

Digitized Vulnerability Atlas of South Asia Integrating Spatial Data on Physical, Demographic and Socio-Economic Features of Different Regions of Each Country

P.G.Dhar Chakrabarti
Executive Director
National Institute of Disaster Management
Director
SAARC Disaster Management Centre
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$$D = (H+R) \times V$$

HAZARDS - A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

RISKS - The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions.

VULNERABILITIES - Factors or processes, physical, social, economic, and environmental, which increase the susceptibility of an area or a community to the impact of hazards

DISASTER - A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources.

South Asia: Hazards of Nature

- Largest, youngest and most seismic active mountain system in the world
- Largest non-polar glacial deposits melting due to effects of global warming
- Heavy rainfall and high silt load on water bodies causing recurrent flood over large areas
- Larger area facing droughts due to scanty rainfall and depleting ground water level
- 12000 km coastline and many islands threatened by cyclones, storm surge and sea level rise

Layers of vulnerabilities

- With 23% of world population, South Asia produces only 1.3% of world income
- 40% of world poor (500 million) live in South Asia
- Half of malnourished children belong to South Asia
- 46% of world illiterates also belong to South Asia
- South Asia has the lowest sex ratio reflecting deeply rooted gender discrimination in society
- 1.4 billion people of South Asia is still growing at more than 2% per annum
- Unplanned urban areas growing at faster rate of 4.5% per annum creating further layer of urban vulnerabilities

Recent mega disasters

Country	Disaster	Deaths	People affected
Bangladesh	Cyclone 1970	300,000	20 million
Bangladesh	Cyclone 1991	138,000	15 million
India	Earthquake 1993	9475	1 million
India	Cyclone 1999	10086	15 million
India	Earthquake 2001	13805	1.8 million
India	Tsunami 2004	12405	3.5 million
Pakistan	Earthquake 2005	83,000	5 million
Afghanistan	Drought 2000	712	2.5 million
Sri Lanka	Tsunami 2004	35,399	1 million

India

Area – 3,287,590 sq.km
 Population – 1,102.6 million
 Density – 329 per sq.km
 Urbanization – 28.1%

Major disasters

Event	Year	Dead	Affected
Quake	1993	9475	1 million
Cyclone	1999	10086	15 million
Quake	2001	13805	1.8 million
Tsunami	2004	12405	3.5 million

Pakistan

Area – 803,940 sq.km
 Population – 162.4 million
 Density – 188 per sq.km
 Urbanization – 33.7%

Major disasters

Event	Year	Dead	Affected
Quake	2005	83,000	5 million
Quake	1974	4,700	230,500
Flood	1992	1,334	12 million
Flood	1998	1,000	9 million

Bangladesh

Area – 144,000 sq.km
 Population – 141.34 million
 Density – 1055 per sq.km
 Urbanization – 23.9%

Major disasters

Event	Year	Dead	Affected
Cyclone	1970	300,000	20 million
Flood	1974	1789	38 million
Flood	1988	2211	73 million
Cyclone	1991	138,866	15 million

Afghanistan

Area – 652,090 sq.km
 Population – 29.86 million
 Density – 46 per sq.km
 Urbanization – 28%

Major disasters

Event	Year	Dead	Affected
Earthquake	1998	4,700	116,935
Earthquake	2002	2,500	56,000
Flood	1991	728	108,400
Drought	2000	-	2,580,000

Sri Lanka

Area – 65,610 sq.km
 Population – 20.6 million
 Density – 298 per sq.km
 Urbanization – 30.9%

Major disasters

Event	Year	Dead	Affected
Tsunami	2004	35,399	1 million
Cyclone	1978	740	1 million
Flood	1989	325	1.2 million
Flood	2003	235	695,000

Nepal

Area – 65,610 sq.km
 Population – 18.9 million
 Density – 288 per sq.km
 Urbanization – 21.1%

Major disasters


Event	Year	Dead	Affected
Quake	1934	9040	215,884
Quake	1988	709	301,016
Flood	1993	1048	553,268
Landslide	2002	472	265,865

Bhutan

Area – 47,500 sq.km
 Population – 2.23 million
 Density – 45 per sq.km
 Urbanization – 8.2%

Major disasters

Event	Year	Dead	Affected
Flood	2000	200	1000
Flood	1994	22	600
Wind storm	1994	17	65,000




Maldives

Area – 498 sq.km
 Population – 0.34 million
 Density – 571 per sq.km
 Urbanization – 19.9%

Major disasters

Event	Year	Dead	Affected
Tsunami	2004	108	20,000



Current status of hazard analysis and risk assessment in South Asia

- Despite progress made in science and technology the current status of hazard and risk analysis in South Asia is not satisfactory
- Latur earthquake exposed weakness of seismic risk assessment
- India developed Vulnerability Atlas in 1996 in respect of four major natural hazards - earthquake, flood, landslide and cyclone - but this was prepared in a scale of 1: 100,000
- Second version of the Vulnerability Atlas released in 2007 in digitized form without difference in resolution
- Few countries acquired satellite imageries in a higher resolution, but integration / verification with ground data, yet to take place
- Micro-zonation of major natural hazards even in high risk zones far from being taken up in systematic manner – no clear road map yet visible

Vulnerability Analysis

- No system in place to integrate wealth of data generated through
 - Human, animal, agricultural census,
 - Economic, industrial and manpower surveys,
 - Gender, poverty and disability studies etc
- Isolated examples of spatial data integration
- In the absence of access to scientific tools heavy reliance placed on Participatory Risk Assessment, which are not always appropriate for large scale mega disasters which overwhelm local communities

Opportunities

- Development of satellite technology, remote sensing, GIS/ GPS have opened up enormous opportunities
- It is possible to prepare micro-zonation maps in respect of every natural hazard for every village and city within a definite time frame

Feasibility Study under SAARC-Japan Cooperation Programme

- Assess current status of hazard analysis, vulnerability mapping and risk assessment in each of the eight countries of South Asia
- Identify strength and critical gaps in infrastructure, resources and capacities in each country
- Develop common format of Vulnerability Atlas for South Asia
- Assess the technical, financial and human resources required for undertaking the study
- Assess time required for the development of the proposed atlas
- Recommend the most appropriate strategy for preparation of Digitized and Vulnerability Atlas Integrating Spatial Data on Physical, Socio-Economic and other related data

Methodology, costing, outcome

- Core Group of multi-disciplinary experts to oversee
- National Focal Points in each country to coordinate
- All relevant scientific, technical and academic organizations to be associated
- All available resources to be studied, discussions held with concerned organizations and brainstorming workshops organized in each country
- Findings to be validated by each country
- US\$ 30,000 allocated for the feasibility study
- Study expected to be completed in six months

What next?

- After the study report is available, SAARC Disaster Management Centre shall develop a Road Map for undertaking the preparation of digitized vulnerability atlas in consultation with the member countries
- Appropriate financial protocol and phasing shall be developed for the exercise.

THANK YOU