%	1,162,006	3.97%	23,788,190	2.39%
Total Sum of Killed		568,423	100.00%	1,115,183	100.00%	168,581	100.00%	1,852,187	100.00%
Total Sum of TotAff		85,978,229	100.00%	4,885,423,867	100.00%	67,325,648	100.00%	5,038,727,744	100.00%
Total Sum of DamageUS ('000s)		319,454,906	100.00%	644,828,723	100.00%	29,291,209	100.00%	993,574,838	100.00%

Source: CRED-EMDAT 2003, and ADRC, 2003.



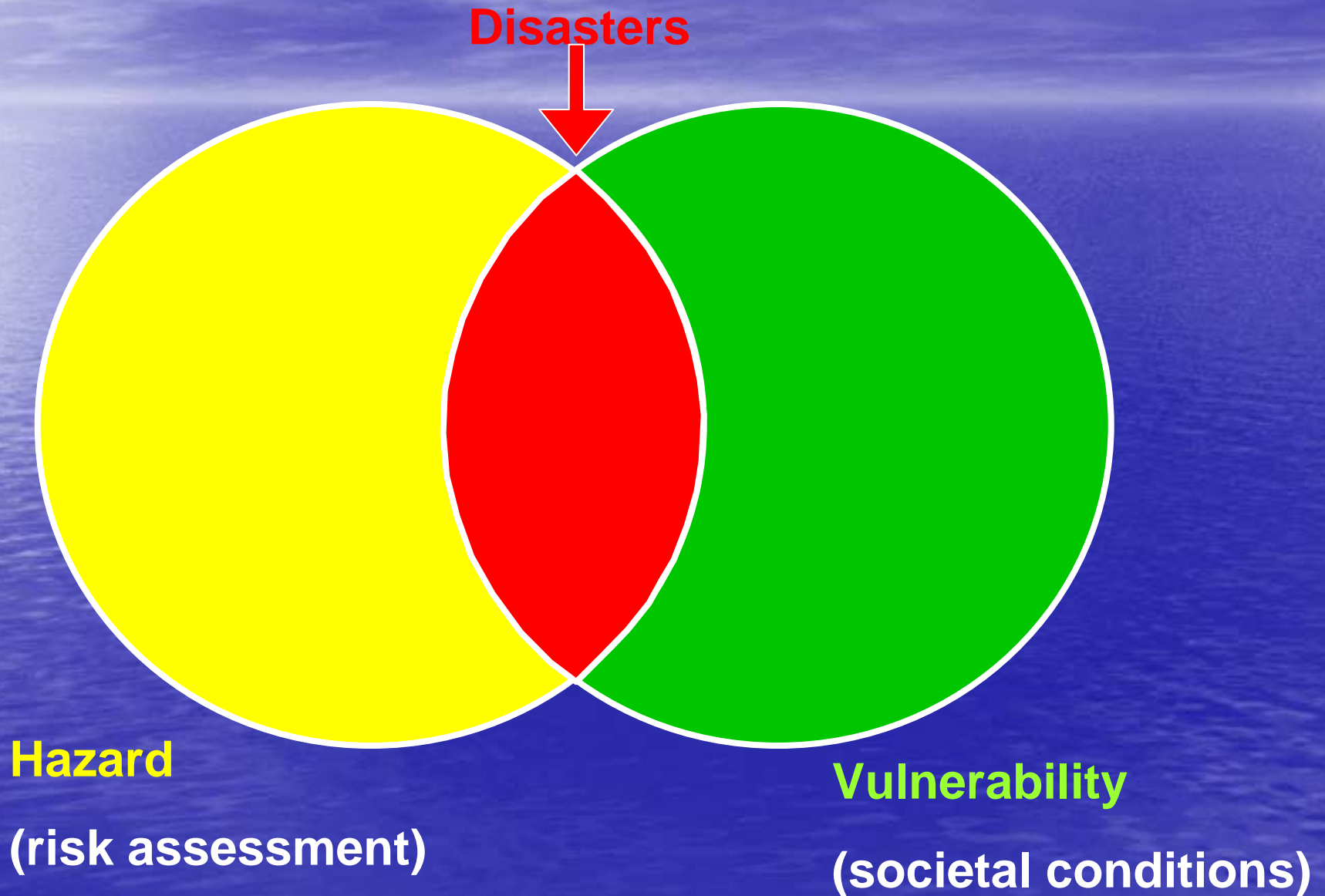
Tasks lying ahead for Asia

**Holistic Approach to Development
through Disaster Reduction**

-Towards Total Disaster Risk Management-

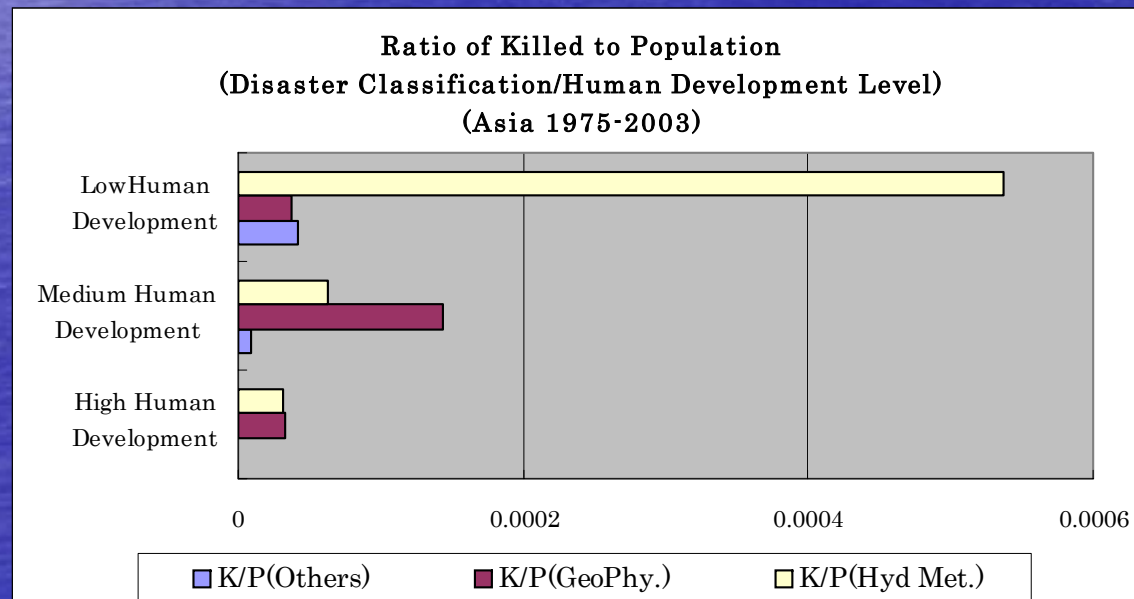
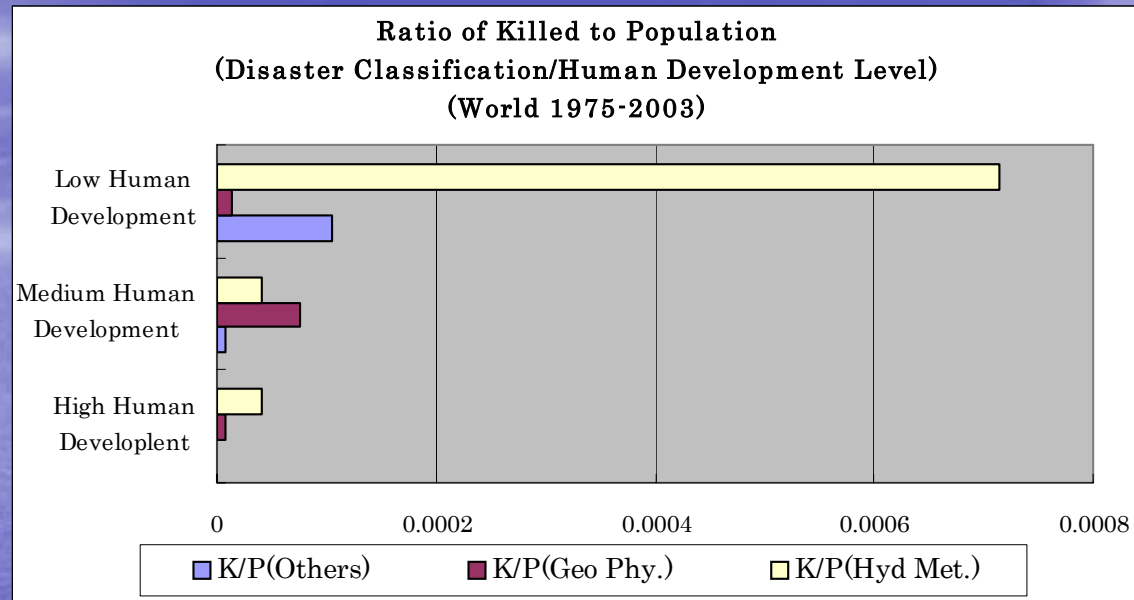


Hazards Confronting Vulnerable Communities Cause Disasters





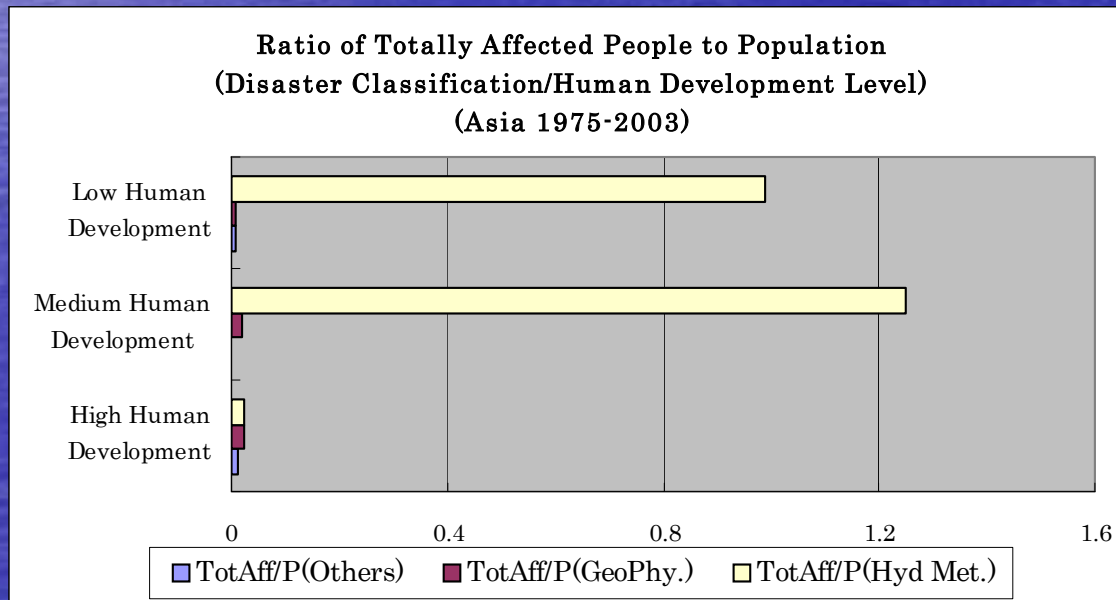
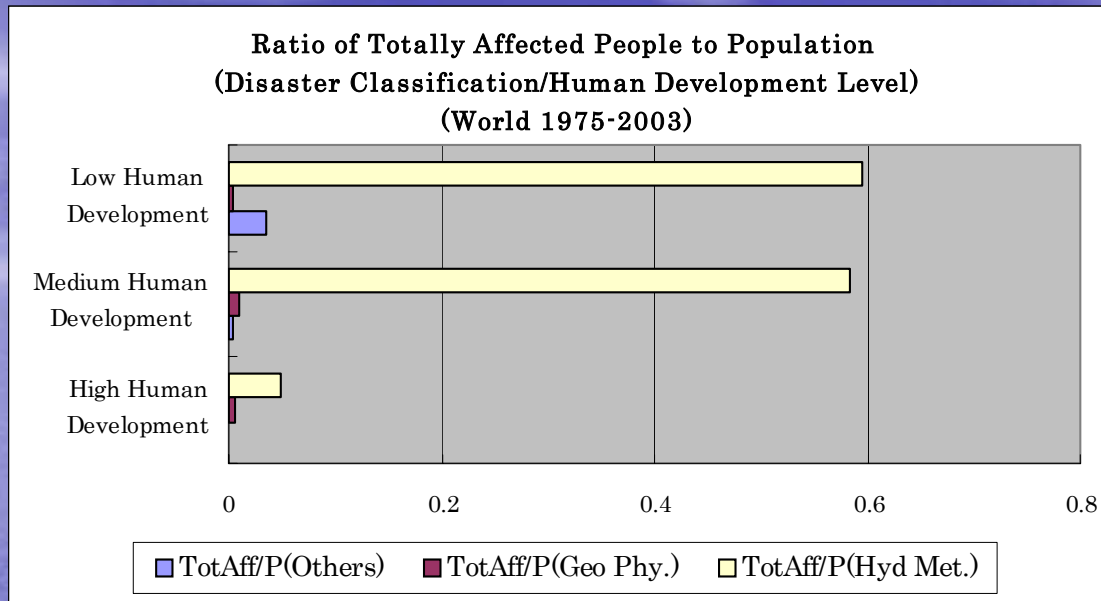
Human Development and Natural Disasters



Source: ADRC, Japan, based on EM-DAT, CRED, Belgium and WDI, World Bank 2003



Human Development and Natural Disasters

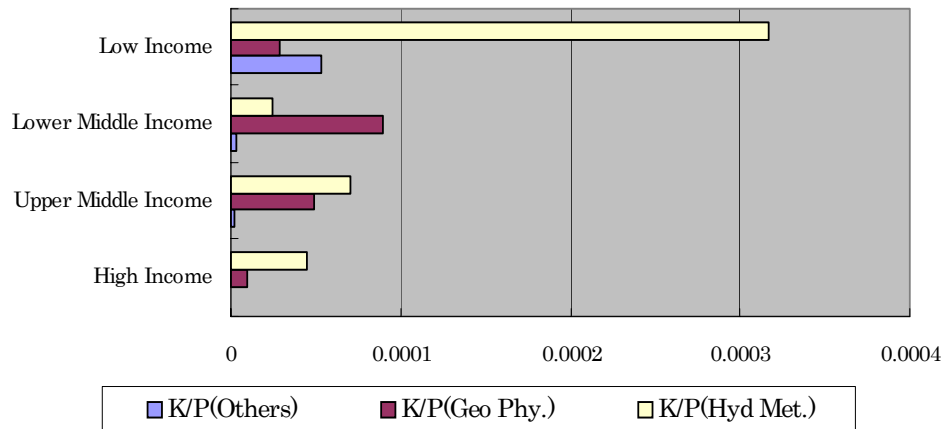


Source: ADRC, Japan, based on EM-DAT, CRED, Belgium and WDI, World Bank 2003

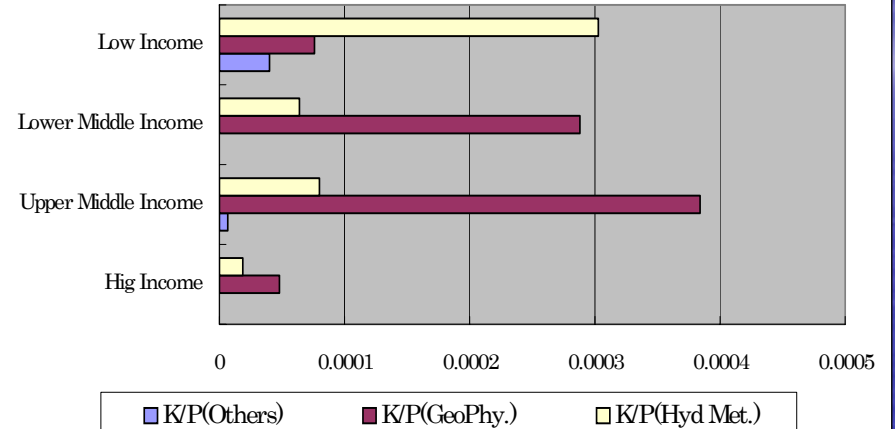


Disaster Impact on Economy

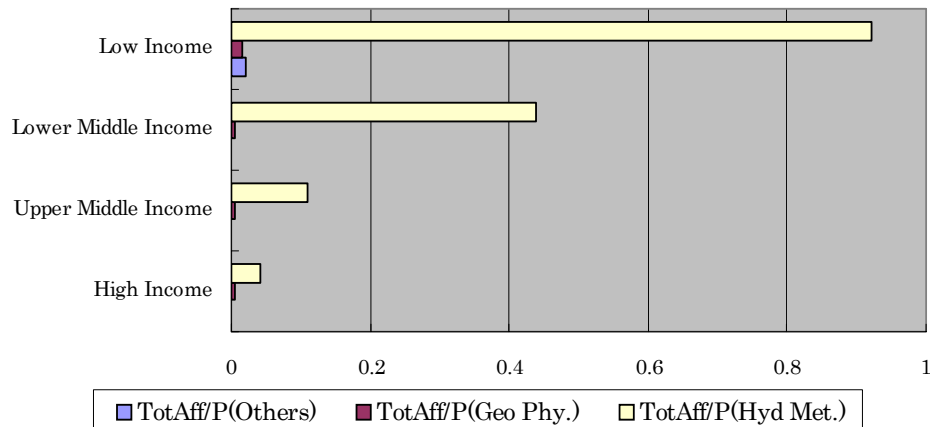
**Ratio of Killed to Population
(Disaster Classification/Income Level) (World 1975-2003)**



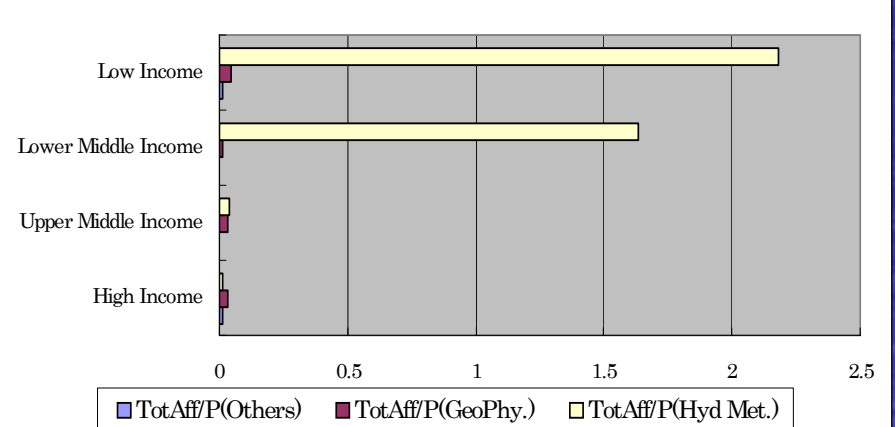
**Ratio of Killed to Population
(Disaster Classification/Income Level) (Asia 1975-2003)**



**Ratio of Totally Affected People to Population
(Disaster Classification/Income Level) (World 1975-2003)**



**Ratio of Totally Affected People to Population
(Disaster Classification/Income Level) (Asia 1975-2003)**

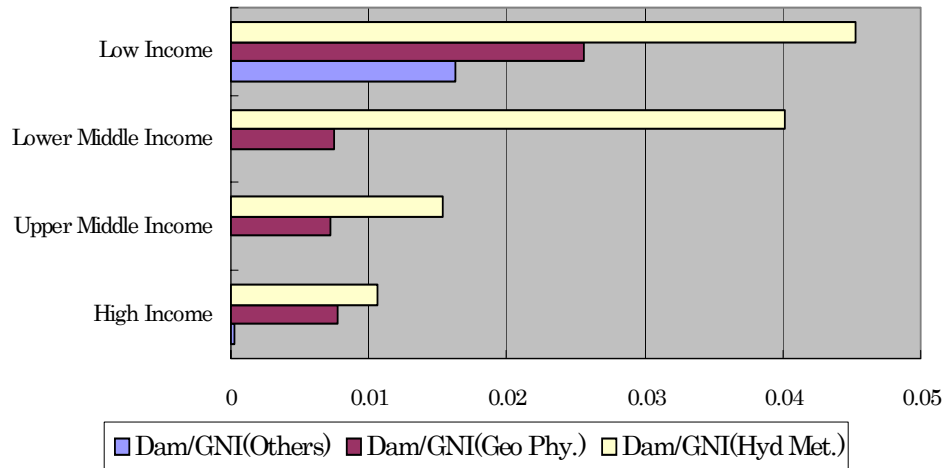


Source: ADRC, Japan, based on EM-DAT, CRED, Belgium and WDI, World Bank 2003

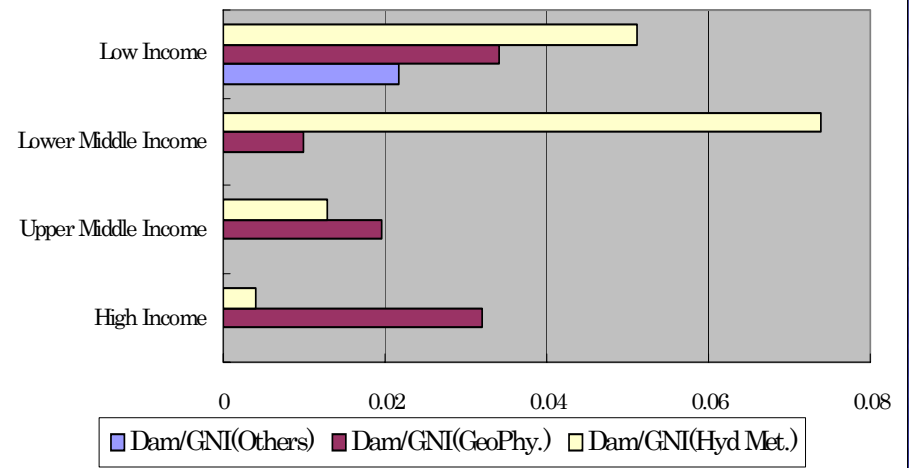


Disaster Impact on Economy and Human Development

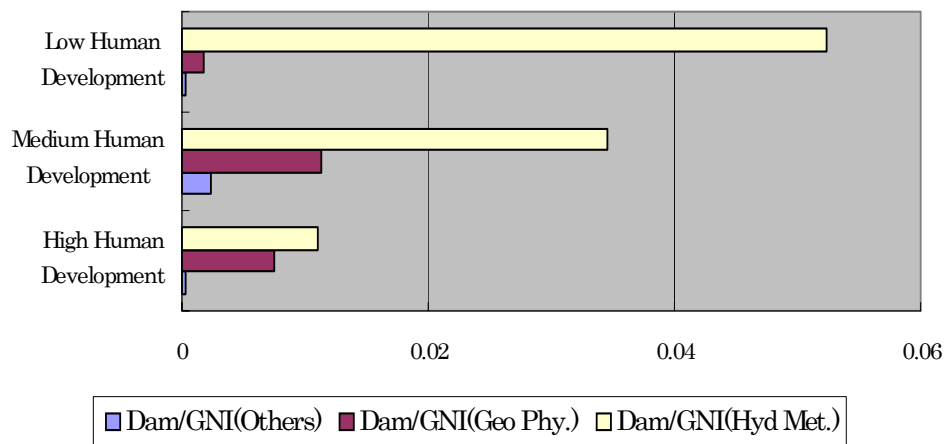
Ratio of Amount of Damage to GNI
(Disaster Classification/Income Level) (World 1975-2003)



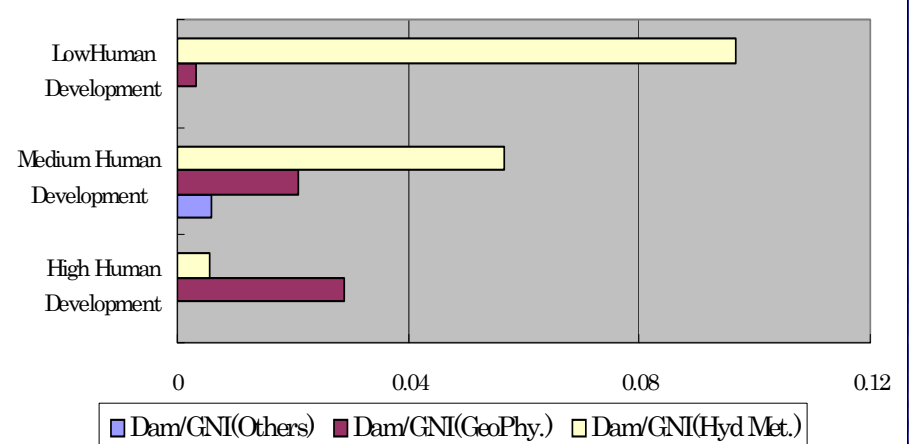
Ratio of Amount of Damage to GNI
(Disaster Classification/Income Level) (Asia 1975-2003)



Ratio of Amount of Damage to GNI
(Disaster Classification/Human Development Level)
(World 1975-2003)



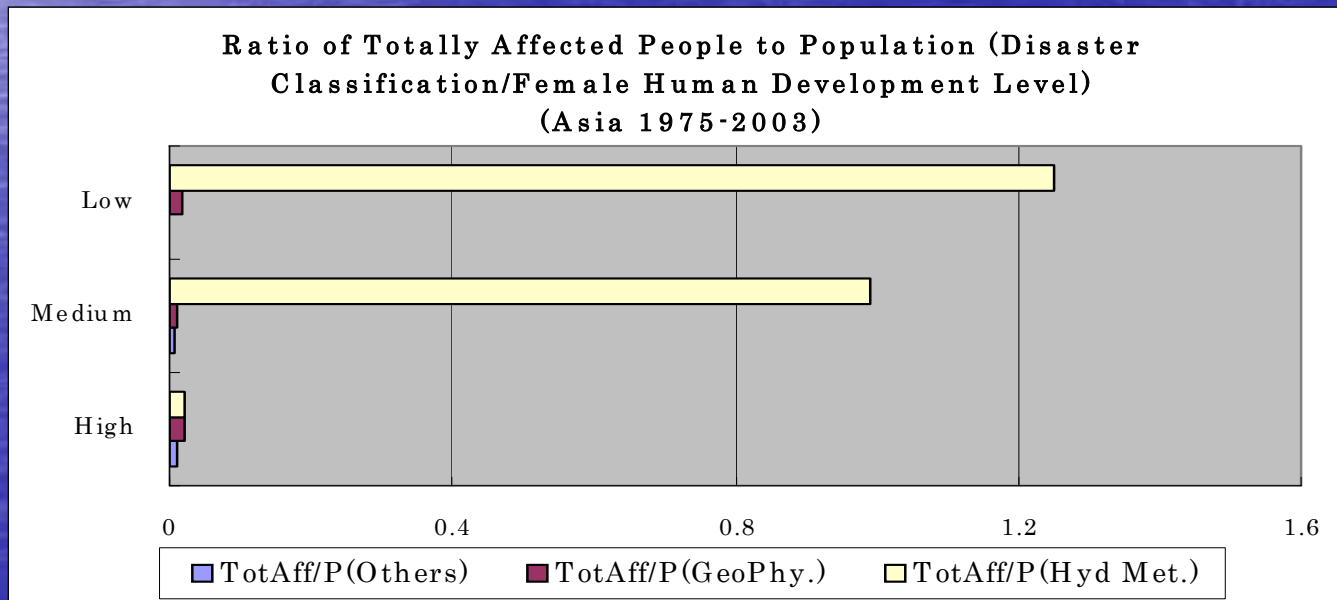
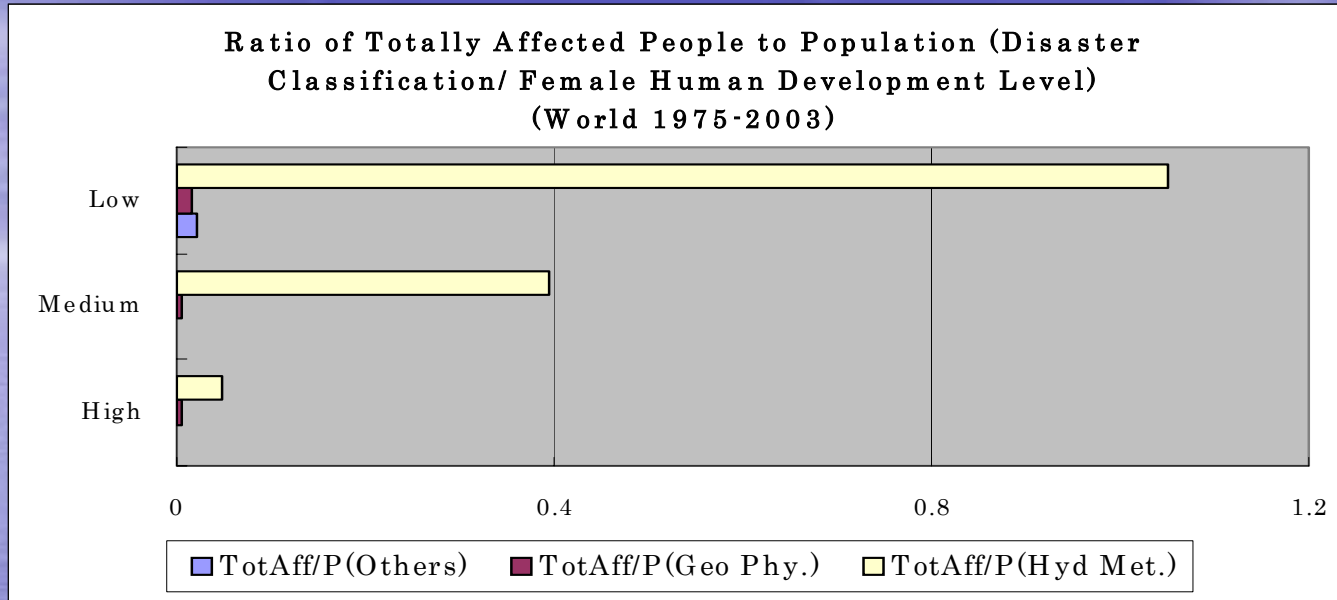
Ratio of Amount of Damage to GNI
(Disaster Classification/Human Development Level)
(Asia 1975-2003)



Source: ADRC, Japan, based on EM-DAT, CRED, Belgium and WDI, World Bank 2003



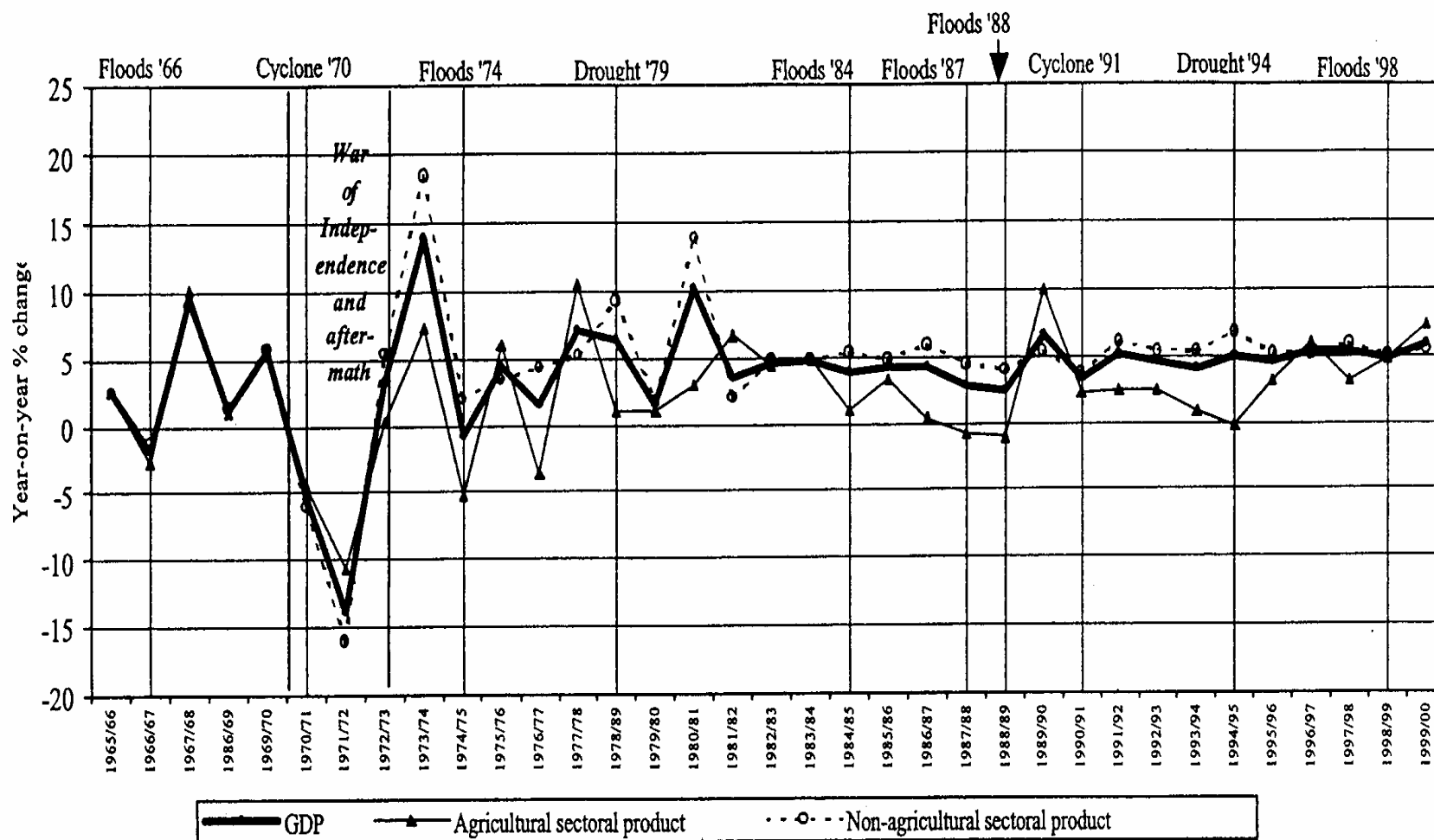
Gender and Disaster Impacts



Source: ADRC, Japan, based on EM-DAT, CRED, Belgium and WDI, World Bank 2003

Bangladesh: GDP and Disaster Impacts

Bangladesh - real annual fluctuations in GDP, agricultural and non-agricultural sector product, 1966-2000

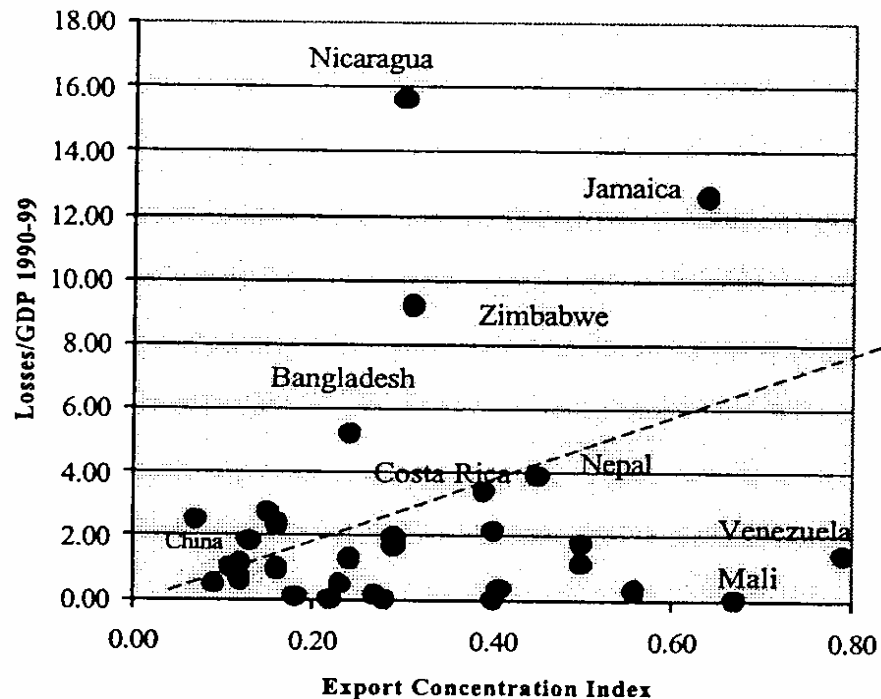


Source: Benson and Clay, 2002



Economic Losses and Export Concentration

Economic Losses and Export Concentration

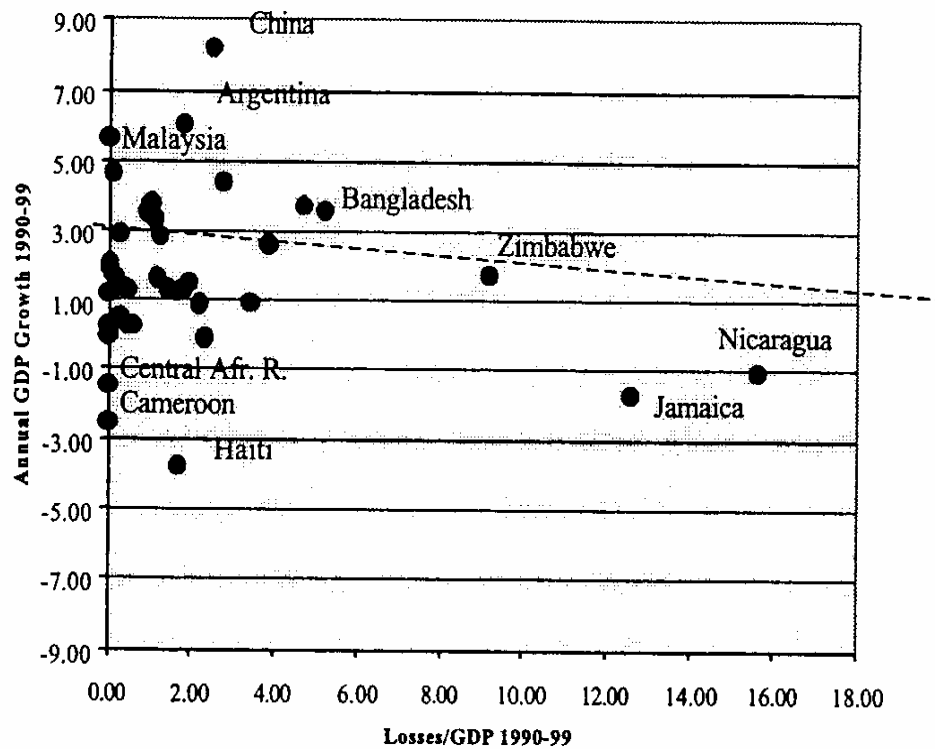


Sources: Centre for Research on the Epidemiology of Disasters (CRED), United Nations Conference on Trade and Development (UNCTAD), and the World Factbook.



Economic Growth and Catastrophic Losses

The Relationship Between Economic Growth and Catastrophe Losses
(1990-2000)

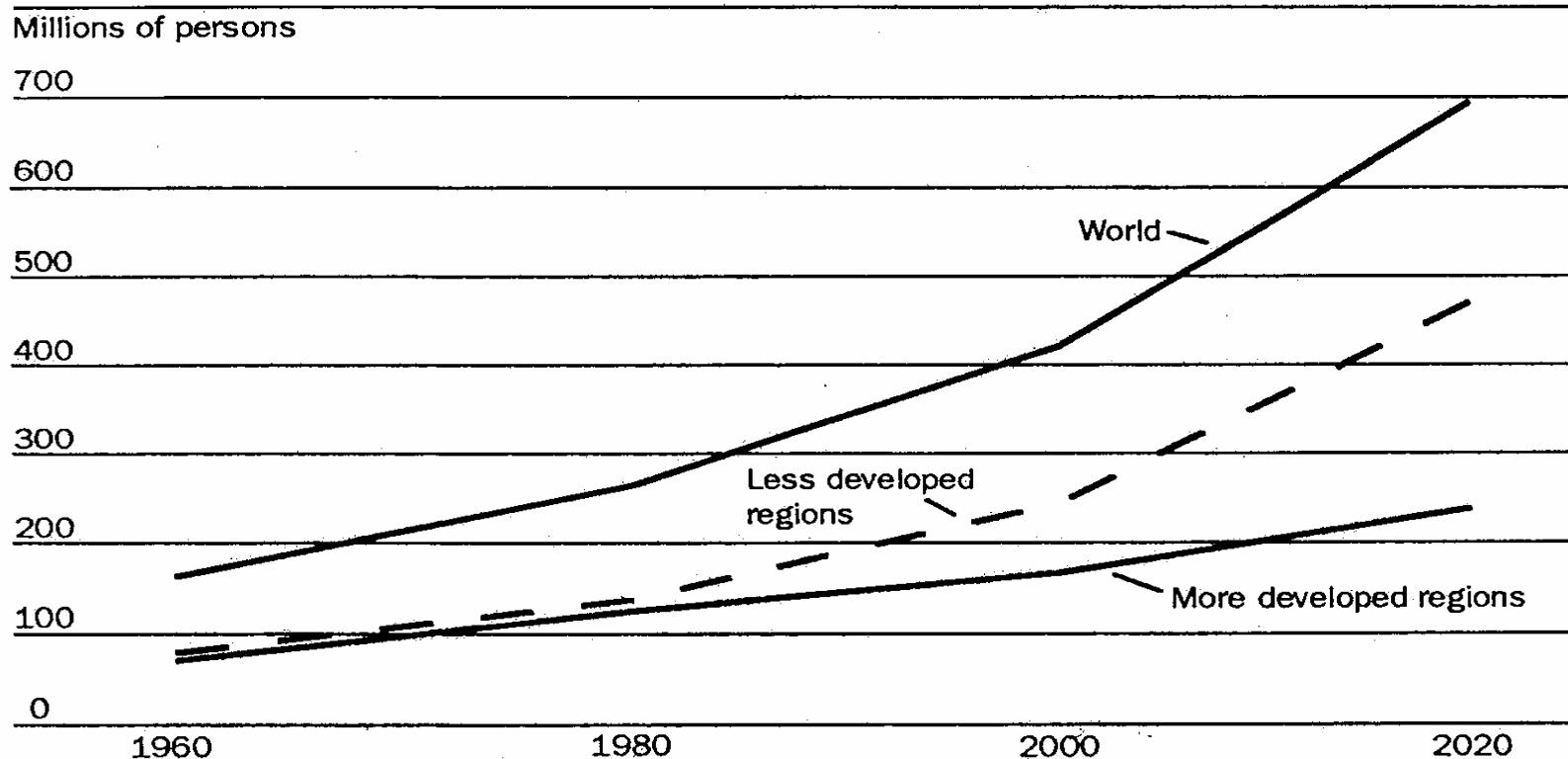


Sources: Centre for Research on the Epidemiology of Disasters (CRED), World Factbook, and World Bank data.



Aged Population Growth Pattern

Trends In Population Age Sixty-Five And Older, By Region, Selected Years, 1960–2020

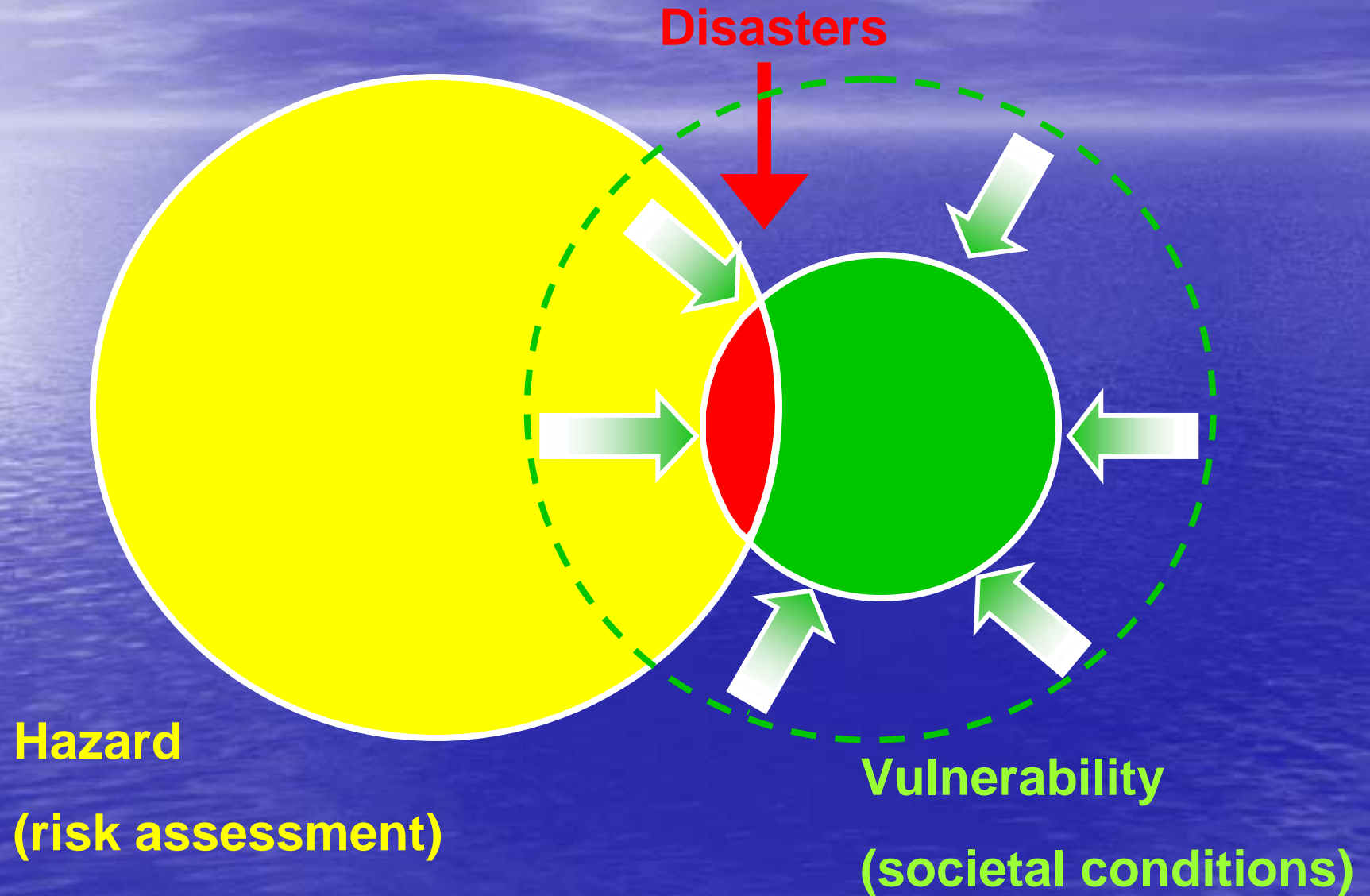


SOURCE: Adapted from United Nations, *World Population Prospects: The 1998 Revision, Volume 1: Comprehensive Tables* (New York: United Nations Secretariat, 1998).

NOTES: As data for years 2000 and 2020 are projections, the UN calculates three scenarios: high-fertility, medium-fertility, and low-fertility variants. The numbers here use the medium variant, which assumes that the annual population growth rate will continue declining from 1.33 percent in 1995–2000 to 0.34 percent in 2045–2050. More developed regions are North America, Japan, Europe, and Australia/New Zealand. Less developed regions are all regions of Africa; Latin America and the Caribbean; Asia (excluding Japan); and Melanesia, Micronesia, and Polynesia.



Less Disasters





How ?



Strategies for Total Disaster Risk Management

Coordination Mechanism

Collaboration among Stakeholders

Information

Public Awareness

Investment for Disaster Reduction

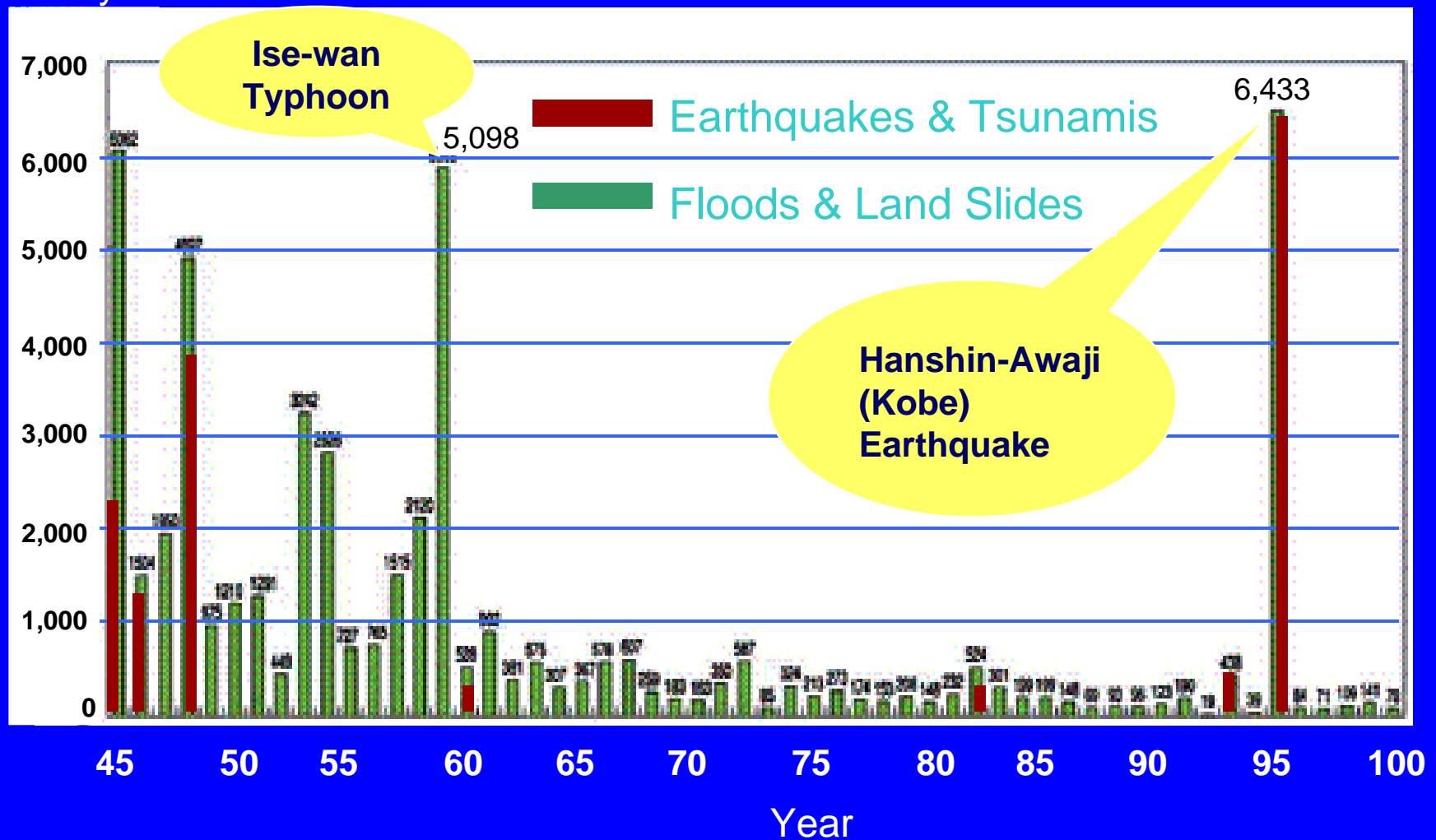


Japanese Experience

Case of the Typhoon & Flood Disaster Management

Japanese Disasters by Mortalities

Mortality





The Holistic Approach to cope with Disasters

The 1959 Ise-wan Typhoon was the Epoch-making Turning Point

Response oriented approach to preventive approach

Individual approach to comprehensive multi-sectoral approach

Investment for disaster reduction



Disaster Countermeasures Basic Act 1961

- Central Disaster Prevention Council chaired by the Prime Minister
National Coordinating Body with all relevant Ministers
- Annual Gov't Official Report on Disaster Countermeasures
The Cabinet must officially report the disaster countermeasures to the National Diet
- Formulation of "Natural Basic Disaster Management Plan for Disaster Prevention"
 - The Disaster Management Operation Plan (Sectoral)
 - The Local Disaster Management Plan

Designation of "Disaster Prevention Day"

Public Awareness Programs



-Continued-

Emphasis on Strong Link of Information Flow among Various Sectors

- Stronger Coordination among various gov't sectors
- Involvement of Semi-Public Sectors
Electric Companies, Railway Companies, Public Broadcasting etc.

Investment for Disaster Prevention

- Flood Control & Land Conservation Works
- Forest Conservation
- Meteorological Observation
 - Mt. Fuji Rader Site
 - Meteo-Sats
- Emergency Telecommunication Systems



Great Success in decreasing Typhoon & Flood Casualties



Coordination Mechanism



Public Forum

(24 August 2004)

**“Recovery from Catastrophic Disaster
- towards a safer world for all - ”**



His Imperial Highness the Crown Prince at the Public Forum

Risk communication to build social consensus on disaster risks

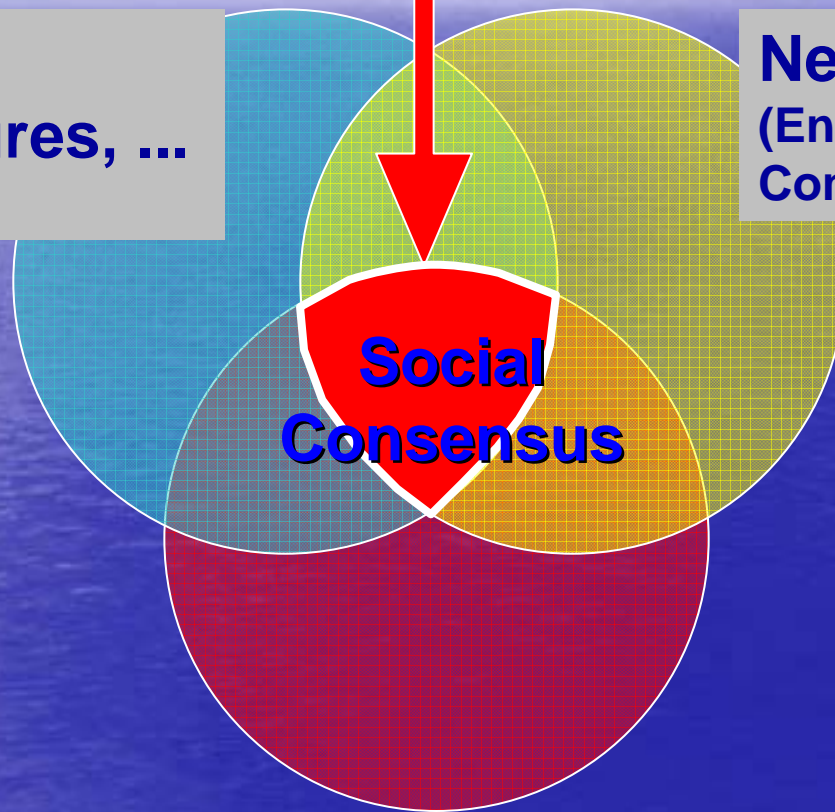
Communication on Disaster Risks

**Policy,
Countermeasures, ...
(Government)**

**Needs & Experiences
(Enterprises, Mass media,
Communities, Individuals, ...)**

**Social
Consensus**

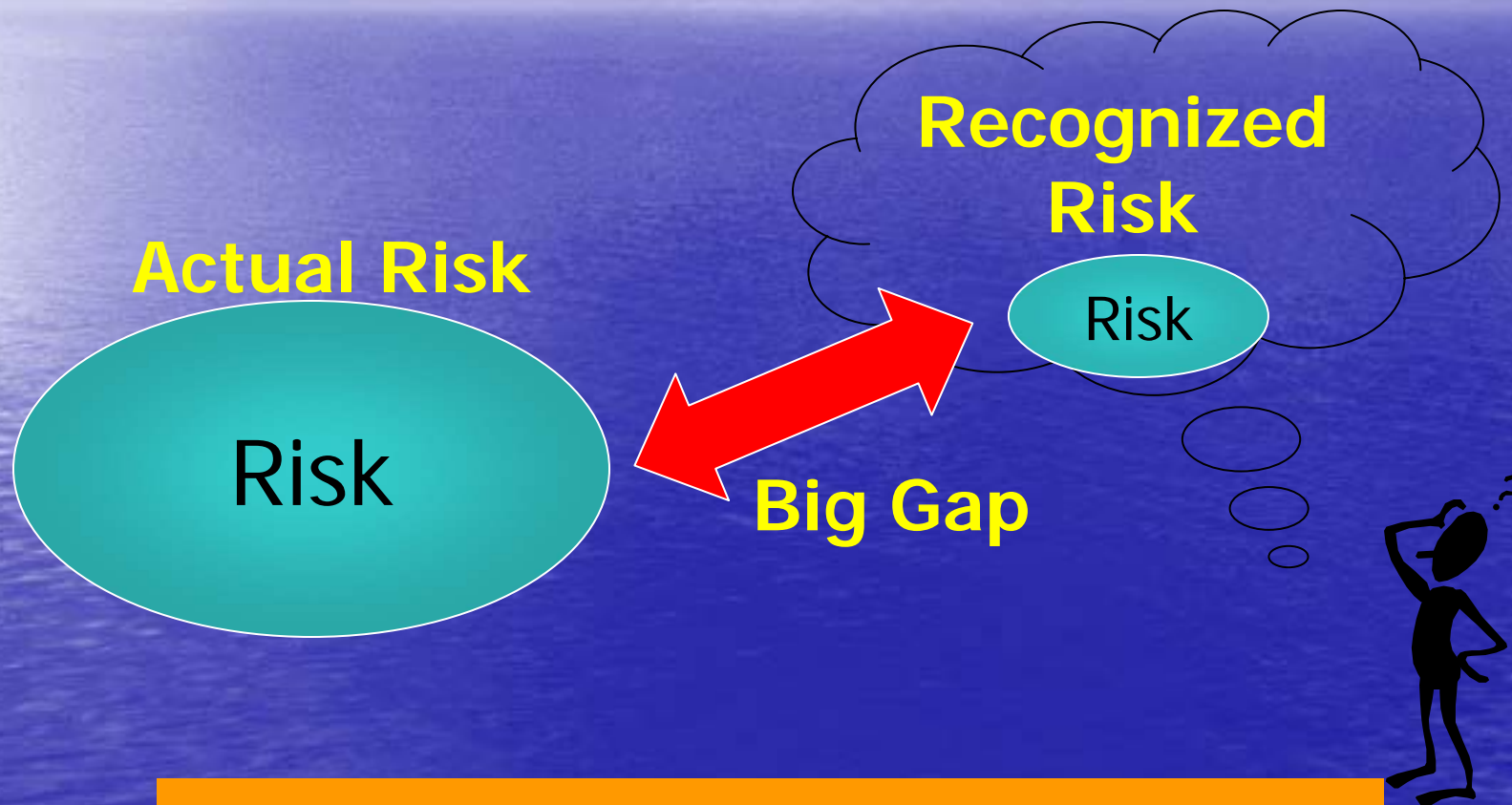
**Expertise
(Engineers, Scientists, ...)**





Information is Vital!

Risk Perception Gap



Need for Generating
Realistic Disaster Scenario

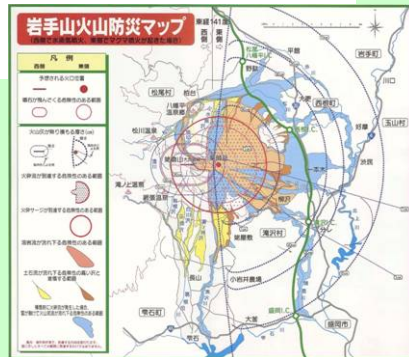
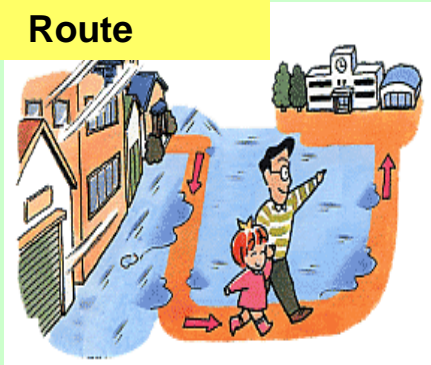


Information is Vital!

Hazard Mapping as a Tool for Effective Early Warning



Safe Evacuation Route



Understanding of Hazardous Areas

Appropriate Risk Awareness of Local Communities



Early Warning



Safe Evacuation

Viet Nam

(28 June – 8 July)

**ADRC's collaboration with the UNDP / OCHA project
- *Training Course on Flood Hazard Mapping* –
supported by USAID**



Town Watching for Flood Hazard Risk



New Development Paradigm: Integration of IWRM and TDRM

- Water Sector is one of the prime components under hydro-meteorological disasters. There is clear evidence that political openness and stability and good governance are the most significant factors for reducing societal vulnerabilities.
- Investment is low because water is seen as a high risk and low profit or return sector associated with various complicated and sensitive issues.
- Further prevention is better than cure and good water governance requires effective socio-political and administrative systems which could adopt Integrated Water Resource Management (IWRM) and TDRM approach together with transparent and participatory processes which addresses environmental and human needs that should not be compromised under sustainable development.
- It is noteworthy to mention that IWRM approach and Integrated Flood Management plans within the concept of IWRM should be integrated with TDRM approach in order to sustain the development benefits.
- It must be said that IWRM should be one of the components of the TDRM approach under the new development framework towards creating a new development paradigm which should, in turn, incorporate the following issues.



Disaster Reduction as Tool for New Development Paradigm

- **Integrated Disaster Management Approach** should Coordinate Structural Interventions and Community Based Disaster and Water Resource Management.
- Orient Development and Funding Agencies of the need to Integrate Disaster Risk Management into National and Local Planning Process.

“MAINSTREAM DISASTER REDUCTION INTO DEVELOPMENT”



Disaster Reduction as Tool for New Development Paradigm

- **Enhance Collaboration Among Stakeholders** as a Critical Strategy in Disaster Reduction.
- **Develop Disaster Risk Reduction Framework** and Establish Strong Linkages to the Existing Frameworks such as MDGs, UNDAFs etc.



Disaster Reduction as Tool for New Development Paradigm

- More Stronger Lobbying at Regional Level for **INVESTMENT IN DISASTER REDUCTION** and Development to **Transform Commitment into Best Practice.**
- Create a Futuristic Vision of Real Time Disasters among Communities transforming **Risk into Opportunities.**
- Promote “**CULTURE OF PREVENTION**” and “**RESPONSIBLE RESPONSE**” for Disaster Reduction and Sustainable Development.



THANK YOU