Foreword

Like previous years, 2006 brought several severe natural disasters around the world. The earthquake and subsequent tsunami that struck Indonesia yielded the highest death toll, while the floods in China, the Philippines, India and the Southeast Asian countries affected the greatest number of people. Windstorms, floods, and landslides in the Philippines and China and the earthquake that hit Indonesia produced the most extensive economic damage. These disasters were further compounded by the floods and wind storms in the US and Australia. These disasters, particularly those that occurred in Asia, severely impacted the development and economic advancement of China, Indonesia, the Philippines, India, Thailand, and Viet Nam, almost paralyzing them. Consequently, these disasters affected the entire Asian region and presented severe setbacks to economic development. Droughts and epidemics also occurred in many African countries in 2006, resulting in extensive human casualties and economic damage. Even more unexpectedly, Europe experienced floods and extreme temperatures (cold wave) as it did in 2004 (heat wave), which claimed a considerable number of lives and caused extensive casualties in the region. Oceania also experienced severe storms, floods and volcanic activity that affected many people and caused significant economic damage.

The prevalence and magnitude of these natural disasters have clearly had serious consequences for many societies, national economies, and the global environment. Natural disasters have increased noticeably in frequency and severity all over the world. The exponential increase in economic losses associated with natural hazards in the developing countries poses a major obstacle to development. Thus, the devastation caused by natural disasters and the economic uncertainties they create have had an adverse effect on the ability of developing countries to compete in the global economy. The statistics for the last 30 years clearly show that Asia is the most disaster-afflicted region in the world, accounting for about 90% of all those affected by disasters, and more than 50% of the total fatalities and economic losses. It is therefore imperative that we analyze past disasters and look at annual trends from the perspective of development mechanisms.

We have compiled this publication to analyze the natural disaster trends in the year 2006 for the purpose of accelerating and strengthening global and regional socio-economic frameworks for addressing the consequences of natural disasters and designing effective disaster reduction mechanisms. We hope this publication will be of use not only to policy planners, researchers, and scholars, but also to grass-roots promoters of development initiatives. We sincerely hope that this data book will further our efforts to transform the total disaster risk management approach into an instrument for global sustainable development.

March 2007

Asian Disaster Reduction Center

Note 1:

The disasters analyzed here are from CRED EM-DAT database. For a disaster to be entered into this database, at least one of the following criteria must be satisfied.

(i) 10 or more people reported killed

(ii) 100 or more people reported affected

(iii) declaration of a state of emergency

(iv) call for international assistance

Note 2:

Notation used	Description
(1) DisType	= Types of Disasters
(2) Dis Classification	= Disaster Classification
(3) Count of DisNo	= Total number of disasters
(4) Sum of Killed	= Total number of people killed
(5) Sum of Injured	= Total number of people injured
(6) Sum of Homeless	= Total number of people left homeless
(7) Sum of Affected	= Total number of affected people
(8) Sum of TotAff	= Total affected people
	= (5) + (6) + (7)
(9) Sum of Damage	= Amount of damage

Note 3:

Income Classifications According to the World Bank

Income Classification	Income Level (US$, annually)
High	9,266 and above
Upper Middle	from 2,996 to 9,265
Lower Middle	from 756 to 2,995
Low	up to 755

Human Development Level Classifications According to the UNDP.

Human Development Level	Index
High	0.8 ~ 1.0
Medium	0.5 ~ 0.79
Low	0.0 ~ 0.49

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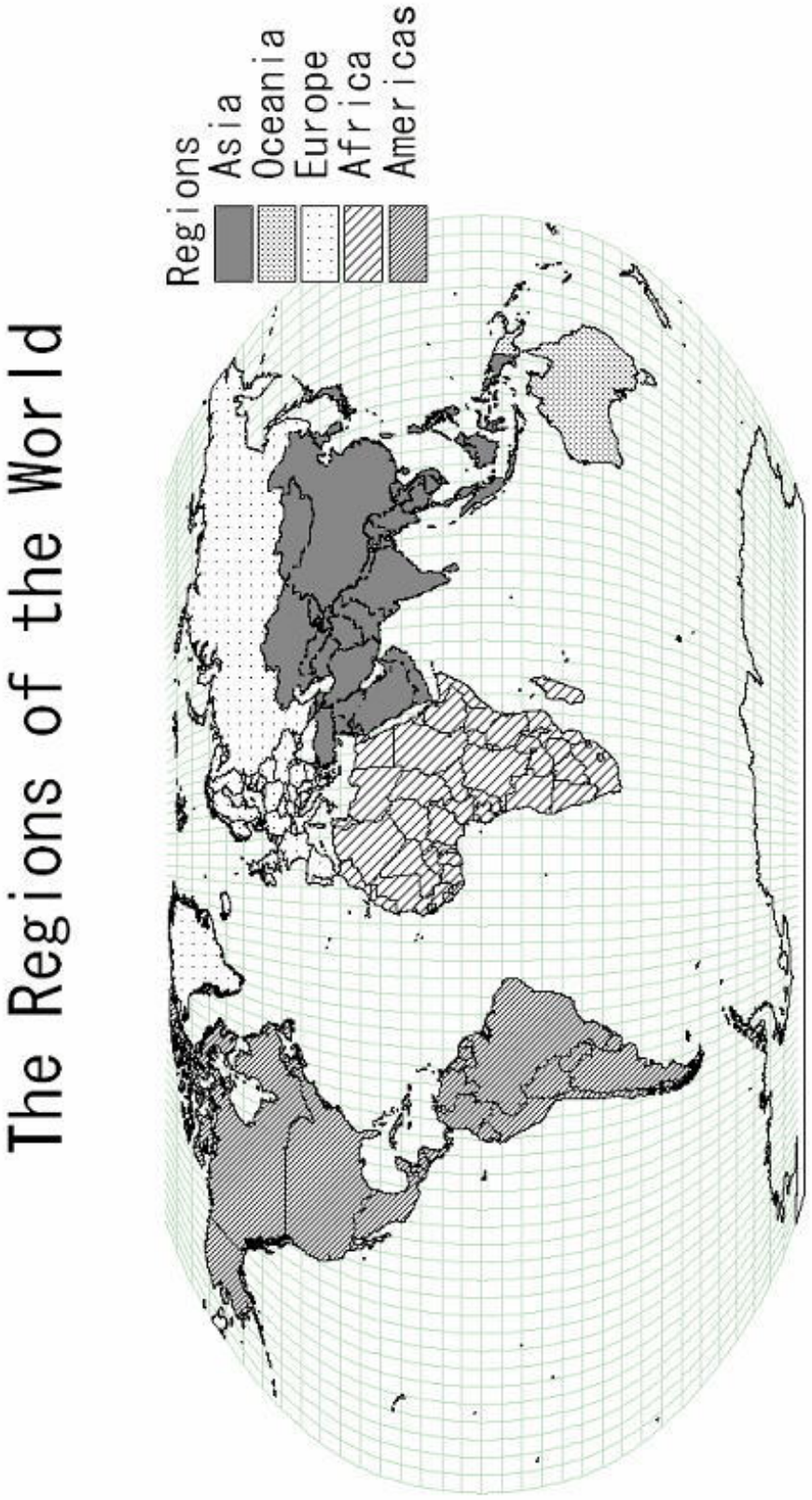
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Natural Disasters in 2006: An Analytical Overview

Chapter 1: Impacts of Natural Disasters

This chapter deals with the overall trends in natural disasters and their impacts for the year 2006. It also addresses regional perspectives on disasters based on disaster types and discusses the vulnerability of natural disasters, especially in the Asian region.

1.1 Trends in Natural Disaster Damage and Characteristics

The following figures (Figures 1, 2, and 3) and summary tables (Tables 1A, 1B, 2A, 2B, 3A, and 3B) indicate an increasing trend in the occurrence of natural disasters. This is due to various factors, such as global climate change, environmental and ecological imbalances, increasing population density, ad-hoc urbanization, deforestation, and desertification. Compounded by these factors, natural disasters are resulting in an increased level of human suffering, loss of life, and economic losses. It is noteworthy to mention that the worldwide *total*[1] affected population in the year 2006 was about 2.1% of the world population (a decrease of about 14.5% over 2005 value) and the total worldwide economic damage in the year 2006 exceeded the GDP (purchasing power parity)[2] of certain developing countries in the Asia-Pacific and Africa, underscoring the importance of natural disaster mitigation strategies in these regions. For instance, the total amount of damage worldwide caused by natural disasters in the year 2006 was 4 times the annual GDP (PPP, 2006 estimate) of Mongolia, 3 times that of Tajikistan, 2 times that of Laos, and almost equal to the size of the economies of Armenia, Kyrgyz, and Papua New Guinea. This is quite a notable decrease when compared against 2005. When we compare with 2005, there was also a considerable decrease in the number of disasters that occurred (3%), the number of killed people (71%), the number of total affected people (15%), and the amount of economic damage incurred (88%) in 2006. Last year's figures were mainly due to the South Asian Earthquake in Pakistan and India, the event responsible for a significant portion of the human losses in Asia. This year's statistics show that almost 59% of the people killed, 89% of total affected people and 71% of the damage worldwide are in Asia. This clearly underscores the vulnerability of the region. This regional trend is quite alarming and represents a considerable obstacle to any development activities in the affected countries from the perspective of

[1] According to CRED, Belgium, the *total* affected population includes the number of people injured; number of people became homeless and number of people affected by various other means due to disasters.

sustainable development. Human suffering and economic losses undeniably create a development-vacuum that will be hard to fill in the near future.

Table 1A: Summary of Natural Disasters, 1975-2006

	Number of Disasters	Sum of Killed	Sum of Total Affected	Sum of Damage US$ ('000s)
Asia	3,290	1,268,062	4,867,836,854	564,699,941
	37.49%	57.21%	88.87%	44.44%
World	8,776	2,216,408	5,477,392,009	1,270,630,884

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 1B: Summary of Natural Disasters, 2006

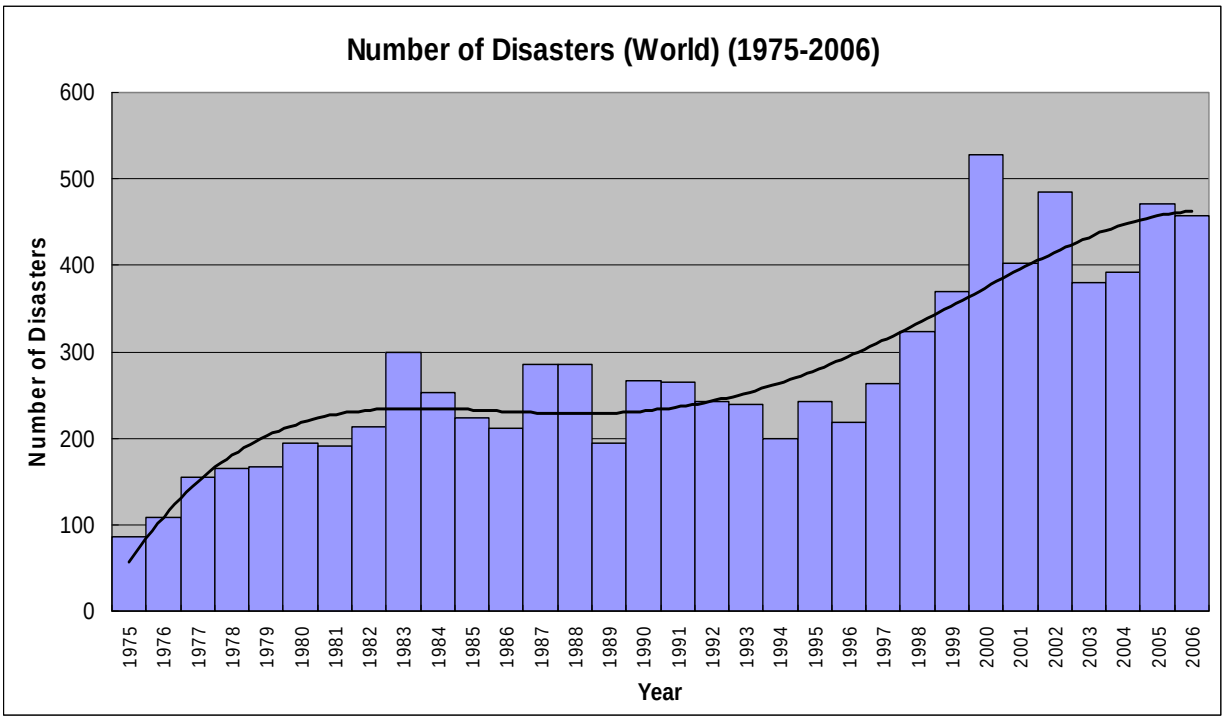
	Number of Disasters	Sum of Killed	Sum of Total Affected	Sum of Damage US$ ('000s)
Asia	183	16,151	120,011,231	14,069,346
	40.04%	59.18%	88.85%	71.05%
World	457	27,292	135,068,229	19,801,519

Source: CRED-EMDAT, Université Catholique de Louvain , Brussels, Belgium, 2006

The following figures show the increasing trend in natural disasters, the number of total affected people, and the amount of damage from 1975 to 2006.

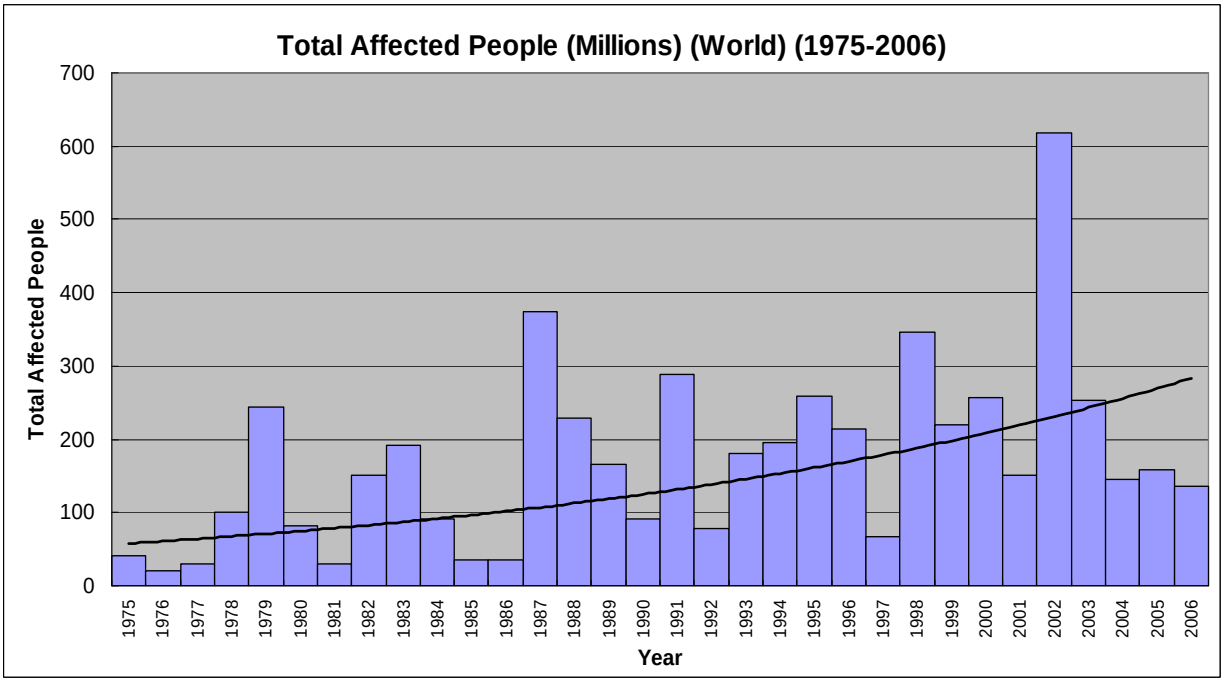
[2] We used GDP (PPP) 2006 estimate data from the World Fact Book.

Figure 1 Number of Disasters, 1975-2006 (World)



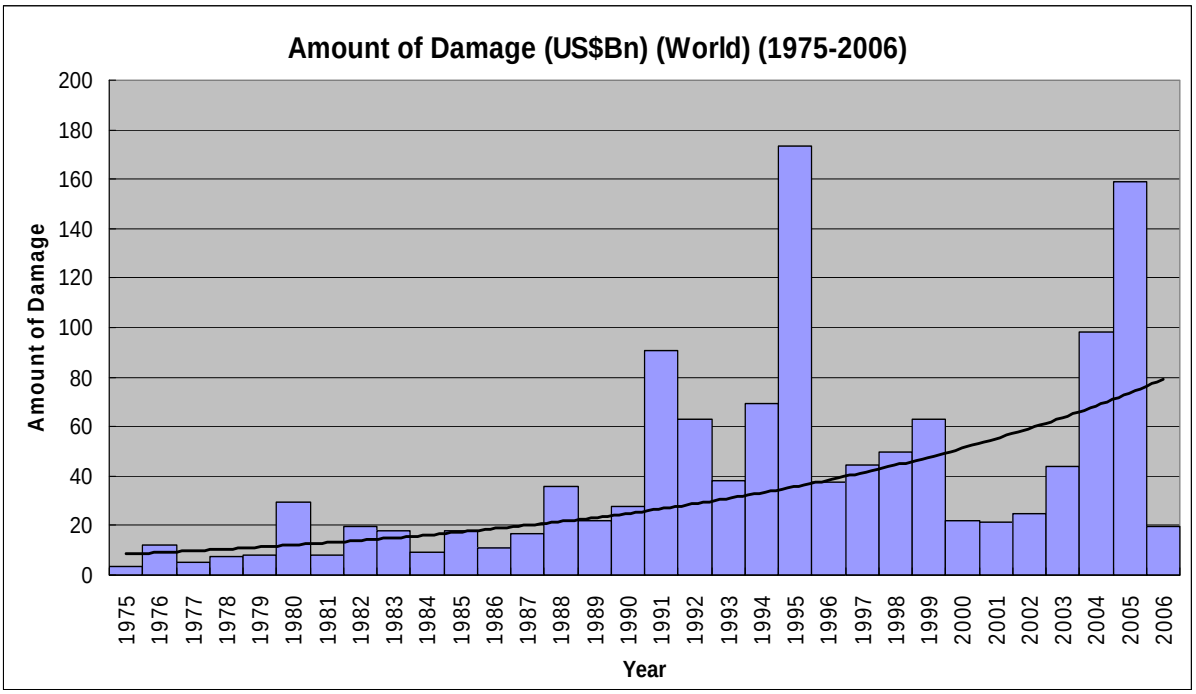
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 2 Number of Total Affected People (Millions), 1975-2006 (World)



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 3 Amount of Damage (US$ Billions), 1975-2006 (World)



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

The following tables show regional disaster characteristics in relation to various types of disaster for the periods 1975-2006. Tables 2A and 3A in particular show this trend for the 32 years from 1975-2006 while Tables 2B and 3B show figures for 2006 only.

Table 2A: Summary of Natural Disasters by Region, 1975-2006

Continent	DisType	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
Africa	Drought	328	560,640	307,312,049	4,051,193
	Earthquake	55	6,719	1,516,616	8,725,608
	Epidemic	556	112,045	10,632,424	4,730
	Extreme Temperature	10	218	1,000,218	47,809
	Famine (natural)	34	6,087	31,607,592	89,000
	Flood	511	15,650	36,041,806	3,193,075
	Insect infestation	68		446,000	5,200
	Slide	24	552	20,304	
	Volcano	13	2,152	461,160	
	Wave / Surge	4	312	109,913	30,000
	Wild fire	14	120	16,710	3,500
	Wind storm	141	3,358	11,198,644	2,796,873
Africa Total		**1,758**	**707,853**	**400,363,436**	**18,946,988**
Americas	Drought	97	79	50,069,164	13,057,539
	Earthquake	153	43,311	11,723,093	56,720,010
	Epidemic	72	14,346	1,626,410	
	Extreme Temperature	67	5,403	4,089,468	13,911,250
	Famine (natural)	2		1,003,000	
	Flood	646	50,671	43,937,795	53,861,897
	Insect infestation	3		2,000	104,000
	Slide	112	5,210	1,163,028	1,085,200
	Volcano	54	22,010	1,550,175	2,029,022
	Wave / Surge	5	1,274	8,844	
	Wild fire	101	165	364,312	5,682,700
	Wind storm	681	38,758	43,244,418	305,846,361
Americas Total		**1,993**	**181,227**	**158,781,707**	**452,297,979**
Asia	Drought	138	3,928	1,425,115,138	14,379,391
	Earthquake	403	557,110	74,468,512	251,269,140
	Epidemic	240	44,929	6,867,563	
	Extreme Temperature	107	19,491	50,712,738	5,042,887
	Famine (natural)	10	760	8,670,000	4,399
	Flood	1,107	134,967	2,656,722,976	162,214,785
	Insect infestation	9		200	925
	Slide	239	16,670	5,869,441	477,034
	Volcano	58	1,424	2,194,663	579,149
	Wave / Surge	23	232,671	2,374,538	7,784,397
	Wild fire	60	450	3,246,085	19,249,500
	Wind storm	896	255,662	631,595,000	103,698,334
Asia Total		**3,290**	**1,268,062**	**4,867,836,854**	**564,699,941**
Europe	Drought	31		7,062,575	14,416,309
	Earthquake	158	8,704	2,842,309	34,404,776
	Epidemic	28	476	186,089	
	Extreme Temperature	148	38,552	849,428	3,316,088
	Famine (natural)	2		3,210,000	
	Flood	363	3,116	7,533,200	123,474,090
	Insect infestation	1			
	Slide	48	1,177	39,458	1,669,389
	Volcano	16	9	7,024	19,600
	Wave / Surge	1	11	2	
	Wild fire	81	322	132,587	3,118,249
	Wind storm	299	1,974	8,642,320	28,557,948
Europe Total		**1,176**	**54,341**	**30,504,992**	**208,976,449**
Oceania	Drought	25	98	8,653,635	11,006,000
	Earthquake	86	585	81,287	2,507,400
	Epidemic	7	288	4,850	
	Extreme Temperature	4	23	4,600,784	
	Flood	149	249	533,146	2,111,937
	Insect infestation	1			120,000
	Slide	18	444	10,615	2,466
	Volcano	14	9	227,722	400,000
	Wave / Surge	2	2,382	9,867	
	Wild fire	34	134	76,310	1,182,006
	Wind storm	219	713	5,706,804	8,379,718
Oceania Total		**559**	**4,925**	**19,905,020**	**25,709,527**
Grand Total		**8,776**	**2,216,408**	**5,477,392,009**	**1,270,630,884**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 2B: Summary of Natural Disasters by Region, 2006

Continent	DisType	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
Africa	Drought	6	147	10,807,000	
	Earthquake	2	8	1,795	
	Epidemic	54	5,440	329,819	
	Flood	58	1,488	2,192,127	157,761
	Slide	1	24	2,000	
	Volcano	1			
	Wind storm	5	8	89,622	
Africa Total		**127**	**7,115**	**13,422,363**	**157,761**
Americas	Drought	1			
	Earthquake	2		12,519	73,000
	Extreme Temperature	5	200		
	Flood	37	305	818,247	1,938,300
	Slide	2	21		
	Volcano	5	5	320,263	150,000
	Wild fire	4	10	1,695	116,000
	Wind storm	12	85	290,800	638,760
Americas Total		**68**	**626**	**1,443,524**	**2,916,060**
Asia	Drought	2		19,900,000	817,000
	Earthquake	17	5,882	3,788,935	3,171,453
	Epidemic	8	56	153,632	
	Extreme Temperature	4	411	1,100	
	Flood	98	3,444	29,046,546	1,118,832
	Slide	14	1,489	396,290	13,146
	Volcano	2		54,849	
	Wave / Surge	1	802	35,543	2,000
	Wild fire	1		200	14,000
	Wind storm	36	4,067	66,634,136	8,932,915
Asia Total		**183**	**16,151**	**120,011,231**	**14,069,346**
Europe	Drought	1			225,573
	Earthquake	2		12,567	55,000
	Extreme Temperature	21	3,292	61,654	1,000,000
	Flood	27	51	89,145	161,925
	Slide	1	4	159	
	Wild fire	1	4		
	Wind storm	9	26	1,802	10,000
Europe Total		**62**	**3,377**	**165,327**	**1,452,498**
Oceania	Drought	1			
	Flood	6	6	15,224	3,500
	Slide	1	13		
	Volcano	2		1,221	
	Wild fire	3	4	141	100,000
	Wind storm	4		9,198	1,102,354
Oceania Total		**17**	**23**	**25,784**	**1,205,854**
Grand Total		**457**	**27,292**	**135,068,229**	**19,801,519**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 3A: Summary of Natural Disasters by Disaster Type, 1975-2006

DisType	Continent	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
Drought	Africa	328	560,640	307,312,049	4,051,193
	Americas	97	79	50,069,164	13,057,539
	Asia	138	3,928	1,425,115,138	14,379,391
	Europe	31		7,062,575	14,416,309
	Oceania	25	98	8,653,635	11,006,000
Drought Total		**619**	**564,745**	**1,798,212,561**	**56,910,432**
Earthquake	Africa	55	6,719	1,516,616	8,725,608
	Americas	153	43,311	11,723,093	56,720,010
	Asia	403	557,110	74,468,512	251,269,140
	Europe	158	8,704	2,842,309	34,404,776
	Oceania	86	585	81,287	2,507,400
Earthquake Total		**855**	**616,429**	**90,631,817**	**353,626,934**
Epidemic	Africa	556	112,045	10,632,424	4,730
	Americas	72	14,346	1,626,410	
	Asia	240	44,929	6,867,563	
	Europe	28	476	186,089	
	Oceania	7	288	4,850	
Epidemic Total		**903**	**172,084**	**19,317,336**	**4,730**
Extreme Temperature	Africa	10	218	1,000,218	47,809
	Americas	67	5,403	4,089,468	13,911,250
	Asia	107	19,491	50,712,738	5,042,887
	Europe	148	38,552	849,428	3,316,088
	Oceania	4	23	4,600,784	
Extreme Temperature Total		**336**	**63,687**	**61,252,636**	**22,318,034**
Famine (natural)	Africa	34	6,087	31,607,592	89,000
	Americas	2		1,003,000	
	Asia	10	760	8,670,000	4,399
	Europe	2		3,210,000	
Famine (natural) Total		**48**	**6,847**	**44,490,592**	**93,399**
Flood	Africa	511	15,650	36,041,806	3,193,075
	Americas	646	50,671	43,937,795	53,861,897
	Asia	1,107	134,967	2,656,722,976	162,214,785
	Europe	363	3,116	7,533,200	123,474,090
	Oceania	149	249	533,146	2,111,937
Flood Total		**2,776**	**204,653**	**2,744,768,923**	**344,855,784**
Insect infestation	Africa	68		446,000	5,200
	Americas	3		2,000	104,000
	Asia	9		200	925
	Europe	1			
	Oceania	1			120,000
Insect infestation Total		**82**		**448,200**	**230,125**
Slide	Africa	24	552	20,304	
	Americas	112	5,210	1,163,028	1,085,200
	Asia	239	16,670	5,869,441	477,034
	Europe	48	1,177	39,458	1,669,389
	Oceania	18	444	10,615	2,466
Slide Total		**441**	**24,053**	**7,102,846**	**3,234,089**
Volcano	Africa	13	2,152	461,160	
	Americas	54	22,010	1,550,175	2,029,022
	Asia	58	1,424	2,194,663	579,149
	Europe	16	9	7,024	19,600
	Oceania	14	9	227,722	400,000
Volcano Total		**155**	**25,604**	**4,440,744**	**3,027,771**
Wave / Surge	Africa	4	312	109,913	30,000
	Americas	5	1,274	8,844	
	Asia	23	232,671	2,374,538	7,784,397
	Europe	1	11	2	
	Oceania	2	2,382	9,867	
Wave / Surge Total		**35**	**236,650**	**2,503,164**	**7,814,397**
Wild fire	Africa	14	120	16,710	3,500
	Americas	101	165	364,312	5,682,700
	Asia	60	450	3,246,085	19,249,500
	Europe	81	322	132,587	3,118,249
	Oceania	34	134	76,310	1,182,006
Wild fire Total		**290**	**1,191**	**3,836,004**	**29,235,955**
Wind storm	Africa	141	3,358	11,198,644	2,796,873
	Americas	681	38,758	43,244,418	305,846,361
	Asia	896	255,662	631,595,000	103,698,334
	Europe	299	1,974	8,642,320	28,557,948
	Oceania	219	713	5,706,804	8,379,718
Wind storm Total		**2,236**	**300,465**	**700,387,186**	**449,279,234**
Grand Total		**8,776**	**2,216,408**	**5,477,392,009**	**1,270,630,884**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 3B: Summary of Natural Disasters by Disaster Type, 2006

DisType	Continent	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
Drought	Africa	6	147	10,807,000	
	Americas	1			
	Asia	2		19,900,000	817,000
	Europe	1			225,573
	Oceania	1			
Drought Total		**11**	**147**	**30,707,000**	**1,042,573**
Earthquake	Africa	2	8	1,795	
	Americas	2		12,519	73,000
	Asia	17	5,882	3,788,935	3,171,453
	Europe	2		12,567	55,000
Earthquake Total		**23**	**5,890**	**3,815,816**	**3,299,453**
Epidemic	Africa	54	5,440	329,819	
	Asia	8	56	153,632	
Epidemic Total		**62**	**5,496**	**483,451**	
Extreme Temperatu	Americas	5	200		
	Asia	4	411	1,100	
	Europe	21	3,292	61,654	1,000,000
Extreme Temperature Total		**30**	**3,903**	**62,754**	**1,000,000**
Flood	Africa	58	1,488	2,192,127	157,761
	Americas	37	305	818,247	1,938,300
	Asia	98	3,444	29,046,546	1,118,832
	Europe	27	51	89,145	161,925
	Oceania	6	6	15,224	3,500
Flood Total		**226**	**5,294**	**32,161,289**	**3,380,318**
Slide	Africa	1	24	2,000	
	Americas	2	21		
	Asia	14	1,489	396,290	13,146
	Europe	1	4	159	
	Oceania	1	13		
Slide Total		**19**	**1,551**	**398,449**	**13,146**
Volcano	Africa	1			
	Americas	5	5	320,263	150,000
	Asia	2		54,849	
	Oceania	2		1,221	
Volcano Total		**10**	**5**	**376,333**	**150,000**
Wave / Surge	Asia	1	802	35,543	2,000
Wave / Surge Total		**1**	**802**	**35,543**	**2,000**
Wild fire	Americas	4	10	1,695	116,000
	Asia	1		200	14,000
	Europe	1	4		
	Oceania	3	4	141	100,000
Wild fire Total		**9**	**18**	**2,036**	**230,000**
Wind storm	Africa	5	8	89,622	
	Americas	12	85	290,800	638,760
	Asia	36	4,067	66,634,136	8,932,915
	Europe	9	26	1,802	10,000
	Oceania	4		9,198	1,102,354
Wind storm Total		**66**	**4,186**	**67,025,558**	**10,684,029**
Grand Total		**457**	**27,292**	**135,068,229**	**19,801,519**

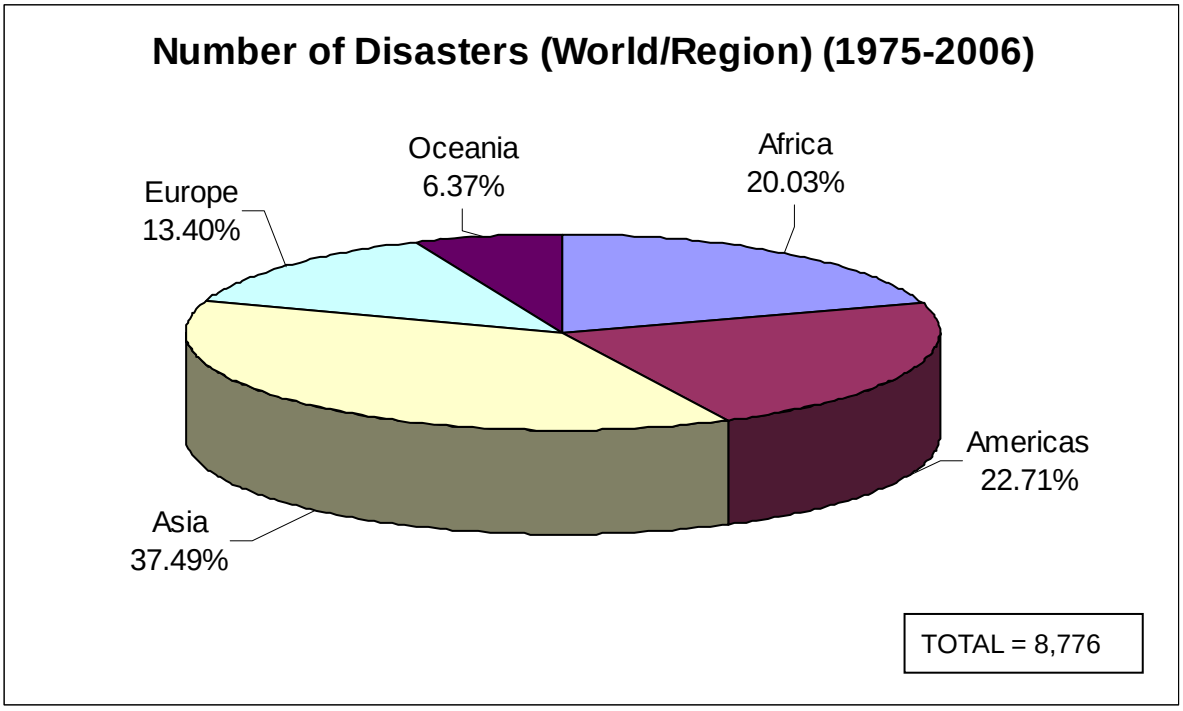
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

1.2 Regional Vulnerability: Disaster-Prone Asia

The years 2004 and 2005 were particularly disastrous years for Asia due to the Indian Ocean Tsunami, South Asian Earthquake as well as other earthquakes, wind storms, and floods. The year 2006 was likewise disastrous as a result of the earthquake plus tsunami in Indonesia, flood in China and India and typhoon and landslide in the Philippines, which accounted for almost 59% of the disaster-related human losses in the world. The statistics make the region's vulnerability to natural disasters quite evident. The majority of human losses and suffering, and noticeably the majority of economic losses, were reported in this region in 2006, as had been the case in previous years. Specifically, nearly 89% (down 9% from 2005) of the total affected people and 59% (down 81% from 2005) of the human losses were reported in Asia. Further a noticeable 71% of the reported economic damage also came from Asia in 2006 and this is a record 500% increase from 2005.

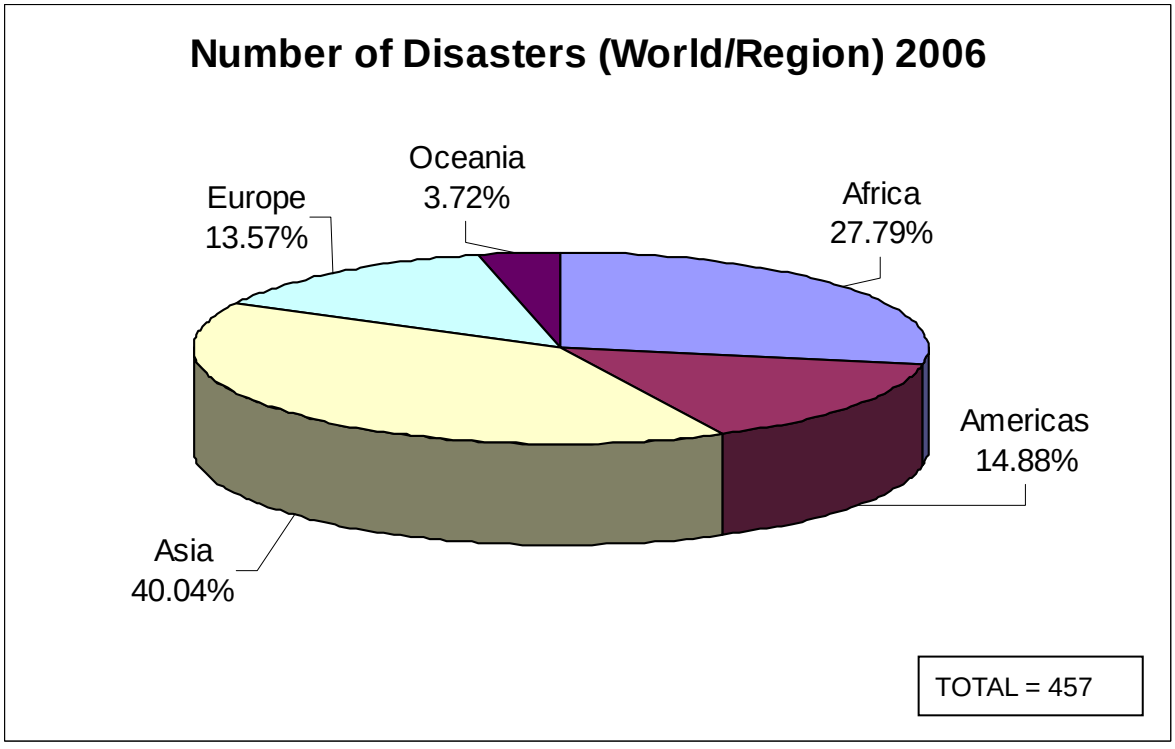
Furthermore, in 2006, the majority of economic losses caused by disasters happened in the Asia, followed by Americas, Europe, Oceania and Africa. These losses were due to the natural disasters that hit China, Indonesia, the Philippines and India and Pakistan (earthquakes, windstorms and flood). The earthquake and consequent tsunami in Indonesia, floods in China and windstorms that hit the Philippines highlighted for the world the region’s vulnerability to such a disaster. Outside of Asia, disaster damages were also reported from the US, and Australia. This year also, Africa was subjected to epidemics, floods, and droughts which affected millions of people in the region. Like last year, Europe again experienced extreme temperatures, floods, and wind storms which caused considerable human and economic losses. The following figures from 4A to 7B show the regional trends for 2006 as well as for the period 1975-2006. Figures 8A to 11C show trends by disaster type for 2006 and for the 1975-2006 period, for the world and the Asian region. We have included figures not only for the year 2006, but also for the 32-year period from 1975 to 2006. This will provide a better understanding of the situation and a useful basis for comparison.

Figure 4A **Proportion of Disasters by Region, 1975-2006**



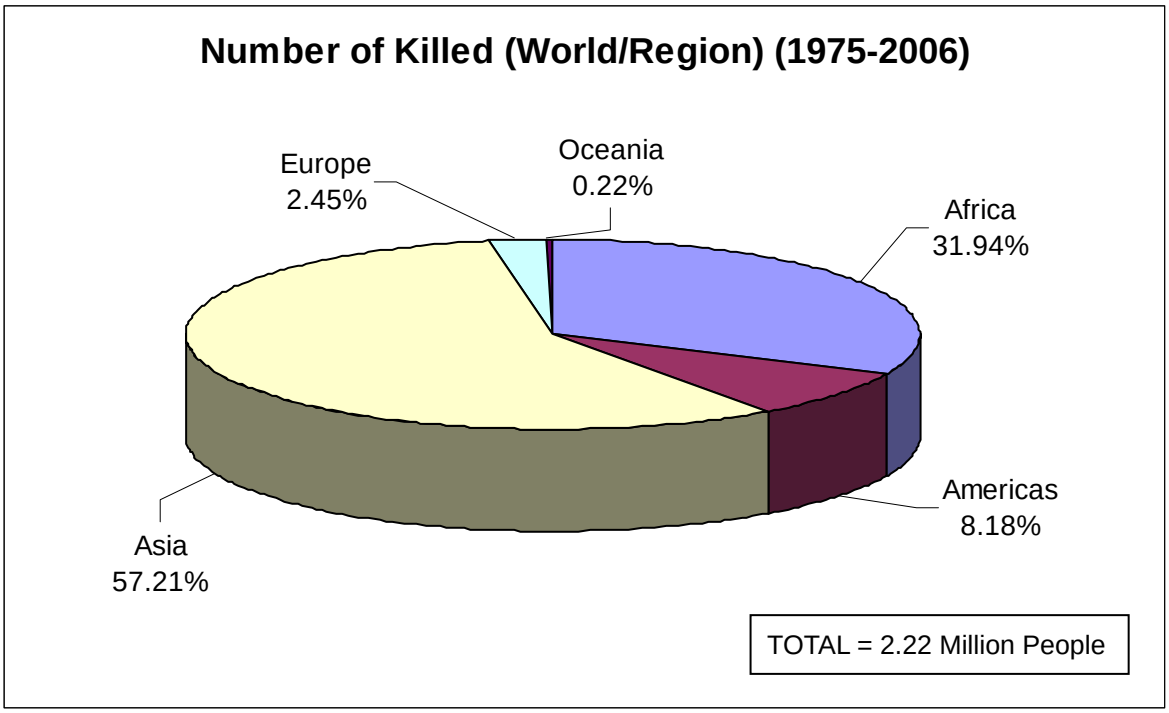
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 4B **Proportion of Disasters by Region, 2006**



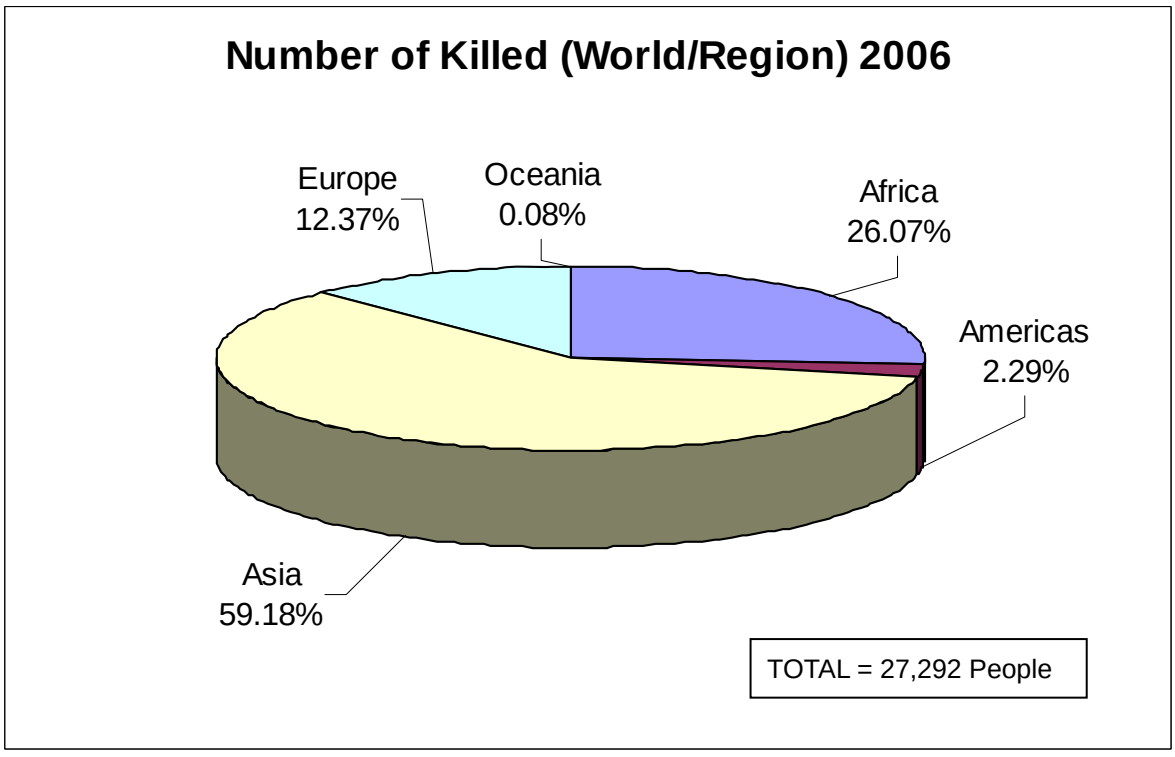
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 5A **Proportion of People Killed by Region, 1975-2006**



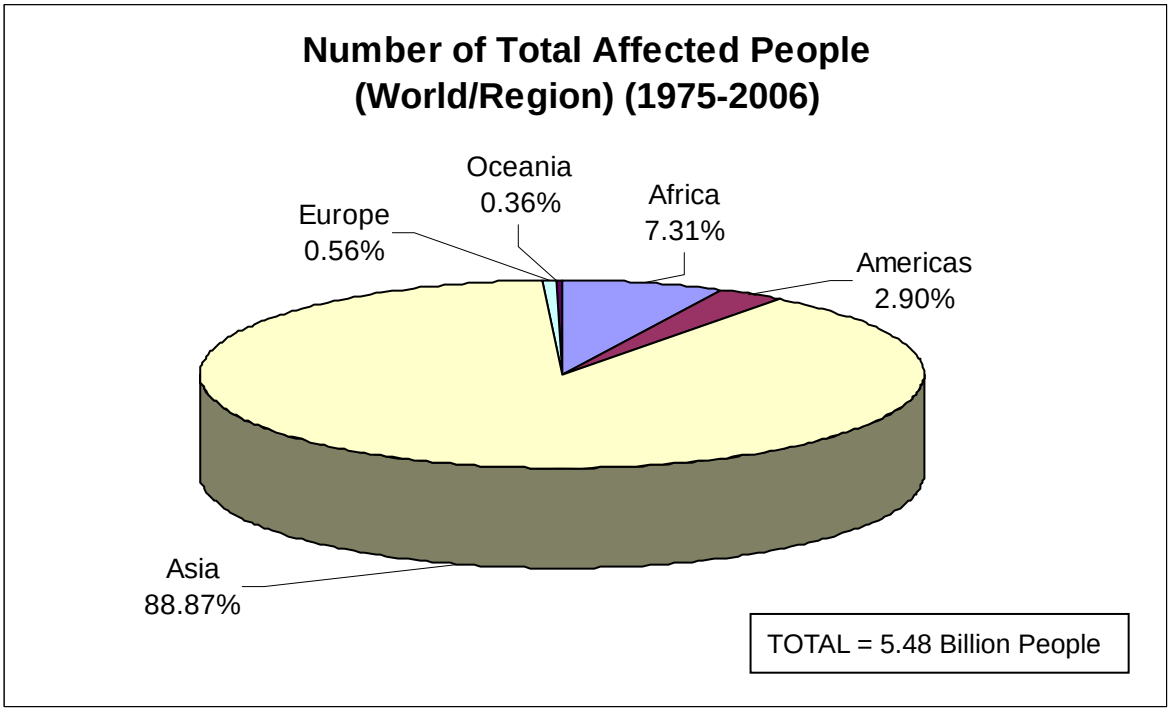
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 5B **Proportion of People Killed by Region, 2006**



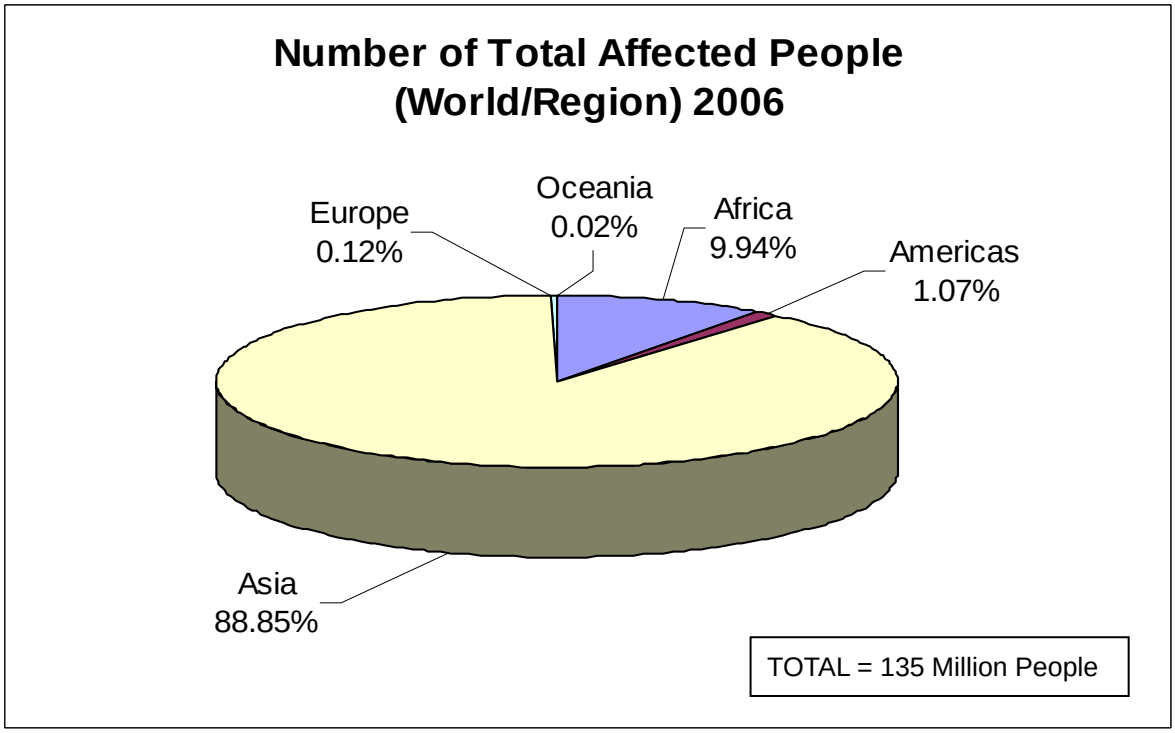
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 6A **Proportion of Total Affected People by Region, 1975-2006**



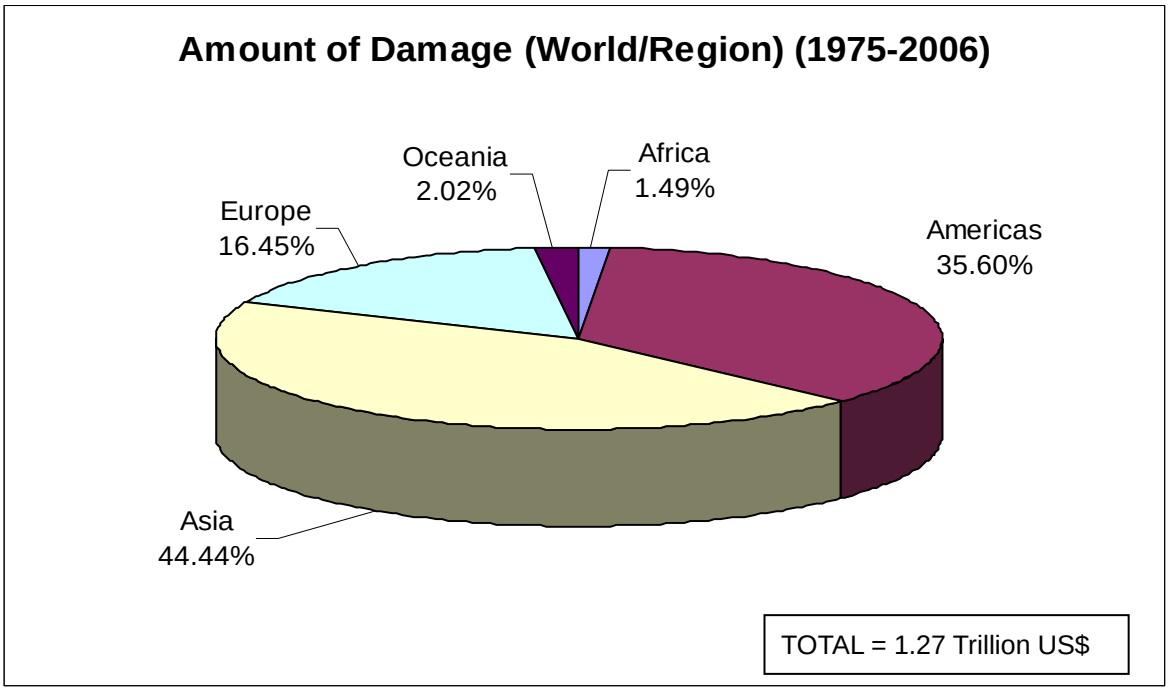
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 6B **Proportion of Total Affected People by Region, 2006**



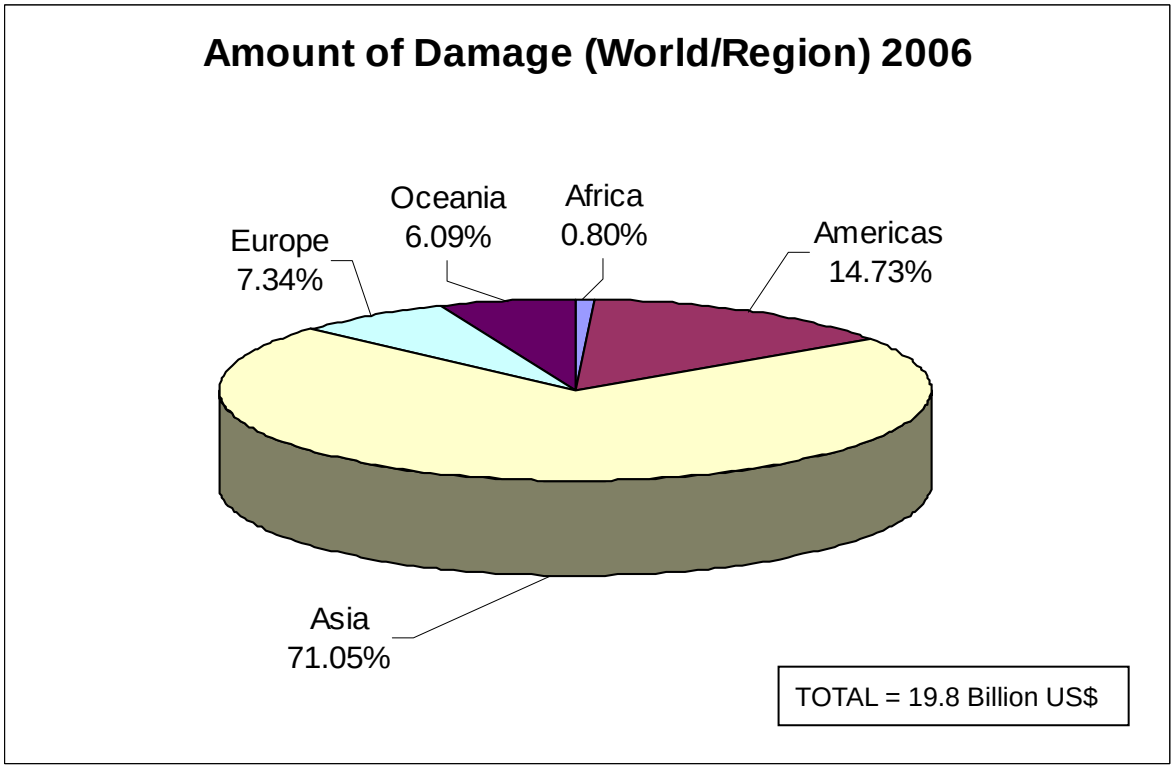
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 7A **Proportion of Damage by Region, 1975-2006**



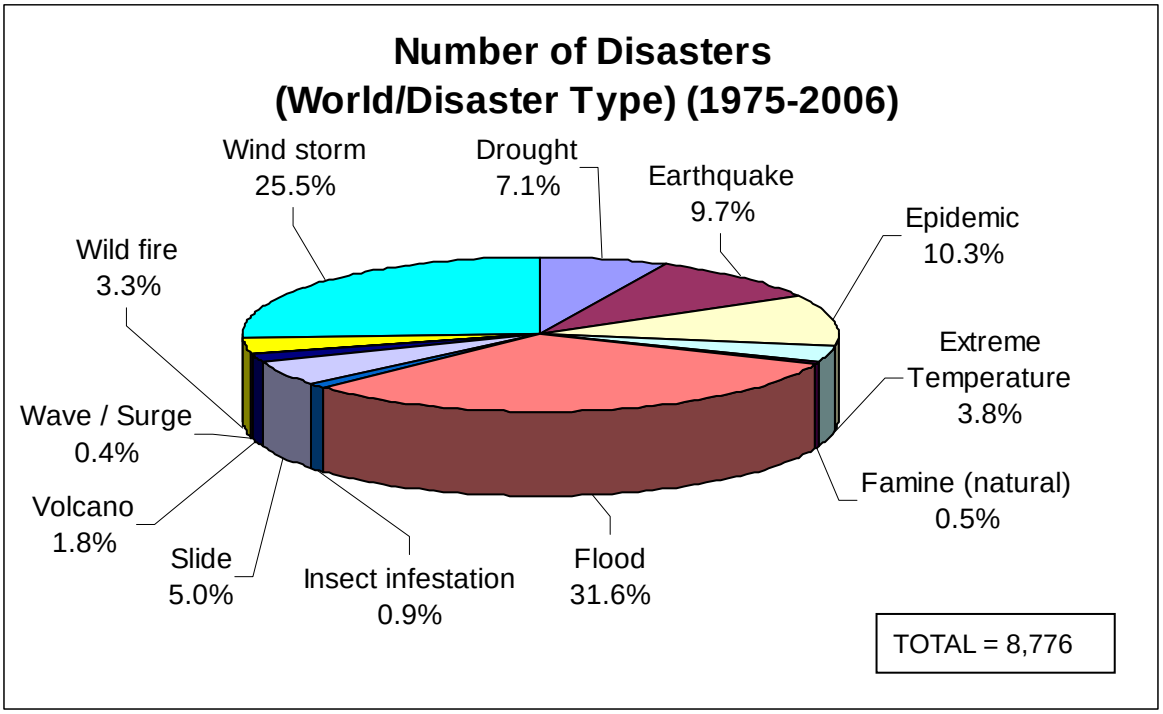
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 7B **Proportion of Damage by Region, 2006**



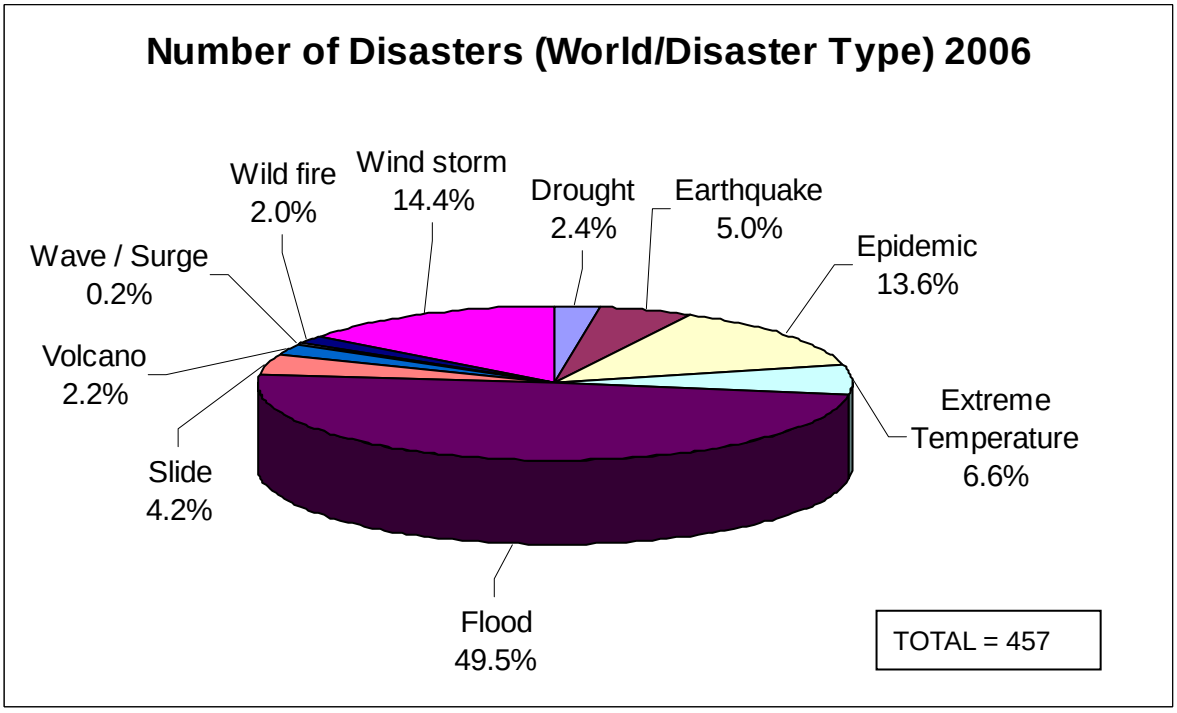
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 8A **Proportion of Disasters Worldwide by Type, 1975-2006**



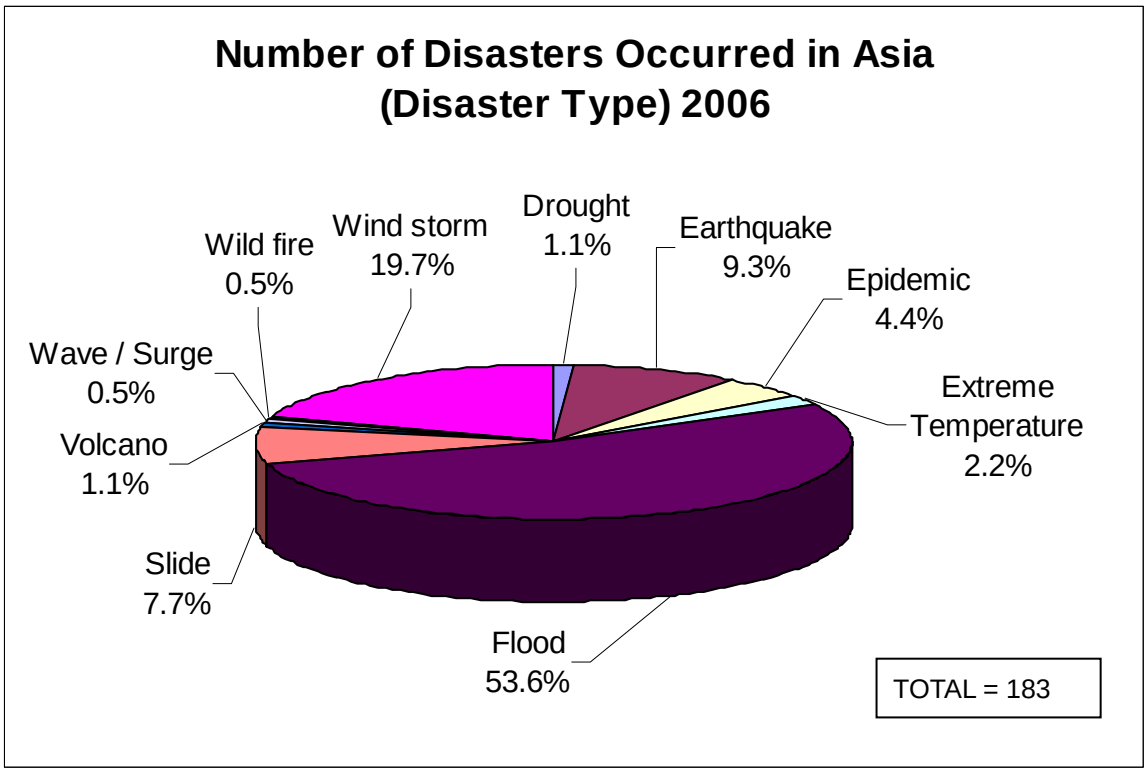
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 8B **Proportion of Disasters Worldwide by Type, 2006**



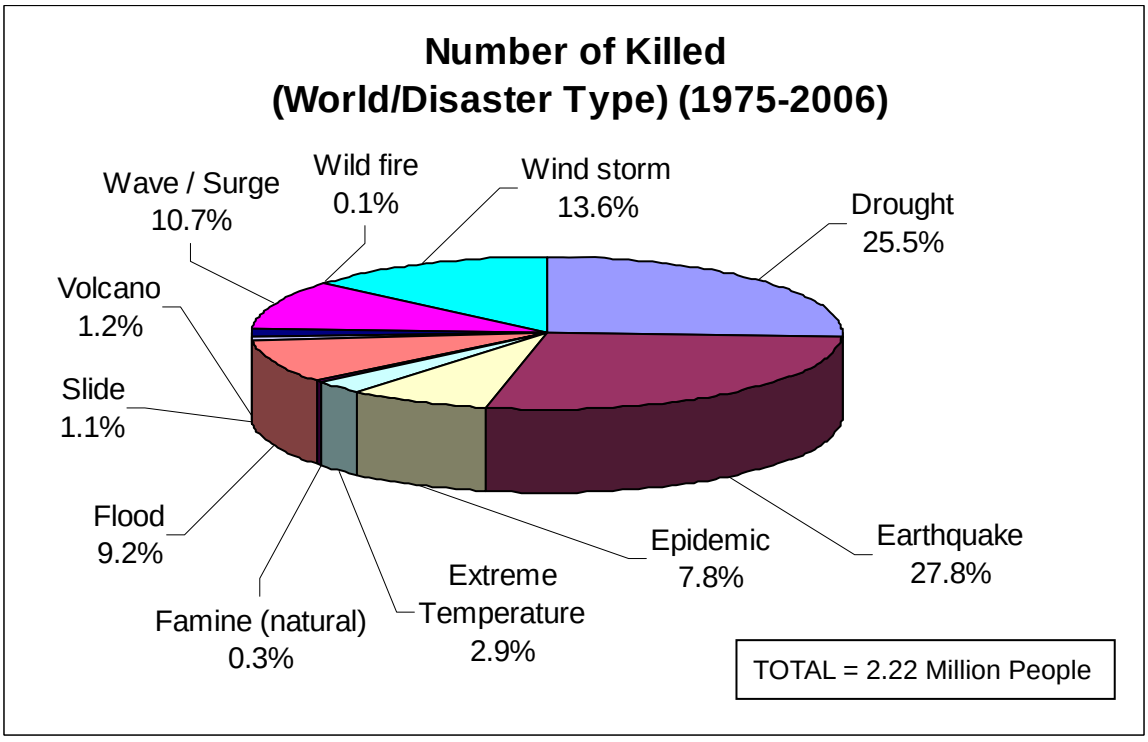
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 8C **Proportion of Disasters in Asia by Type, 2006**



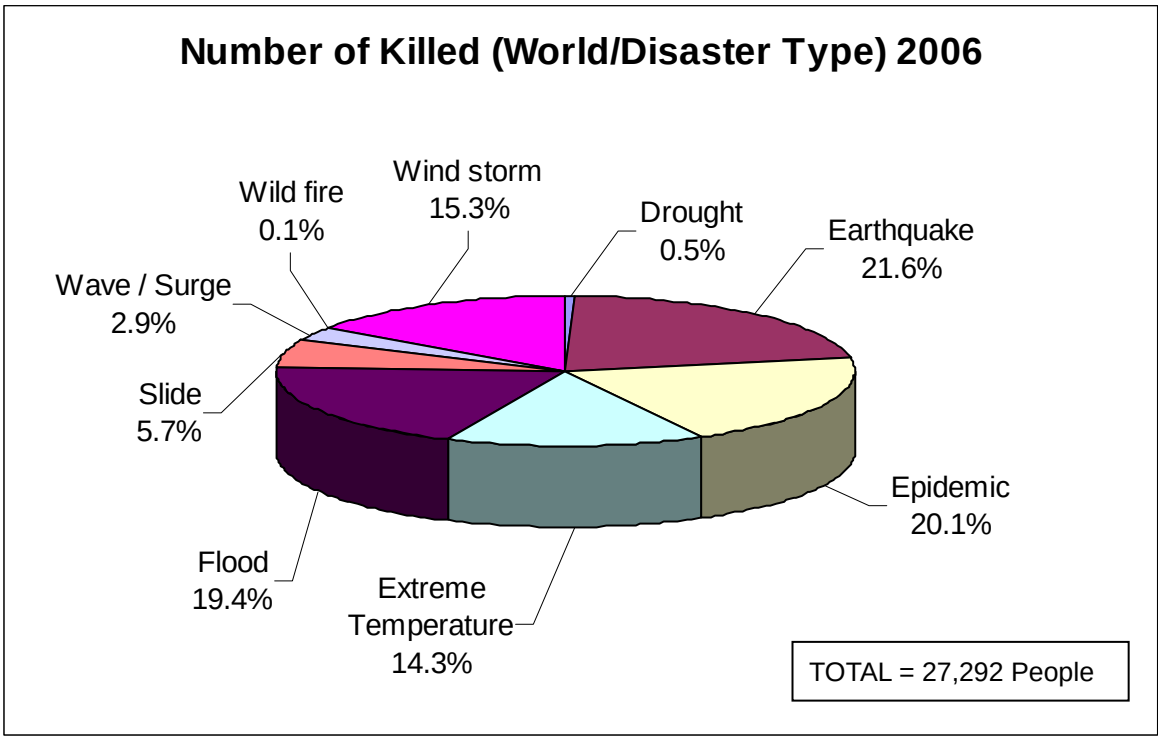
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 9A **Proportion of People Killed Worldwide by Type of Disaster, 1975-2006**



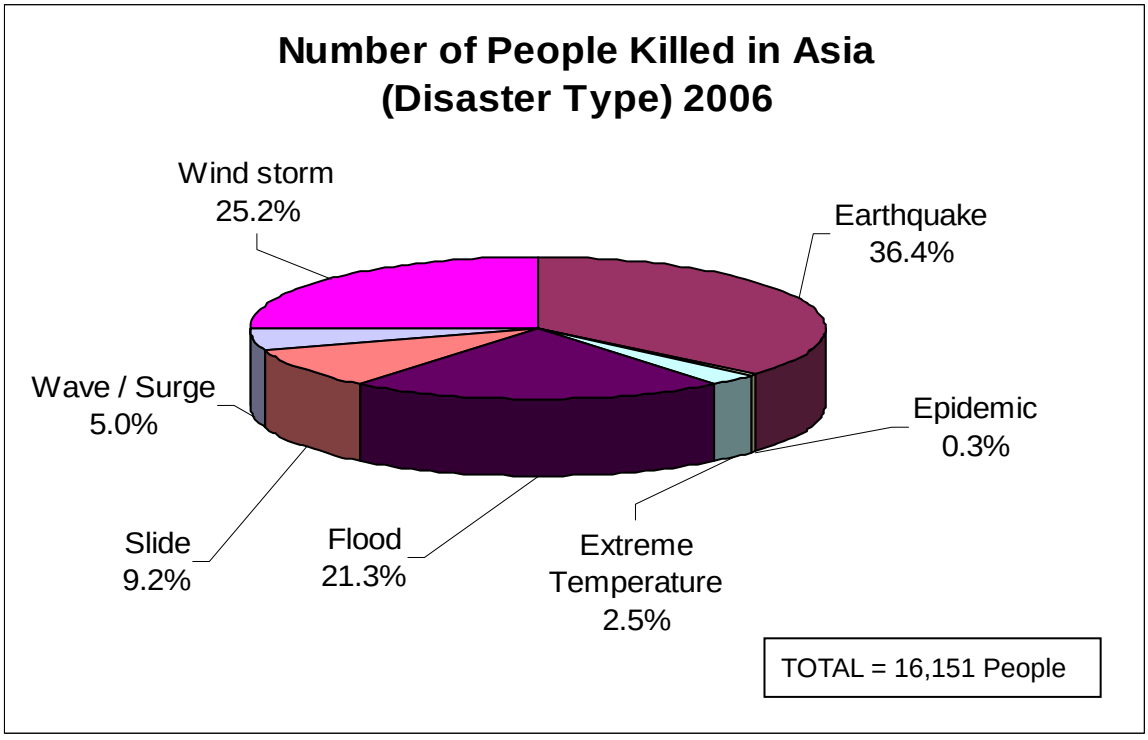
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 9B **Proportion of People Killed Worldwide by Type of Disaster, 2006**



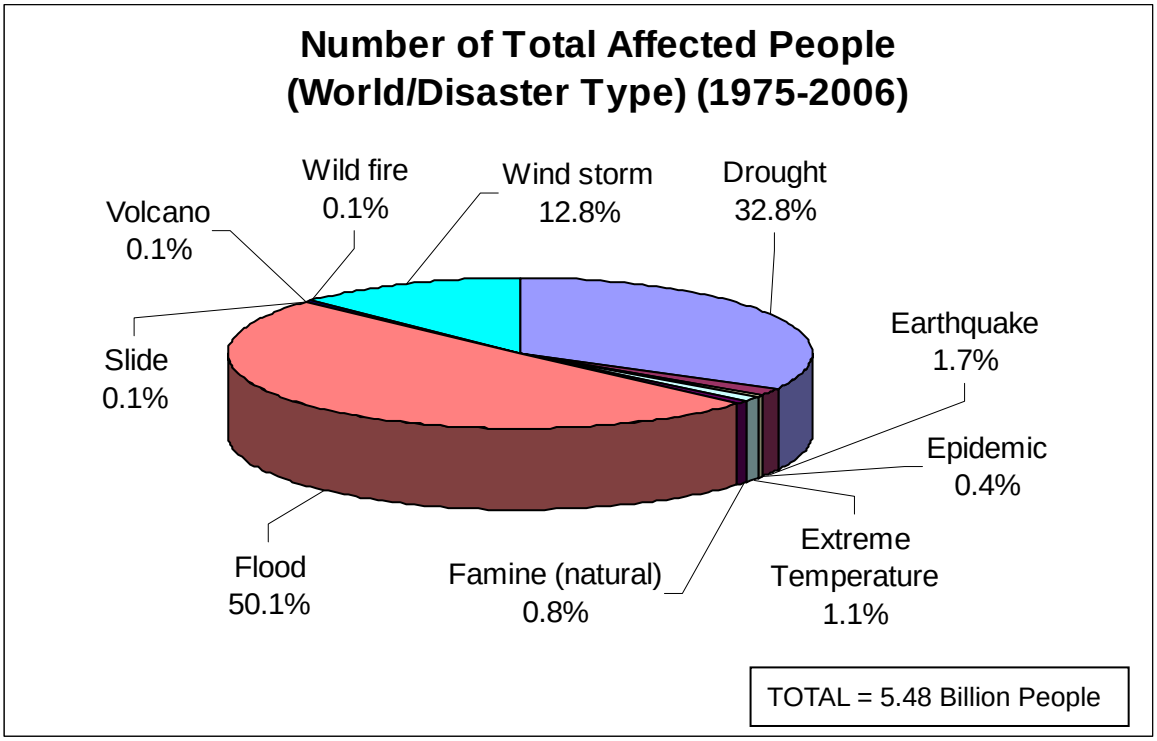
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 9C **Proportion of People Killed in Asia by Type of Disaster, 2006**



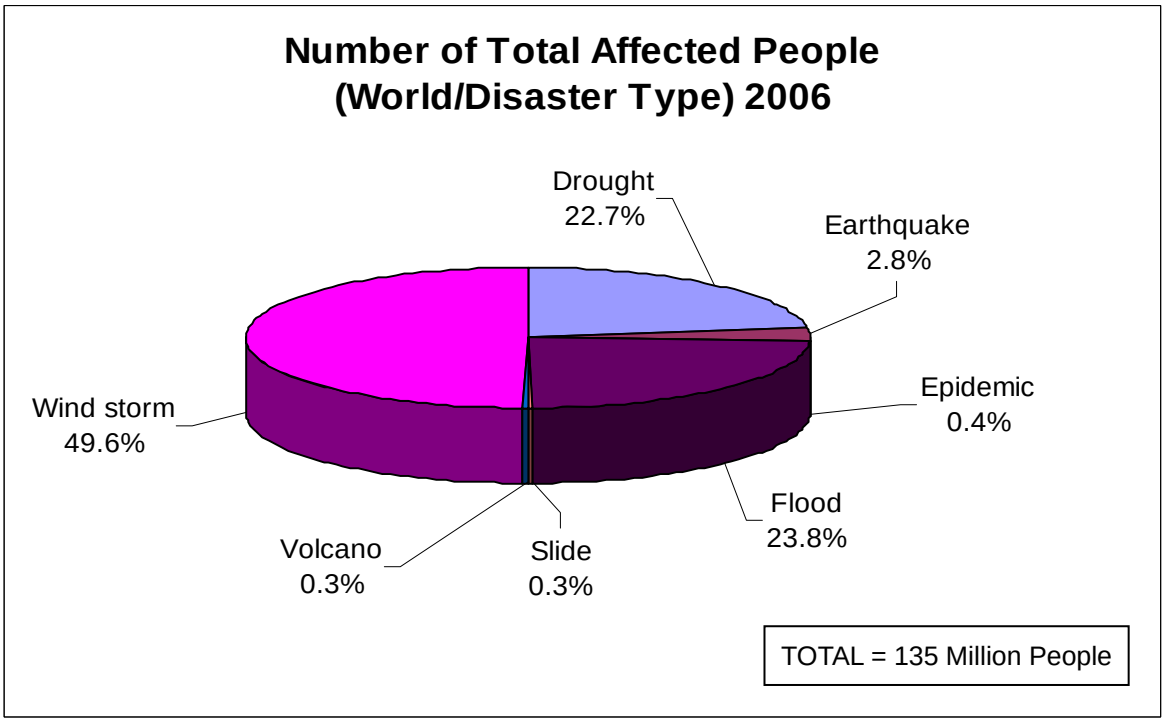
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 10A **Proportion of Total Affected People Worldwide by Type of Disaster, 1975-2006**



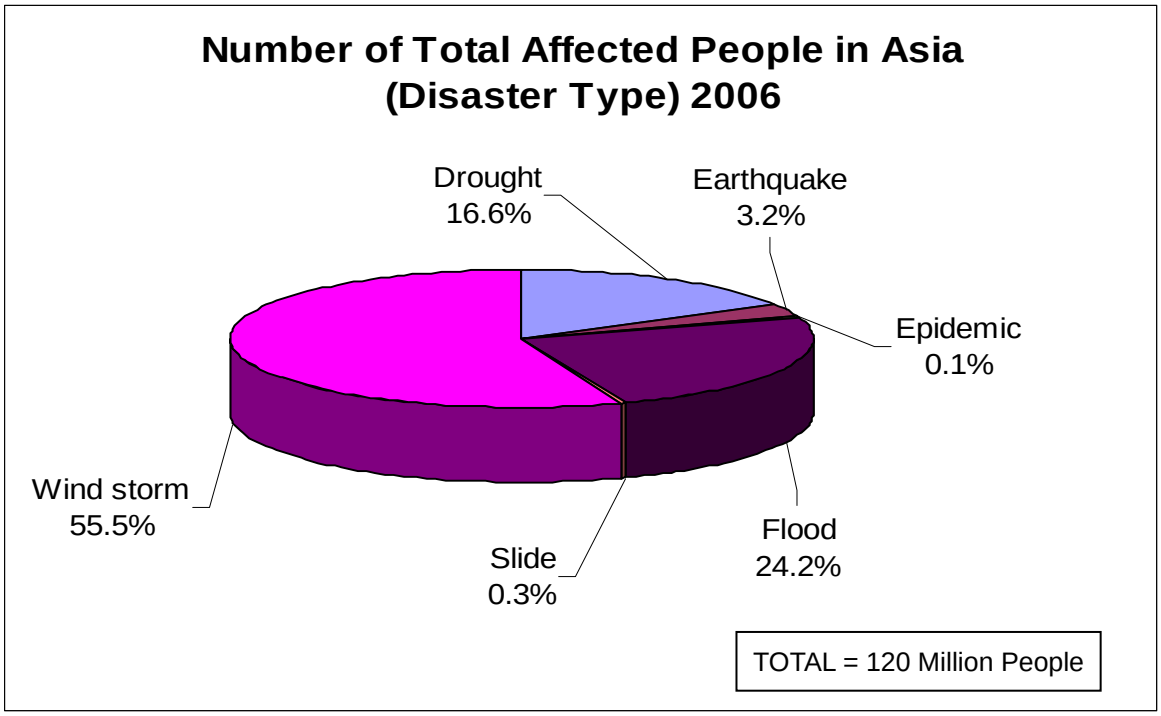
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 10B **Proportion of Total Affected People Worldwide by Type of Disaster, 2006**



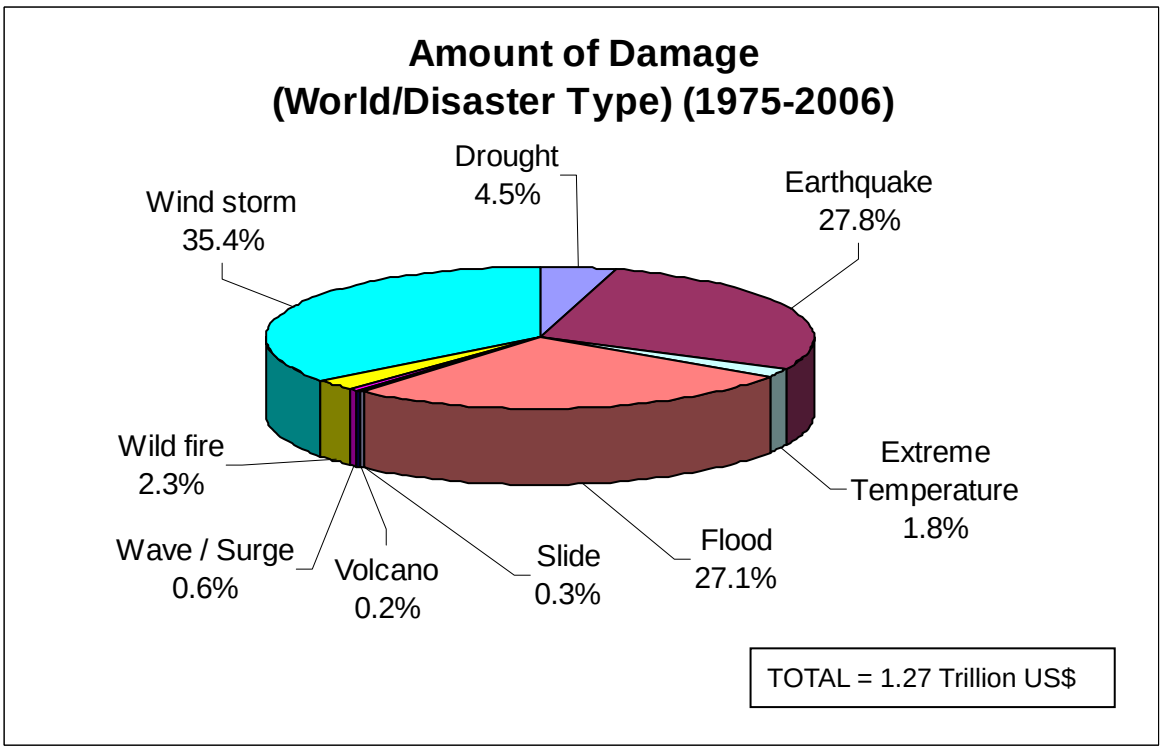
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 10C Proportion of Total Affected People in Asia by Type of Disaster, 2006



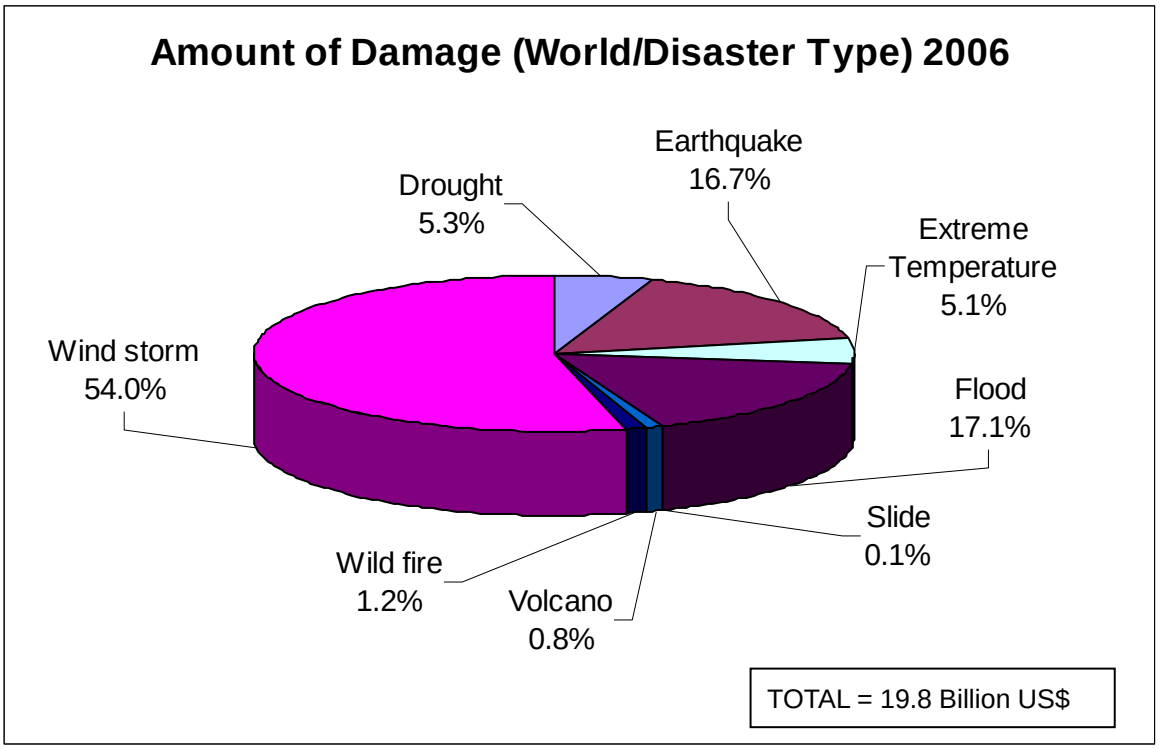
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 11A Proportion of Damage Worldwide by Type of Disaster, 1975-2006



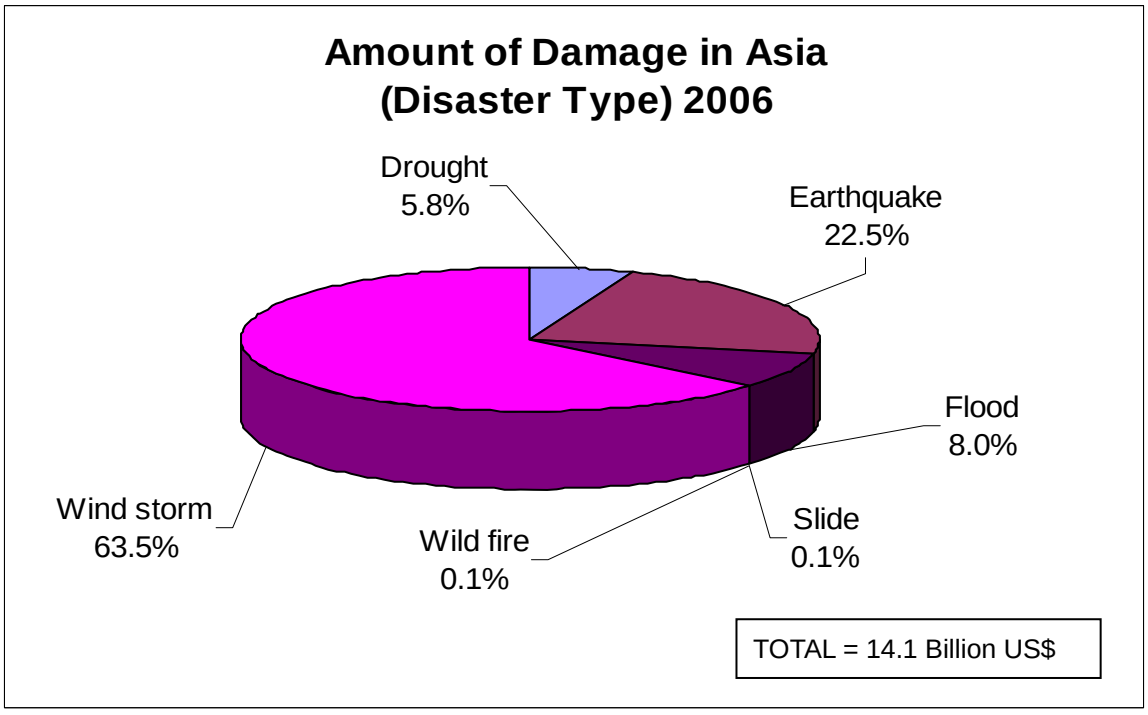
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 11B Proportion of Damage Worldwide by Type of Disaster, 2006



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 11C Proportion of Damage in Asia by Type of Disaster, 2006



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Based on data related to disaster types and their impact on societies and economies in 2006, we can conclude that the Asian region has been deeply affected by both geo-physical disasters like earthquakes and tsunamis, as well as hydro-meteorological disasters like floods and wind storms. In contrast to the past years, Asia was not much affected by extreme temperatures and droughts in 2005. In 2006, Asia mainly experienced earthquakes, tsunami, windstorms, floods and slides, and these were really harmful to the development in the region. A comparative analysis can be made from past analytical studies of disasters and the ADRC's "20th Century Asian Natural Disasters Data Book." Socio-economic and cultural dimensions specific to the Asian region provide some explanation of the large number of affected people in spite of a relatively small amount of real economic damage as compared to previous years. But the 2004 Indian Ocean Tsunami, the 2005 South Asian Earthquake and 2006 disasters in China, Indonesia and the Philippines changed this perception and prompted the Asian region to adopt appropriate countermeasures. The great amount of human suffering and related financial losses in this region substantially hinder development activities. The above figures clearly illustrate this trend by disaster type for Asia and the rest of the world. The following chapters will also help us better understand regional differences in the characteristics of various types of disasters.

1.3 Vulnerabilities of Countries with Small Economies and Populations

It is obvious that countries with small economies and populations suffer more, even when only minor disasters occur. The following tables show the ranks of actual disasters in terms of the number of people killed, the number of people affected, and the amount of damage, as well as the change in the actual (real) rank when compared to the population and GNI (Gross National Income-Atlas method).[3]

Tables 4 to 9 show that while the actual damage in terms of human and economic losses are small, the effects on the population and the country's economy can be large in comparison with the population and GNI of these countries. Accordingly, this comparison reveals that countries with smaller economies and populations can not bear heavy damage in terms of loss share to population and GNI. For example, Table 4 ranks disaster events according to the number of people killed. Table 5 ranks those events according to the ratio of people killed to the total population. In Table 5, we can see African countries with smaller populations account for a larger share of human losses. While the disaster in Namibia ranked at 199, Chad at 68, Somalia at 67, Angola at 55, and the Guinea at 43 in Table 4 (the actual number of people killed), they all were ranked within the top 25 in Table 5, based on the share of their human loss to their respective population. Similar observations can be made from Tables 6, 7, 8, and 9 in terms of affected people and economic damage, underscoring the vulnerability of small states.

[3] Here we used the values from World Bank, 2005 GNI data and definition on atlas method GNI calculation.

Table 4: Top 25 Natural Disasters by Number of People Killed, 2006

Rank	Country	Region	DisType	DisSubset	DisName	Month	Day	Killed	Injured	Homeless	Affected	TotAff	Damage US$ ('000s)	Location
1	Indonesia	South-Eastern Asia	Earthquake	Earthquake		5	27	5778	137883	699295	2340745	3177923	3100000	Yogyakarta, Central Java
2	Angola	Middle Africa	Epidemic	Diarrhoeal/ Enteric	Cholera	2	13	2179			50893	50893		Luanda, Bengo, Kwanza Norte, Benguela , Huambo, Malanje, Namibe, Bie, Huila, Kwanza Sul, Uige, Zaire, Lunda-Norte, Cabinda, Namibe, Kuando
3	Philippines	South-Eastern Asia	Wind Storm	Typhoon	Durian (Reming)	11	30	1399	2143		2560374	2562517	66400	Daraga town, Bicol region (Albay province), Catanduanes, Camarines, Sorgoson, Mindoro, Marinduque, Batangas, Laguna
4	Philippines	South-Eastern Asia	Slides	Landslide		2	17	1112	19		3272	3291	2203	Baranguay Guinsaugon (St Bernard, Southern Leyte)
5	Netherlands	Western Europe	Extreme Temperature	Heat wave		7	15	1000						
6	Belgium	Western Europe	Extreme Temperature	Heat wave		6		940						
7	China, P Rep	Eastern Asia	Wind Storm	Typhoon	Bilis	7	16	820			29622000	29622000	3325000	Fujian, Hunan, Guangdong, Jiangxi, Zhejiang, Guangxi provinces
8	Indonesia	South-Eastern Asia	Wave / Surge	Tsunami		7	17	802	543		35000	35543	2000	Tasikmalaya, Ciamis, Sukabumi, Garut (West Java province), Cilacap, Kebumen, Banyumas (Central java province), Gunung Kidul, Bantul (Yogyakarta
9	Ukraine	Eastern Europe	Extreme Temperature	Cold Wave		1	16	801	9600		50000	59600		Kiev
10	Ethiopia	Eastern Africa	Flood	Flash Flood		8	5	498	96		10000	10096	3200	Dire Dawa city, Addiq Ketema, Genfele, Coca Cola, Aftessa districts
11	Sudan	Northern Africa	Epidemic	Diarrhoeal/ Enteric	Cholera	1	28	476			15711	15711		Central Equatria, East Equatria, Western Equatria, Upper Nile, Jonglei, Lakes, Unity, Northern Bahr el Ghazel, Yei, Juba, Kajo-Keqi, Jebel Lado, Pibor, Ber
12	Botswana	Southern Africa	Epidemic	Diarrhoeal/ Enteric	Acute diarrhoeal syndrome	1		470			22264	22264		Francistown, S/Palapye, Boteti, Tutume, Bobirwa, Phikwe, Kweneng East, Kanye, Lobatse, N/West, Mahalapye, Goodhope
13	Sudan	Northern Africa	Epidemic	Meningitis	Meningococcal disease	12	3	382			3436	3436		Twic, Wau, Tanj, Gogerial counties (Bahr Al Gazal state), Unity State
14	China, P Rep	Eastern Asia	Wind Storm	Typhoon	Saomai	8	10	373			5920000	5920000	1500000	Zhejiang, Fujian provinces
15	Ethiopia	Eastern Africa	Flood	Flash Flood		8	13	364			8000	8000		Amorate, Gangato villages (North, near Turkana lake), Souith Omo zone (Southern Nation and Nationalities People's Region)
16	Korea Dem P Rep	Eastern Asia	Flood	Flash Flood		7	12	278		84500		84500		South Pyongan, North Hwanghe, Kangwon, South Hamgyong provinces
17	Burkina Faso	Western Africa	Epidemic	Meningitis	Meningococcal disease	1	1	246			2000	2000		Banfora, Barsologo, Boromo, Bousse, Dande, Dano,Diebougou, Djibo, Bobo-Dioulasso, Gaoua, Gourcy, Kaya, Koungoussi, Solenzo
18	Indonesia	South-Eastern Asia	Flood	Flash Flood		12	23	236			300000	300000		Langkat, Mendaling Natal districts (North Sumatra province), Nanggroe Aceh Darussalam, Riau provinces
19	Indonesia	South-Eastern Asia	Flood	Flash Flood		6	19	236	56	670	28505	29231	55200	Sinjai, Jeneponto, Bulukumba, Bantaeng, Luwu Utara, Bone, Gowa, Sidrap, Selayar, Wajo, Soppeng (South Sulawesi province)
20	Philippines	South-Eastern Asia	Wind Storm	Typhoon	Xangsane (Milenyo)	9	27	228	406		3842000	3842406	113000	Luzon, Manilla, Panay Isl.
21	Ethiopia	Eastern Africa	Epidemic	Diarrhoeal/ Enteric	Acute Watery Diarrheal syndrome	4	15	219			21882	21882		Oromiya, Amhara, Somali, Tigray, Southern Nation Nationalities, People Region, Afar, Addis Abeba city
22	Viet Nam	South-Eastern Asia	Wind Storm	Tropical storm	Chanchu (Caloy)	5	17	204			600000	600000		
23	Sudan	Northern Africa	Epidemic	Diarrhoeal/ Enteric	Acute Watery Diarrhoeal Syndrome/Cholera	4	21	196			5757	5757		Khartoum, North Kordofan, South Kordofan, White Nile, River Nile, South Darfur, Gezira, Kassala (North Dudan)
24	Poland	Eastern Europe	Extreme Temperature	Cold Wave		10		191						
25	India	Southern Asia	Flood			8	1	185			2000000	2000000		Orissa, Andhra Pradesh, Chhattisgarh

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 5: Top 25 Natural Disasters by the Ratio of People Killed to the Total Population, 2006

Rank (Killed/Popln)	Rank (Killed)	Country	Region	DisType	DisName	Month	Day	Killed	Injured	Homeless	Affected	TotAff	Population (World Fact Book)	Kill/Popln	Damage US$ ('000s)	Location
1	12	Botswana	Southern Africa	Epidemic	Acute diarrhoeal syndrome	1		470			22264	22264	1639833	0.000287		Francistown, S/Palapye, Boteti, Tutume, Bobirwa, Phikwe, Kweneng East, Kanye, Lobatse, N/West, Mahalapye, Goodhope
2	2	Angola	Middle Africa	Epidemic	Cholera	2	13	2179			50893	50893	12127071	0.000180		Luanda, Bengo, Kwanza Norte, Benguela , Huambo, Malanje, Namibe, Bie, Huila, Kwanza Sul, Uige, Zaire, Lunda-Norte, Cabinda, Namibe, Kuando
3	6	Belgium	Western Europe	Extreme Temperature		6		940					10379067	0.000091		
4	5	Netherlands	Western Europe	Extreme Temperature		7	15	1000					16491461	0.000061		
5	1	Indonesia	South-Eastern Asia	Earthquake		5	27	5778	137883	699295	2340745	3177923	#########	0.000024	3100000	Yogyakarta, Central Java
6	17	Burkina Faso	Western Africa	Epidemic	Meningococcal disease	1	1	246			2000	2000	13902972	0.000018		Banfora, Barsologo, Boromo, Bousse, Dande, Dano,Diebougou, Djibo, Bobo-Dioulasso, Gaoua, Courcy, Kaya, Koungoussi
7	81	Latvia	Northern Europe	Extreme Temperature		1		40					2274735	0.000018		
8	9	Ukraine	Eastern Europe	Extreme Temperature		1	16	801	9600		50000	59600	46710816	0.000017		Kiev
9	3	Philippines	South-Eastern Asia	Wind Storm	Durian (Reming)	11	30	1399	2143		2560374	2562517	89468677	0.000016	66400	Daraga town, Bicol region (Albay province), Catanduanes, Camarines, Sorgoson, Mindoro, Marinduque, Batangas, Laguna
10	37	Burundi	Eastern Africa	Drought		1		120			2150000	2150000	8090068	0.000015		Busoni, Bugabira, Ntega, Kirundo communes (Kirundo province), Ruyigi, Cankuzo, Rutana, Muyinga provinces
11	33	Zambia	Eastern Africa	Epidemic	Cholera	8	13	144			7615	7615	11502010	0.000013		Lusaka, Kabwe, Chihombo, Kapiri Mposhi, Mufulira, Kasempa, Copperbelt, Central, Eastern, Luampala, North Western, Western (Lusaka
12	4	Philippines	South-Eastern Asia	Slides		2	17	1112	19		3272	3291	89468677	0.000012	2203	Baranguay Guinsaugon (St Bernard, Southern Leyte)
13	16	Korea Dem P Rep	Eastern Asia	Flood		7	12	278		84500		84500	23113019	0.000012		South Pyongan, North Hwanghe, Kangwon, South Hamgyong provinces
14	11	Sudan	Northern Africa	Epidemic	Cholera	1	28	476			15711	15711	41236378	0.000012		Cental Equatria, East Equatria, Western Equatria, Upper Nile, Jonglei, Lakes, Unity, Northern Bahr el Ghazel, Yei, Juba, Kajo-Kegi, Jebel Lado, Pibor
15	43	Guinea	Western Africa	Epidemic	Cholera	1		111			173	173	9690222	0.000011		Gueckedou, Kissidougou, N'zerekore, Lola districst of Farnah and Conakry
16	13	Sudan	Northern Africa	Epidemic	Meningococcal disease	12	3	382			3436	3436	41236378	0.000009		Twic, Wau, Tanj, Gogerial counties (Bahr Al Gazal state), Unity State
17	10	Ethiopia	Eastern Africa	Flood		8	5	498	96		10000	10096	74777981	0.000007	3200	Dire Dawa city, Addiq Ketema, Genfele, Coca Cola, Aftessa districts
18	53	Zimbabwe	Eastern Africa	Epidemic	Cholera	12	10	73			980	980	12236805	0.000006		Chikomba, Buhera, Harare, Manicaland, Mashonaland Central, East and West, Masvingo, Midlands
19	67	Somalia	Eastern Africa	Flood		10	26	52			299000	299000	8863338	0.000006		Beletweyne, Jalalaqsi, Jowhar districts
20	55	Angola	Middle Africa	Epidemic	Cholera	10	24	68					12127071	0.000006		Huila, Uige provinces
21	27	Afghanistan	Southern Asia	Flood		11	16	166			17575	17575	31056997	0.000005		Murghab, Ghormach, Balamourghab district (Baghdis province)
22	68	Chad	Middle Africa	Flood		9	5	52					9944201	0.000005		N'Djamena, Sahr, Doba, B饕idja, Gor・Pala, Kouma (Western and Southwestern)
23	32	Nepal	Southern Asia	Slides		8	26	147		80000		80000	28287147	0.000005		Banke, Bardya, Achham, Chitwan, Makwanpur, Tanahun, Tehrathum, Nawalparasi, Kailali districts (mid and far western regions)
24	24	Poland	Eastern Europe	Extreme Temperature		10		191					38536869	0.000005		
25	199	Namibia	Southern Africa	Epidemic	Polio	5	7	10			47	47	2044147	0.000005		Aranos (Mariental), Windhoek, Engela, Okahaon Oshakati (Oshana), Okahandja (Otjozondjupa)

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 6: Top 25 Natural Disasters by the Number of Total Affected People, 2006

Rank	Country	Region	DisType	DisSubset	DisName	Month	Day	Killed	Injured	Homeless	Affected	TotAff	Damage US$ ('000s)	Location
1	China, P Rep	Eastern Asia	Wind Storm	Typhoon	Bilis	7	16	820			29622000	29622000	3325000	Fujian, Hunan, Guangdong, Jiangxi, Zhejiang, Guangxi provinces
2	China, P Rep	Eastern Asia	Drought	Drought		8					18000000	18000000	817000	Sichuan, Guizhou, Zhejiang, Anhui, Jiangxi, Hunana, Hubei provinces
3	China, P Rep	Eastern Asia	Wind Storm	Typhoon	Prapiroon	8	3	89			10000000	10000000	900000	Guangdong, Guangxi, Hainan provinces
4	China, P Rep	Eastern Asia	Wind Storm	Cyclone	Kaemi	7	24	109			6531000	6531000	367000	Jiangxi, Fujian, Zhejiang, Guangdong, Hunan
5	India	Southern Asia	Flood			7	28	161	65		6000000	6000065		Andhra Pradesh, Gujarat, Maharashtra, Chhattisgarh, Rajasthan, Madhya Pradesh, Orissa, Karnataka
6	China, P Rep	Eastern Asia	Wind Storm	Typhoon	Saomai	8	10	373			5920000	5920000	1500000	Zhejiang, Fujian provinces
7	China, P Rep	Eastern Asia	Flood			6	8	21	24		4600000	4600024		Wuzhou, Baise (Guangxi province)
8	Malawi	Eastern Africa	Drought	Drought		10					4500000	4500000		Southern and central regions
9	China, P Rep	Eastern Asia	Flood			6	28	30			4120000	4120000	2500	Sixian, Xiaoxian and Fengyang counties (Anhui Province), Yuzhou City (Henan Province)
10	Philippines	South-Eastern Asia	Wind Storm	Typhoon	Xangsane (Milenyo)	9	27	228	406		3842000	3842406	113000	Luzon, Manilla, Panay Isl.
11	Kenya	Eastern Africa	Drought	Drought		12		27			3500000	3500000		Makueni, Kitui, Mainidi, Kwale, Kilifi, Taita Taveta, Mandera, Wajir, Marsabit, Kajiado, Garissa, Myale, Isiolo, Muyingi, Tana river
12	Indonesia	South-Eastern Asia	Earthquake	Earthquake		5	27	5778	137883	699295	2340745	3177923	3100000	Yogyakarta, Central Java
13	China, P Rep	Eastern Asia	Wind Storm	Tropical storm	Chanchu (Caloy)	5	18	23			3150000	3150000	745000	Shantou (Guangdong province), Fujian province
14	Philippines	South-Eastern Asia	Wind Storm	Typhoon	Durian (Reming)	11	30	1399	2143		2560374	2562517	66400	Daraga town, Bicol region (Albay province), Catanduanes, Camarines, Sorgoson, Mindoro, Marinduque, Batangas
15	China, P Rep	Eastern Asia	Flood	Valley Flood		6	25	27			2375000	2375000		Shaoyang, Huaihua, Loudi, Zhangjiajie and Xiangxi (Longhui county, Hunan province)
16	Thailand	South-Eastern Asia	Flood	Flash Flood		8	20	164			2212413	2212413	9940	Chiang Rai, Chiang mai, Mae Hong Son, Lamphun, lampang, Phrae, Phayao, Uttaradit, Phetchabun, Phitsanulok, Sukhothai, Tak
17	Burundi	Eastern Africa	Drought	Drought		1		120			2150000	2150000		Busoni, Bugabira, Ntega, Kirundo communes (Kirundo province), Ruyigi, Cankuzo, Rutana, Muyinga provinces
18	India	Southern Asia	Flood			8	1	185			2000000	2000000		Orissa, Andhra Pradesh, Chhattisgarh
19	Afghanistan	Southern Asia	Drought	Drought		7					1900000	1900000		
20	Viet Nam	South-Eastern Asia	Wind Storm	Typhoon	Xangsane (Milenyo)	9	27	71	525	98680	1368720	1467925	624000	Ha Tinh, Thua Thien-Hue, Da Nang, Quang Nam, Quang Ngai provinces
21	China, P Rep	Eastern Asia	Flood			6	13	2			1410000	1410000		Hunan province
22	China, P Rep	Eastern Asia	Flood			7	7	10			1400000	1400000	31000	Qinzhou, Yulin (Guangxi Zhuang)
23	Viet Nam	South-Eastern Asia	Wind Storm	Typhoon	Durian (Reming)	11	30	95	1360	250000	975000	1226360	456000	Ba Ria-Vung Tau , Ben Tre, Binh Thuan, Vinh Long, Tien Gang, Khanh Hao, , An Giang, Tra Vinh, Long An, Dong Thap, Ho
24	Kenya	Eastern Africa	Flood			10	23	114			723000	723000		Dabaab, Kwale, Garissa, Kilifi, Tana river, Ijara, Wajir, Moyale, El Wak, Budalangi, Mandera, Isiolo, Turkana, Ladwar
25	Thailand	South-Eastern Asia	Flood	Flash Flood		11	23	55			700000	700000	97000	Songkhla, Trang, Satun, Nakhon Si Thammarat, Phatthalung, Samui, Chomphon, Narathiwat, Pattani, Yala provinces

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 7: Top 25 Natural Disasters by the Ratio of Total Affected People to the Total Population, 2006

Rank (TotAff/Popln)	Rank (TotAff)	Country	Region	DisType	DisSubset	DisName	Month	Day	Killed	Injured	Homeless	Affected	TotAff	Population (World Fact Book)	TotAff/Popln	Damage US$ ('000s)	Location
1	8	Malawi	Eastern Africa	Drought	Drought		10					4500000	4500000	13013926	0.345783		Southern and central regions
2	17	Burundi	Eastern Africa	Drought	Drought		1		120			2150000	2150000	8090068	0.265758		Busoni, Bugabira, Ntega, Kirundo communes (Kirundo province), Ruyigi, Cankuzo, Rutana
3	49	Reunion	Eastern Africa	Epidemic		Chikungunya virus disease	3	28				157000	157000	787584	0.199344		
4	11	Kenya	Eastern Africa	Drought	Drought		12		27			3500000	3500000	34707817	0.100842		Makueni, Kitui, Malindi, Kwale, Kilifi, Taita Taveta, Mandera, Wajir, Marsabit, Kajiado, Garissa
5	172	Seychelles	Eastern Africa	Epidemic		Chikungunya virus disease	1					5461	5461	81541	0.066972		
6	19	Afghanistan	Southern Asia	Drought	Drought		7					1900000	1900000	31056997	0.061178		
7	87	Guyana	South America	Flood			1	8				35000	35000	767245	0.045618	169000	Barima, Waini (Region One), Pomeroon, Supenaam (Region Two), Essequibo Islands, West Demerara
8	10	Philippines	South-Eastern Asia	Wind Storm	Typhoon	Xangsane (Milenyo)	9	27	228	406		3842000	3842406	89468677	0.042947	113000	Luzon, Manilla, Panay Isl.
9	16	Thailand	South-Eastern Asia	Flood	Flash Flood		8	20	164			2212413	2212413	64631595	0.034231	9940	Chiang Rai, Chiang mai, Mae Hong Son, Lamphun, lampang, Phrae, Phayao, Uttaradit, Phetchabun
10	40	Somalia	Eastern Africa	Flood			10	26	52			299000	299000	8863338	0.033734		Beletweyne, Jalalaqsi, Jowhar districts
11	14	Philippines	South-Eastern Asia	Wind Storm	Typhoon	Durian (Reming)	11	30	1399	2143		2560374	2562517	89468677	0.028641	66400	Daraga town, Bicol region (Albay province), Catanduanes, Camarines, Sorgoson, Mindoro, Marinduque
12	1	China, P Rep	Eastern Asia	Wind Storm	Typhoon	Bilis	7	16	820			29622000	29622000	##########	0.022425	3325000	Fujian, Hunan, Guangdong, Jiangxi, Zhejiang, Guangxi provinces
13	90	Guinea Bissau	Western Africa	Drought	Drought		5	0	0			32000	32000	1442029	0.022191		Quinara, Tombali regions, Bijagos Isl.
14	36	Ecuador	South America	Volcano	Explosive Eruption	Tungurahua	7	14	5	13		300000	300013	13547510	0.022145	150000	Tungurahua, Chimborozo, Bolivar, Pastaza provinces
15	97	Suriname	South America	Flood			5	7	3			25000	25000	1136334	0.022001		Tapanahoni, Boven Suriname, Boven Saramacca, Boven Coppename, Kabalebo, Coeroeni, Sarakreek
16	26	Uganda	Eastern Africa	Drought	Drought		3					600000	600000	28195754	0.021280		Katapata, Nyakwae (Kotido district), Rupa, Nadunget (Moroto district), Karamoja region
17	24	Kenya	Eastern Africa	Flood			10	23	114			723000	723000	34707817	0.020831		Dabaab, Kwale, Garissa, Kilifi, Tana river, Ijara, Wajir, Moyale, El Wak, Budalangi, Mandera
18	50	Somalia	Eastern Africa	Flood			10	23	35			155500	155500	8863338	0.017544		Gedo region
19	20	Viet Nam	South-Eastern Asia	Wind Storm	Typhoon	Xangsane (Milenyo)	9	27	71	525	98680	1368720	1467925	84402966	0.017392	624000	Ha Tinh, Thua Thien-Hue, Da Nang, Quang Nam, Quang Ngai provinces
20	35	Sri Lanka	Southern Asia	Flood			10	26	25	2		333000	333002	20222240	0.016467		Colombo, Gampaha, Kalutara, Galle, Matara, Puttlam, Ratnapura, Badulla, Kegalle, Kurunegala
21	23	Viet Nam	South-Eastern Asia	Wind Storm	Typhoon	Durian (Reming)	11	30	95	1360	250000	975000	1226360	84402966	0.014530	456000	Ba Ria-Vung Tau , Ben Tre, Binh Thuan, Vinh Long, Tien Gang, Khanh Hao, , An Giang, Tra Vinh, Long
22	55	Bolivia	South America	Flood			1	25	25	21		126075	126096	8989046	0.014028	35000	City of La Paz, Los Yungas, Luribay, Papel Pampa, San Pedro de Curahuara (La Paz), Viloma, Aymaya
23	2	China, P Rep	Eastern Asia	Drought	Drought		8					18000000	18000000	##########	0.013627	817000	Sichuan, Guizhou, Zhejiang, Anhui, Jiangxi, Hunana, Hubei provinces
24	98	Botswana	Southern Africa	Epidemic	Diarrhoeal/Enteric	Acute diarrhoeal syndrome	1		470			22264	22264	1639833	0.013577		Francistown, S/Palapye, Boteti, Tutume, Bobirwa, Phikwe, Kweneng East, Kanye, Lobatse, N/West
25	12	Indonesia	South-Eastern Asia	Earthquake	Earthquake		5	27	5778	137883	699295	2340745	3177923	245452739	0.012947	3100000	Yogyakarta, Central Java

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 8: Top 25 Natural Disasters by the Amount of Damage, 2006

Rank	Country	Region	DisType	DisSubset	DisName	Month	Day	Killed	Injured	Homeless	Affected	TotAff	Damage US$ ('000s)	Location
1	China, P Rep	Eastern Asia	Wind Storm	Typhoon	Bilis	7	16	820			29622000	29622000	3325000	Fujian, Hunan, Guangdong, Jiangxi, Zhejiang, Guangxi provinces
2	Indonesia	South-Eastern Asia	Earthquake	Earthquake		5	27	5778	137883	699295	2340745	3177923	3100000	Yogyakarta, Central Java
3	China, P Rep	Eastern Asia	Wind Storm	Typhoon	Saomai	8	10	373			5920000	5920000	1500000	Zhejiang, Fujian provinces
4	Australia	Australia and New Zealand	Wind Storm	Tropical storm	Larry	3	20		30		7000	7030	1100000	South of Cairns (Queensland state)
5	Russia	Eastern Europe	Extreme Temperatur e	Cold Wave		1		116	14			14	1000000	Moscou, Volgograd region, St Petersbourg, Tchita region, Magadan region
6	United States	Northern America	Flood			6	25	11			65000	65000	1000000	Maryland, Pennsylvania, New York, Delaware, Virginia, New Jersey
7	China, P Rep	Eastern Asia	Wind Storm	Typhoon	Prapiroon	8	3	89			10000000	10000000	900000	Guangdong, Guangxi, Hainan provinces
8	China, P Rep	Eastern Asia	Drought	Drought		8					18000000	18000000	817000	Sichuan, Guizhou, Zhejiang, Anhui, Jiangxi, Hunana, Hubei provinces
9	China, P Rep	Eastern Asia	Wind Storm	Tropical storm	Chanchu (Caloy)	5	18	23			3150000	3150000	745000	Shantou (Guangdong province), Fujian province
10	Philippines	South-Eastern Asia	Wind Storm	Tropical storm	Henry	6	30	8			476027	476027	644660	Tarlac, Zambales, Nueva Ecija
11	Viet Nam	South-Eastern Asia	Wind Storm	Typhoon	Xangsane (Milenyo)	9	27	71	525	98680	1368720	1467925	624000	Ha Tinh, Thua Thien-Hue, Da Nang, Quang Nam, Quang Ngai provinces
12	United States	Northern America	Wind Storm	Tornado		4	2	28			3600	3600	600000	Tennessee, Illinois, Arkansas, Indiania, Oklahoma, Missouri, Kentucky, Iowa
13	Viet Nam	South-Eastern Asia	Wind Storm	Typhoon	Durian (Reming)	11	30	95	1360	250000	975000	1226360	456000	Ba Ria-Vung Tau , Ben Tre, Binh Thuan, Vinh Long, Tien Gang, Khanh Hao, , An Giang, Tra Vinh, Long An, Dong Thap, Ho Chi Ming
14	China, P Rep	Eastern Asia	Flood			5	30	57			356000	356000	393000	Fujian province
15	China, P Rep	Eastern Asia	Wind Storm	Cyclone	Kaemi	7	24	109			6531000	6531000	367000	Jiangxi, Fujian, Zhejiang, Guangdong, Hunan
16	United States	Northern America	Flood			4	4	1			600	600	259000	Amador, Calaveras, Fresno, Merced, San Joaquin, San Mateo, Stanislau (Northern California)
17	United States	Northern America	Flood			12	31	3			3600	3600	245000	Napa, Sonoma, Mendocino, Marin, Solano (San Francisco region), Los Angeles (California), Reno, Truckee, Carson (Nevada)
18	Lithuania	Northern Europe	Drought	Drought		8							225573	
19	Guyana	South America	Flood			1	8				35000	35000	169000	Barima, Waini (Region One), Pomeroon, Supenaam (Region Two), Essequibo Islands, West Demerara (Region Three), Mahaica, Mahaicony
20	Ecuador	South America	Volcano	Explosive Eruption	Tungurahu a	7	14	5	13		300000	300013	150000	Tungurahua, Chimborozo, Bolivar, Pastaza provinces
21	South Africa	Southern Africa	Flood			8	2	6			3000	3000	145000	Eastern and Southern Cape regions
22	Philippines	South-Eastern Asia	Wind Storm	Typhoon	Prapiroon	8	2	6			15000	15000	135000	Quirino region, Northern Luzon
23	China, P Rep	Eastern Asia	Flood	Flash Flood		6	12	52			5900	5900	130000	Wangmo, Luodian, Qianxi'nan Bouyei, Miao counties (Guizhou province)
24	Russia	Eastern Europe	Flood			6	4				1300	1300	125000	Lens, Olekminsk regions (Yakutia)
25	Taiwan (China)	Eastern Asia	Flood			6	10	3			300	300	116130	Nantou, Taichung, Hsinchu, Changhua and Chiayi, Kaohsiung counties (Central and southern Taiwan)

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 9: Top 25 Natural Disasters by the Ratio of Damage to GNI, 2006

Rank (Damage/GNI)	Rank (Damage)	Country	Region	DisType	DisSubset	DisName	Month	Day	Killed	Injured	Homeless	Affected	TotAff	GNI (Bn US$) (World Bank)	DamageUS ('000s)	Dam/GNI	Location
1	19	Guyana	South America	Flood			1	8				35000	35000	0.77	169000	0.2194805	Barima, Waini (Region One), Pomeroon, Supenaam (Region Two), Essequibo Islands, West Demerara (Region Three), Mahaica
2	11	Viet Nam	South-Eastern Asia	Wind Storm	Typhoon	Xangsane (Milenyo)	9	27	71	525	98680	1368720	1467925	44.63	624000	0.0139816	Ha Tinh, Thua Thien-Hue, Da Nang, Quang Nam, Quang Ngai provinces
3	2	Indonesia	South-Eastern Asia	Earthquake	Earthquake		5	27	5778	137883	699295	2340745	3177923	248.01	3100000	0.0124995	Yogyakarta, Central Java
4	47	Tajikistan	Central Asia	Earthquake	Earthquake		7	29	3	19		15408	15427	1.78	22000	0.0123596	Koumsanguir, Panj Jamoat
5	18	Lithuania	Northern Europe	Drought	Drought		8							19.73	225573	0.0114330	
6	13	Viet Nam	South-Eastern Asia	Wind Storm	Typhoon	Durian (Reming)	11	30	95	1360	250000	975000	1226360	44.63	456000	0.0102173	Ba Ria-Vung Tau , Ben Tre, Binh Thuan, Vinh Long, Tien Gang, Khanh Hao, , An Giang, Tra Vinh, Long An, Dong Thap, Ho Chi Minc
7	10	Philippines	South-Eastern Asia	Wind Storm	Tropical storm	Henry	6	30	8			476027	476027	95.08	644660	0.0067802	Tarlac, Zambales, Nueva Ecija
8	20	Ecuador	South America	Volcano	Explosive Eruption	Tungurahua	7	14	5	13		300000	300013	28.86	150000	0.0051975	Tungurahua, Chimborozo, Bolivar, Pastaza provinces
9	40	Bolivia	South America	Flood			1	25	25	21		126075	126096	8.64	35000	0.0040509	City of La Paz, Los Yungas, Luribay, Papel Pampa, San Pedro de Curahuara (La Paz), Viloma, Aymaya, Tiraque (Cochabamba)
10	5	Russia	Eastern Europe	Extreme Temperature	Cold Wave		1		116	14			14	488.50	1000000	0.0020471	Moscou, Volgograd region, St Petersbourg, Tchita region, Magadan region
11	4	Australia	Australia and New Zealand	Wind Storm	Tropical storm	Larry	3	20		30		7000	7030	544.34	1100000	0.0020208	South of Cairns (Queensland state)
12	62	Namibia	Southern Africa	Flood			2	24	5			2100	2100	4.79	8490	0.0017724	Mariental
13	1	China, P Rep	Eastern Asia	Wind Storm	Typhoon	Bilis	7	16	820			29622000	29622000	1937.97	3325000	0.0017157	Fujian, Hunan, Guangdong, Jiangxi, Zhejiang, Guangxi provinces
14	22	Philippines	South-Eastern Asia	Wind Storm	Typhoon	Prapiroon	8	2	6			15000	15000	95.08	135000	0.0014199	Quirino region, Northern Luzon
15	26	Philippines	South-Eastern Asia	Wind Storm	Typhoon	Xangsane (Milenyo)	9	27	228	406		3842000	3842406	95.08	113000	0.0011885	Luzon, Manilla, Panay Isl.
16	63	Honduras	Central America	Flood			6	25	4			1500	1500	7.32	8000	0.0010929	Cortes, Intibuca
17	21	South Africa	Southern Africa	Flood			8	2	6			3000	3000	165.33	145000	0.0008770	Eastern and Southern Cape regions
18	3	China, P Rep	Eastern Asia	Wind Storm	Typhoon	Saomai	8	10	373			5920000	5920000	1937.97	1500000	0.0007740	Zhejiang, Fujian provinces
19	33	Philippines	South-Eastern Asia	Wind Storm	Typhoon	Durian (Reming)	11	30	1399	2143		2560374	2562517	95.08	66400	0.0006984	Daraga town, Bicol region (Albay province), Catanduanes, Camarines, Sorgoson, Mindoro, Masbateque, Batangas
20	30	Thailand	South-Eastern Asia	Flood	Flash Flood		11	23	55			700000	700000	158.37	97000	0.0006125	Songkhla, Trang, Satun, Nakhon Si Thammarat, Phatthalung, Samui, Chomphon, Narathiwat, Pattani, Yala provinces
21	7	China, P Rep	Eastern Asia	Wind Storm	Typhoon	Prapiroon	8	3	89			10000000	10000000	1937.97	900000	0.0004644	Guangdong, Guangxi, Hainan provinces
22	8	China, P Rep	Eastern Asia	Drought	Drought		8					18000000	18000000	1937.97	817000	0.0004216	Sichuan, Guizhou, Zhejiang, Anhui, Jiangxi, Hunana, Hubei provinces
23	71	Ethiopia	Eastern Africa	Flood	Flash Flood		8	5	498	96		10000	10096	7.64	3200	0.0004188	Dire Dawa city, Addiq Ketema, Genfele, Coca Cola, Aftessa districts
24	46	Ukraine	Eastern Europe	Flood			7	2	2			5000	5000	60.20	23855	0.0003963	Berogorsky district, Lvivskaya, Ivano-Frankovskaya, Chernovetskaya oblast, South Crimea
25	9	China, P Rep	Eastern Asia	Wind Storm	Tropical storm	Chanchu (Caloy)	5	18	23			3150000	3150000	1937.97	745000	0.0003844	Shantou (Guangdong province), Fujian province

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

The above tables and figures clearly show the trends in natural disasters in Asia and around the world, as well as the impacts and characteristics of those disasters in 2006. This chapter also analyzed the vulnerability of the small states due to the small size of their populations and economies. It is equally important to analyze the impact of disasters on economic development and efforts to achieve sustainable development in order to stimulate the development of effective disaster risk management approaches. The following chapters will illustrate these issues in detail.

Chapter 2: Natural Disasters and Sustainable Development

This chapter addresses the importance of the link between disaster reduction frameworks and development initiatives, based on the disaster trends in 2006 as well as the trends from 1975 to 2006. As we know, various UN agencies, international institutions, and governments have placed high priority on natural disasters and sustainable development. Hence, it is of paramount importance that efforts be made to analyze disaster trends in relation to variables of sustainable development, primarily the Human Development Index and other economic factors, especially in countries that are affected by disasters. These trends are discussed below.

2.1 Human Development and Natural Disasters

The human development level (HDL) is a measure of factors that express a country's level of development, including its literacy rate, gross school enrollment rate, per capita income, and life expectancy. These variables are significant in terms of disaster mitigation, preparedness planning, and disaster reduction and management strategies. Higher HDLs will make planning and management strategies and follow-up activities easier in post-disaster periods. A country's HDL is categorized as high (HHD: 0.8 or higher), medium (MHD: 0.5 to 0.79) or low (LHD: lower than 0.5), in accordance with UNDP specifications. This section presents disaster data according to the HDL.

Income levels are also categorized as high (annual per capita income US$9,266 and above), upper middle (annual per capita income $2,996-$9,265), lower middle (annual per capita income $756-$2,995) and low (annual per capita income less than $755) according to the World Bank definitions. The figures below show the disaster characteristics by income level, both globally and regionally.

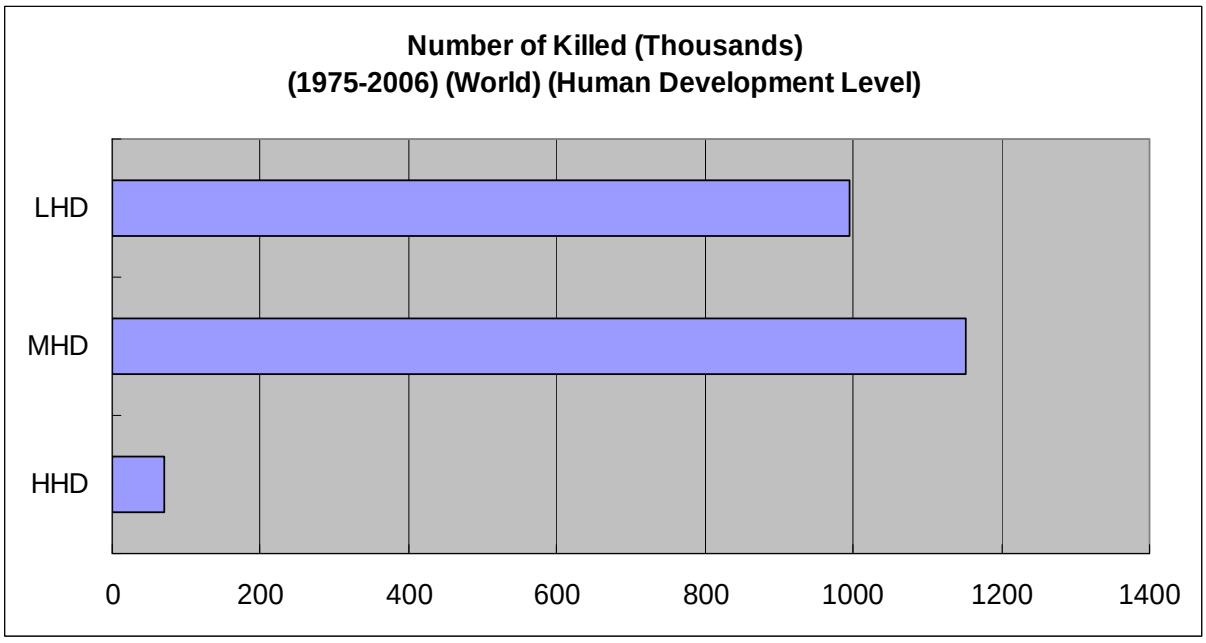
Figures 12, 13A, 13B, 14, 15A, 15B, 16, 17A, and 17B show the relationship between the HDL and the impacts that disaster-related human suffering and economic losses have on societies and economies. Figures 12, 14, and 16 show the number of people killed, the number of total affected people, and the amount of damage, respectively, by HDL for the period 1975 to 2006. Figures marked as A and B show the ratio of people killed to population, total affected people per million population, and the ratio of damage to GNI for the world (A) and for Asia (B). Disaster trends for 2006, as in the previous years, clearly show that human loss and suffering were considerably higher in countries with low human development (LHD), as the ratios of people killed and people affected to the total population were considerably higher in LHD countries than in medium human development (MHD) or high human development (HHD) countries.

In 2003, however, a major shift occurred around the world. An unexpected heat wave caused tremendous human suffering in the HHD countries of Europe. The 2004 and 2005 disaster trends once

again stressed the importance of disaster reduction in the developing countries. Similarly, the trends in 2006 further indicate that countries with low and medium human development levels tend to suffer more serious human and economic losses. The figures for the year 2006, as shown below, clearly illustrate this important point. Since the human development index reflects a country's literacy rate, life expectancy, and per capita income, improving these variables could contribute immensely to reducing the impact of natural disasters. Although considerable disaster damage was sustained in the HHD countries, the impact of disasters, in terms of human and economic losses, were more severe in the MHD and LHD countries. Since developing and less developed countries (LDCs) tend to have low and medium HDLs, and thus tend to have elevated levels of human and economic losses, their development efforts and ability to compete within a scenario of global development are limited. Better disaster management approaches are therefore needed in these regions.

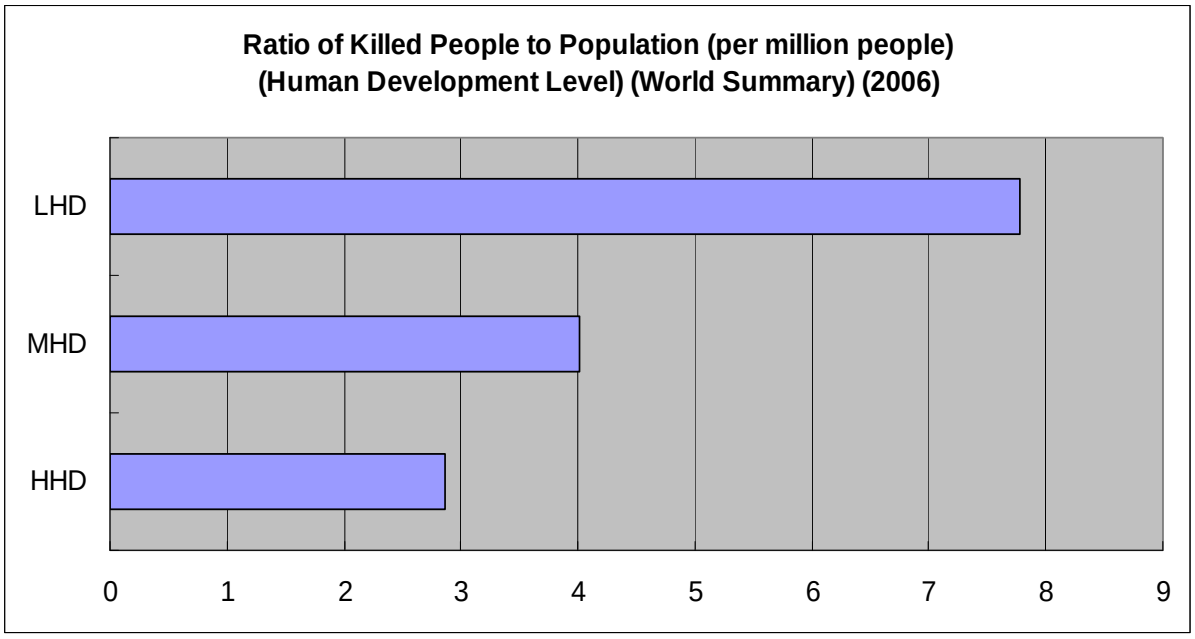
It is also quite evident from the following figures that the ratios of people killed and total affected people to the total population are high in the LHD and MHD countries, stressing the importance of incorporating disaster reduction approaches into mainstream national policies. Although the real value of damage is high in higher income countries, the ratio of damage to GNI is higher in the middle income countries. Likewise, although the actual human losses are higher in the MHD countries, the LHD countries are shown to suffer more when the human loss and suffering are expressed as the ratio to the total population. The 2006 trend is similar to those of 2004 and 2005 in this aspect.

Figure 12: Number of People Killed (Thousands) by Human Development Level, 1975-2006 (World)



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

Figure 13A: Ratio of People Killed to Population by Human Development Level, 2006 (World)



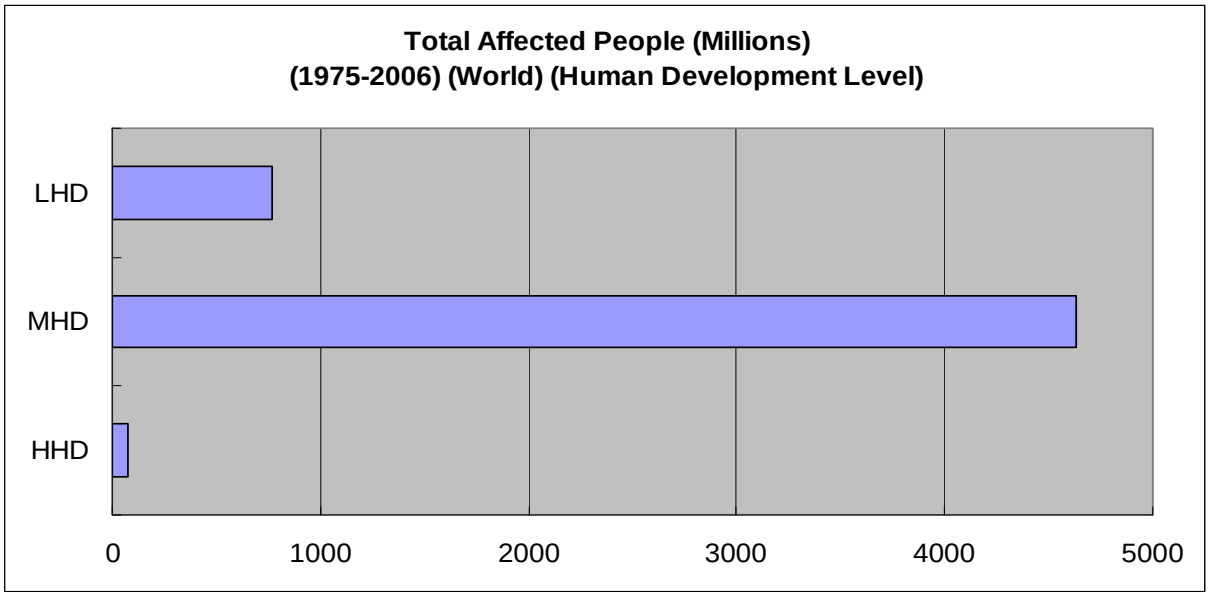
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

Figure 13B: Ratio of People Killed to Population by Human Development Level, 2006 (Asia)

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

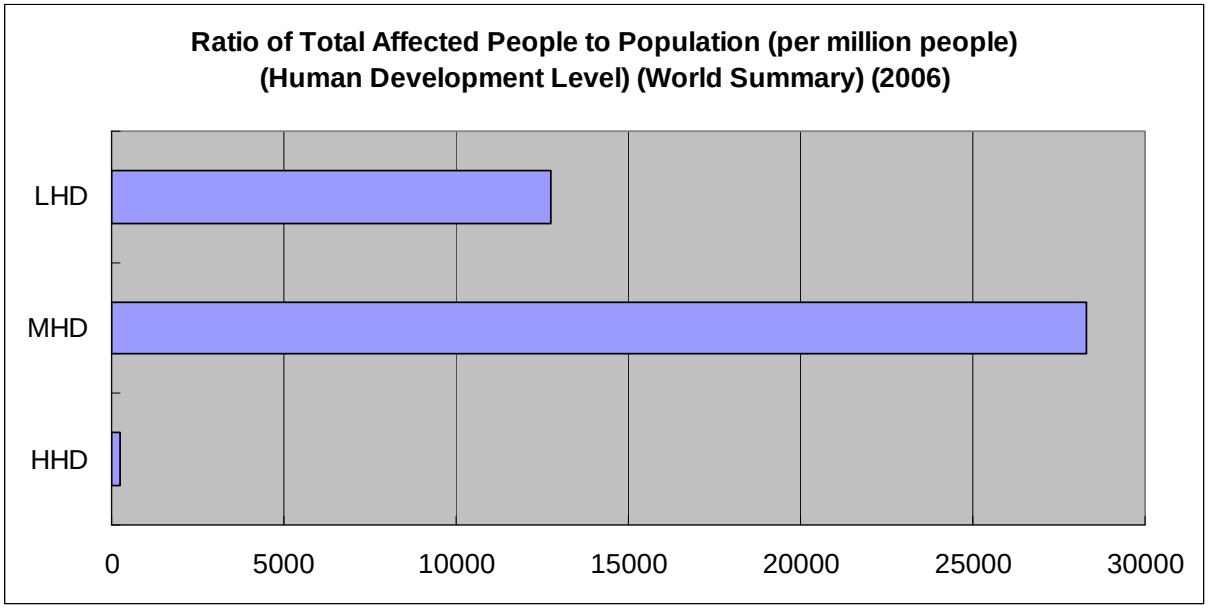
These figures clearly show that the majority of human losses were reported in countries with a low level of human development (due to the disasters in the vulnerable Asian region). This is consistent for figures worldwide.

Figure 14: Total Affected People (Millions) by Human Development Level, 1975-2006 (World)



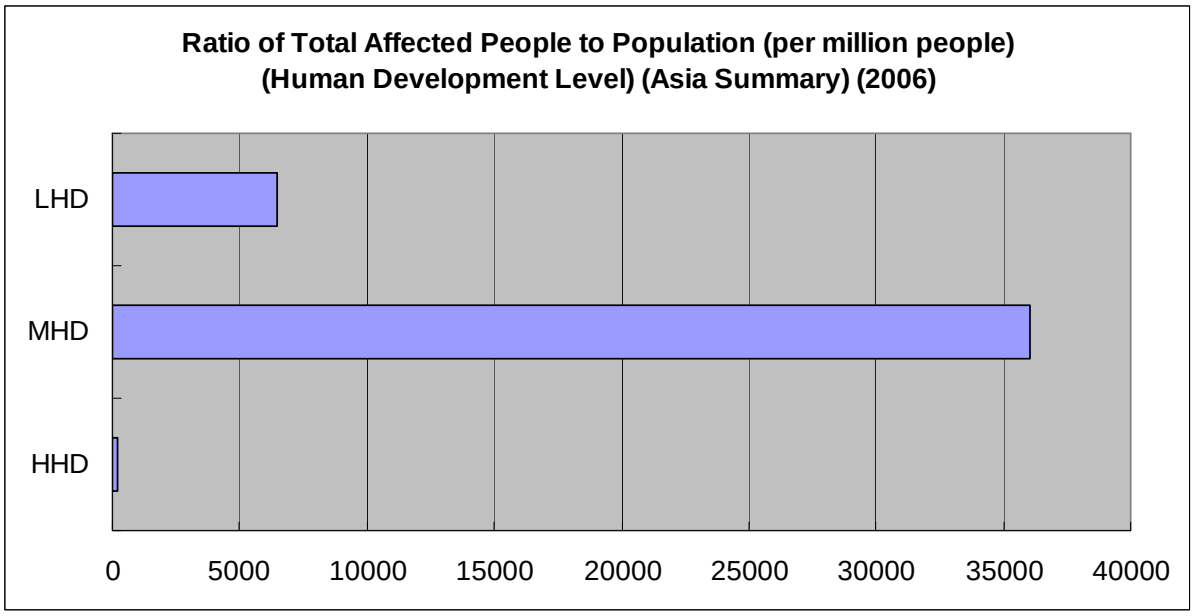
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

Figure 15A: Total Affected People Per Million Population by Human Development Level, 2006 (World)



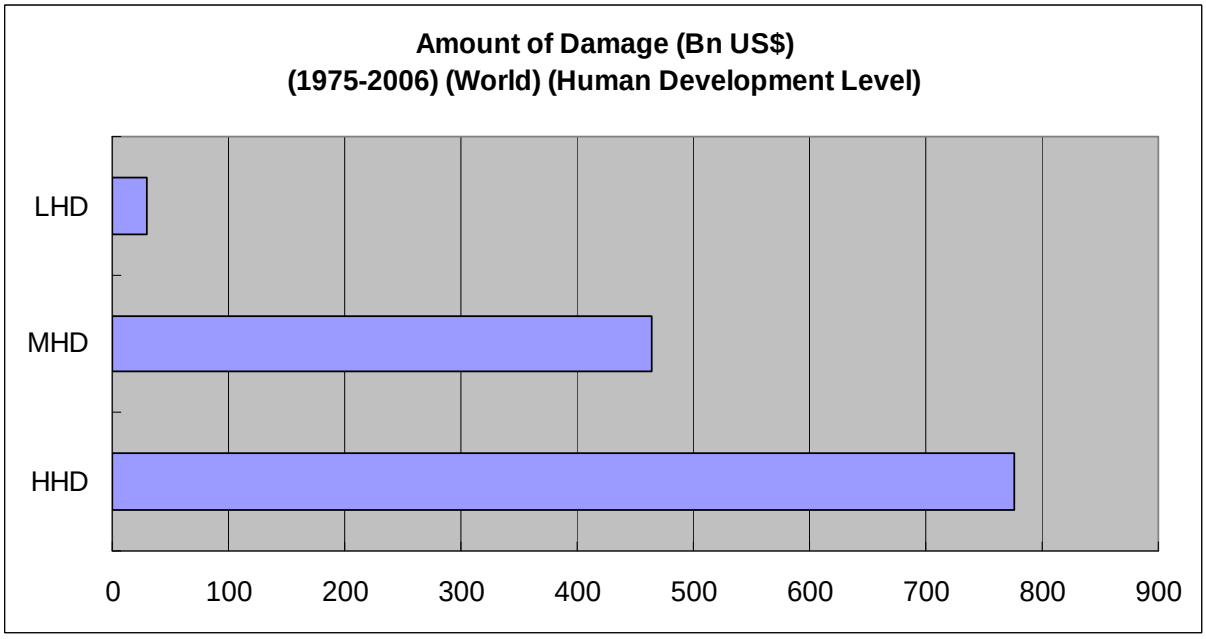
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

Figure 15B: Total Affected People Per Million Population by Human Development Level, 2006 (Asia)



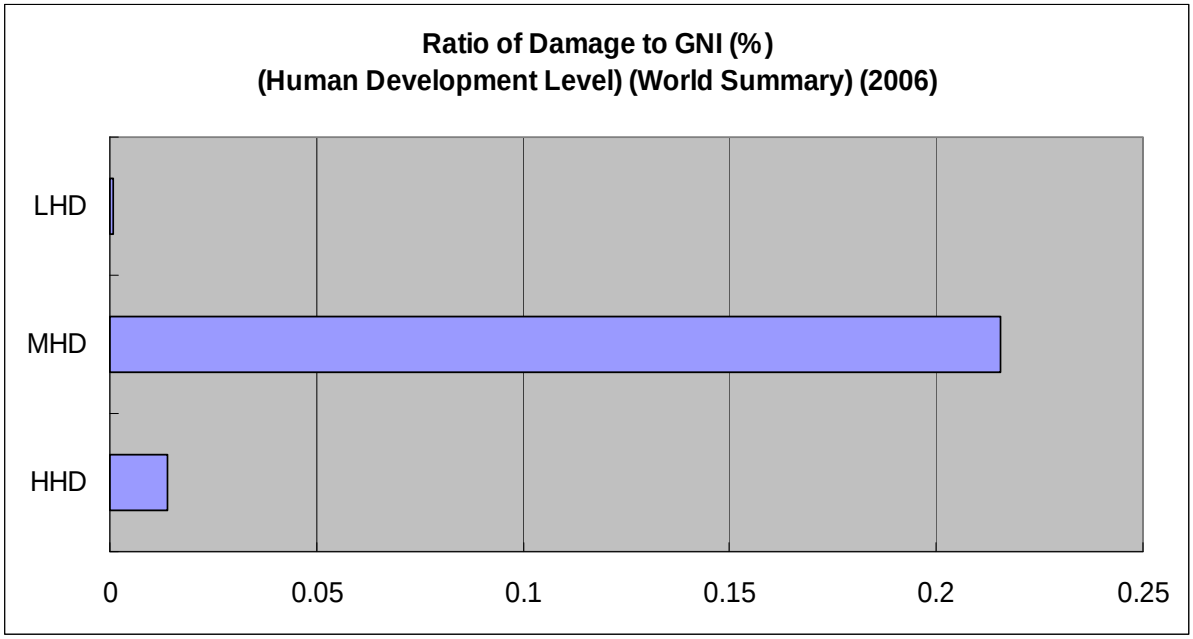
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

Figure 16: Amount of Damage (US$ Billions) by Human Development Level, 1975-2006 (World)



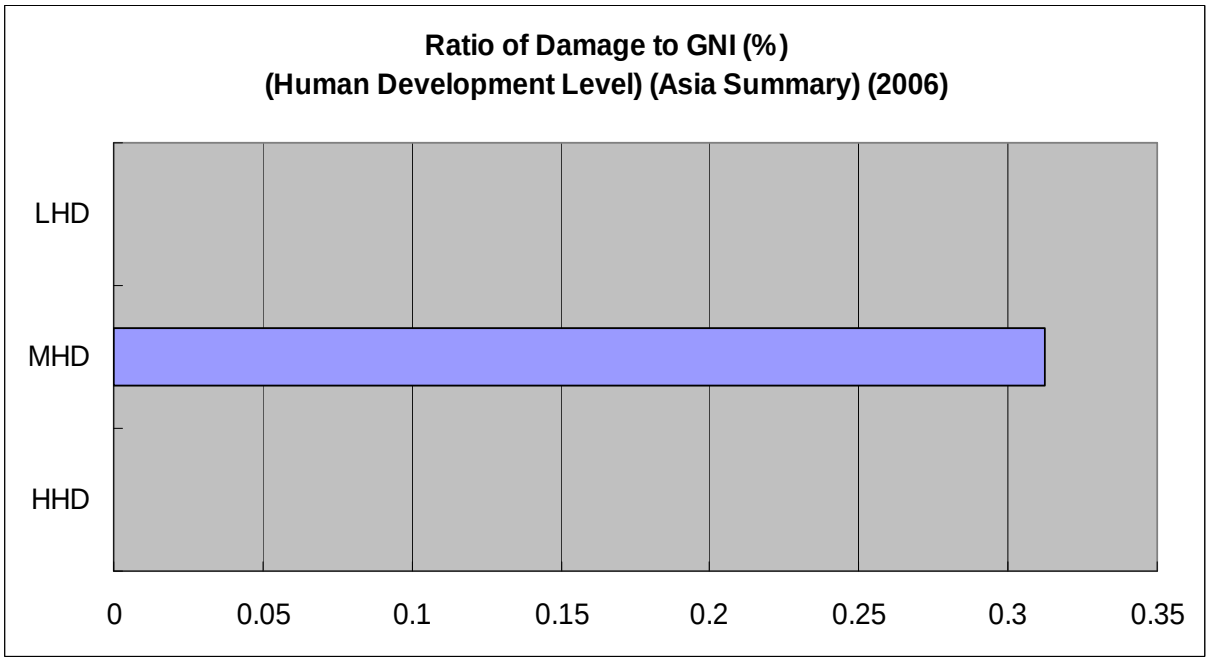
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

Figure 17A: Ratio of Amount of Damage to GNI (%) by Human Development Level, 2006 (World)



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

Figure 17B: Ratio of Amount of Damage to GNI (%) by Human Development Level, 2006 (Asia)



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

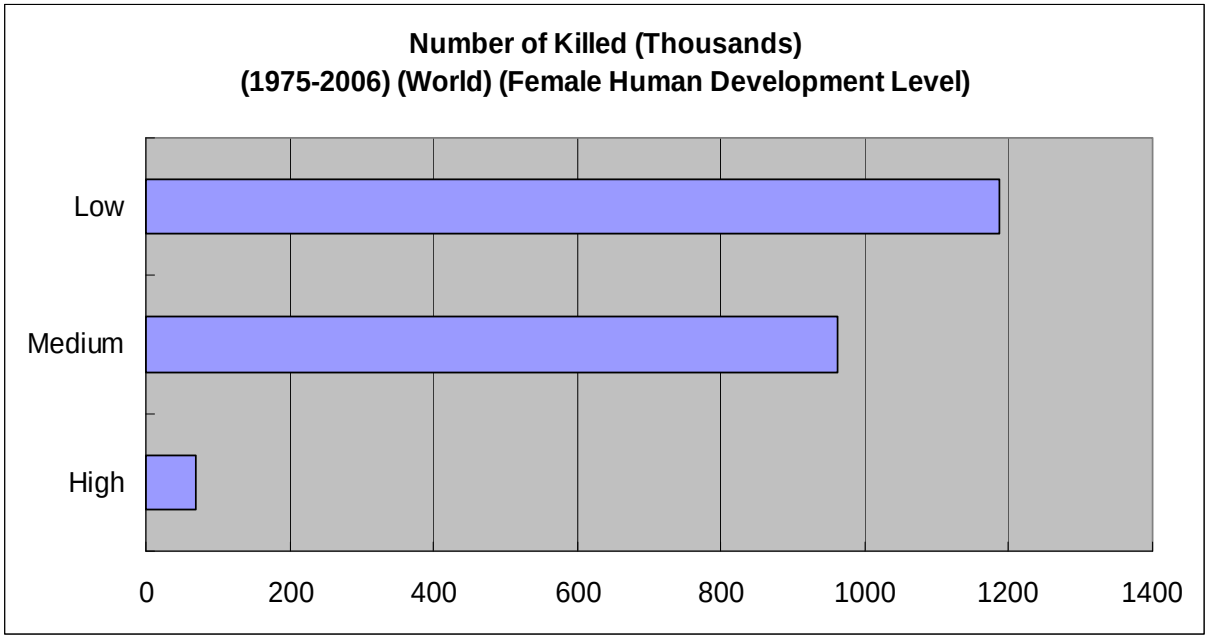
2.2 Gender Issues and Natural Disaster Impacts

In addition to what we have seen above with respect to overall human development and the impact of natural disasters, it is also of paramount importance that efforts be made to examine the relationship between gender and natural disasters. Here we examine the Female Human Development Index, which was extracted from the general Human Development Index, in relation to disasters. Generally speaking, countries with lower female human development (LFHD) report the most human suffering, and tend to have higher ratios of people killed and total affected people to the total population than countries with higher female human development levels (HFHD). The trend is very similar to the trend in general human development.

Accordingly, as in the previous years, in 2006 both the ratio of the people killed to the total population were high in countries with low and medium Female Human Development indicators due to the earthquakes, floods, and wind storms that struck many countries in Asia, especially the earthquake in Indonesia, floods in China, windstorms and slides in Philippines and flood in India (Figures 18, 19A, and 19B). Moreover, the ratio of total affected people to the total population was high in countries with low and medium female human development, as shown in Figures 20, 21A, and 21B. Further, Figures 22, 23A, and 23B indicate that damage as a proportion of GNI is also relatively high in the low and medium female human development countries, although the amounts of actual damage are higher in high female human development countries. These figures highlight the importance of gender-related planning and mitigation strategies and approaches in the field of disaster management, especially in countries with relatively low human development levels.

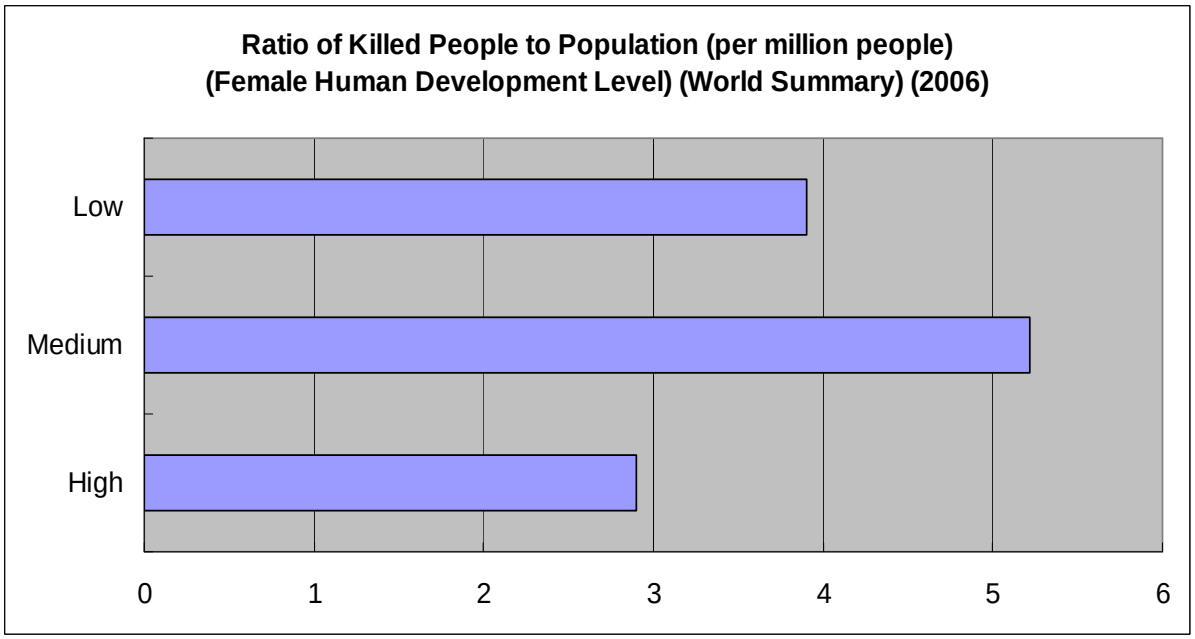
Gender powerfully shapes the human response to disasters, both directly and indirectly. Studies have shown that women are hit hard by the social impacts of disasters, suggesting that women should play a major role in post-disaster activities if proper integration of gender issues and disaster management is achieved. The reality is that women are always identified as active and resourceful disaster respondents, but are often regarded as helpless victims. Since disaster mitigation and risk management activities should be incorporated into development strategies, it is imperative to prevent gender bias and ensure women's participation in the field of development.

Figure 18: Number of People Killed (Thousands) by Female Human Development Level, 1975-2006 (World)



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

Figure 19A: Ratio of People Killed to Population by Female Human Development Level, 2006 (World)



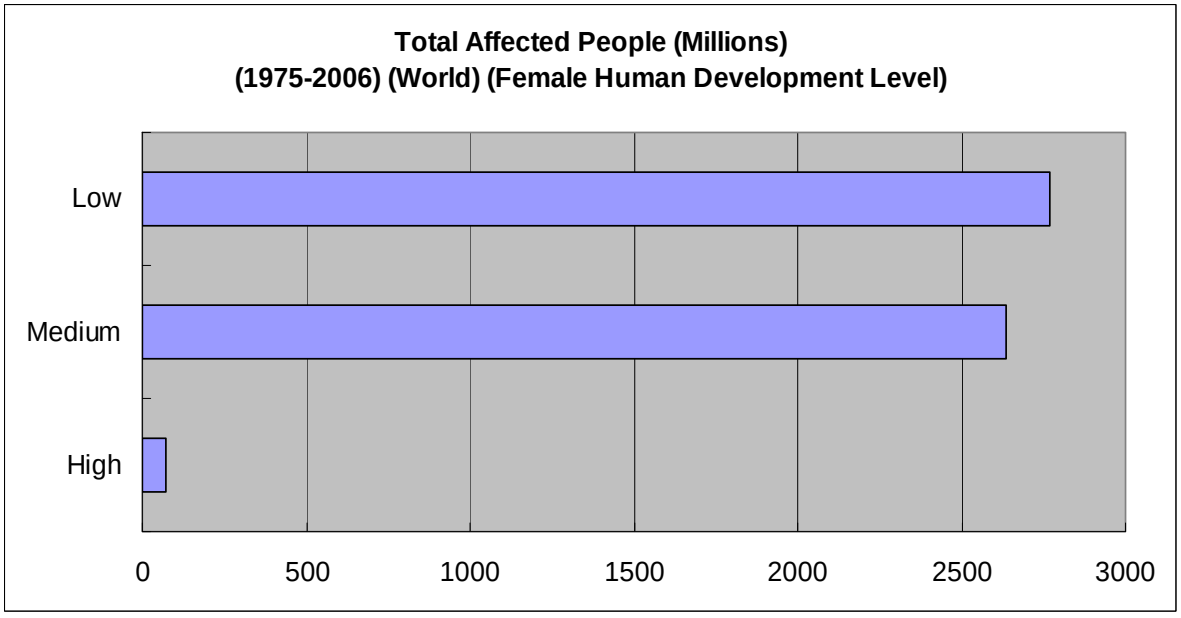
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

Figure 19B: Ratio of People Killed to Population by Female Human Development Level, 2006 (Asia)

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

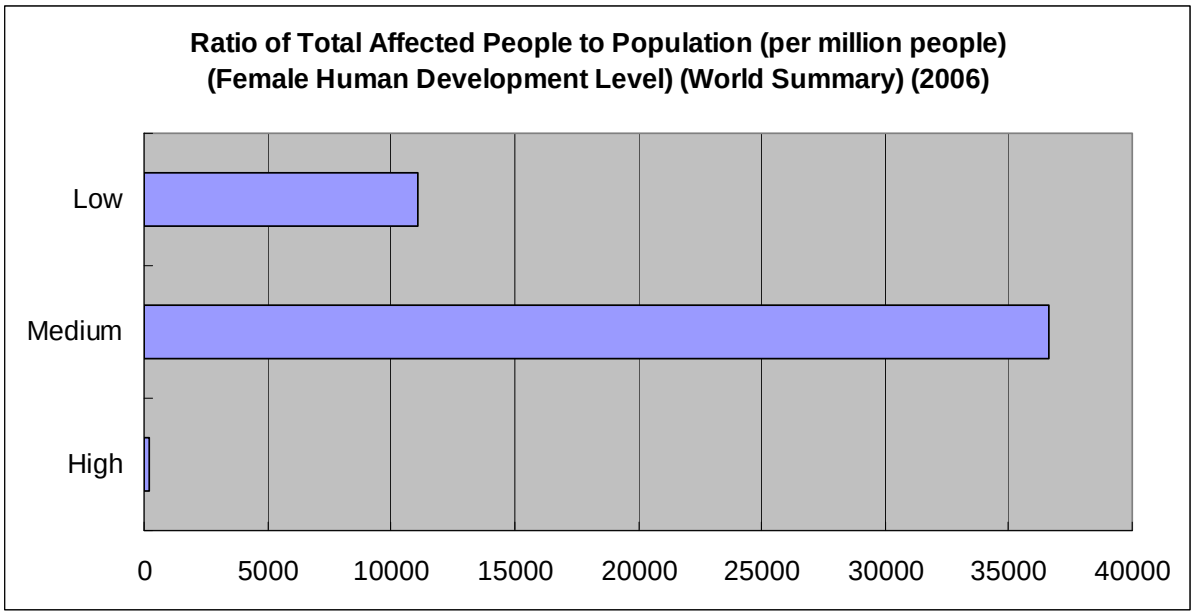
The above figures also indicate that the majority of human losses, both on a global and regional level, were sustained in countries with low and medium levels of female human development. This is attributed to the impact of disasters in vulnerable regions of Asia-Pacific and Africa.

Figure 20: Total Affected People (Millions) by Female Human Development Level, 1975-2006 (World)



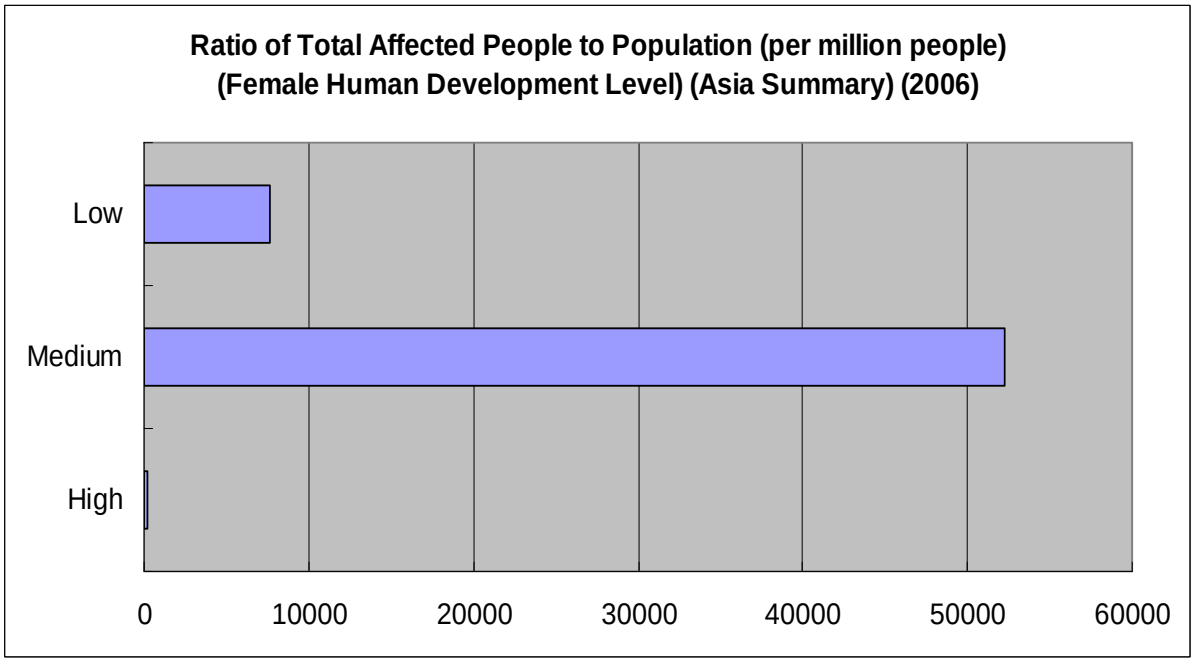
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

Figure 21A: Total Affected People Per Million Population by Female Human Development Level, 2006 (World)



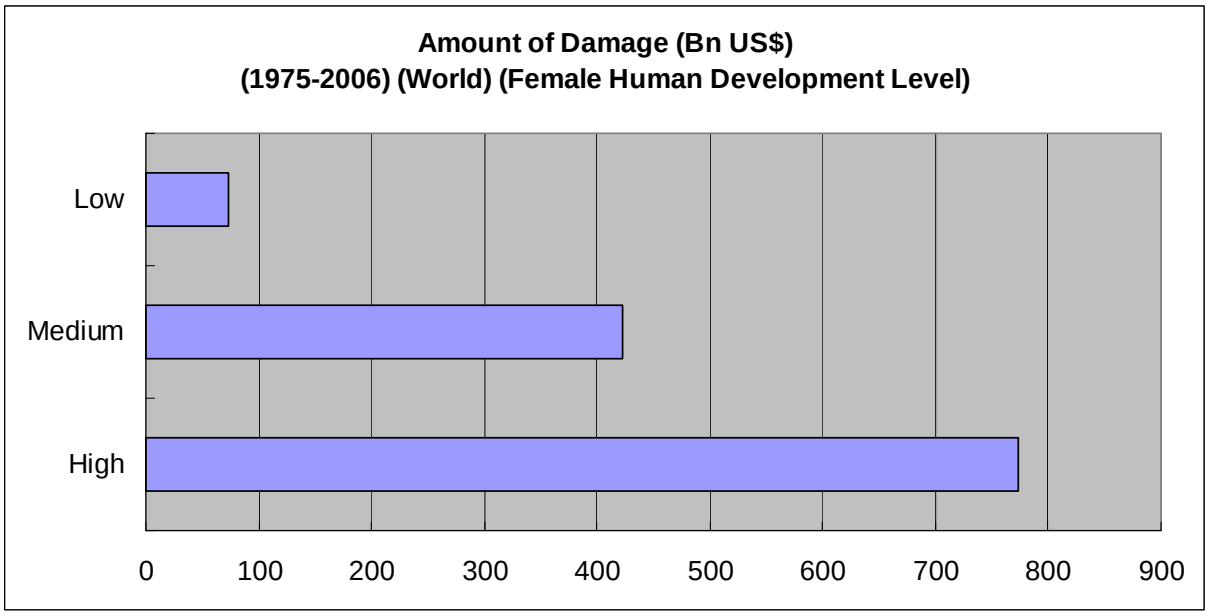
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

Figure 21B: Total Affected People Per Million Population by Female Human Development Level, 2006 (Asia)



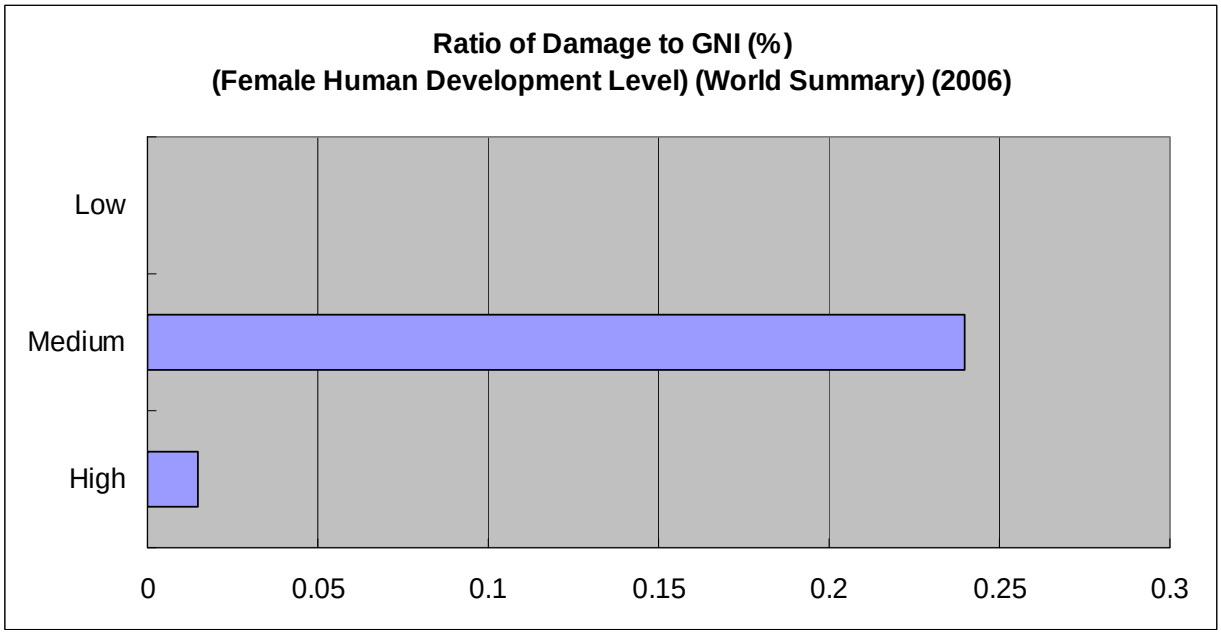
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

Figure 22: Amount of Damage (US$ Billions) by Female Human Development Level, 1975-2006 (World)



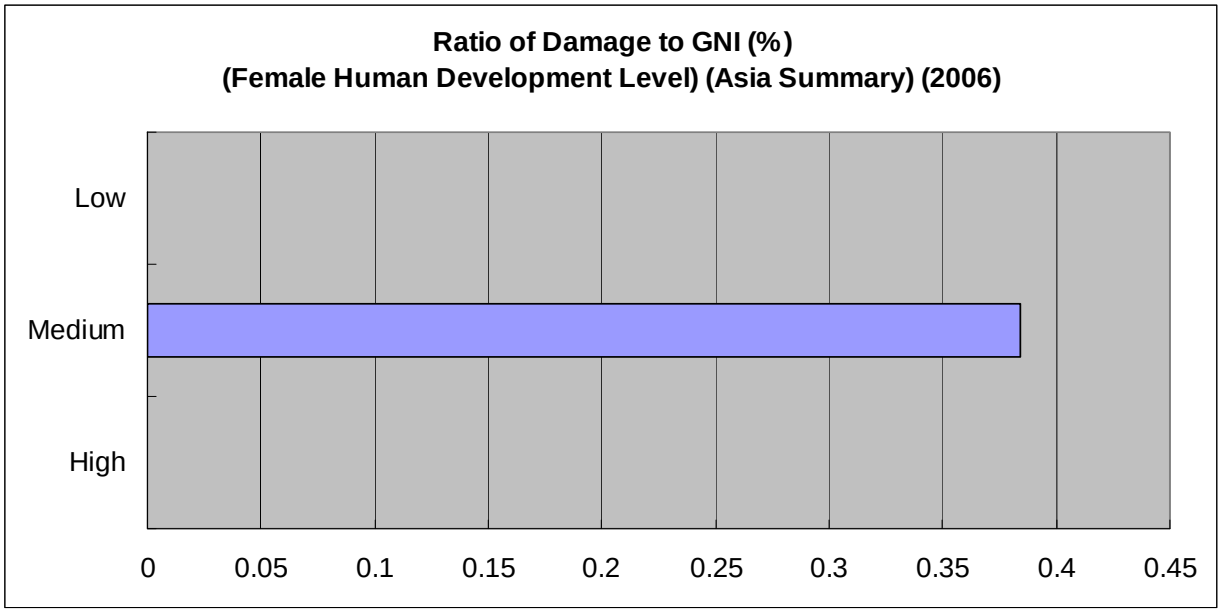
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

Figure 23A: Ratio of Damage to GNI (%) by Female Human Development Level, 2006 (World)



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

Figure 23B: Ratio of Damage to GNI (%) by Female Human Development Level, 2006 (Asia)



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and UNDP, 2006

2.3 The Economics of Natural Disasters

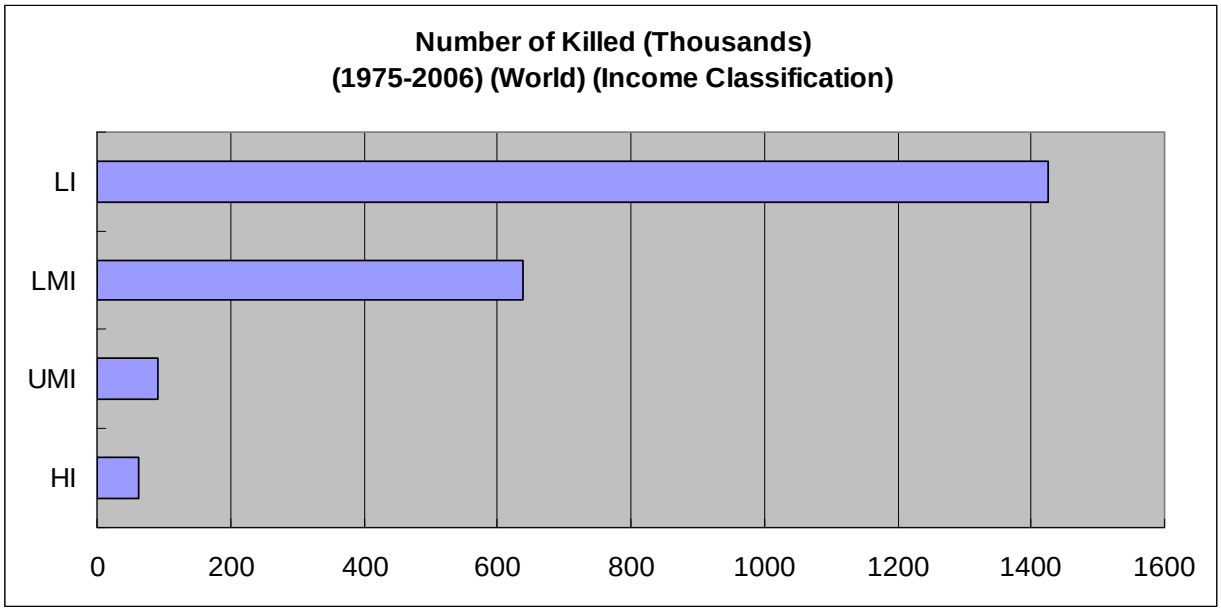
This section focuses on income levels as they relate to disaster impacts, based on the disaster trends in 2006. A country's income level is determined by its per capita GNI and is analyzed here in relation to the disaster statistics. The figures below (24 to 29B) show this relationship and once again indicate that the majority of human losses and affected people are reported in low and lower middle income countries. Although this could be attributed to the impacts of earthquake, windstorms and slides and flooding in the low-income and less developed Asian countries in 2006, the statistics are consistent with the longer-term trends. Figures 24, 26, and 28 show the global trends in the number of people killed, the total affected, and the amount of damage sustained, respectively, by income level for the period 1975-2006. Further, figures marked A and B show the ratio of these characteristics to the total population for the world (A) and Asia (B) in 2006.

Generally, though the real economic losses from disasters are higher in high-income countries due to their developed infrastructural framework and economic establishments that have accumulated social capital, disaster-related losses are more substantial in developing and lower-income countries, especially when viewed as a proportion of the GNIs of those countries. When human losses and suffering are considered, the low and lower middle income countries suffer greatly, as is further shown in the figures below. This firmly emphasizes the need for a holistic disaster management approach that gives due consideration to a country's disaster vulnerability, the impact and extent of disaster-related damage, and the impact of disasters on human development and the economy. This is clearly shown in Figures 28, 29A, and 29B.

The socio-economic impacts of disasters vary by the type of disaster, the disaster period (length), and the post-disaster recovery period. A country's income level plays a crucial role in determining how long it will take for a community to recover from a disaster. In addition, the national income level and magnitude of the socio-economic impacts of a disaster are proportionally related, and the ratio of such impacts to the country's GNI demonstrates the negative effects of disasters upon low and lower middle income countries. This explains the shapes of Figures 24 to 29B, as the ratio of human and economic losses to the total population and income level (GNI) is high in the low-income countries and low in the high-income countries. The disasters that have occurred in the Asian countries of India, Pakistan, Bangladesh, and China, and in some countries in Africa, have contributed significantly to this trend. The disasters that occurred in the US (hurricanes) and the extreme temperatures experienced in Europe contributed to the heavy damage sustained in the high-income countries, in proportion to their high GNIs. The figures below show these trends for the world and the Asian region.

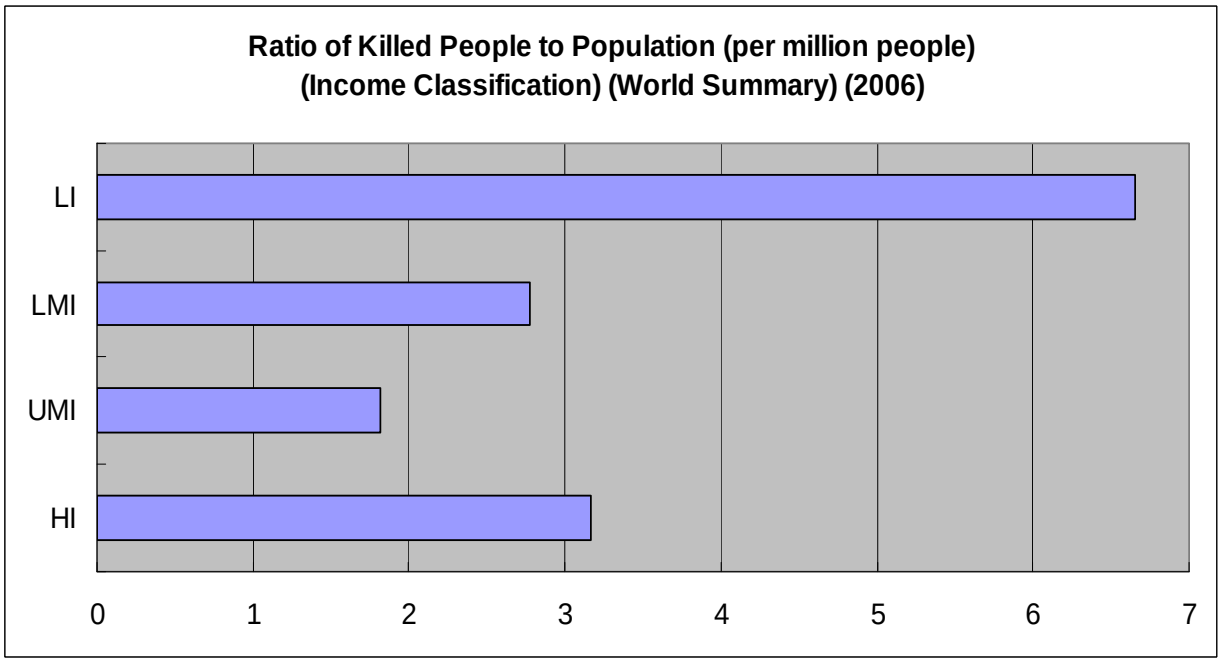
Note: **LI:** Lower Income, **LMI:** Lower Middle Income, **UMI:** Upper Middle Income and **HI:** High Income.

Figure 24: Number of People Killed (Thousands) by Income Classification, 1975-2006 (World)



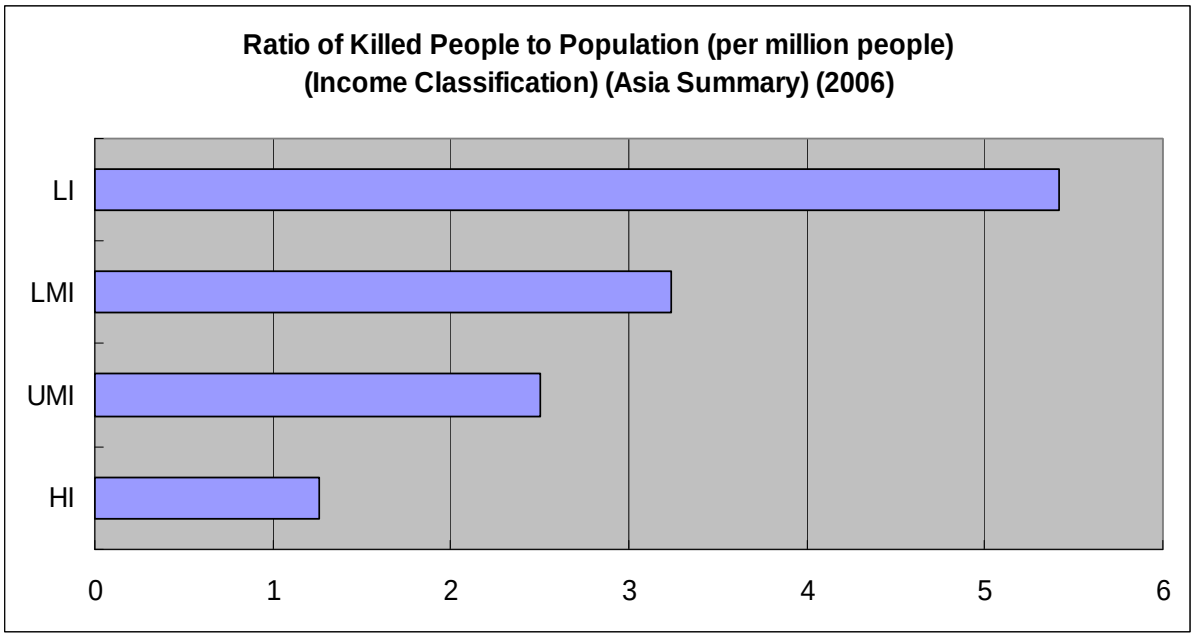
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and World Bank, 2006

Figure 25A: Ratio of People Killed to Population by Income Level, 2006 (World)



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and World Bank, 2006

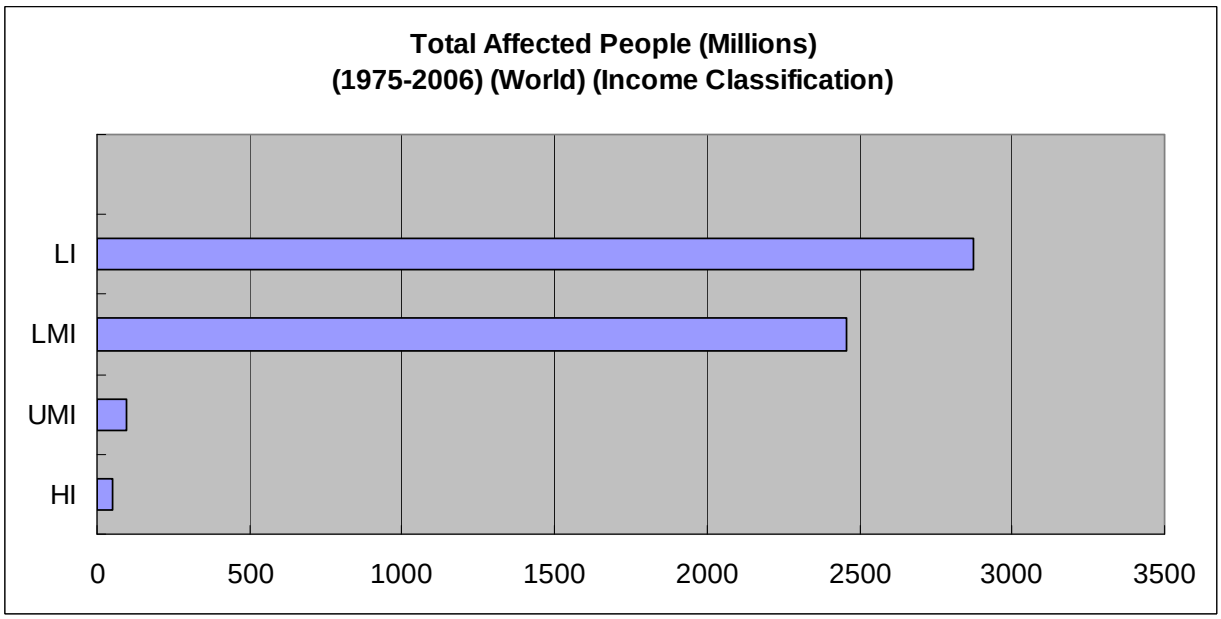
Figure 25B: Ratio of People Killed to Population by Income Level, 2006 (Asia)



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and World Bank, 2006

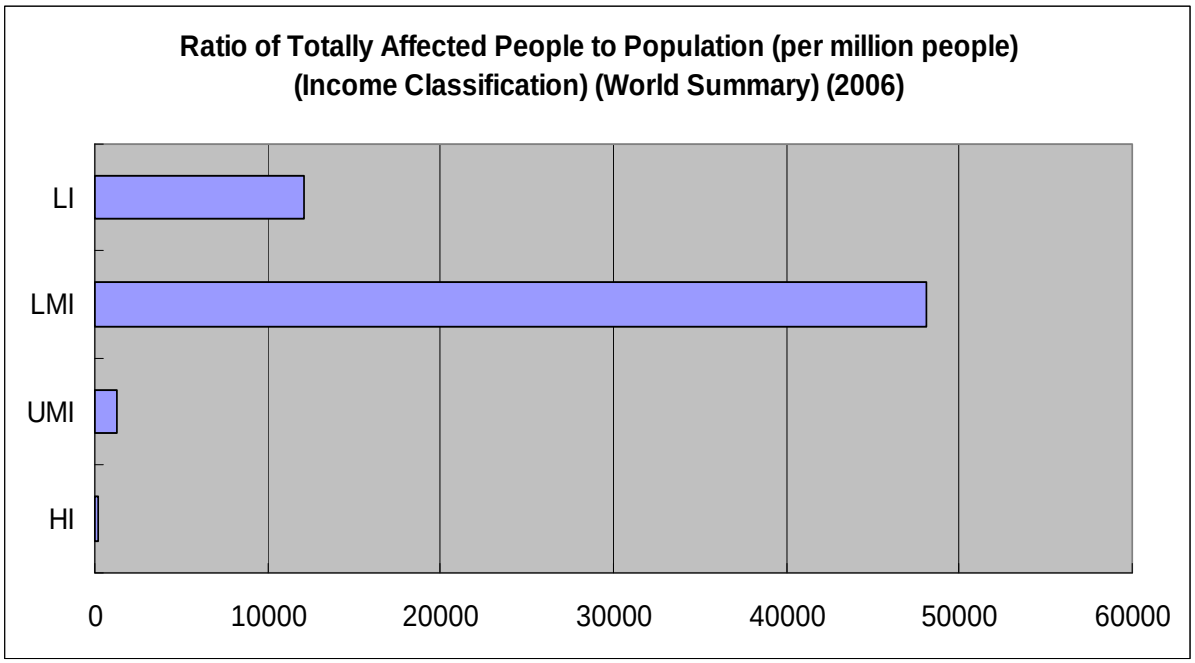
It is clearly known from above Figures that the majority of the human loss was in the low and lower middle income countries in the World as well as in Asia and these are due to 2006 disasters in the vulnerable regions of Asia, Oceania and Africa.

Figure 26: Total Affected People (Millions) by Income Level, 1975-2006 (World)



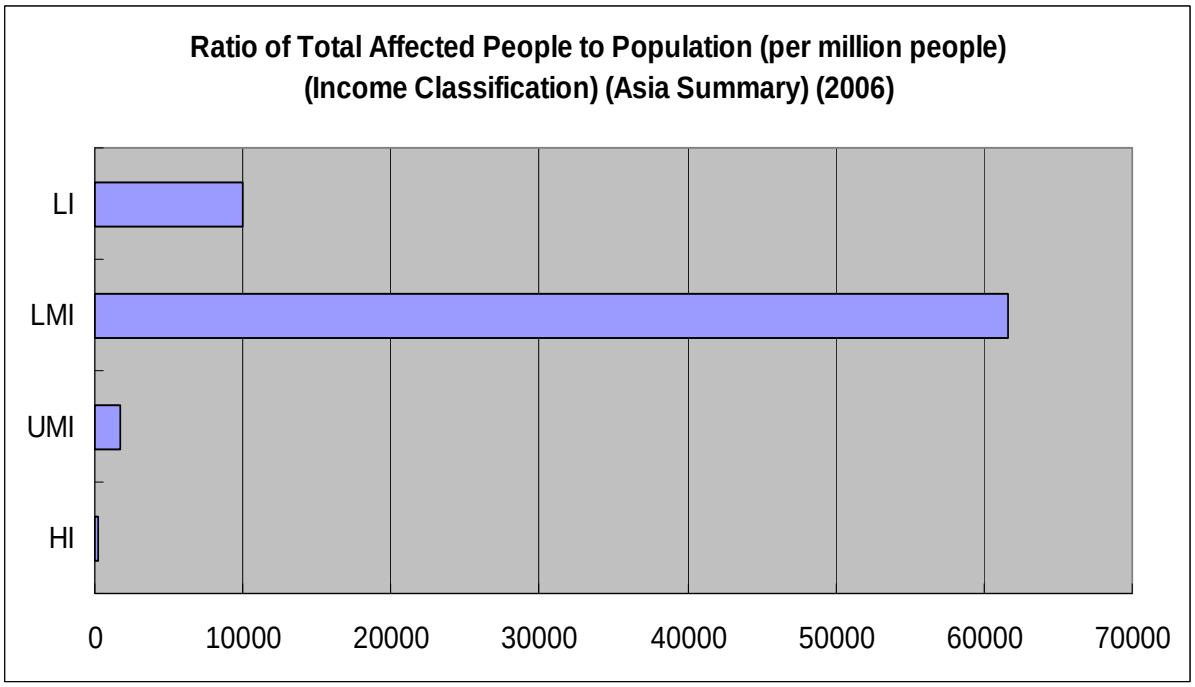
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and World Bank, 2006

Figure 27A: Total Affected People Per Million Population by Income Level, 2006 (World)



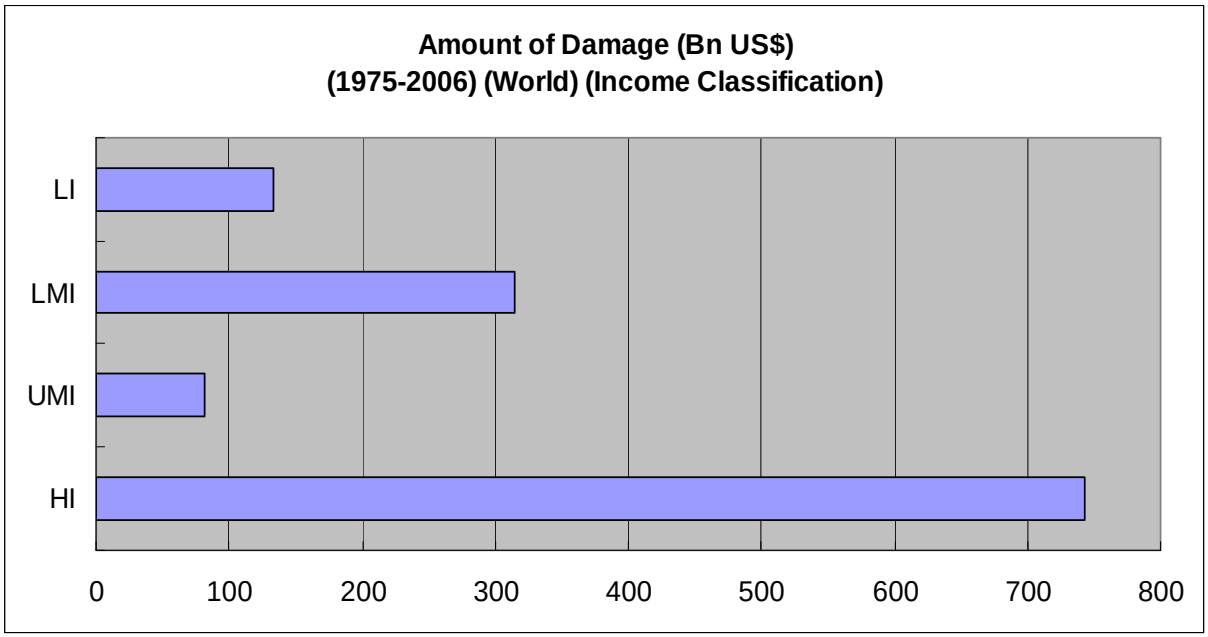
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and World Bank, 2006

Figure 27B: Total Affected People Per Million Population by Income Level, 2006 (Asia)



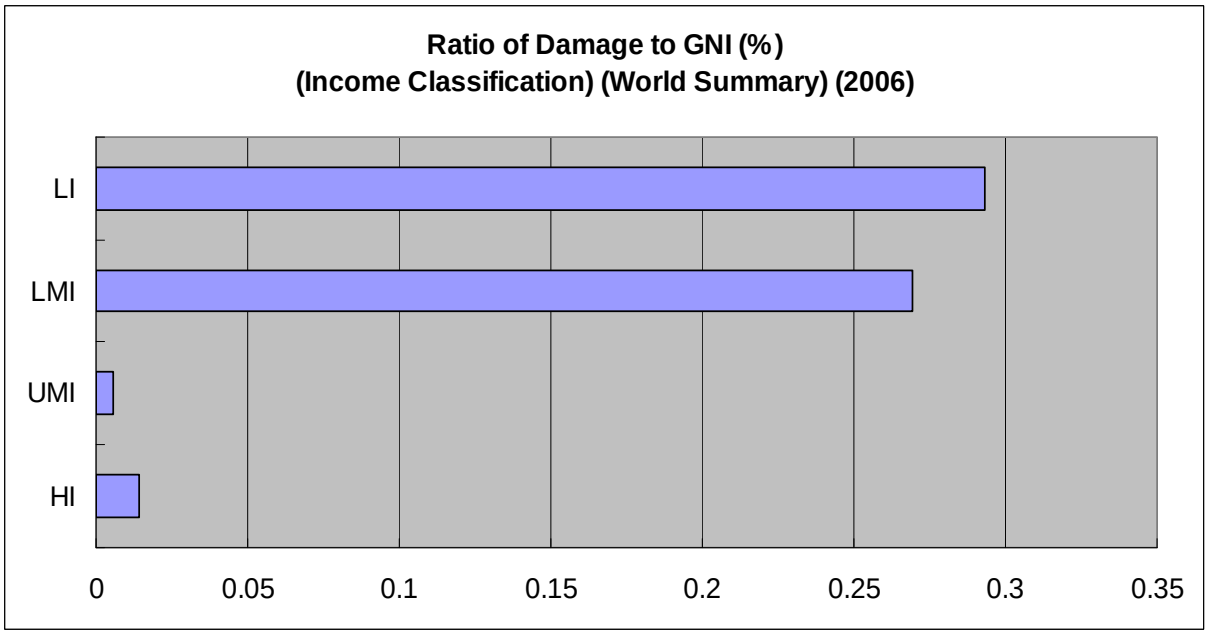
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and World Bank, 2006

Figure 28: Amount of Damage (US$ Billions) by Income Level, 1975-2006 (World)



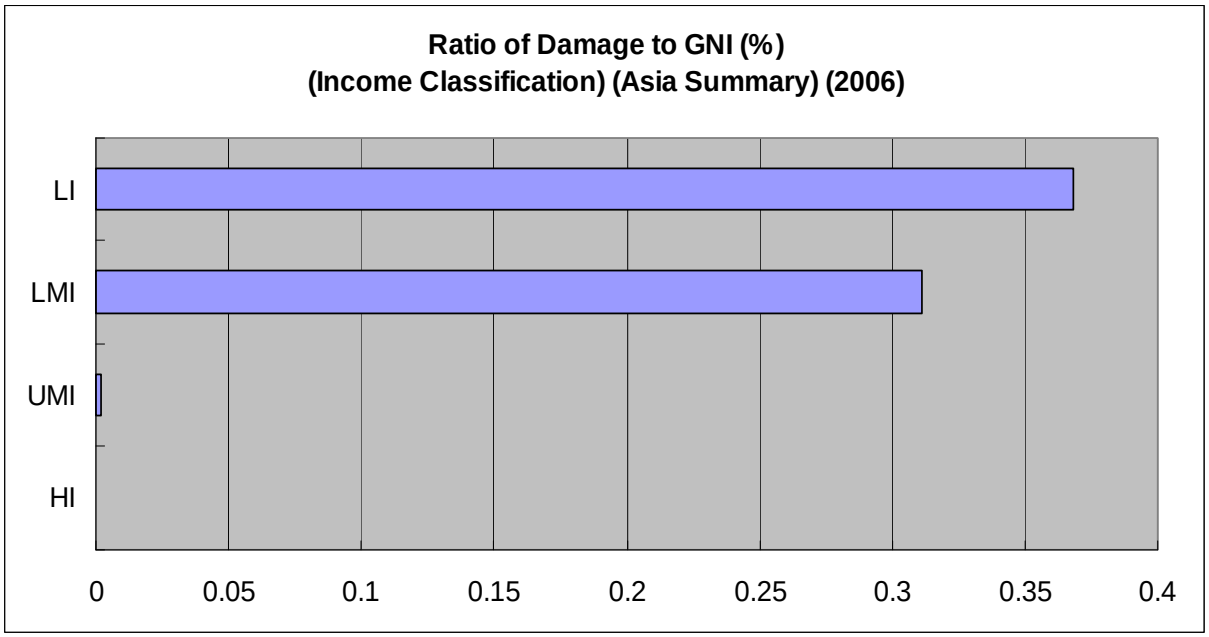
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and World Bank, 2006

Figure 29A: Ratio of Damage to GNI (%) by Income Level, 2006 (World)



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and World Bank, 2006

Figure 29B: Ratio of Amount of Damage to GNI (%) by Income Level, 2006 (Asia)



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium and World Bank, 2006

Figure 28 shows the actual amount of damage sustained by countries with different income levels. Figures 29A and 29B depict the ratio of damage to GNI by income level. Clearly, the ratio of damage to GNI is high in the low income countries, mainly due to the various disasters that have occurred in the most vulnerable countries. In Asia, this ratio is high in the low and lower middle income countries, primarily due to the earthquakes, typhoons, and floods experienced by Indonesia, Philippines, China and India. These trends are in consistent with long-term trends and those in previous years.

2.4 Disaster Classifications and the Impact of Development Characteristics

We have classified disasters into geo-physical, hydro-meteorological, and other disasters. Earthquakes, volcanic eruptions, earthquake-induced tsunamis, and landslides are categorized as geo-physical disasters, while wind storms, floods, extreme temperatures, droughts, and heavy rain-induced landslides are categorized as hydro-meteorological disasters. All other disasters, including famines and epidemics, are included in the "other" category. The tables below show the disaster classifications and their impact on development for the period 1975-2006. Tables 10A, 10B, 11A, and 11B show the disaster classifications by region and vice versa. Similarly, Tables 12A, 12B, 13A, and 13B show the disaster classification by income classification and vice versa. Finally, Tables 14A, 14B, 15A, and 15B show the disaster patterns by human development level.

These tables make it clear that hydro-meteorological disasters produce the largest numbers of total affected people in Asia, while geo-physical disasters produce the largest numbers of people killed. The region is vulnerable to both types of disasters due to its geographical position and socio-economic characteristics. Africa is more vulnerable to hydro-meteorological disasters, as it is prone to prolonged droughts. The Americas, Asia, Oceania and Europe sustain most of their economic damage from hydro-meteorological disasters, with high-income countries like the US, Japan, and the EU countries and Australia in Oceania facing heavy losses caused by wind storms, floods, and extreme temperatures. So far the heaviest damage in Asia was caused by Japan’s 1995 Great Hanshin-Awaji Earthquake and the 2004 Indian Ocean Tsunami. This year (2006), the economic damages and human sufferings were also from floods in China and earthquake in Indonesia.

Similarly, low income and lower middle income countries tend to be most vulnerable to hydro-meteorological disasters, but also moderately vulnerable to geo-physical disasters. Low and medium human development countries follow the same trend. Since hydro-meteorological disasters tend to be annual events, they cause much more damage to the low and medium human development countries than geo-physical disasters. The following tables clearly show these trends by region, human development level, and income level. Once again, the facts underscore the need to integrate disaster reduction strategies and human development efforts, and the need for governments to take note of this important concept and ensure its inclusion in their policy frameworks.

Table 10A: 1975-2006 Disasters and Impacts by Disaster Classification and Region

Dis Classification	Continent	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
Geo Phy Dis	Africa	72	9,183	2,087,689	8,755,608
	Americas	211	66,595	13,273,112	58,749,032
	Asia	484	791,205	79,037,713	259,632,686
	Europe	175	8,724	2,849,335	34,424,376
	Oceania	102	2,976	318,876	2,907,400
Geo Phy Dis Total		**1,044**	**878,683**	**97,566,725**	**364,469,102**
Hyd Met Dis	Africa	1,014	580,418	355,573,021	10,088,950
	Americas	1,612	100,136	142,509,978	387,878,247
	Asia	2,492	430,718	4,770,017,633	285,826,431
	Europe	892	44,849	24,127,118	171,433,824
	Oceania	419	1,547	19,505,345	21,640,121
Hyd Met Dis Total		**6,429**	**1,157,668**	**5,311,733,095**	**876,867,573**
Others	Africa	672	118,252	42,702,726	102,430
	Americas	170	14,496	2,998,617	5,670,700
	Asia	314	46,139	18,781,508	19,240,824
	Europe	109	768	3,528,539	3,118,249
	Oceania	38	402	80,799	1,162,006
Others Total		**1,303**	**180,057**	**68,092,189**	**29,294,209**
Grand Total		**8,776**	**2,216,408**	**5,477,392,009**	**1,270,630,884**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 10B: 1975-2006 Disasters and Impacts by Disaster Classification and Region (Percentages)

Dis Classification	Continent	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
Geo Phy Dis	Africa	0.82%	0.41%	0.04%	0.69%
	Americas	2.40%	3.00%	0.24%	4.62%
	Asia	5.52%	35.70%	1.44%	20.43%
	Europe	1.99%	0.39%	0.05%	2.71%
	Oceania	1.16%	0.13%	0.01%	0.23%
Geo Phy Dis Total		**11.90%**	**39.64%**	**1.78%**	**28.68%**
Hyd Met Dis	Africa	11.55%	26.19%	6.49%	0.79%
	Americas	18.37%	4.52%	2.60%	30.53%
	Asia	28.40%	19.43%	87.09%	22.49%
	Europe	10.16%	2.02%	0.44%	13.49%
	Oceania	4.77%	0.07%	0.36%	1.70%
Hyd Met Dis Total		**73.26%**	**52.23%**	**96.98%**	**69.01%**
Others	Africa	7.66%	5.34%	0.78%	0.01%
	Americas	1.94%	0.65%	0.05%	0.45%
	Asia	3.58%	2.08%	0.34%	1.51%
	Europe	1.24%	0.03%	0.06%	0.25%
	Oceania	0.43%	0.02%	0.00%	0.09%
Others Total		**14.85%**	**8.12%**	**1.24%**	**2.31%**
Grand Total		**100.00%**	**100.00%**	**100.00%**	**100.00%**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 11A: 1975-2006 Disasters and Impacts by Region and Disaster Classification

Continent	Dis Classification	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
Africa	Geo Phy Dis	72	9,183	2,087,689	8,755,608
	Hyd Met Dis	1,014	580,418	355,573,021	10,088,950
	Others	672	118,252	42,702,726	102,430
Africa Total		**1,758**	**707,853**	**400,363,436**	**18,946,988**
Americas	Geo Phy Dis	211	66,595	13,273,112	58,749,032
	Hyd Met Dis	1,612	100,136	142,509,978	387,878,247
	Others	170	14,496	2,998,617	5,670,700
Americas Total		**1,993**	**181,227**	**158,781,707**	**452,297,979**
Asia	Geo Phy Dis	484	791,205	79,037,713	259,632,686
	Hyd Met Dis	2,492	430,718	4,770,017,633	285,826,431
	Others	314	46,139	18,781,508	19,240,824
Asia Total		**3,290**	**1,268,062**	**4,867,836,854**	**564,699,941**
Europe	Geo Phy Dis	175	8,724	2,849,335	34,424,376
	Hyd Met Dis	892	44,849	24,127,118	171,433,824
	Others	109	768	3,528,539	3,118,249
Europe Total		**1,176**	**54,341**	**30,504,992**	**208,976,449**
Oceania	Geo Phy Dis	102	2,976	318,876	2,907,400
	Hyd Met Dis	419	1,547	19,505,345	21,640,121
	Others	38	402	80,799	1,162,006
Oceania Total		**559**	**4,925**	**19,905,020**	**25,709,527**
Grand Total		**8,776**	**2,216,408**	**5,477,392,009**	**1,270,630,884**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 11B: 1975-2006 Disasters and Impacts by Region and Disaster Classification (Percentages)

Continent	Dis Classification	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
Africa	Geo Phy Dis	0.82%	0.41%	0.04%	0.69%
	Hyd Met Dis	11.55%	26.19%	6.49%	0.79%
	Others	7.66%	5.34%	0.78%	0.01%
Africa Total		**20.03%**	**31.94%**	**7.31%**	**1.49%**
Americas	Geo Phy Dis	2.40%	3.00%	0.24%	4.62%
	Hyd Met Dis	18.37%	4.52%	2.60%	30.53%
	Others	1.94%	0.65%	0.05%	0.45%
Americas Total		**22.71%**	**8.18%**	**2.90%**	**35.60%**
Asia	Geo Phy Dis	5.52%	35.70%	1.44%	20.43%
	Hyd Met Dis	28.40%	19.43%	87.09%	22.49%
	Others	3.58%	2.08%	0.34%	1.51%
Asia Total		**37.49%**	**57.21%**	**88.87%**	**44.44%**
Europe	Geo Phy Dis	1.99%	0.39%	0.05%	2.71%
	Hyd Met Dis	10.16%	2.02%	0.44%	13.49%
	Others	1.24%	0.03%	0.06%	0.25%
Europe Total		**13.40%**	**2.45%**	**0.56%**	**16.45%**
Oceania	Geo Phy Dis	1.16%	0.13%	0.01%	0.23%
	Hyd Met Dis	4.77%	0.07%	0.36%	1.70%
	Others	0.43%	0.02%	0.00%	0.09%
Oceania Total		**6.37%**	**0.22%**	**0.36%**	**2.02%**
Grand Total		**100.00%**	**100.00%**	**100.00%**	**100.00%**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 12A: 1975-2006 Disasters and Impacts by Disaster Classification and Income Level

Dis Classification	Income class	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
Geo Phy Dis	HI	174	10,604	6,056,120	247,869,421
	LI	279	347,391	54,437,043	44,484,509
	LMI	461	484,583	32,221,581	46,895,612
	UMI	130	36,105	4,851,981	25,219,560
Geo Phy Dis Total		**1,044**	**878,683**	**97,566,725**	**364,469,102**
Hyd Met Dis	HI	1,534	51,319	44,889,650	485,809,881
	LI	2,091	916,602	2,759,907,673	68,968,565
	LMI	1,987	135,924	2,418,262,114	266,510,366
	UMI	817	53,823	88,673,658	55,578,761
Hyd Met Dis Total		**6,429**	**1,157,668**	**5,311,733,095**	**876,867,573**
Others	HI	154	604	2,685,217	8,795,056
	LI	843	160,216	58,755,123	19,263,829
	LMI	217	16,875	5,696,852	618,074
	UMI	89	2,362	954,997	617,250
Others Total		**1,303**	**180,057**	**68,092,189**	**29,294,209**
Grand Total		**8,776**	**2,216,408**	**5,477,392,009**	**1,270,630,884**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 12B: 1975-2006 Disasters and Impacts by Disaster Classification and Income Level (Percentages)

Dis Classification	Income class	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
Geo Phy Dis	HI	1.98%	0.48%	0.11%	19.51%
	LI	3.18%	15.67%	0.99%	3.50%
	LMI	5.25%	21.86%	0.59%	3.69%
	UMI	1.48%	1.63%	0.09%	1.98%
Geo Phy Dis Total		**11.90%**	**39.64%**	**1.78%**	**28.68%**
Hyd Met Dis	HI	17.48%	2.32%	0.82%	38.23%
	LI	23.83%	41.36%	50.39%	5.43%
	LMI	22.64%	6.13%	44.15%	20.97%
	UMI	9.31%	2.43%	1.62%	4.37%
Hyd Met Dis Total		**73.26%**	**52.23%**	**96.98%**	**69.01%**
Others	HI	1.75%	0.03%	0.05%	0.69%
	LI	9.61%	7.23%	1.07%	1.52%
	LMI	2.47%	0.76%	0.10%	0.05%
	UMI	1.01%	0.11%	0.02%	0.05%
Others Total		**14.85%**	**8.12%**	**1.24%**	**2.31%**
Grand Total		**100.00%**	**100.00%**	**100.00%**	**100.00%**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 13A: 1975-2006 Disasters and Impacts by Income Level and Disaster Classification

Income class	Dis Classification	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
HI	Geo Phy Dis	174	10,604	6,056,120	247,869,421
	Hyd Met Dis	1,534	51,319	44,889,650	485,809,881
	Others	154	604	2,685,217	8,795,056
HI Total		**1,862**	**62,527**	**53,630,987**	**742,474,358**
LI	Geo Phy Dis	279	347,391	54,437,043	44,484,509
	Hyd Met Dis	2,091	916,602	2,759,907,673	68,968,565
	Others	843	160,216	58,755,123	19,263,829
LI Total		**3,213**	**1,424,209**	**2,873,099,839**	**132,716,903**
LMI	Geo Phy Dis	461	484,583	32,221,581	46,895,612
	Hyd Met Dis	1,987	135,924	2,418,262,114	266,510,366
	Others	217	16,875	5,696,852	618,074
LMI Total		**2,665**	**637,382**	**2,456,180,547**	**314,024,052**
UMI	Geo Phy Dis	130	36,105	4,851,981	25,219,560
	Hyd Met Dis	817	53,823	88,673,658	55,578,761
	Others	89	2,362	954,997	617,250
UMI Total		**1,036**	**92,290**	**94,480,636**	**81,415,571**
Grand Total		**8,776**	**2,216,408**	**5,477,392,009**	**1,270,630,884**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 13B: 1975-2006 Disasters and Impacts by Income Level and Disaster Classification (Percentages)

Income class	Dis Classification	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
HI	Geo Phy Dis	1.98%	0.48%	0.11%	19.51%
	Hyd Met Dis	17.48%	2.32%	0.82%	38.23%
	Others	1.75%	0.03%	0.05%	0.69%
HI Total		**21.22%**	**2.82%**	**0.98%**	**58.43%**
LI	Geo Phy Dis	3.18%	15.67%	0.99%	3.50%
	Hyd Met Dis	23.83%	41.36%	50.39%	5.43%
	Others	9.61%	7.23%	1.07%	1.52%
LI Total		**36.61%**	**64.26%**	**52.45%**	**10.44%**
LMI	Geo Phy Dis	5.25%	21.86%	0.59%	3.69%
	Hyd Met Dis	22.64%	6.13%	44.15%	20.97%
	Others	2.47%	0.76%	0.10%	0.05%
LMI Total		**30.37%**	**28.76%**	**44.84%**	**24.71%**
UMI	Geo Phy Dis	1.48%	1.63%	0.09%	1.98%
	Hyd Met Dis	9.31%	2.43%	1.62%	4.37%
	Others	1.01%	0.11%	0.02%	0.05%
UMI Total		**11.80%**	**4.16%**	**1.72%**	**6.41%**
Grand Total		**100.00%**	**100.00%**	**100.00%**	**100.00%**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 14A: 1975-2006 World Disaster Classification and Impact Characteristics by Disaster Classification and Human Development Level

Dis Classification	Human development	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
Geo Phy Dis	HHD	214	10,962	7,948,040	250,056,581
	LHD	81	88,438	6,739,910	5,564,000
	MHD	749	779,283	82,878,775	108,848,521
Geo Phy Dis Total		**1,044**	**878,683**	**97,566,725**	**364,469,102**
Hyd Met Dis	HHD	1,832	58,661	64,381,795	517,392,129
	LHD	1,197	784,254	720,442,553	24,386,518
	MHD	3,400	314,753	4,526,908,747	335,088,926
Hyd Met Dis Total		**6,429**	**1,157,668**	**5,311,733,095**	**876,867,573**
Others	HHD	181	875	2,892,354	9,372,806
	LHD	604	122,144	38,177,919	106,930
	MHD	518	57,038	27,021,916	19,814,473
Others Total		**1,303**	**180,057**	**68,092,189**	**29,294,209**
Grand Total		**8,776**	**2,216,408**	**5,477,392,009**	**1,270,630,884**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 14B: 1975-2006 Disasters and Impacts by Disaster Classification and Human Development Level (Percentages)

Dis Classification	Human development	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
Geo Phy Dis	HHD	2.44%	0.49%	0.15%	19.68%
	LHD	0.92%	3.99%	0.12%	0.44%
	MHD	8.53%	35.16%	1.51%	8.57%
Geo Phy Dis Total		**11.90%**	**39.64%**	**1.78%**	**28.68%**
Hyd Met Dis	HHD	20.88%	2.65%	1.18%	40.72%
	LHD	13.64%	35.38%	13.15%	1.92%
	MHD	38.74%	14.20%	82.65%	26.37%
Hyd Met Dis Total		**73.26%**	**52.23%**	**96.98%**	**69.01%**
Others	HHD	2.06%	0.04%	0.05%	0.74%
	LHD	6.88%	5.51%	0.70%	0.01%
	MHD	5.90%	2.57%	0.49%	1.56%
Others Total		**14.85%**	**8.12%**	**1.24%**	**2.31%**
Grand Total		**100.00%**	**100.00%**	**100.00%**	**100.00%**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 15A: 1975-2006 Disasters and Impacts by Human Development Level and Disaster Classification

Human development	Dis Classification	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
HHD	Geo Phy Dis	214	10,962	7,948,040	250,056,581
	Hyd Met Dis	1,832	58,661	64,381,795	517,392,129
	Others	181	875	2,892,354	9,372,806
HHD Total		**2,227**	**70,498**	**75,222,189**	**776,821,516**
LHD	Geo Phy Dis	81	88,438	6,739,910	5,564,000
	Hyd Met Dis	1,197	784,254	720,442,553	24,386,518
	Others	604	122,144	38,177,919	106,930
LHD Total		**1,882**	**994,836**	**765,360,382**	**30,057,448**
MHD	Geo Phy Dis	749	779,283	82,878,775	108,848,521
	Hyd Met Dis	3,400	314,753	4,526,908,747	335,088,926
	Others	518	57,038	27,021,916	19,814,473
MHD Total		**4,667**	**1,151,074**	**4,636,809,438**	**463,751,920**
Grand Total		**8,776**	**2,216,408**	**5,477,392,009**	**1,270,630,884**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Table 15B: 1975-2006 Disasters and Impacts by Human Development Level and Disaster Classification (Percentages)

Human development	Dis Classification	Count of DisNo	Sum of Killed	Sum of TotAff	Sum of Damage US$ ('000s)
HHD	Geo Phy Dis	2.44%	0.49%	0.15%	19.68%
	Hyd Met Dis	20.88%	2.65%	1.18%	40.72%
	Others	2.06%	0.04%	0.05%	0.74%
HHD Total		**25.38%**	**3.18%**	**1.37%**	**61.14%**
LHD	Geo Phy Dis	0.92%	3.99%	0.12%	0.44%
	Hyd Met Dis	13.64%	35.38%	13.15%	1.92%
	Others	6.88%	5.51%	0.70%	0.01%
LHD Total		**21.44%**	**44.89%**	**13.97%**	**2.37%**
MHD	Geo Phy Dis	8.53%	35.16%	1.51%	8.57%
	Hyd Met Dis	38.74%	14.20%	82.65%	26.37%
	Others	5.90%	2.57%	0.49%	1.56%
MHD Total		**53.18%**	**51.93%**	**84.65%**	**36.50%**
Grand Total		**100.00%**	**100.00%**	**100.00%**	**100.00%**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

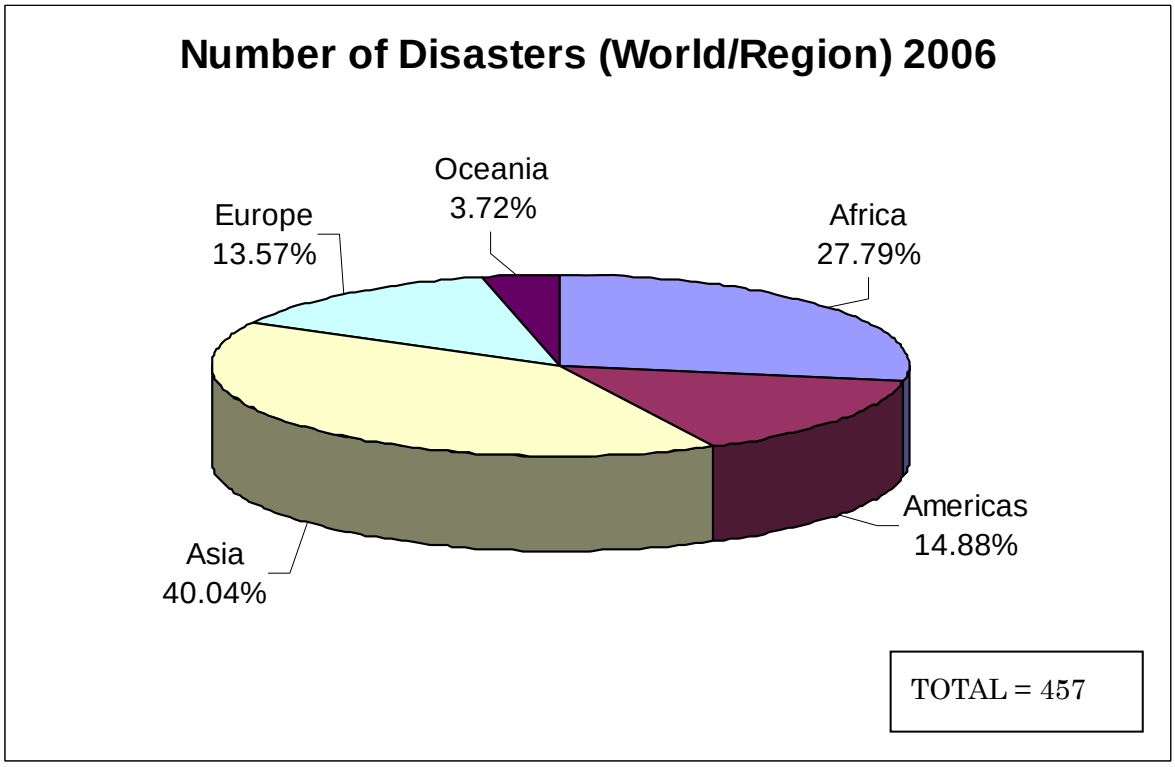
The extent of damage caused by natural disasters is clearly connected to a country's socio-economic level. As in previous years, the disaster statistics and trends for 2006 show that disaster management and post-disaster activities are crucial to sustainable development. In 2006, as in many previous years, the impacts of natural disasters were closely related to poverty, education, quality of health, gender related issues, and changing policy scenarios in relation to global socio-economic characteristics and stakeholder partnerships. Hence, disaster mitigation and management strategies must incorporate these components to create a holistic disaster management approach that includes strategies for sustainable development.

Chapter 3: Regional Characteristics of Natural Disasters

3.1 Proportion of Natural Disasters by Region

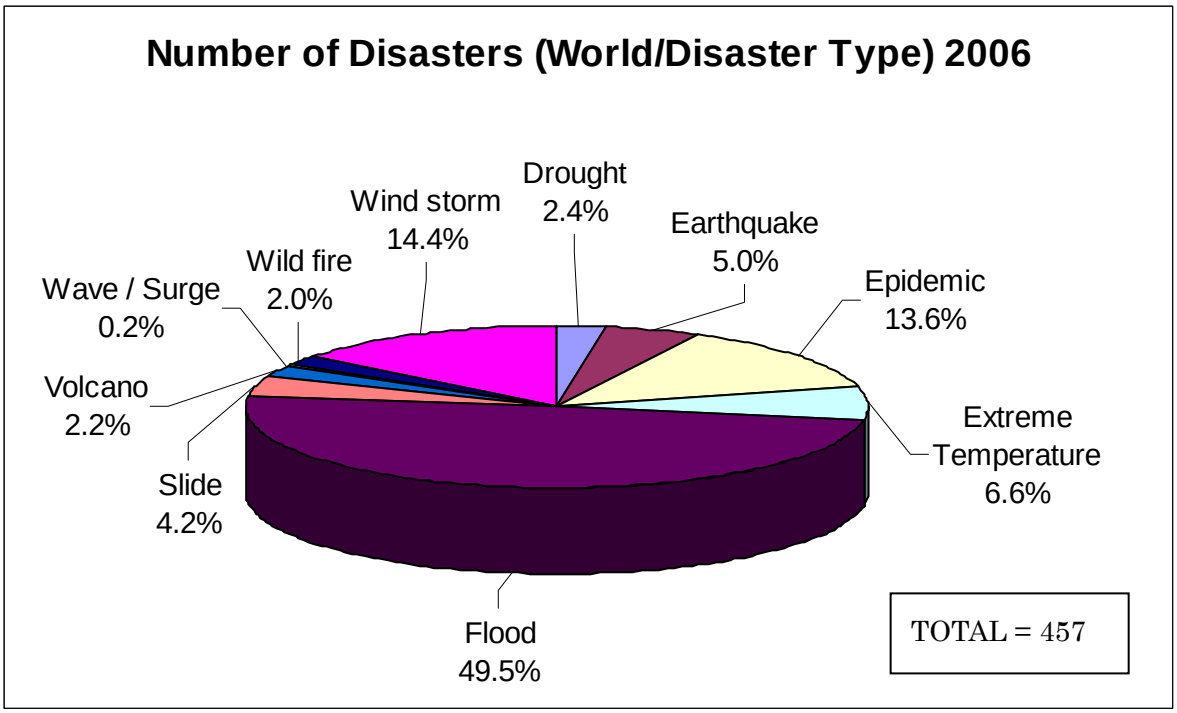
As in the previous year, Asia accounted for most of the devastating disasters that occurred in 2006 (40%, increase from 37% in 2005), followed by Africa (28%; an increase from 19% in 2005), the Americas (15%; a decrease from 20% in 2005), Europe (14%; a decrease from 21% in 2005), and Oceania (4%; a marginal increase from 3% in 2005). Although the 2006 disaster trends look similar to those for 2004 and 2005, their impacts in terms of human and economic losses were different. Figure 30A summarizes the 2006 data visually. Figure 30B summarizes the world data by type of disaster. The majority of the disasters in 2006 were floods and wind storms followed by epidemics, extreme temperatures, earthquakes, and slides.

Figure 30A: Proportion of Worldwide Disasters by Region, 2006



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

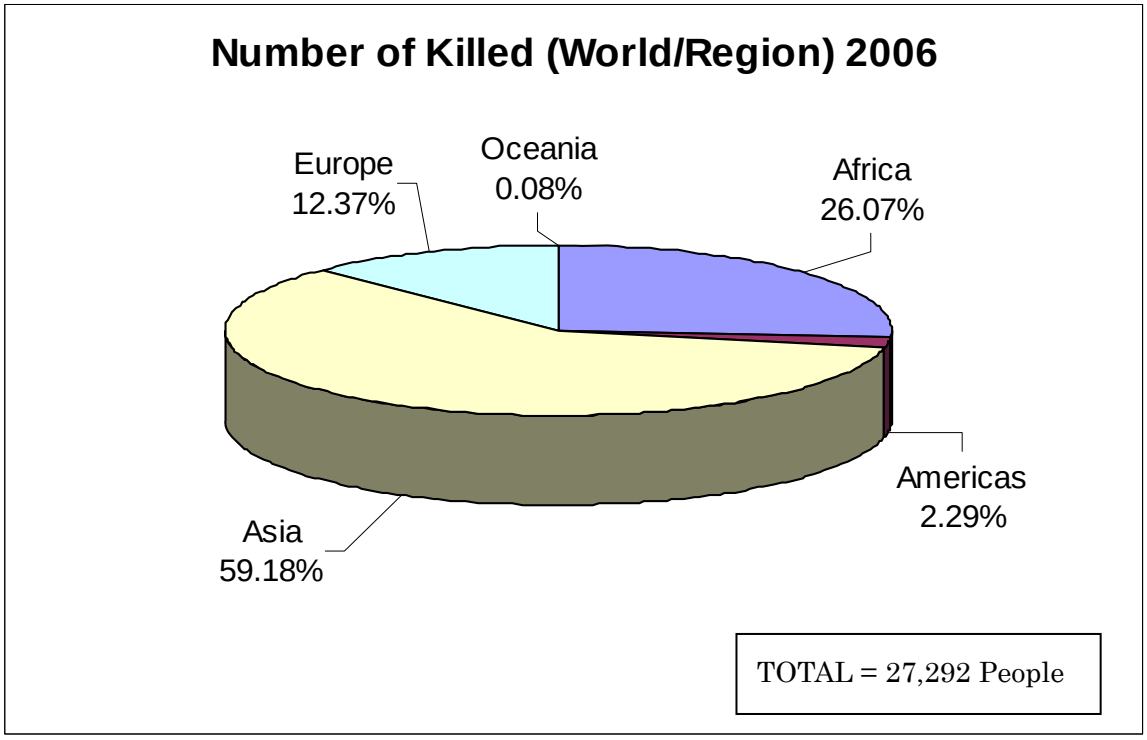
Figure 30B: Proportion of Worldwide Disasters by Type, 2006



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

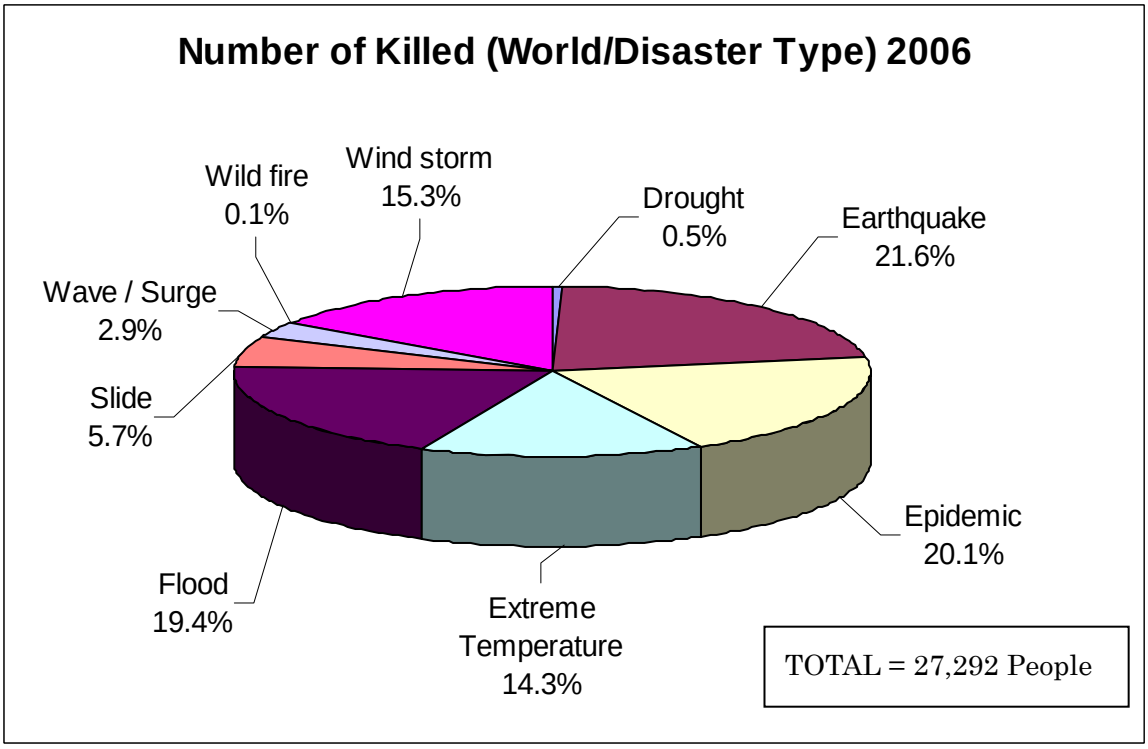
As can be seen in Figure 31A, the majority of people killed by natural disasters in the year 2006 lived in Asia, which accounted for 59% of the total number of people killed by disasters worldwide (considerable decrease from 91% in the previous year). (This decrease from 2005 to 2006 is mainly due to the heavy death toll in 2005 caused by South Asian earthquake that struck India and Pakistan). In 2006 once again Asia accounted for the majority of the people killed due to the floods in China and India, windstorms and slides in the Philippines and the earthquake and tsunami in Indonesia. Another significant region is Africa, which accounted for 26% of the people killed in 2006 (considerable increase from 3% in the previous year 2005 and this is due to the heavy dead toll in Africa caused by epidemic and flood in 2006). The number of people killed in Europe increased from 2% in 2005 to 12% in 2006. This is due to the extreme temperature conditions that prevailed in Europe in 2006. The Americas also saw a decrease in people killed, from 4% in 2005 to 2% in 2006. Oceania registered almost the same number of people killed by natural disasters as in the previous year. The heavy death toll in Asia caused by the Asian disasters in 2006 makes other regions' figures look smaller in 2006 as in the previous years' trend. Earthquakes, epidemics and floods were responsible for the majority of the death toll worldwide (61%), followed by extreme temperature, wind storms and floods, as shown in Figure 31B.

Figure 31A; Proportion of People Killed Worldwide by Region, 2006



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

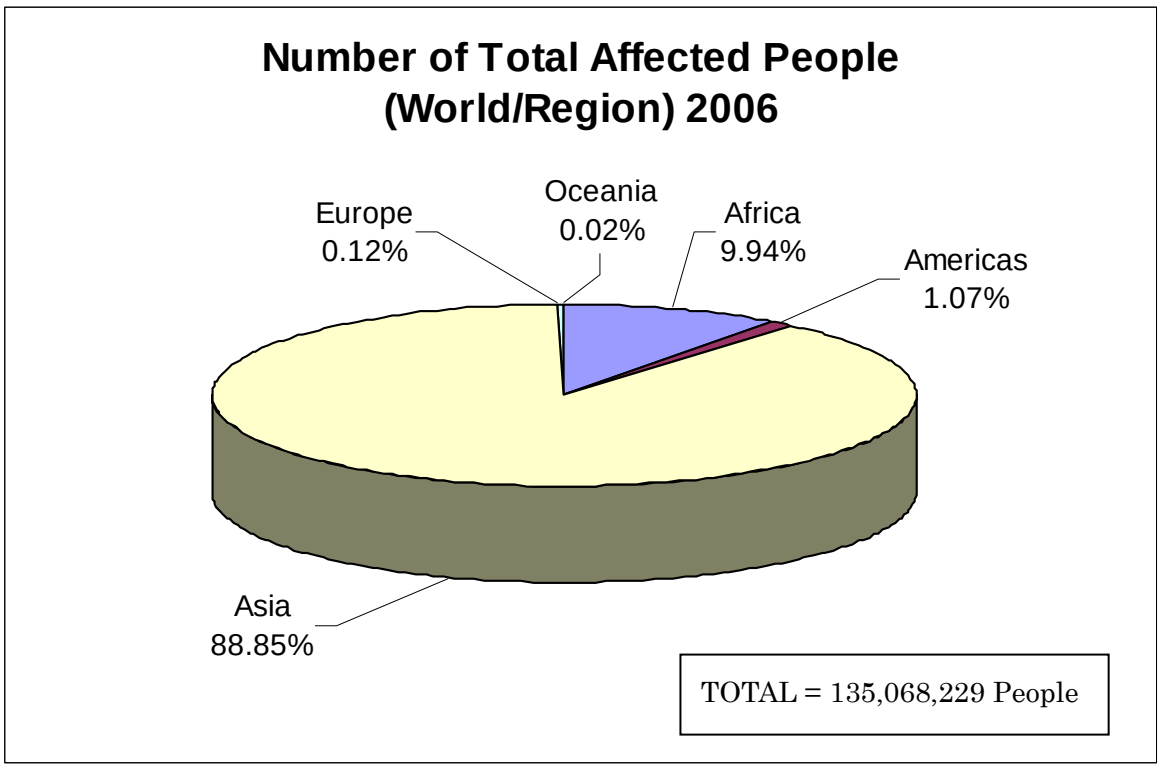
Figure 31B: Proportion of People Killed Worldwide by Disaster Type, 2006



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

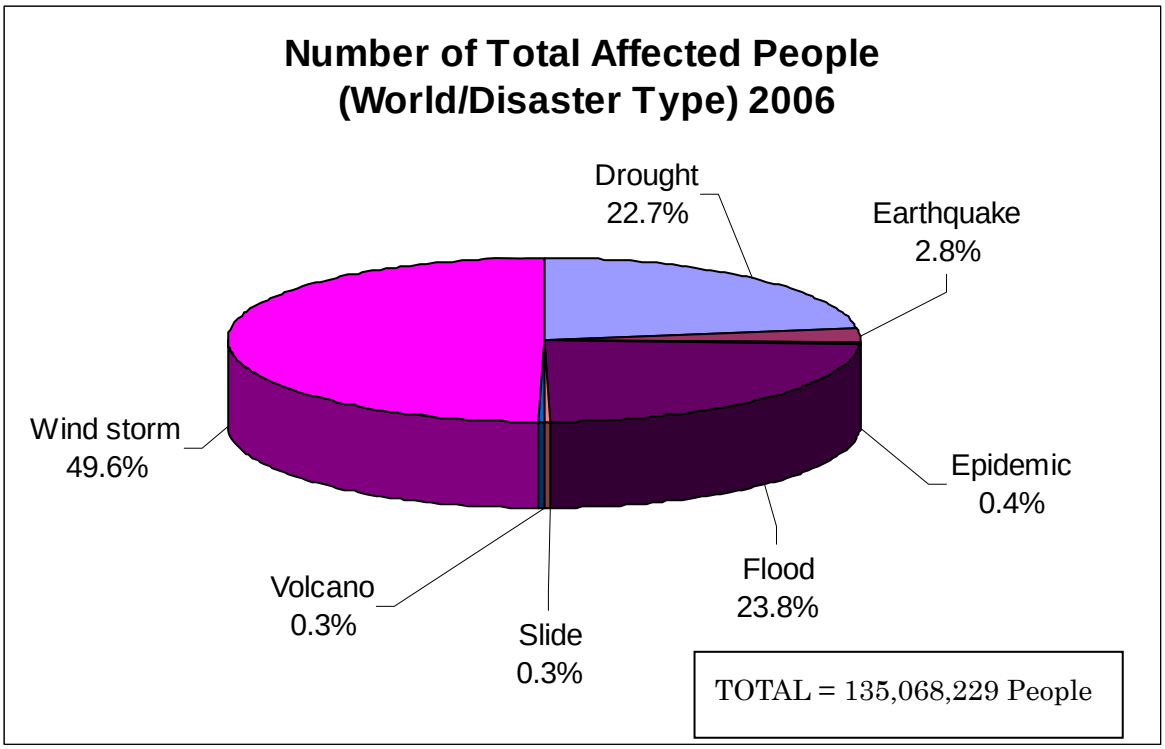
The number of total affected people deccreased from 158 million in 2005 to 135 million in 2006. As shown in Figure 32A, the Asian region accounted for the highest percentage of total affected people, with 89% in 2006. This is an increase from the previous year's 83%. But the real number of total affected people in Asia this year 2006 has decreased by 8.6%. This an interesting point to note this year. In addition to the 2006 Asian disasters, which affected many people in Asia, other disasters in other parts of the world, especially Africa, also had a significant impact. The number of total affected people in every region worldwide decreased significantly over previous year. Nevertheless, the trend clearly reflects Asia's continued vulnerability to natural hazards. Figure 32B shows the percentages of total affected people by disaster type. Hydro-meteorological disasters, such as floods, wind storms, and droughts had a significant impact on people worldwide.

Figure 32A: Proportion of Total Affected People Worldwide by Region, 2006



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 32B: Proportion of Total Affected People Worldwide by Disaster Type, 2006

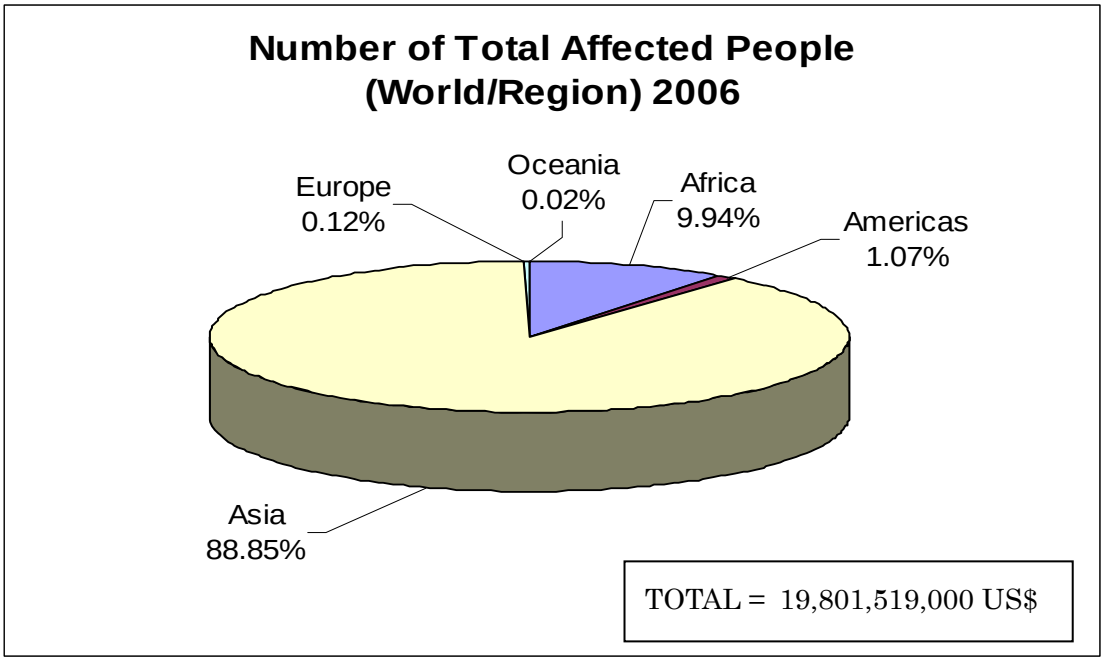


Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

As in the previous years (except in 2005 in which Americas accounted for the highest damage), Asia accounted for more than two-thirds of the economic damage caused by natural disasters in 2006 (Figure 33A). This is mainly due to the impact of the earthquake and tsunami in Indonesia, windstorms and slides in the Philippines, floods in China and India in 2006. Asia accounted for more economic damage than in the previous year (in 2005, it was 12%), a tremendous increase from 2005. The majority of damage in Asia was due to windstorms, floods and earthquakes. The Americas (15%) accounted for the next highest level of economic losses, in contrast to the pattern in 2005 in terms of damage (in 2005, it was the highest at 86% due to hurricanes Katrina, Wilma and others). All other regions accounted for much less of the economic damage sustained in 2006.

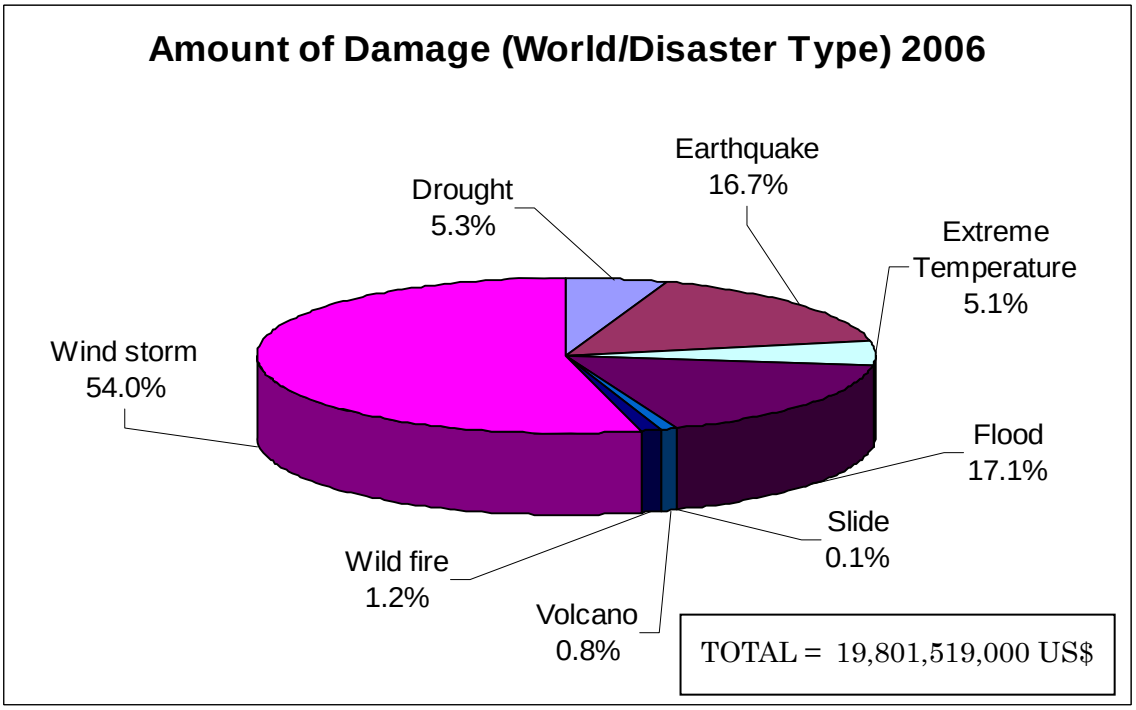
Figure 33B shows the amount of damage worldwide for 2006 by disaster type. Wind storms and floods were the leading causes of damage worldwide, followed by earthquakes. The socio-economic structure of these regions and the disaster occurrences and countermeasures could be attributed to these trends. Overall damage decreased by about 87% from the previous year 2005, from US$159 billion to US$20 billion.

Figure 33A: Proportion of Worldwide Damage by Region, 2006



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 33B: Proportion of Worldwide Damage by Disaster Type, 2006



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

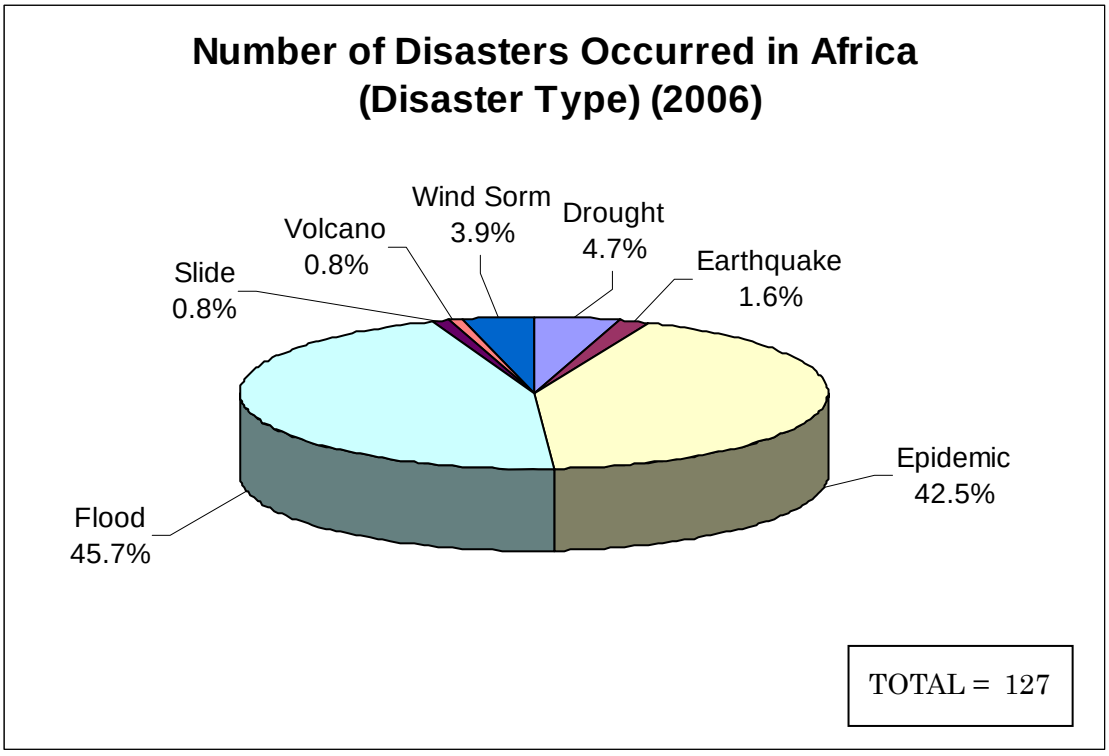
These figures indisputably demonstrate that the disaster vulnerability of the Asian region cannot be neglected in relation to global sustainable development and the need of stronger disaster countermeasures.

3.2 Natural Disasters around the World

3.2.1 Characteristics of Disasters in Africa

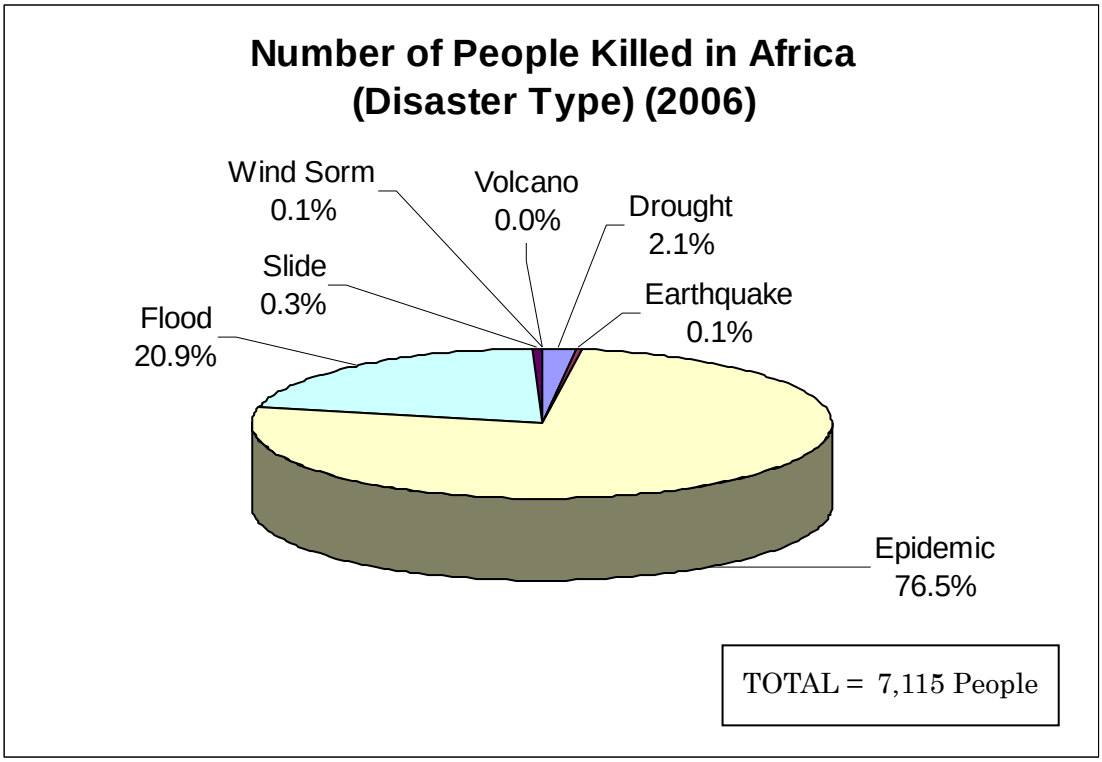
About 93% of the natural disasters that occurred in Africa in 2006 consisted of floods, epidemics and droughts (Figure 34). Furthermore, the majority of the human losses (99.5%) in Africa were due to epidemics, floods, and droughts (Figure 35). Meanwhile, the majority of people affected by disasters in Africa were affected by droughts, which account for nearly 81% of the total affected people in Africa in 2006 (Figure 36). The same pattern was seen in the previous year 2005, when droughts accounted for almost 94% of the people affected. Droughts, floods and epidemics accounted for nearly 99% of the total affected population in Africa in 2006. Kenya, Malawi, Uganda and Burundi were severely hit by drought. It is interesting to note, however, that all of the economic damage sustained in Africa was caused by flooding in 2006 as it was in the previous year 2005 (Figure 37). These figures show Africa to be a disaster-prone region with socio-economic vulnerabilities, where the majority of human suffering comes from droughts, floods, and epidemics.

Figure 34: Proportion of Disasters in Africa by Type, 2006



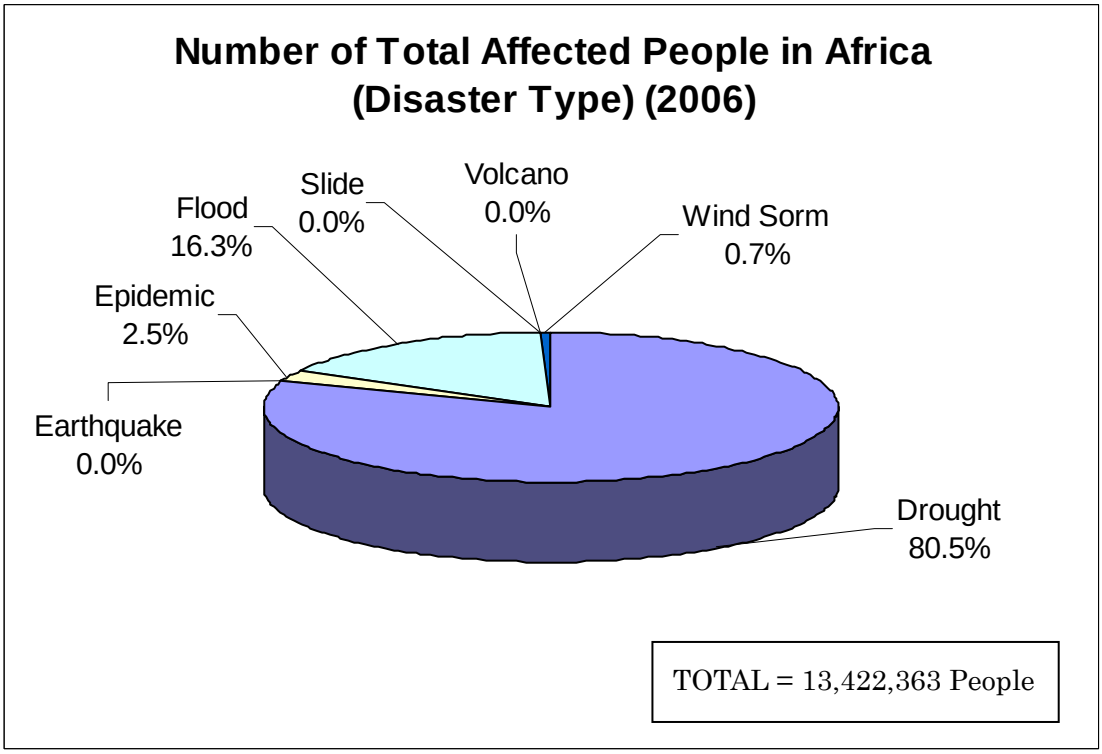
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 35: Proportion of People Killed in Africa by Disaster Type, 2006



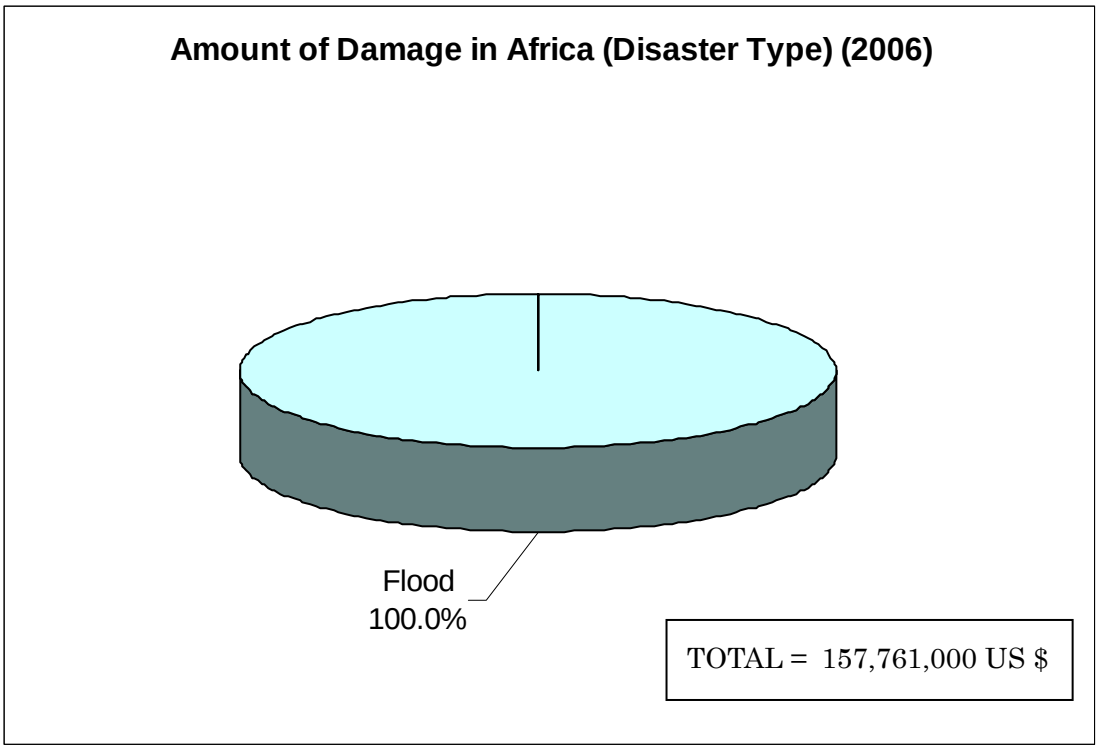
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 36: Proportion of Total Affected People in Africa by Disaster Type, 2006



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 37: Proportion of Damage in Africa by Disaster Type, 2006

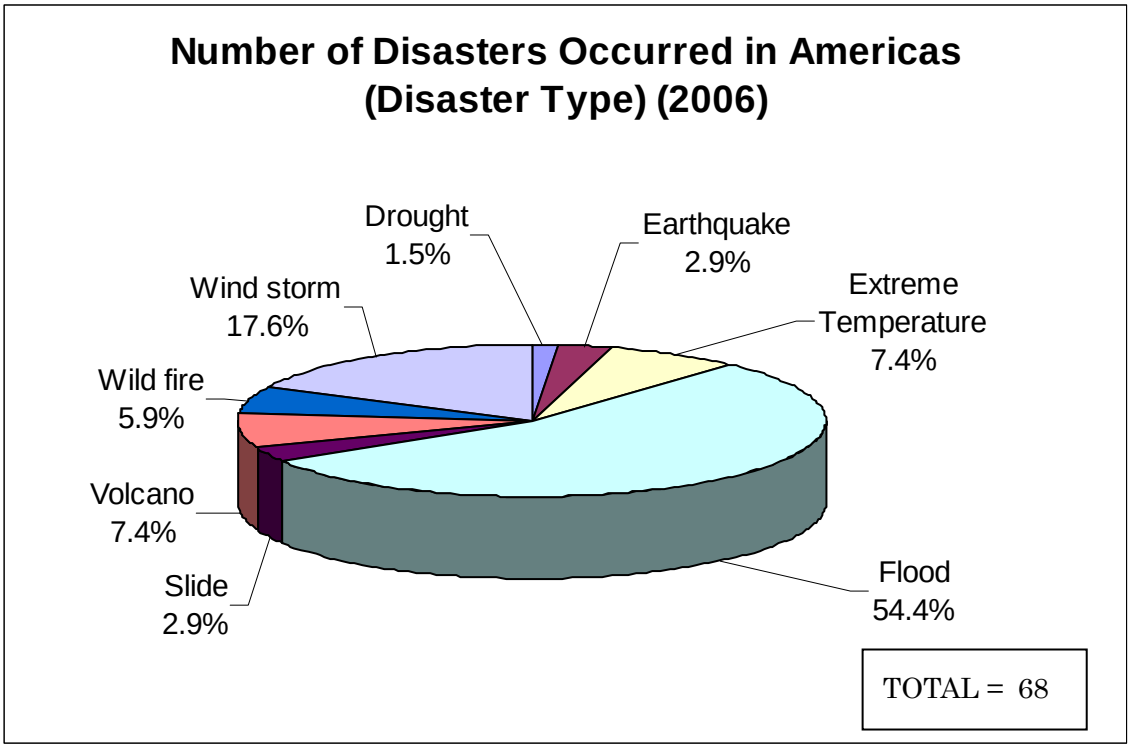


Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

3.2.2 Characteristics of Disasters in the Americas

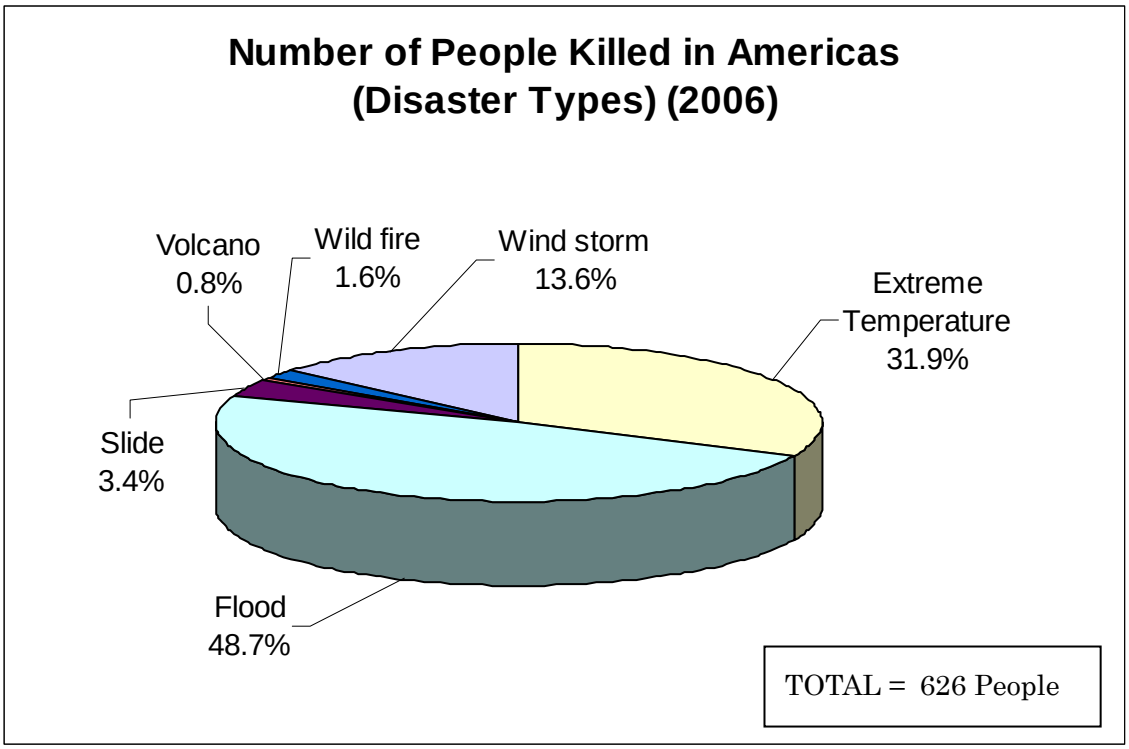
In the Americas, that includes the countries of North and South America, flood, and windstorms accounted for the vast majority (almost 72%) of natural disasters that occurred in 2006 as it was in the previous year 2005 which was a devastating year. Extreme temperatures, volcano eruptions and wildfire also created devastation in the Americas in 2006. In terms of human loss and suffering, about 94% of people killed were by floods, extreme temperatures and wind storms. Nearly 99% of the people affected were affected by wind storms, floods and volcano activities. The majority of the economic damage sustained was caused by floods in 2006. In 2005, severe damage was caused by the historic hurricanes that rocked United States. Severe damage was inflicted by floods and tornados that hit the US and the Caribbean, and the volcano activity in Ecuador. Figures 38 to 41 show that the Americas were visited by significant hydro-meteorological disasters in 2006, as they had been in 2003, 2004 and 2005 as well. Overall the human and economic losses have decreased in the Americas in 2006 in comparison to the previous years.

Figure 38: Proportion of Disasters in the Americas by Type, 2006



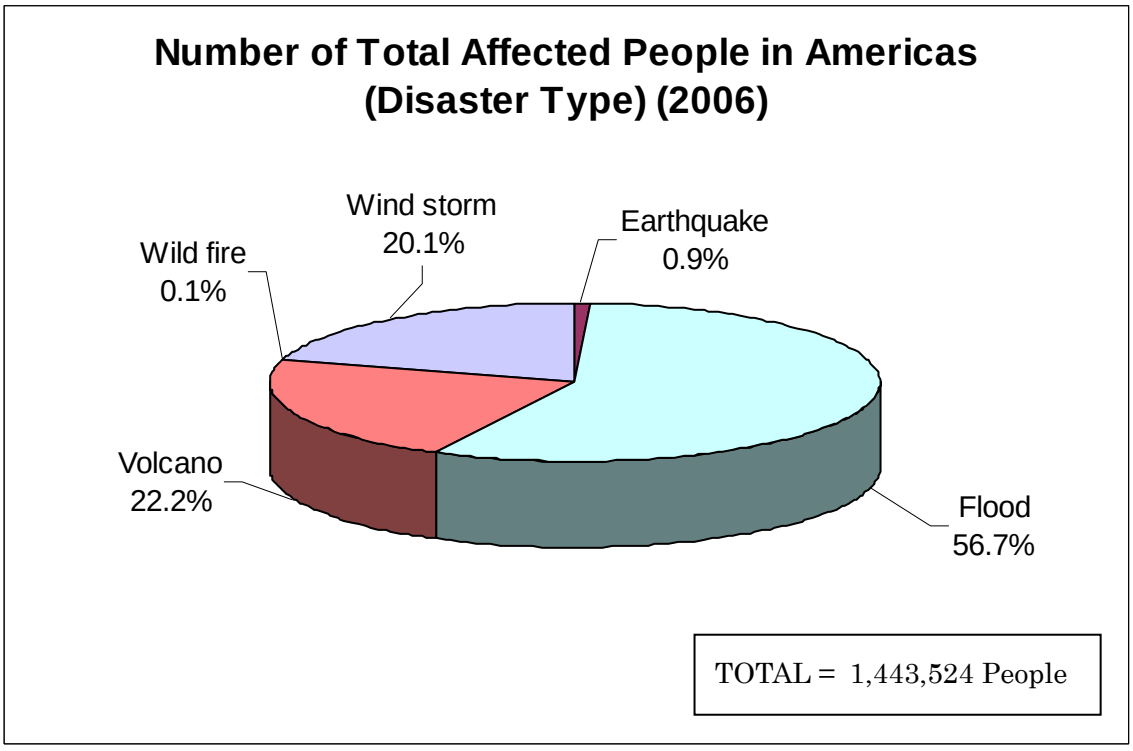
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 39: Proportion of People Killed in the Americas by Disaster Type, 2006



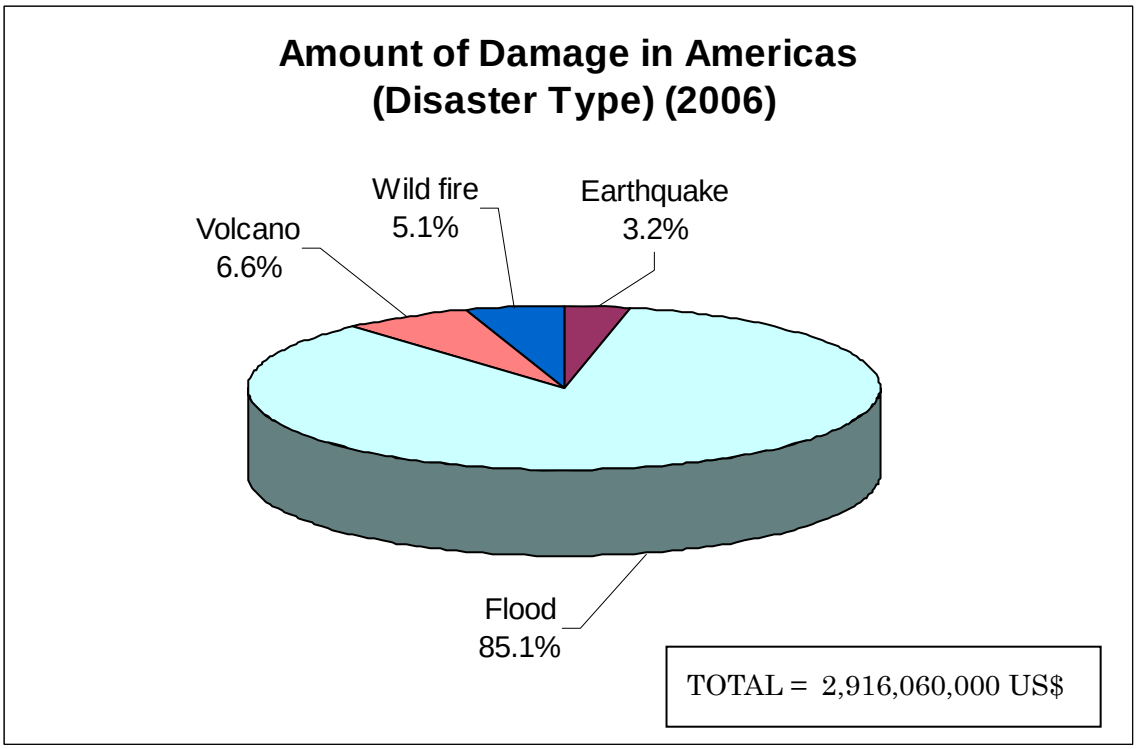
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 40: Proportion of Total Affected People in the Americas by Disaster Type, 2006



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 41: Proportion of Damage in the Americas by Disaster Type, 2006

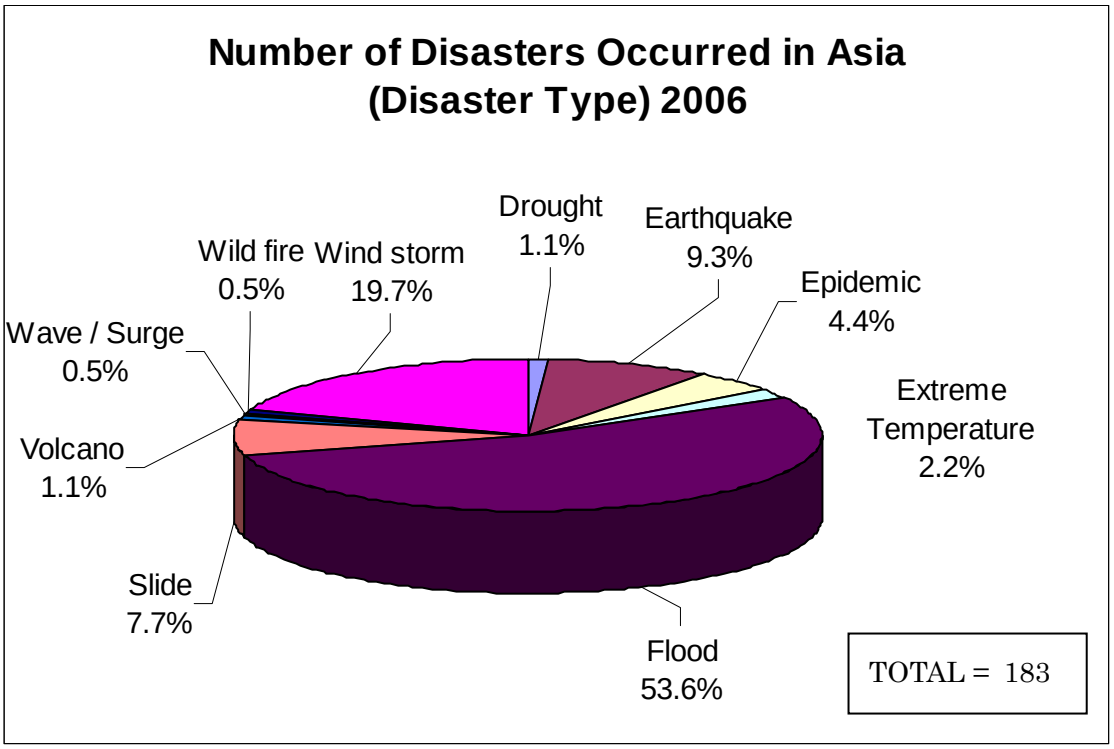


Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

3.2.3 Characteristics of Disasters in Asia

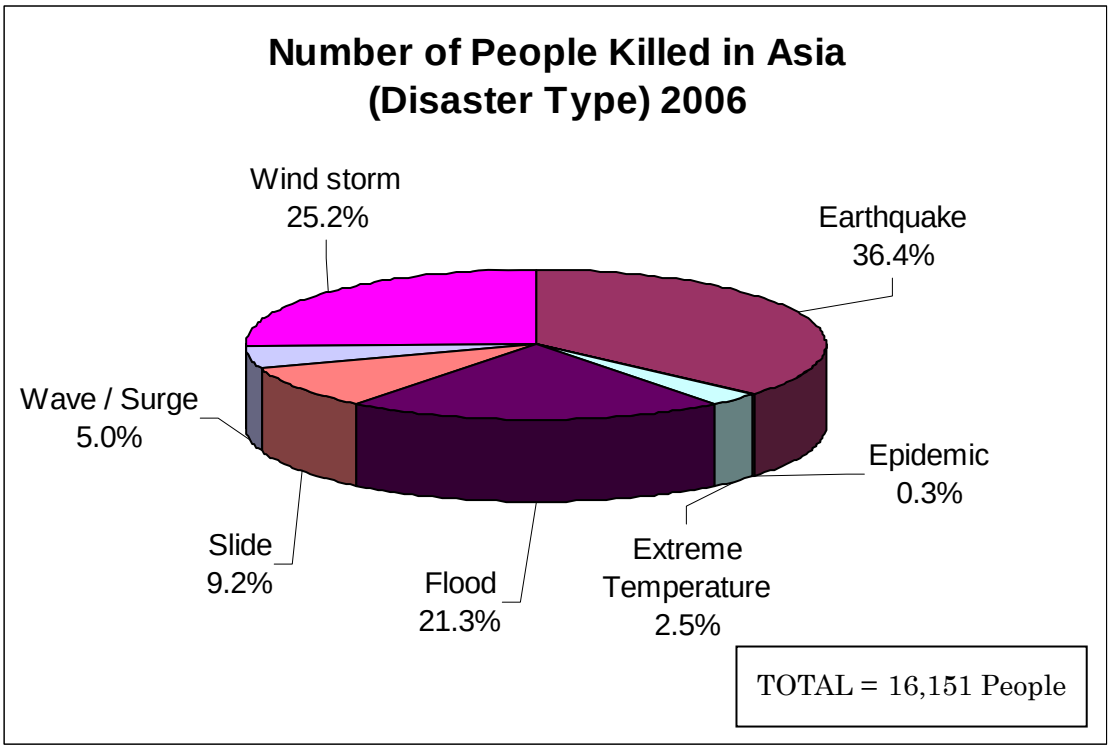
An earlier chapter demonstrated the high vulnerability of the Asian region to natural disasters. The same trend will be observed here. Floods, wind storms, earthquakes, landslides, and epidemics occurred at a greater rate than other disasters in 2005 (Figure 42). About 73% of the disasters in Asia consisted of floods and wind storms, followed by earthquakes (9%), landslides (8%) and epidemics (4%). It is worth noting that earthquakes and tsunami in Indonesia caused considerable human losses (about 41%) in Asia, followed by floods, wind storms and slides (Figure 43). Floods in China, India and Bangladesh also contributed to the high death toll in Asia. Figure 44 shows that wind storms, floods, droughts, and earthquakes caused severe human suffering in Asia, as these accounted for almost all the people affected by natural disasters in the region in 2006. Although the Indonesia earthquake caused heavy human losses, this earthquake and tsunami did not account for a large percentage of the total affected people in Asia in 2006. Furthermore, about 86% of the economic damage sustained was due to windstorms and earthquakes. The remainder was due to floods and droughts (Figure 45). Clearly, the Asian region is severely disaster-prone and vulnerable to both hydro-meteorological and geophysical disasters. The following figures highlight these trends.

Figure 42: Proportion of Disasters in Asia by Type, 2006



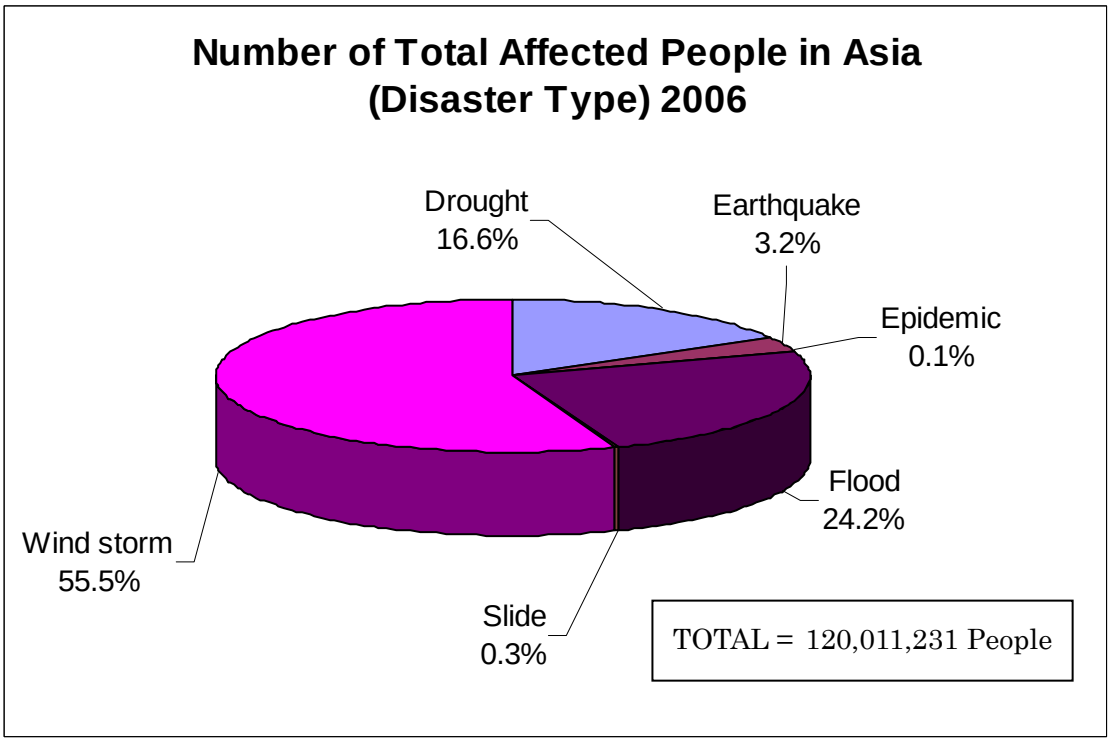
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 43: Proportion of People Killed in Asia by Disaster Type, 2006



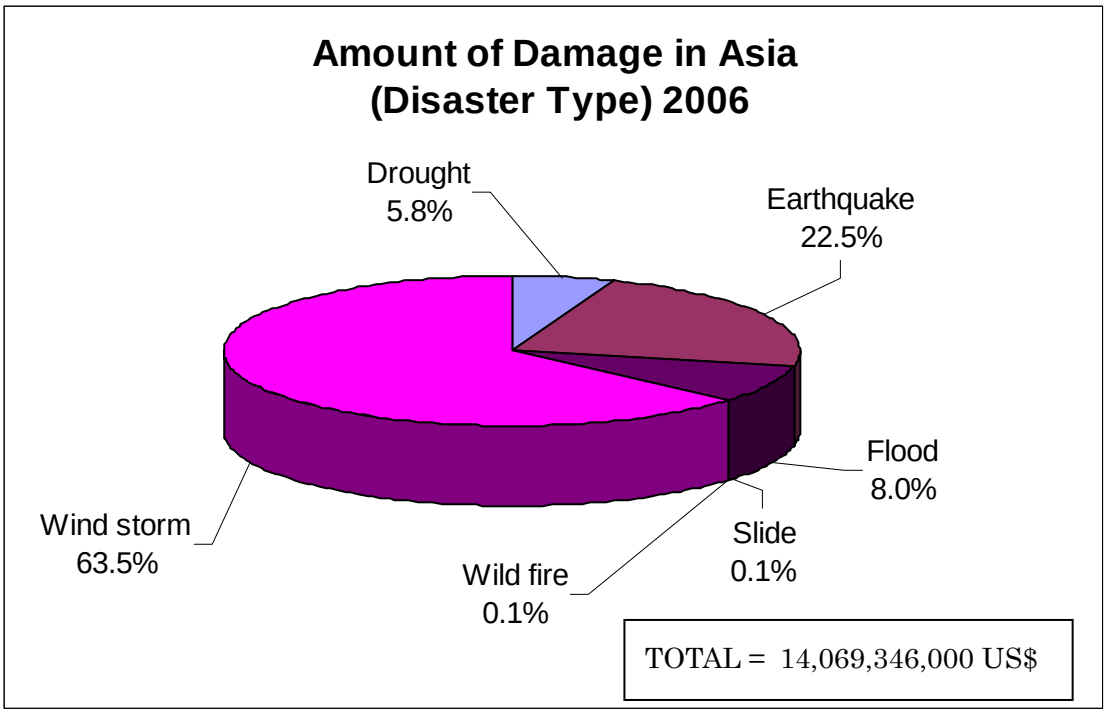
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 44: Proportion of Total Affected People in Asia by Disaster Type, 2006



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 45: Proportion of Damage in Asia by Disaster Type, 2006

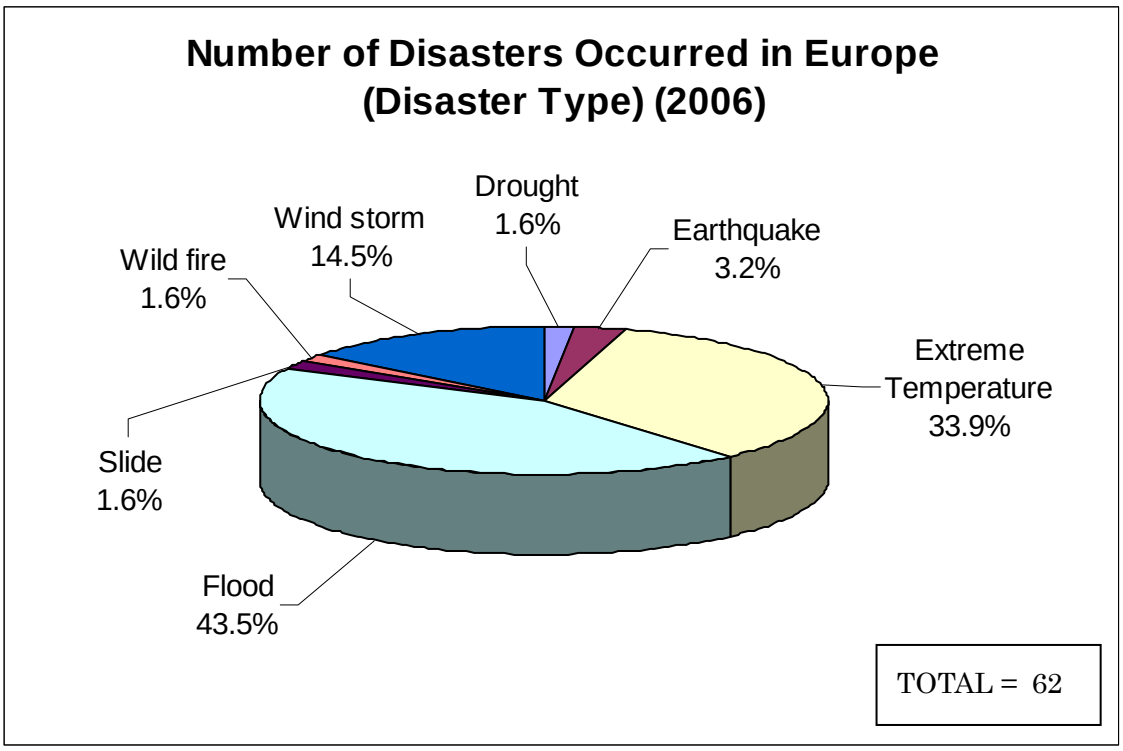


Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

3.2.4 Characteristics of Disasters in Europe

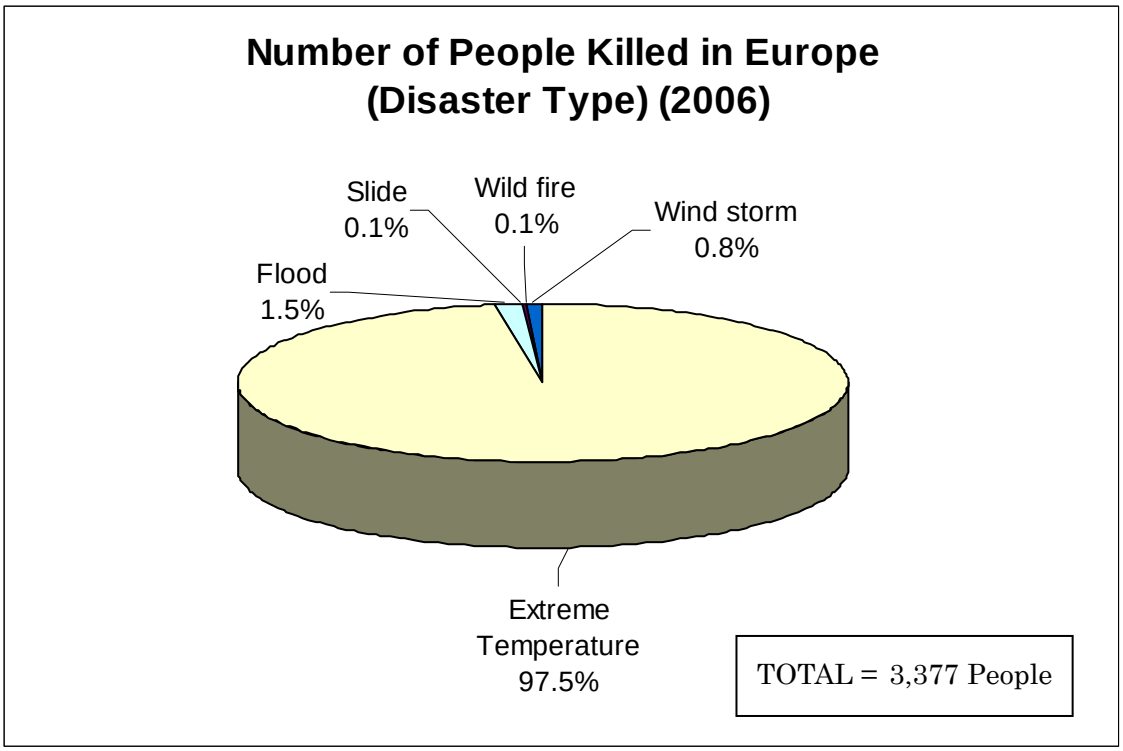
The year 2005 was not a difficult year for Europe in comparison with the devastating floods of 2002 and the extreme temperatures of 2003. But once again, 2006 saw some events of extreme temperatures causing devastation and human loss in the region. Figures 46 to 49 show that mainly extreme temperatures and floods caused severe human losses in the region. The majority of disasters in 2006 were floods and extreme temperatures, accounting for 77% of all disasters (Figure 46). The majority of human losses were due to extreme temperatures (98%), followed floods (Figure 47). All of these disasters caused about 99% of the total human losses in the region in 2006. Furthermore, 91% of the total affected people were affected by floods and extreme temperatures (Figure 48), in contrast to 2005 which saw winstorms affecting majority of the people in the region. In 2004 many people were affected by floods (88%). In 2002, as many as 84% were affected by floods, whereas in 2003, many people were killed by extreme temperatures (99%). Floods in Romania, Serbia, Czech Republic, and Switzerland, and cold wave in Belarus, Ukraine and Russia contributed significantly to the human losses and economic damage in this region in 2006. In 2004, droughts created heavy economic losses in the region, but in 2005 floods caused severe economic damage in the region (much as they had in 2003). The year 2006 was a rather tumultuous one for Europe, which once again sustained significant damage caused by hydro-meteorological disasters.

Figure 46: Proportion of Disasters in Europe by Type, 2006



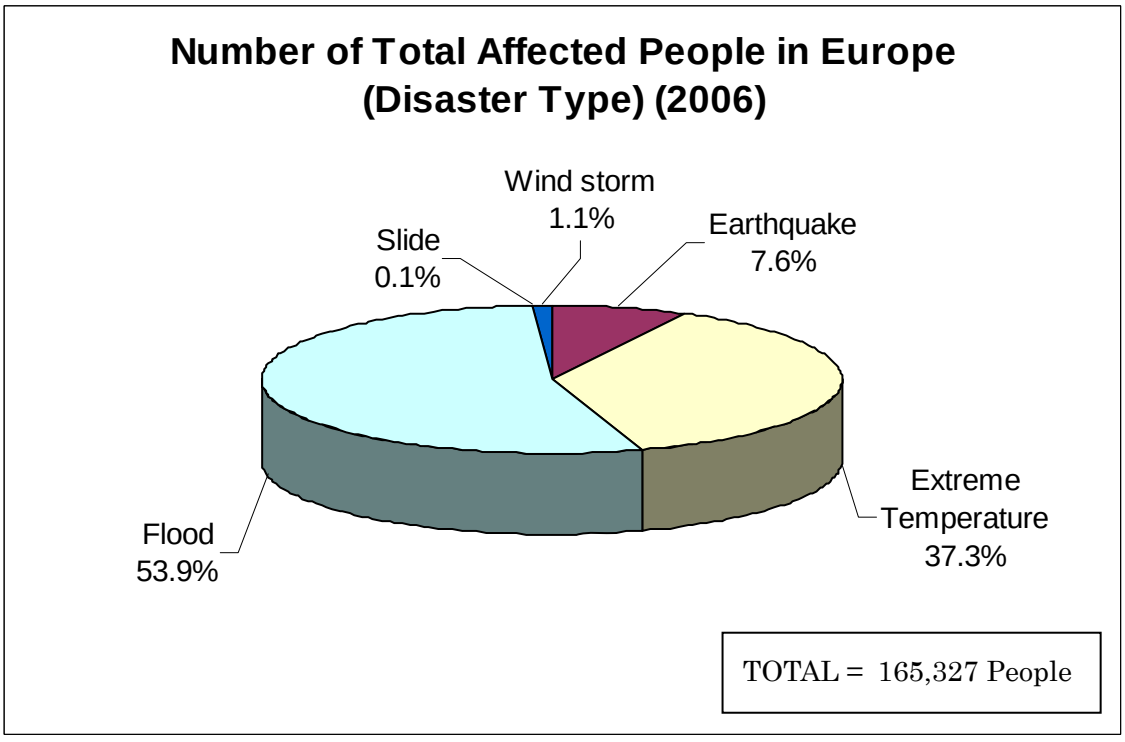
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 47: Proportion of People Killed in Europe by Disaster Type, 2006



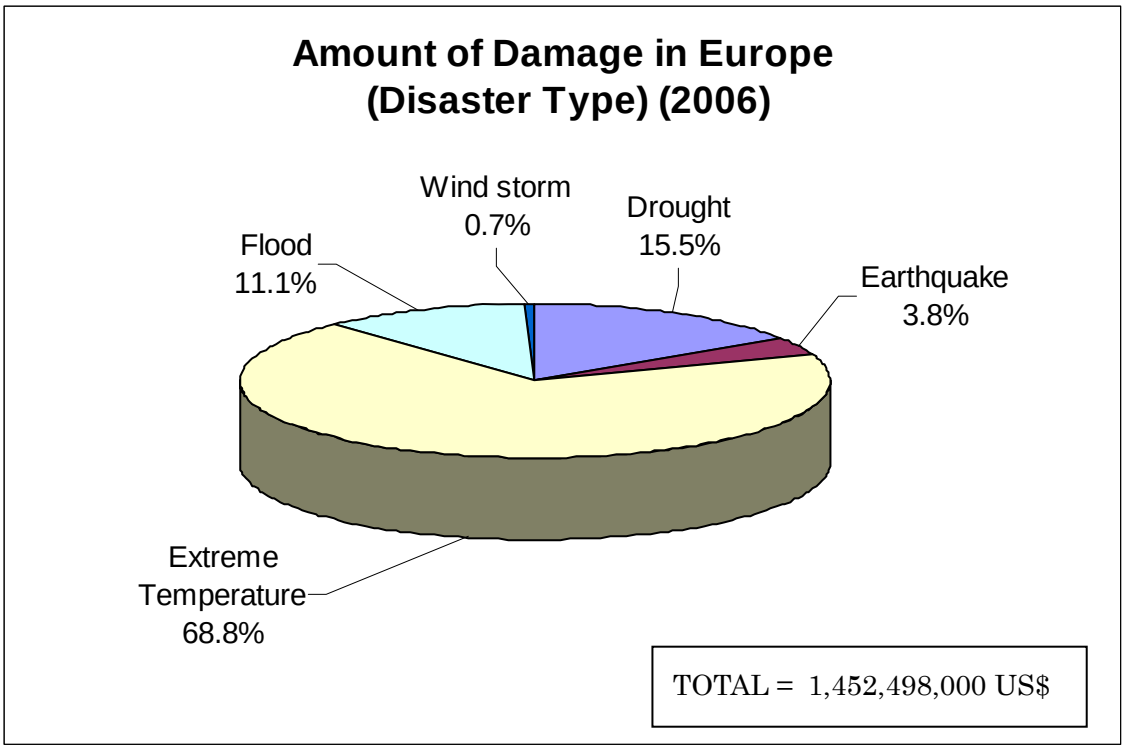
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 48: Proportion of Total Affected People in Europe by Disaster Type, 2006



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 49: Proportion of Damage in Europe by Disaster Type, 2006



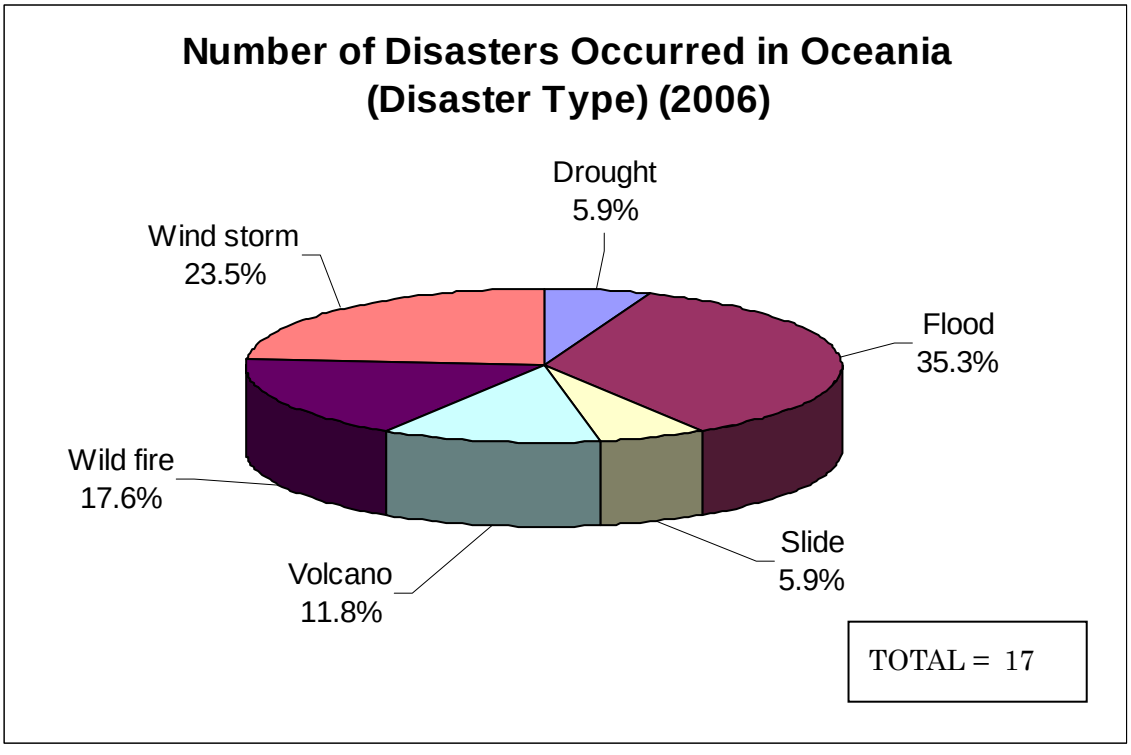
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

3.2.5 Characteristics of Disasters in Oceania

Disaster trends in Oceania were a bit different from those of other regions in previous years as well as in the year 2006, as the natural disasters strayed from the average regional pattern. Not all types of natural disasters occurred here, but the majority that did occur were floods, wind storms, and wildfire, accounting for 76% of the total. The remainder consisted of volcanic eruptions, slides, and drought (Figure 50). The majority of human losses were due to landslides (57%), followed by wildfire and floods (Figure 51). This was due to the slides in Papua New Guinea, floods in Australia and Papua New Guniea, wild fires in Australia and storms in the Pacific island country Fiji and Australia. The total affected people in Oceania in 2006 were largely affected by floods in Papua New Guinea and Australia, and windstorms in Australia (95%), while the remainder was subject to volcanic activity in Vanuatu (Figure 52). The Papua New Guinea floods and windstorms in Australia accounted for the majority of those affected in Oceania in 2006. This is due to severe wind storms that hit Australia and the nearby small Pacific island countries, and wild fires in Australia. The majority of the economic damage was caused by wind storms (91%) and wild fires (8%), mainly from Australia, as shown in Figure 53.

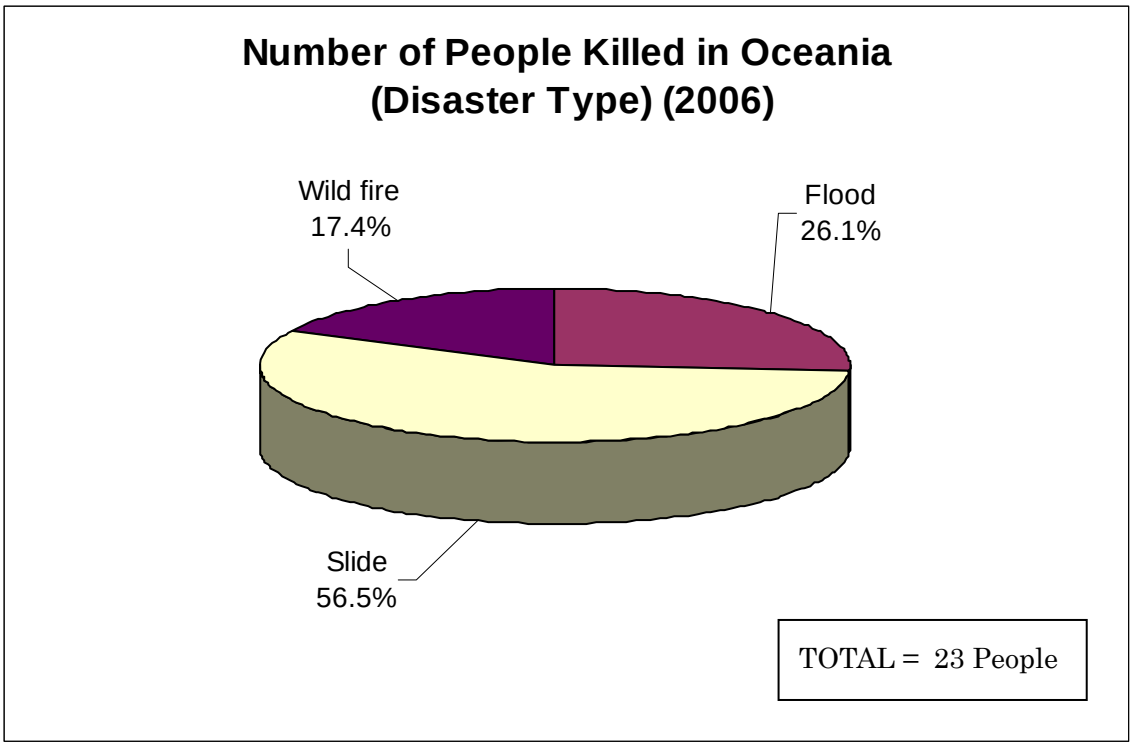
Though Oceania is vulnerable to both hydro-meteorological and geo-physical disasters due its geographical location, in 2006 Oceania experienced mainly hydro-meteorological disasters that created severe economic losses and human sufferings.

Figure 50: Proportion of Disasters in Oceania by Type, 2006



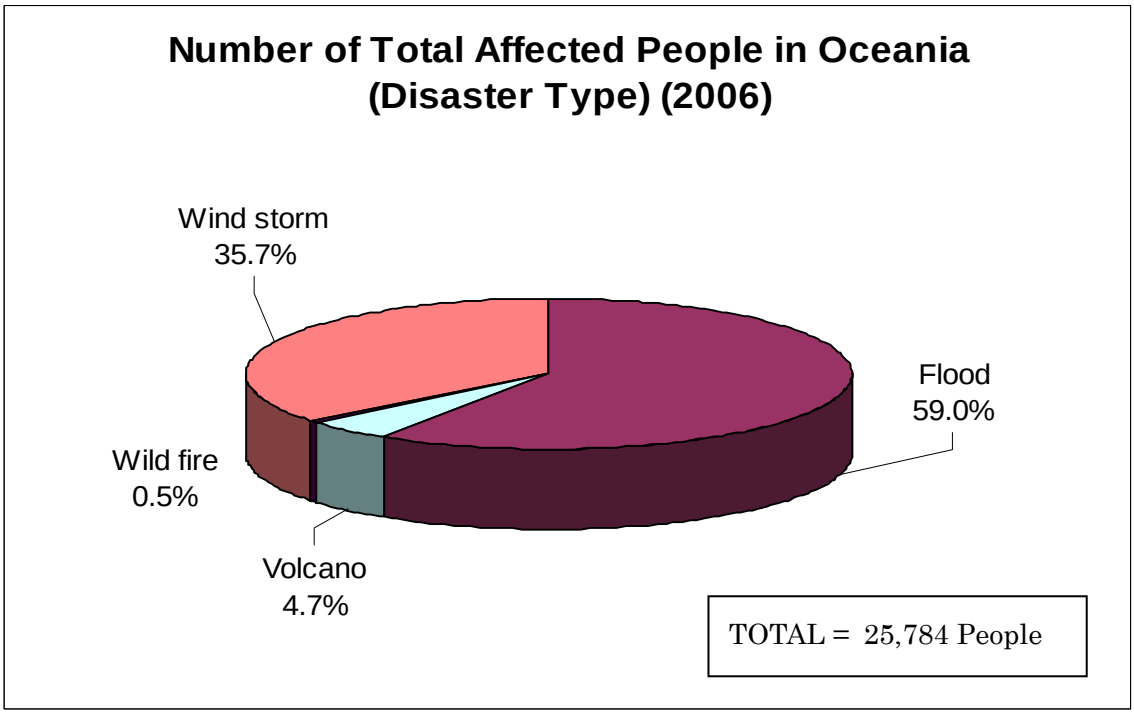
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 51: Proportion of People Killed in Oceania by Disaster Type, 2006



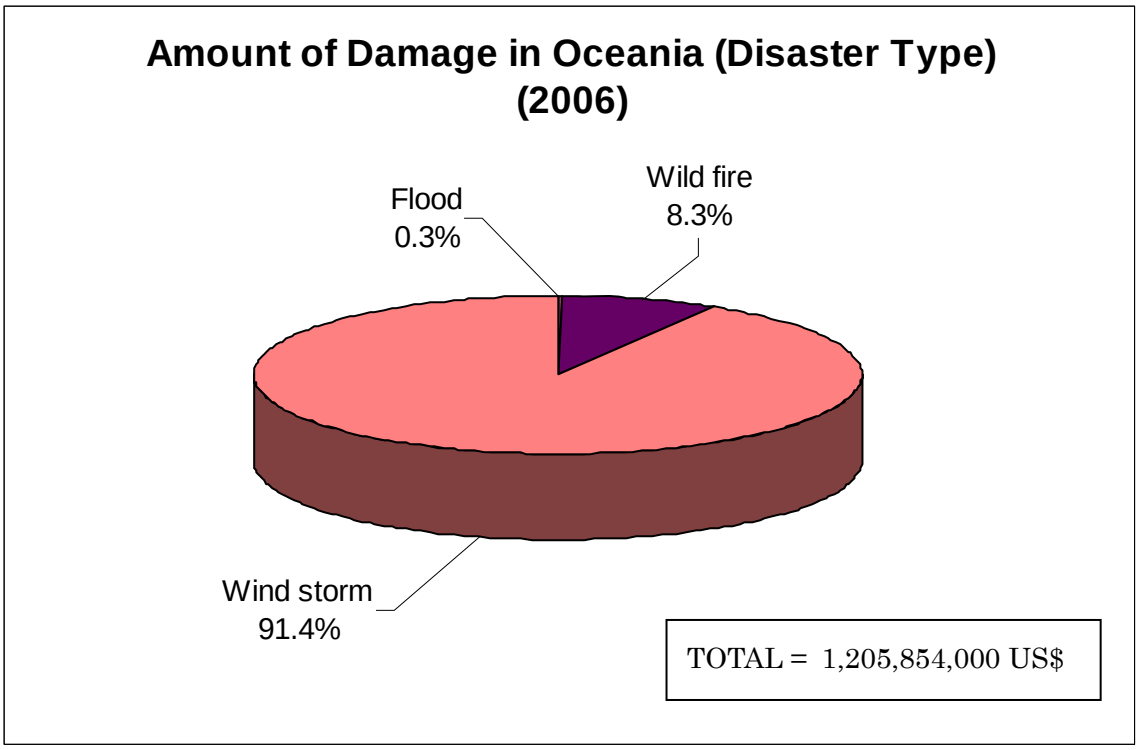
Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 52: Proportion of Total Affected People in Oceania by Disaster Type, 2006



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

Figure 53: Proportion of Damage in Oceania by Disaster Type, 2006



Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

This section summarizes worldwide natural disaster patterns by region. Tables 2B and 3B in Chapter 1 also provide these figures in a tabulated form. Regions all over the world, including Oceania, experienced both hydro-meteorological and geo-physical disasters in 2006. The most significant human and economic losses resulted from the earthquakes, floods, winstorms and slides that occurred in Indonesia, China, the Philippines, India, and the windstom and flood that hit Australia and the US, respectively. The data shown here clearly demonstrates that Asia is a disaster-prone region of the world that sustains considerable levels of human losses and suffering. The most severe disasters of 2006, such as earthquake and tsunami in Indonesia; floods in China; windstorms and slides in the Philippines, occurred in the Asian region. Natural disasters deprive the affected populations of the benefits of socio-economic development, and hinder progress toward sustainable economic development - in disaster-prone regions and all over the globe.

0BChapter 4: Overview of Natural Disasters in the ADRC-Member and Other Asian Countries

4.1 Types of Disasters and Their Effects on the ADRC-Member and Other Asian Countries

This section discusses the disaster patterns in the ADRC-member and other Asian countries,[4] using the 2006 disaster data from 19 of the ADRC's 25 member countries (excluding Armenia, Kazakhstan, Lao PDR, Mongolia, Singapore, and Uzbekistan). There were no significant 2006 disasters recorded for the excluded countries in the CRED-EM-DAT database.[5] It also discusses other non-member Asian countries that reported disasters in 2006. All the ADRC-member countries are located in Asia except for Papua New Guinea (in Oceania) and Russia (in Europe). Table 16 shows the disasters that occurred in each member country, by disaster type.

China, which had one of the most disaster-affected populations in the world in 2006, was seriously affected by **drought**. None of the other countries of Asia, except for Afghanistan, suffered droughts. In 2005, droughts occurred in Cambodia, China, Thailand, and Viet Nam, but in 2004, they only occurred in China. In 2003, Indonesia, Pakistan, and Russia experienced droughts.

Earthquakes had a strong impact on countries like Afghanistan, China, Indonesia, Iran, Kyrgyzstan, Russia, Taiwan (China) and Tajikistan in terms of both the number of people affected and the economic ramifications. The earthquake and subsequent **tsunami** that hit Indonesia constitute one of the world's worst disasters in 2006 in terms of loss of life and economic damage. China and Iran also sustained considerable loss of life and economic damage due to earthquakes. The earthquakes that hit Indonesia produced some of the highest levels of economic damage in the world and accounted for nearly 20% of the total economic damage sustained by the ADRC-member and other Asian countries in 2006. About 36% of the human losses sustained in Asia and the ADRC-member countries were attributed to the quakes.

Epidemics occurred in Cambodia, China, India, Indonesia, Iraq, Turkey and Viet Nam and had a significant impact in terms of total numbers of people affected. Also, a large number of those affected by epidemics were concentrated in India.

Extreme temperatures caused human losses in India, Russia, Bangladesh, and Pakistan. Economic damages were particularly serious in Russia and Europe.

As in previous years, the most frequent disasters in member countries in 2006 were **wind storms** and **floods**. While the ADRC member countries accounted for more than 80% of the total human losses in

[4] The ADRC consists of 25 member countries, five advisory countries (Australia, France, New Zealand, Switzerland and the US) and one observer organization (ADPC). (Visit http://www.adrc.or.jp for further details.) The member countries considered here were Armenia, Bangladesh, Cambodia, China, India, Indonesia, Japan, Kazakhstan, Korea (South), Kyrgyz, Lao PDR, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Papua New Guinea, the Philippines, Russia, Singapore, Sri Lanka, Tajikistan, Thailand, Uzbekistan, and Viet Nam.

[5] See Note 1 on page ii.

2003, they accounted for only 2% of human losses in 2004. In 2005, however, this figure increased to about 7%, the majority of which were due to wind storms and floods. But in 2006 the death toll skyrocketed, with the Asian and ADRC member countries accounting for nearly 46% of all human losses . Furthermore, floods and wind storms accounted for about 80% of the disaster-affected population in the Asian and ADRC member countries in 2006, much as they did in 2005 (90%). This stands in contrast to 2004 when that figure was only 21%. The data also shows that nearly 67% of the total economic losses in member countries were due to floods and wind storms in 2006, similar to the 71% figure in 2005. The most severe damage in terms of human casualties and economic losses occurred in China, India, Thailand, Indonesia, Sri Lanka, the Philippines and Bangladesh, though most member countries were impacted to some degree by floods and wind storms.

Landslides caused considerable human casualties in Afghanistan, Nepal and the Philippines. In fact, the landslides in the Philippines caused more fatalities than any other disaster in 2006.

Volcanic eruptions in the Philippines, Indonesia, and Papua New Guinea affected large numbers of people, but the CRED-EMDAT data show that they did not result in any human or economic losses.

Wild fires also resulted in human casualties in Indonesia.

Table 16: Natural Disasters in the ADRC-member and other Asian Countries by Disaster Type (2006)

Disaster Type	Country	Number of Disasters	Sum of Killed	Sum of Total Affected	Sum of Damage US$ ('000s)
Drought	Afghanistan	1		1,900,000	
	China, P Rep	1		18,000,000	817,000
Drought Total		**2**		**19,900,000**	**817,000**
Earthquake	Afghanistan	1	1	935	
	China, P Rep	6	23	411,548	7,191
	Indonesia	4	5,790	3,180,439	3,100,000
	Iran, Islam Rep	3	63	168,494	42,262
	Kyrgyzstan	1		12,050	
	Russia	1		12,040	55,000
	Taiwan (China)	1	2	42	
	Tajikistan	1	3	15,427	22,000
Earthquake Total		**18**	**5,882**	**3,800,975**	**3,226,453**

Disaster Type	Country	Number of Disasters	Sum of Killed	Sum of Total Affected	Sum of Damage US$ ('000s)
Epidemic	Cambodia	1	4		
	China, P Rep	1	5	3	
	India	1		153,324	
	Indonesia	1	11		
	Iraq	1			
	Turkey	2	20	222	
	Viet Nam	1	16	83	
Epidemic Total		**8**	**56**	**153,632**	
Extreme Temperature	Bangladesh	1	100	1,000	
	India	2	227		
	Pakistan	1	84	100	
	Russia	1	116	14	1,000,000
Extreme Temperature Total		**5**	**527**	**1,114**	**1,000,000**
Flood	Afghanistan	7	282	32,970	
	Bangladesh	2		211,775	
	Cambodia	2	5	38,000	
	China, P Rep	19	406	15,003,448	709,400
	Georgia	1		600	
	India	14	858	9,009,065	
	Indonesia	10	735	388,233	102,300
	Iran, Islam Rep	1	14	2,800	16,000
	Iraq	2	20	59,910	1,300
	Japan	2	42	10,532	
	Korea Dem P Rep	2	278	91,824	
	Korea, Rep	1	46	4,630	
	Malaysia	5	15	136,518	22,000
	Myanmar	1	25	10,000	

Disaster Type	Country	Number of Disasters	Sum of Killed	Sum of Total Affected	Sum of Damage US$ ('000s)
	Nepal	1			
	Pakistan	6	105	2,300	
	Papua New Guinea	3	2	12,700	
	Philippines	6	36	322,891	10,762
	Russia	3		7,720	132,411
	Sri Lanka	1	25	333,002	
	Syrian Arab Rep	1	6		
	Taiwan (China)	1	3	300	116,130
	Tajikistan	1	1	13,000	
	Thailand	4	335	3,257,308	131,940
	Turkey	2	59	63,000	
	Viet Nam	4	118	52,120	9,000
	Yemen	2	30	2,320	
Flood Total		**104**	**3,446**	**29,066,966**	**1,251,243**
Slide	Afghanistan	2	28	300,000	
	China, P Rep	2	22	5	
	Indonesia	3	103	3,536	10,943
	Nepal	2	157	80,000	
	Pakistan	1	29	5	
	Papua New Guinea	1	13		
	Philippines	3	1,129	12,016	2,203
	Tajikistan	1	21	728	
Slide Total		**15**	**1,502**	**396,290**	**13,146**
Volcano	Indonesia	1		11,000	
	Papua New Guinea	1		1,221	
	Philippines	1		43,849	
Volcano Total		**3**		**56,070**	

Disaster Type	Country	Number of Disasters	Sum of Killed	Sum of Total Affected	Sum of Damage US$ ('000s)
Wave / Surge	Indonesia	1	802	35,543	2,000
Wave / Surge Total		**1**	**802**	**35,543**	**2,000**
Wild fire	Indonesia	1		200	14,000
Wild fire Total		**1**		**200**	**14,000**
Wind storm	Afghanistan	2	71		
	Bangladesh	2	119	15,034	
	China, P Rep	7	1,415	55,320,012	6,837,000
	East Timor	1		8,730	
	India	1	114	150,300	
	Japan	3	119	15,327	30,979
	Kyrgyzstan	1	4	9,075	
	Myanmar	1	34	60,106	
	Philippines	10	1,787	7,757,462	974,936
	Taiwan (China)	2	3	800	
	Viet Nam	6	401	3,297,290	1,090,000
Wind storm Total		**36**	**4,067**	**66,634,136**	**8,932,915**
Grand Total		**193**	**16,282**	**120,044,926**	**15,256,757**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006

4.2 Disaster Profiles of the ADRC-Member and Other Asian Countries

Table 17: Natural Disasters in the ADRC-Member and Other Asian Countries by Country (2006)

Country	Disaster Type	Number of Disasters	Sum of Killed	Sum of Total Affected	Sum of Damage US$ ('000s)
Afghanistan	Drought	1		1,900,000	
	Earthquake	1	1	935	
	Flood	7	282	32,970	
	Slide	2	28	300,000	
	Wind storm	2	71		
Afghanistan Total		**13**	**382**	**2,233,905**	
Bangladesh	Extreme Temperature	1	100	1,000	
	Flood	2		211,775	
	Wind storm	2	119	15,034	
Bangladesh Total		**5**	**219**	**227,809**	
Cambodia	Epidemic	1	4		
	Flood	2	5	38,000	
Cambodia Total		**3**	**9**	**38,000**	
China, P Rep	Drought	1		18,000,000	817,000
	Earthquake	6	23	411,548	7,191
	Epidemic	1	5	3	
	Flood	19	406	15,003,448	709,400
	Slide	2	22	5	
	Wind storm	7	1,415	55,320,012	6,837,000
China, P Rep Total		**36**	**1,871**	**88,735,016**	**8,370,591**

Country	Disaster Type	Number of Disasters	Sum of Killed	Sum of Total Affected	Sum of Damage US$ ('000s)
East Timor	Wind storm	1		8,730	
East Timor Total		**1**		**8,730**	
Georgia	Flood	1		600	
Georgia Total		**1**		**600**	
India	Epidemic	1		153,324	
	Extreme Temperature	2	227		
	Flood	14	858	9,009,065	
	Wind storm	1	114	150,300	
India Total		**18**	**1,199**	**9,312,689**	
Indonesia	Earthquake	4	5,790	3,180,439	3,100,000
	Epidemic	1	11		
	Flood	10	735	388,233	102,300
	Slide	3	103	3,536	10,943
	Volcano	1		11,000	
	Wave / Surge	1	802	35,543	2,000
	Wild fire	1		200	14,000
Indonesia Total		**21**	**7,441**	**3,618,951**	**3,229,243**
Iran, Islam Rep	Earthquake	3	63	168,494	42,262
	Flood	1	14	2,800	16,000
Iran, Islam Rep Total		**4**	**77**	**171,294**	**58,262**
Iraq	Epidemic	1			
	Flood	2	20	59,910	1,300
Iraq Total		**3**	**20**	**59,910**	**1,300**

Country	Disaster Type	Number of Disasters	Sum of Killed	Sum of Total Affected	Sum of Damage US$ ('000s)
Japan	Flood	2	42	10,532	
	Wind storm	3	119	15,327	30,979
Japan Total		**5**	**161**	**25,859**	**30,979**
Korea Dem P Rep	Flood	2	278	91,824	
Korea Dem P Rep Total		**2**	**278**	**91,824**	
Korea, Rep	Flood	1	46	4,630	
Korea, Rep Total		**1**	**46**	**4,630**	
Kyrgyzstan	Earthquake	1		12,050	
	Wind storm	1	4	9,075	
Kyrgyzstan Total		**2**	**4**	**21,125**	
Malaysia	Flood	5	15	136,518	22,000
Malaysia Total		**5**	**15**	**136,518**	**22,000**
Myanmar	Flood	1	25	10,000	
	Wind storm	1	34	60,106	
Myanmar Total		**2**	**59**	**70,106**	
Nepal	Flood	1			
	Slide	2	157	80,000	
Nepal Total		**3**	**157**	**80,000**	
Pakistan	Extreme Temperature	1	84	100	
	Flood	6	105	2,300	
	Slide	1	29	5	
Pakistan Total		**8**	**218**	**2,405**	
Papua New Guinea	Flood	3	2	12,700	

Country	Disaster Type	Number of Disasters	Sum of Killed	Sum of Total Affected	Sum of Damage US$ ('000s)
	Slide	1	13		
	Volcano	1		1,221	
Papua New Guinea Total		**5**	**15**	**13,921**	
Philippines	Flood	6	36	322,891	10,762
	Slide	3	1,129	12,016	2,203
	Volcano	1		43,849	
	Wind storm	10	1,787	7,757,462	974,936
Philippines Total		**20**	**2,952**	**8,136,218**	**987,901**
Russia	Earthquake	1		12,040	55,000
	Extreme Temperature	1	116	14	1,000,000
	Flood	3		7,720	132,411
Russia Total		**5**	**116**	**19,774**	**1,187,411**
Sri Lanka	Flood	1	25	333,002	
Sri Lanka Total		**1**	**25**	**333,002**	
Syrian Arab Rep	Flood	1	6		
Syrian Arab Rep Total		**1**	**6**		
Taiwan (China)	Earthquake	1	2	42	
	Flood	1	3	300	116,130
	Wind storm	2	3	800	
Taiwan (China) Total		**4**	**8**	**1,142**	**116,130**
Tajikistan	Earthquake	1	3	15,427	22,000
	Flood	1	1	13,000	
	Slide	1	21	728	

Country	Disaster Type	Number of Disasters	Sum of Killed	Sum of Total Affected	Sum of Damage US$ ('000s)
Tajikistan Total		**3**	**25**	**29,155**	**22,000**
Thailand	Flood	4	335	3,257,308	131,940
Thailand Total		**4**	**335**	**3,257,308**	**131,940**
Turkey	Epidemic	2	20	222	
	Flood	2	59	63,000	
Turkey Total		**4**	**79**	**63,222**	
Viet Nam	Epidemic	1	16	83	
	Flood	4	118	52,120	9,000
	Wind storm	6	401	3,297,290	1,090,000
Viet Nam Total		**11**	**535**	**3,349,493**	**1,099,000**
Yemen	Flood	2	30	2,320	
Yemen Total		**2**	**30**	**2,320**	
Grand Total		**193**	**16,282**	**120,044,926**	**15,256,757**

Source: CRED-EMDAT, Université Catholique de Louvain, Brussels, Belgium, 2006.

Table 17 shows the types of natural disasters that occurred by country. The following country-specific discussions are based on Table 17.

In **Afghanistan,** droughts, floods, and landslides caused considerable human casualties, while an earthquake also had a moderate impact.

In **Bangladesh**, floods and wind storms caused considerable human causalities and loss of life. Bangladesh lies along the path of cyclones generated in the Bay of Bengal, making the country particularly prone to hydro-meteorological disasters.

Cambodia recorded heavy human casualties, including some fatalities, due to floods.

China experienced almost every type of disaster, as the country covers a vast area and has a large population. The most severe disasters in China in 2006 were wind storms and drought, followed by floods. Earthquakes also had a considerable impact on the population. Wind storms, drought, and floods proved to

be the largest natural disasters in China in 2006 in terms of both the affected population and economic damage. These disasters were also among the 25 worst disasters in the world in 2006 in terms of human casualties and economic losses.

Wind storms reported in **East Timor** in 2006 affected many people. **Georgia** reported floods that caused only minor human causalities.

India experienced many severe disasters in 2006. The massive Indian Ocean Tsunami struck in 2004, but 2005 brought even more trouble, with heavy floods and wind storms affecting many parts of the country. The most devastating disaster in 2005, the South Asian Earthquake, had a tremendous impact on India. It caused almost US$6 billion in damage in India and severely disrupted everyday life. India also experienced some of the world's worst disasters in 2006, mostly floods and wind storms, followed by epidemics. Flooding that resulted in particularly heavy human casualties made this one of world's 25 worst disasters in 2006. Located in a natural disaster-prone area, India is vulnerable to wind storms spawned in the Bay of Bengal and the Arabian Sea, earthquakes caused by active crustal movement in the Himalayan Mountains, floods brought about by monsoons, and droughts in the country's arid and semi-arid areas. India has also become much more vulnerable to tsunamis in the Indian Ocean since the 2004 Indian Ocean Tsunami struck the coastal areas of Andaman and the Nicobar Islands.

One of the worst hit countries in 2006 was **Indonesia**. In 2004, Indonesia was significantly affected by tsunamis, earthquakes, floods, wind storms, volcanic eruptions, and epidemics. The year 2005 brought more disasters, including earthquakes, volcanic eruptions, and floods. In 2006, the country experienced one of the world's 25 worst disasters, an earthquake and subsequent tsunami that inflicted heavy causalities and economic damage. This caused the world's highest death toll due to a natural disaster in 2006, and also resulted in the greatest economic damage that year. With seismic belts running throughout the country, Indonesia is prone to earthquakes. It has 129 active volcanoes and regularly experiences volcanic eruptions. As the world's largest archipelago, Indonesia is also prone to seismic upheaval because of its location along the Pacific "Ring of Fire," an arc of volcanoes and fault lines encircling the Pacific Basin. The year 2006 was no exception in terms of disasters related to volcanic activity. Floods and wind storms also tend to occur during the country's rainy season.

The year 2006, like 2004 and 2005, was devastating for **Iran**, which experienced earthquakes and floods. In 2003, the historic Bam Earthquake destroyed almost the entire historical town of Bam and accounted for the highest number of human lives claimed in a single disaster that year. In spite of earthquakes and floods, 2006 was a better year than 2003 or 2004. However, greater damage was sustained in 2006 than in 2005.

Floods affected **Iraq** and inflicted considerable human casualties and economic losses in 2006.

In **Japan,** 2006 was not as bad a year as 2004 in terms of natural disaster damage and human casualties. The 2004 Niigata earthquake caused about US$28 billion in damage and affected more than 62,000 people. Some major wind storms and floods also had a considerable impact on the population in 2005. The damage caused by disasters was comparatively low in 2006 versus previous years, and was

attributed to wind storms and floods. Since Japan's geographical position makes it highly prone to earthquakes, wind storms, floods, landslides, and tsunamis, it has some of the best disaster management systems and countermeasures in the world. These have proven to be highly effective in reducing human casualties and losses.

Most of the natural disasters that occur in **Korea (North and South)** consist of floods in the rainy season, as well as wind storms. In 2006 there were also floods but the related human casualties and economic losses were not as high as in 2005 or 2004.

Almost 90% of **Kyrgyzstan** is covered with mountains that are more than 1,000 meters above sea level, and about 40% of those are situated in alpine areas higher than 3,000 meters in elevation. The distinctive natural disasters of Kyrgyzstan are earthquakes accompanied by active crustal deformations, and floods caused by snowmelt and landslides. In 2006, unlike previous years, Kyrgyzstan reported an earthquake and wind storm that caused moderate human casualties.

Malaysia often experiences floods and landslides caused by rainfall during the monsoon season and rainstorms triggered by tropical low pressure systems. In 2006, the country experienced floods that resulted in little loss of life and economic damage, in spite of high numbers of affected population.

Though a wind storm and flood occurred in **Myanmar** in 2006, they produced very little human and economic losses.

Nepal is located in the Himalayan region where the Indian plate is subsiding under the Eurasian plate. This crustal formation causes frequent earthquakes. Floods, landslides, and extreme temperatures also often pose a threat to Nepal. Table 17 shows that in 2006, Nepal experienced landslides that caused considerable human losses and a high total affected population (which includes the numbers of homeless, injured, and affected persons).

Pakistan is often hit by drought, extreme temperatures, floods, landslides, earthquakes, and wind storms. In 2005, the South Asian earthquake caused significant human casualties, with more than 73,000 dead and about three million people affected. This disaster produced the highest death toll in the world in 2005. The year 2006 was not as bad a year as 2005, but floods and extreme temperatures still had a significant impact on the population.

Papua New Guinea is highly vulnerable to all kinds of natural disasters, both hydro-meteorological and geo-physical, such as earthquakes, tsunamis, volcanic activity, floods, and wind storms. Floods and volcanic eruptions were the main natural disasters that occurred in 2006. These affected considerable numbers of people, but caused relatively little loss of life. The affected population figures from these disasters were some of the highest in Oceania in 2006.

The Philippines is located along the Pacific "Ring of Fire," making it vulnerable to both hydro-meteorological and geo-physical natural disasters. As in previous years, the damage caused by hydro-meteorological disasters grew in 2006, with very large populations were affected by floods and wind storms. Wind storms and floods once again caused extensive economic damage in 2006. Landslides also significantly affected the population and inflicted heavy human losses, ranking them among the world's 25 worst disasters in terms of human losses in 2006.

Russia is a vast land where the disaster-affected population and economic losses are relatively large. Floods, landslides, extreme temperatures, and wind storms affected large numbers of people in 2005. In 2006, however, an unusual cold wave occurred in Russia, and it was ranked among the worst disasters in Europe. Floods and earthquakes also caused considerable economic losses and affected many people in Russia in 2006.

The year 2006 was not nearly as disastrous as 2004 for **Sri Lanka**, which is located in the Indian Ocean just south of India, but it was worse than 2005. Sri Lanka frequently experiences droughts during its dry seasons, and wind storms, floods and subsequent landslides during its rainy seasons due to cyclones from the Bay of Bengal. These natural disasters have been the country's prime concerns thus far. In 2004, Sri Lanka was devastated by the record-breaking Indian Ocean Tsunami, which caused tremendous human losses and affected untold numbers of people. The economic damage caused by this tsunami was so huge as to have severely affected the country's economic progress. The scale of the human and economic losses sustained triggered a massive outpouring of international assistance to that country in 2004. This continued in 2005, as tsunami recovery efforts progressed at a slow pace. Compounding this catastrophe, Sri Lanka also experienced a flood in 2006 that affected more than 330,000 people.

Syria experienced a flood in 2006, but its economic and social impacts were minimal.

Wind storms, a flood, and an earthquake also occurred in **Taiwan (China)** in 2006, yielding relatively high numbers of affected people and economic damage. The most significant economic damage was caused by heavy flooding.

Tajikistan's prime concerns are earthquakes and floods, as much of its terrain is mountainous. Landslides and floods in 2005 resulted in human casualties and economic damage. In 2006, an earthquake caused considerable economic losses, but fewer fatalities than the landslides.

Like 2004 and 2005, the year 2006 was a bad year for flooding in **Thailand**. Floods killed more than 330 people, affected more than three million people, and caused damage of more than US$132 million. The economic damage to this country was due to flooding. Thailand is highly prone to natural disasters because of its location and terrain. The northeastern area is prone to floods and drought, while the south is vulnerable to storms, floods, and landslides. Of these, floods had the greatest impact on Thailand in 2006. It is important to note that the population affected by hydro-meteorological disasters is quite large every year.

Turkey experienced heavy human casualties due to floods and epidemics.

Viet Nam is located in the southeast monsoon climate area, where the majority of annual rainfall occurs during the rainy season and regularly causes heavy human and economic losses. Wind storms and floods caused severe human casualties and economic losses in Viet Nam in 2006. These disasters affected more than three million people and caused more than US$1billion in damage. Figures for 2006 were much higher than in previous years, necessitating the development of countermeasures to prevent a recurrence.

Human casualties in **Yemen** in 2006 were caused primarily by floods.

The tables above show that the majority of ADRC-member and other Asian countries experienced either hydro-meteorological disasters and/or geo-physical disasters that inflicted heavy human

and economic losses on society and created additional hurdles for economic development efforts. Furthermore, the severe impact of these disasters deprived people of opportunities for socio-economic advancement, thereby slowing down the pace of national and regional development. The most severe disasters in 2006 occurred in Asia (China, India, the Philippines, Indonesia, Thailand, Viet Nam and Bangladesh) and affected large numbers of people. The earthquake and tsunami in Indonesia, floods in India, China, and Bangladesh, and wind storms and landslides in the Philippines were particularly damaging, causing destruction at home and hindering economic and development progress region wide. Southeast Asia sustained heavy human and economic damage due to both hydro-meteorological and geo-physical disasters in 2006, once again exposing it as the most disaster-prone region in the world. It is imperative that efforts be made to design and implement proper disaster mitigation and preparedness plans to reduce loss of life, human casualties, and economic losses, and to contribute to sustainable development on a global scale.

4.3 Conclusions

The year 2006 brought severe natural disasters all over the world. The highest death toll resulted from the earthquake and tsunami in Indonesia, the highest affected population from the wind storms and floods in China and the countries of Southeast Asia, and the highest level of economic damage from wind storms and floods in China and the earthquake and tsunami in Indonesia. The year 2006 was one of the most devastating for the Asian region in recent years. Africa also suffered droughts, floods, and epidemics. Europe experienced extreme temperatures (cold wave, heat wave) and floods which claimed many lives and caused casualties throughout the region. Oceania sustained floods and wind storms, and was moderately impacted by volcanic eruptions. Australia and Papua New Guinea were the most severely affected countries of Oceania. The US was also hit by intense floods, which caused the highest levels of economic damage for 2006.

An analysis of the long-term disaster data shows that low-income countries and less developed countries were significantly affected in terms of their ratio of human losses to population, and their ratio of damage to gross national income (GNI). The disaster figures and data for 2006 were consistent with patterns from previous years, but the ratio of damage to the economy was higher in the upper-middle and high-income countries this year. This reinforces the lesson that even the developed countries cannot be complacent about disaster reduction strategies and countermeasures. It also highlights the need for continuous review and monitoring of disaster reduction strategies, and underscores the need for effective, practical regional cooperation, and investments in disaster reduction measures.

Although many initiatives have been launched and investments made in developing countries in regions vulnerable to disasters, the increasing frequency and magnitude of natural catastrophes that result in economic loss and human casualties have hindered those initiatives. This book has sought to derive conclusions from the analytical evidence that can be used to integrate disaster risk management initiatives with development objectives. The preceding chapters show that the human development and income levels of a country are crucial determinants of the effective implementation of risk management approaches and post-disaster management initiatives. In addition, the active and effective participation of women in the risk management process has been shown to be a crucial factor in the development of any meaningful disaster countermeasures, especially in the least developed countries.

These general phenomena can be seen not only in the ADRC-member countries, but also throughout Asia. The obvious vulnerability of this region to geo-physical and hydro-meteorological disasters given its demographic, socio-economic, and geo-physical factors justifies the need for prudent development policies and proactive risk management practices, as well as further investments in disaster reduction. This book also advocates the effective integration of disaster management perspectives into national and regional sustainable development efforts. Disasters have a negative impact on every aspect of a country. To reduce the damage caused by natural disasters, it is essential to promote country-appropriate disaster prevention measures that take advantage of domestic personnel and material resources as well as foreign assistance. The 2006 disaster data lends further support for this argument.

Natural Disaster Data Book-2006
(An Analytical Overview)

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