



Cities and Climate Change

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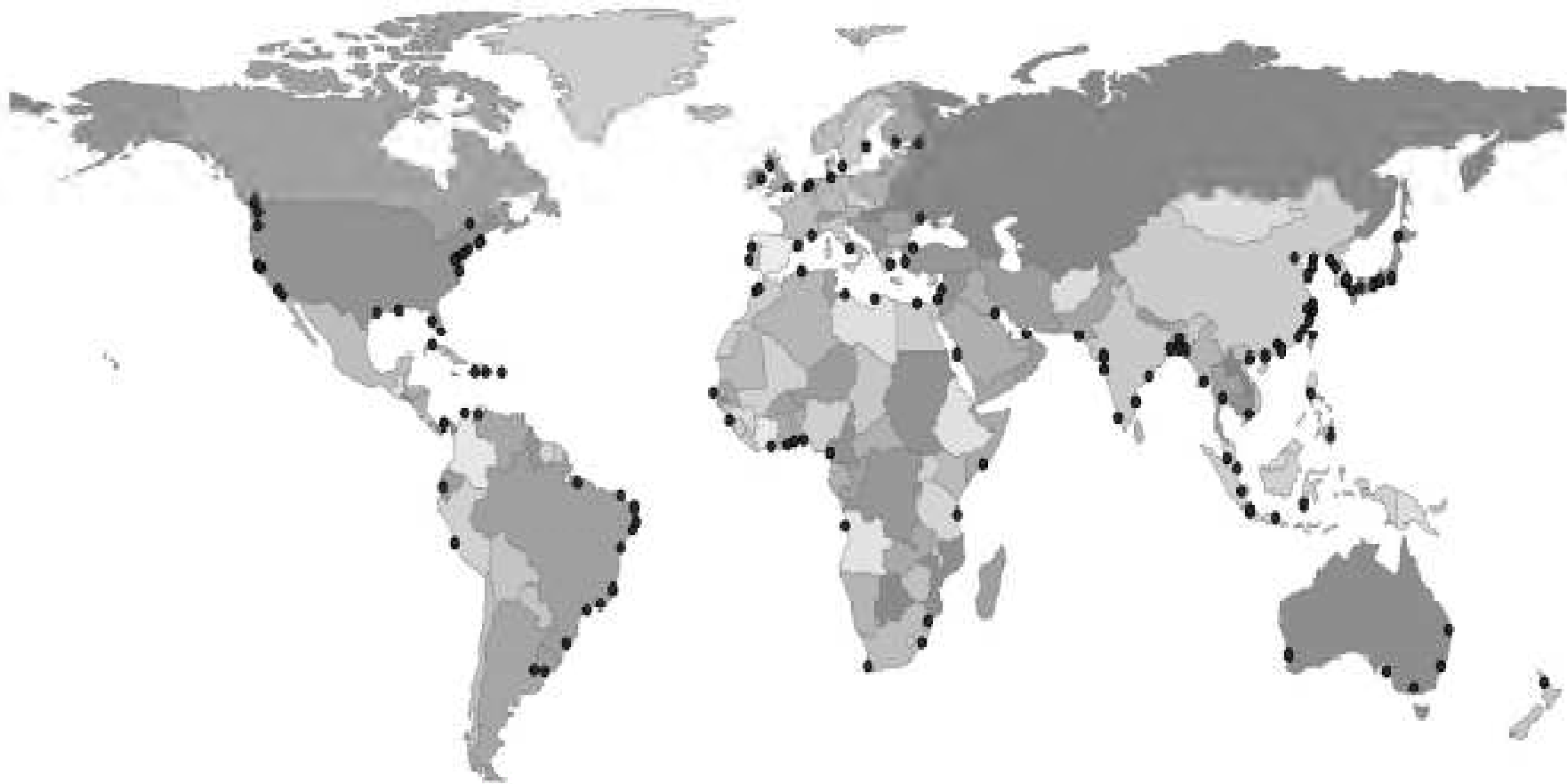
Integrated Research and
Action for Development



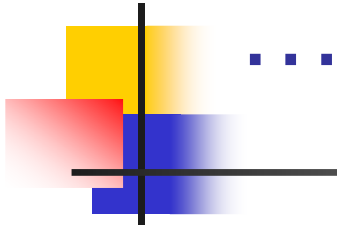
Why Cities Matter?

- In 1800, 2% of world's population lived in cities. Currently, it is 50% and heading towards 60% by 2030. Urban populations are expected to grow by **2 billion** people within 30 years
- Cities in **developing countries** are expected to absorb 95 percent of this increase.
- Over 1 billion people live in urban **slums**. In the least developed nations, slums house 70% of the urban population.
- Droughts and floods in rural areas have increased **migration** to cities. By 2030, if nothing is done, slum population will reach 2 billion.

136 PORT CITIES around the World have more than 1 Million Inhabitants (2005)



RANKING PORT CITIES WITH HIGH EXPOSURE AND VULNERABILITY TO CLIMATE EXTREMES By R.J. Nicholls (1), S. Hanson (1), C. Herweijer (2), N. Patmore (2), S. Hallegatte (3), J. Corfee-Morlot (4), J Chateau (4), R. Muir-Wood (2)



- Many cities are on **risky sites** – near rivers or harbours – while others, established on safer ground, have expanded onto riskier land like steep hillsides or floodplains.
- Thus many cities are at risk from climate change impacts such as sea-level rise, floods and extreme weather.
- 1.2 billion people live along coastal areas with low elevation.
- When cities flood, access to **safe drinking water, food and sanitation** is difficult, particularly for the poor. Children can drown, and disease outbreaks are rife.



WHAT CITIES SHOULD DO

- Cities should initiate **local action** to meet the internationally binding commitments.
- Local governments should use their authority over **land-use planning, waste-management, energy consumption** and **transportation** to tackle climate change
- Through **planning** and **regulation**, local governments should take pro-active role in **mitigation** of climate change.
- Climate change already has impact on large cities in the **coastal** or **low-lying** zones. Therefore, local governments have to take **adaptation** measures.



WHAT CITIES SHOULD DO

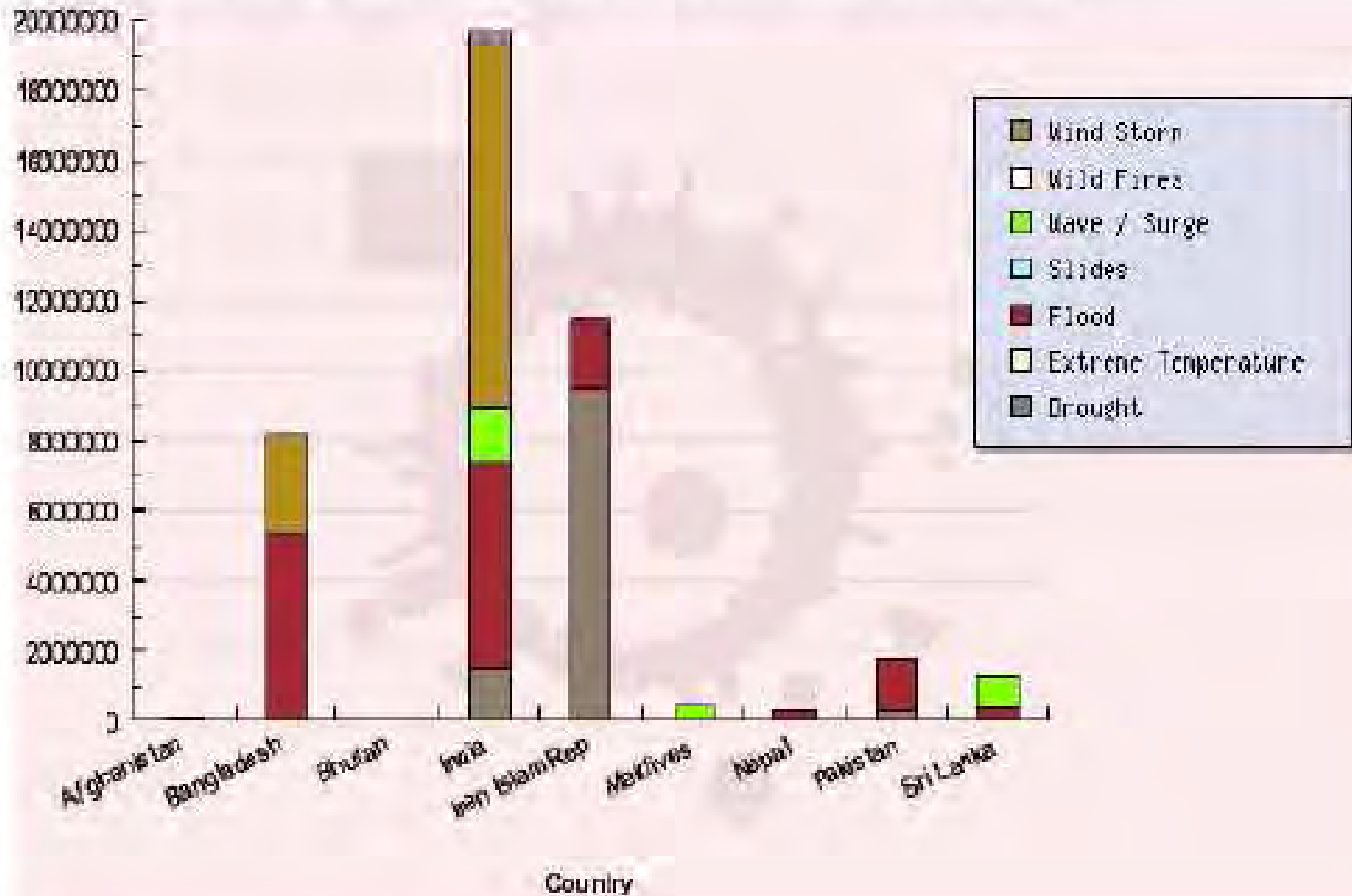
- Cities represent sites of high consumption of energy and production of waste. Therefore, mitigation projects should be incorporated to urban planning and development.



ADAPTATION: 6 Major Risks

- Temperature and precipitation variability
- Drought
- Flooding and extreme rainfall
- Cyclone and storm surge
- Sea-level rise
- Environmental health risks

Figure 4. Damages due to extreme climate events in Asia



Source. Human Development report 2007



A Possible Urban Climate Change Adaptation Framework

- National:** Address urban climate change in NAPA, create incentives for urban insurance instruments
- State-level:** Establish a State Disaster Management Authority
- City-level** Adapt current legal, regulatory and governance structures and institutional culture
- Neighbourhood-Level:** Climate change-related community-based disaster management and risk mitigation initiatives (slum, squatter and informal settlements)



MITIGATION

GHG EMISSION REDUCTION STRATEGIES

- Lighting
- Buildings
- Energy
- Transportation
- Waste management
- Water



WASTE MANAGEMENT contd.

Gothenburg: Integrated Waste System

- The system incinerates waste for generating 3.3 MWh per ton of waste for heating (27% of the city) and electricity, reducing landfill to a small fraction of the total waste collected, and cutting emissions by over 200,000 tCO₂ annually (25% of CO₂ emissions from energy consumption)



TRANSPORT

Portland, USA: Traffic Signals

- The City of Portland has optimized traffic signal timing at 135 intersections on 16 streets in Portland. This resulted in saving over 1,750,000 gallons of gas each year (cutting 15,460 tons of CO₂ each year)
- Optimizing traffic signal timing reduces both idling and the acceleration of vehicles, leading to less fuel being burned and less carbon dioxide emissions.

Bogota: Bus Rapid Transit (BRT) System

- BRT system consists of 850 buses and has a demand of 1,400,000 passengers per day.



TRANSPORT contd.

- BRT has reduced traveling time 32%, reduced gas emissions 40% and reduced accidents 90%.
- Operates 18 hours every day.
- Dedicated lanes, large capacity buses and elevated bus stations allow pre-board ticketing and fast boarding.
- Smaller units offering feeder services to main stations.
- A centralized coordinated fleet control providing monitoring and communications to schedule services and real-time response to contingencies.



WATER

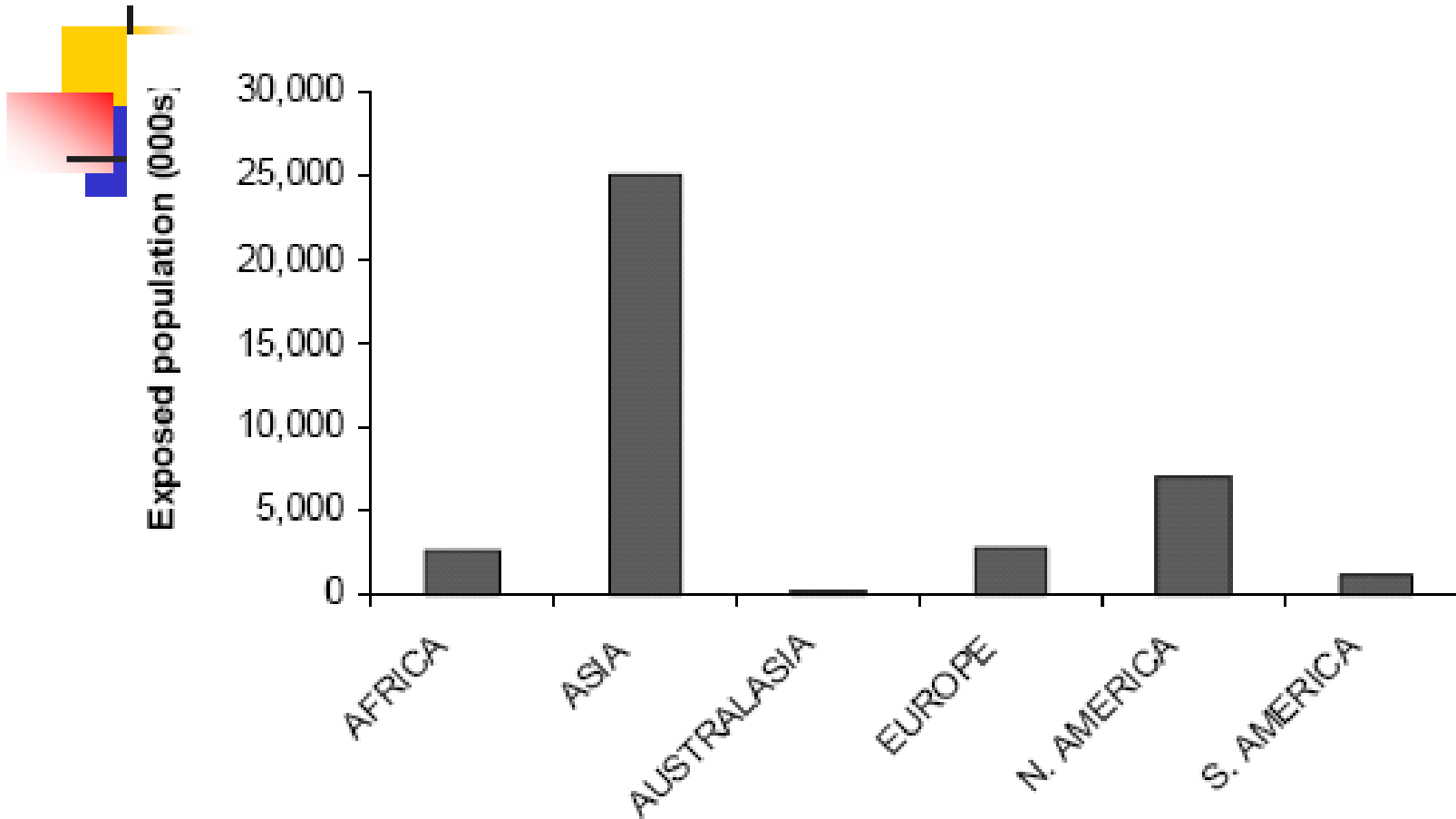
Fortaleza, Brazil: Efficiency

- New monitoring and control system halted large scale water leakage and now generates \$2.5 million a year in savings (energy savings of 88 GWh in energy during 4 years)
- A new automated control system that allows monitoring the efficiency of water flow and control distribution in real time.
- Pumping system optimization and installation of high efficiency motors.




Huge waves are seen as Typhoon Longwang pounds Taiwan's southern coast in Kaohsiung October 2, 2005. One in 10 people in the world, mostly in Asia, live in coastal areas at risk from rising seas and more powerful storms caused by global warming, an international study shows. REUTERS/Samuel Lin

Currently exposed population



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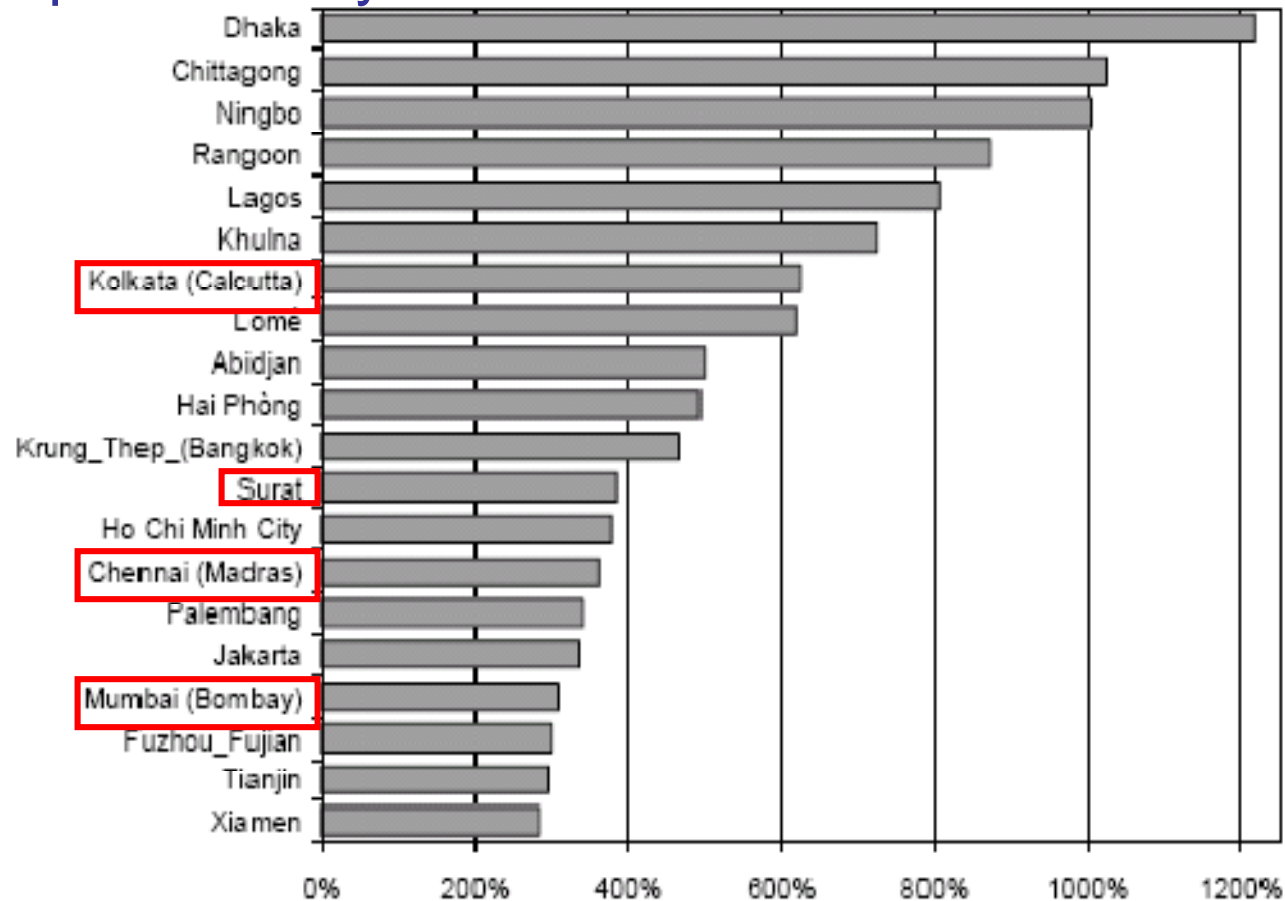
Top 10 countries by population currently exposed to a 1:100 extreme event compared to potential to protect



Number of cities	Exposed population (000s)	Country	GDP CLASS
15	8,154	CHINA	MEDIUM
17	6,538	UNITED STATES OF AMERICA	HIGH
6	5,412	INDIA	LOW
6	3,683	JAPAN	HIGH
2	2,725	VIETNAM	LOW
2	1,591	NETHERLANDS	HIGH
3	1,540	BANGLADESH	LOW
1	1,330	EGYPT	MEDIUM
1	907	THAILAND	MEDIUM
4	700	INDONESIA	MEDIUM

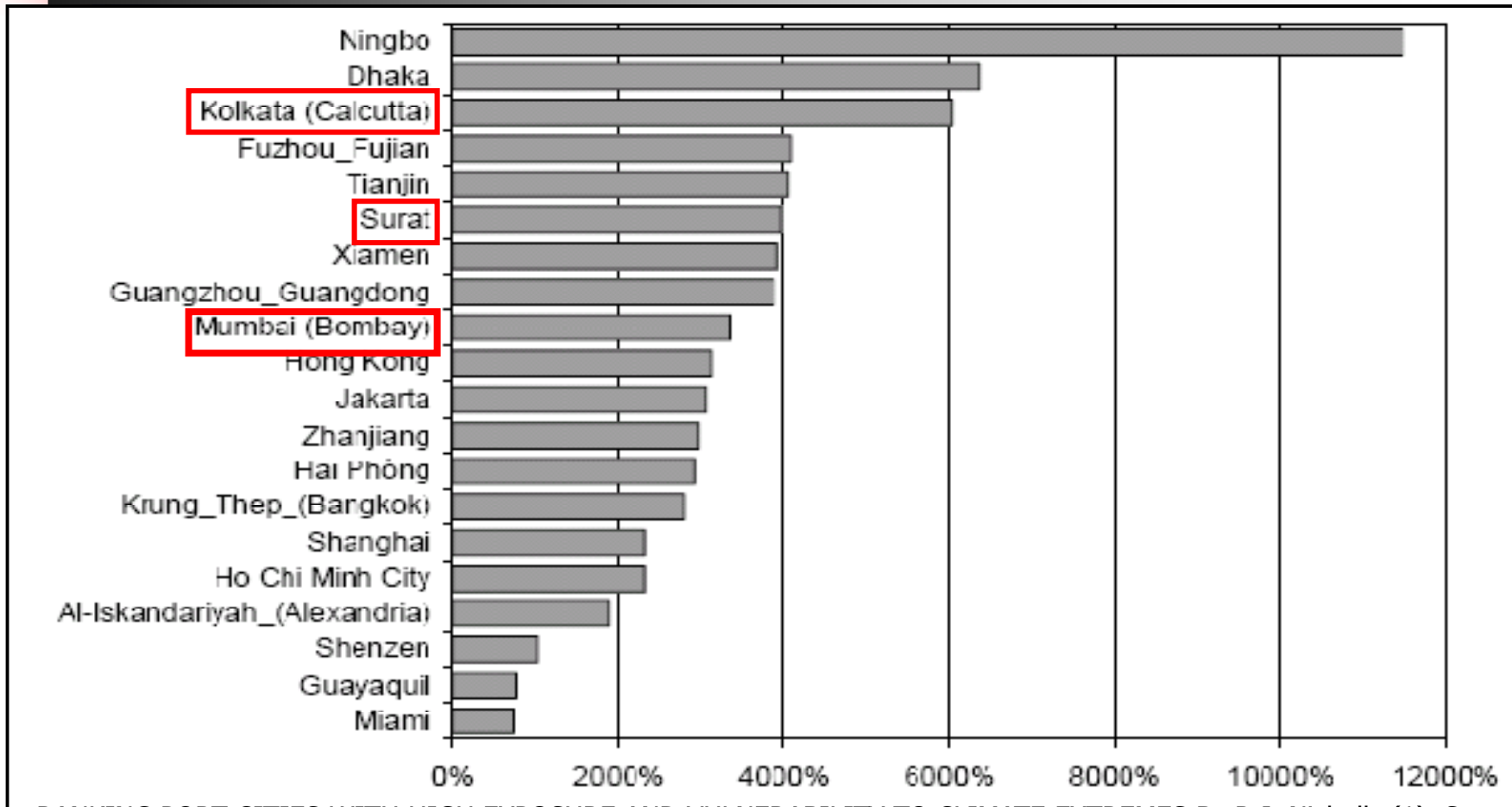
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Twenty cities with the greatest increase in population exposed out of the top fifty cities most exposed to present-day extreme sea levels.



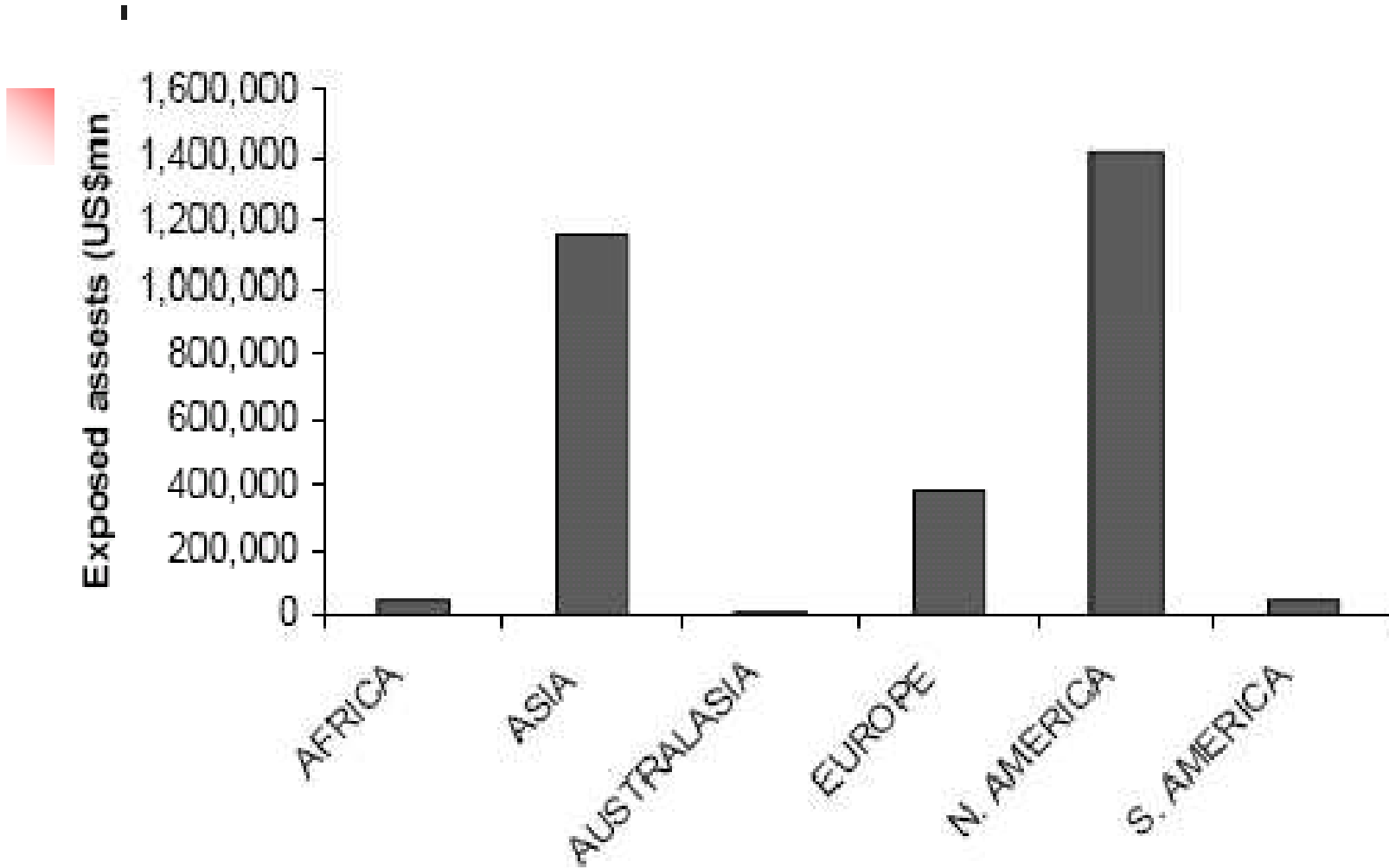
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CITIES THAT WILL EXPERIENCE HIGH PROPORTIONAL INCREASES ON ASSETS EXPOSED



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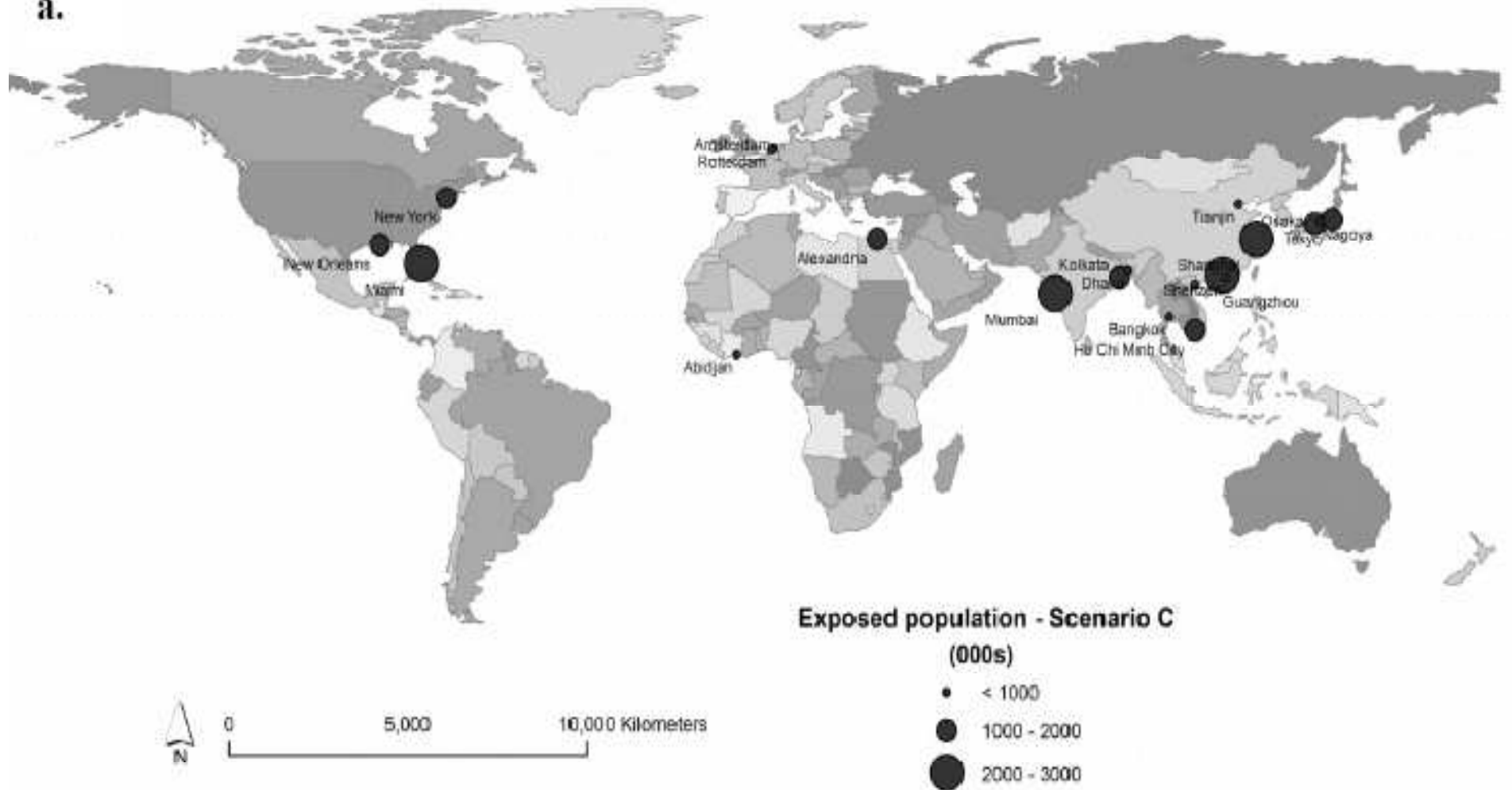
Currently exposed assets



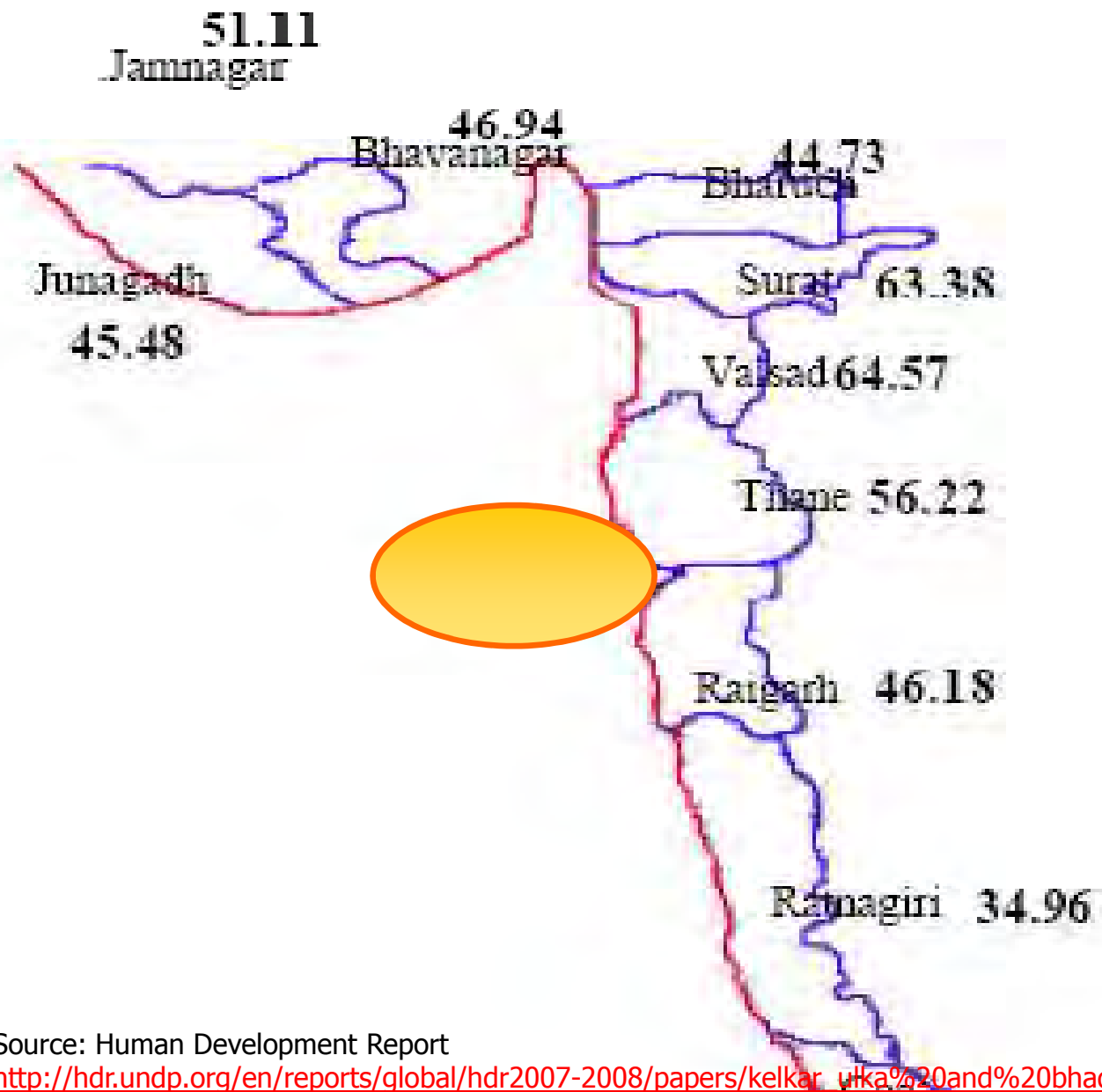
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Most affected cities by population in 2005 scenario

a.



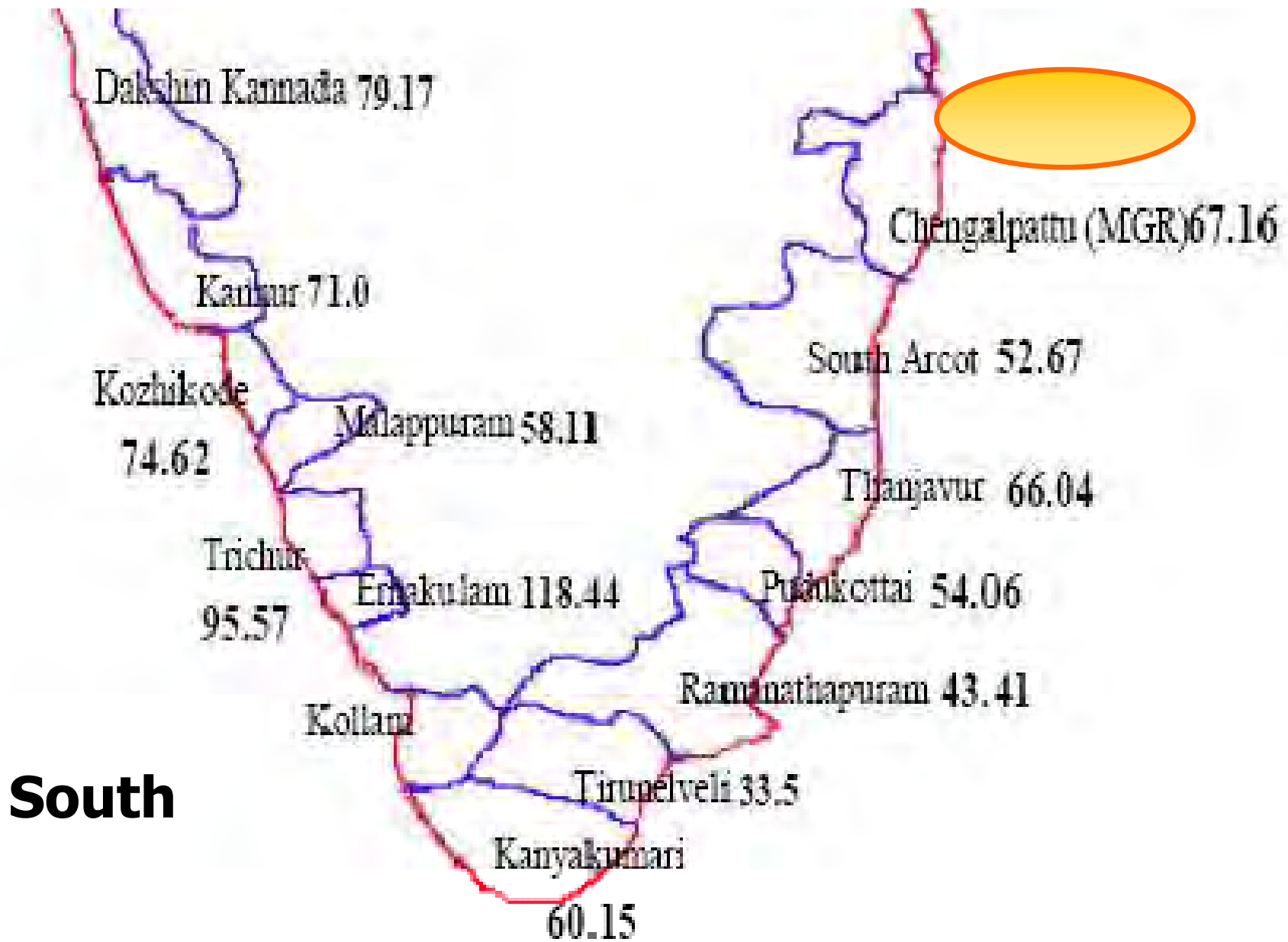
Average index of vulnerability for coastal districts of India



West

Source: Human Development Report

http://hdr.undp.org/en/reports/global/hdr2007-2008/papers/kelkar_yka%20and%20bhadwal_suruchi.pdf

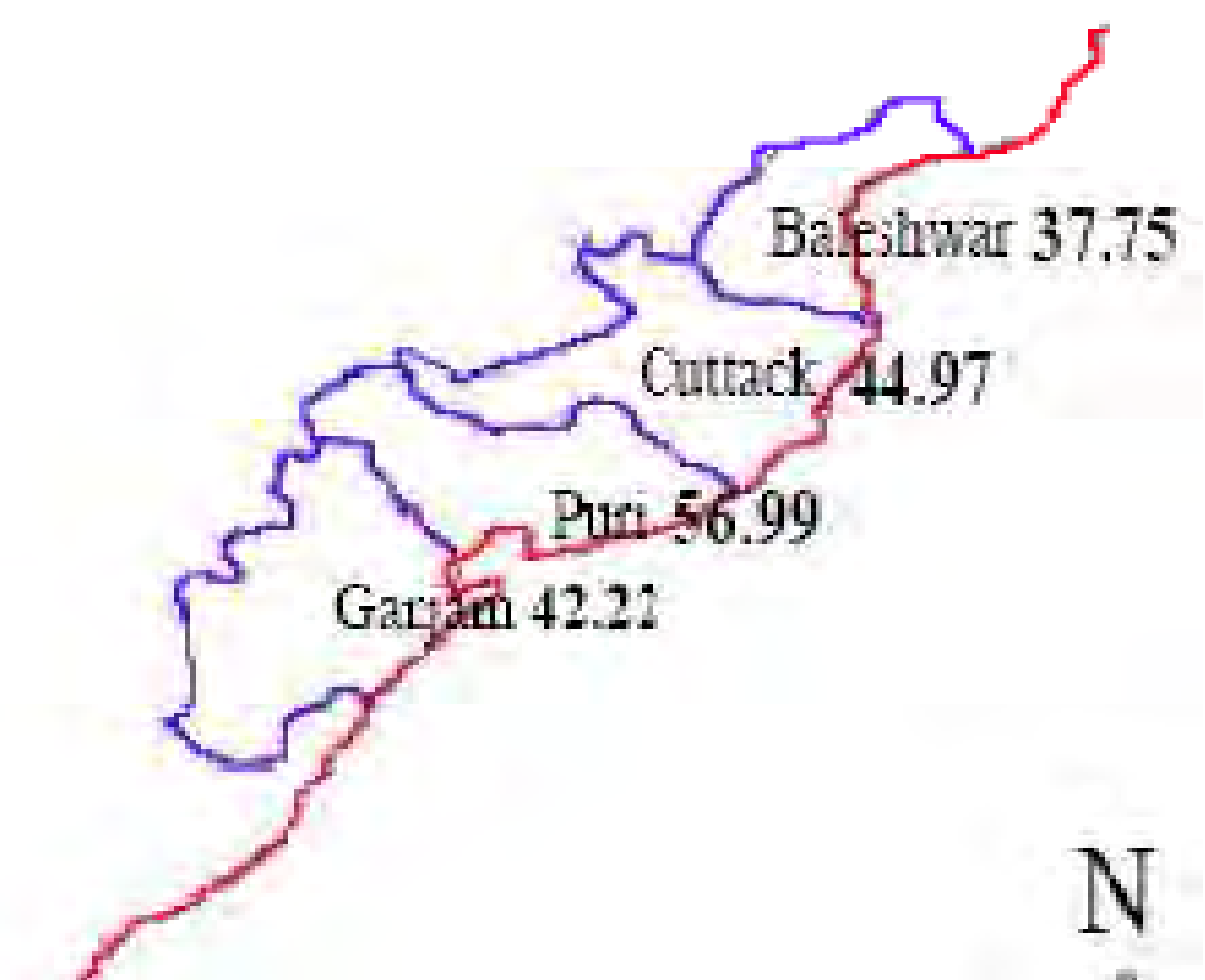


South

Source: Human Development Report

http://hdr.undp.org/en/reports/global/hdr2007-2008/papers/kelkar_ulka%20and%20bhadwal_suruchi.pdf

East



Source: Human Development Report

http://hdr.undp.org/en/reports/global/hdr2007-2008/papers/kelkar_ulka%20and%20bhadwal_suruchi.pdf