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Towards building regional sustainability in monsoon Asia and its implication to global sustainability

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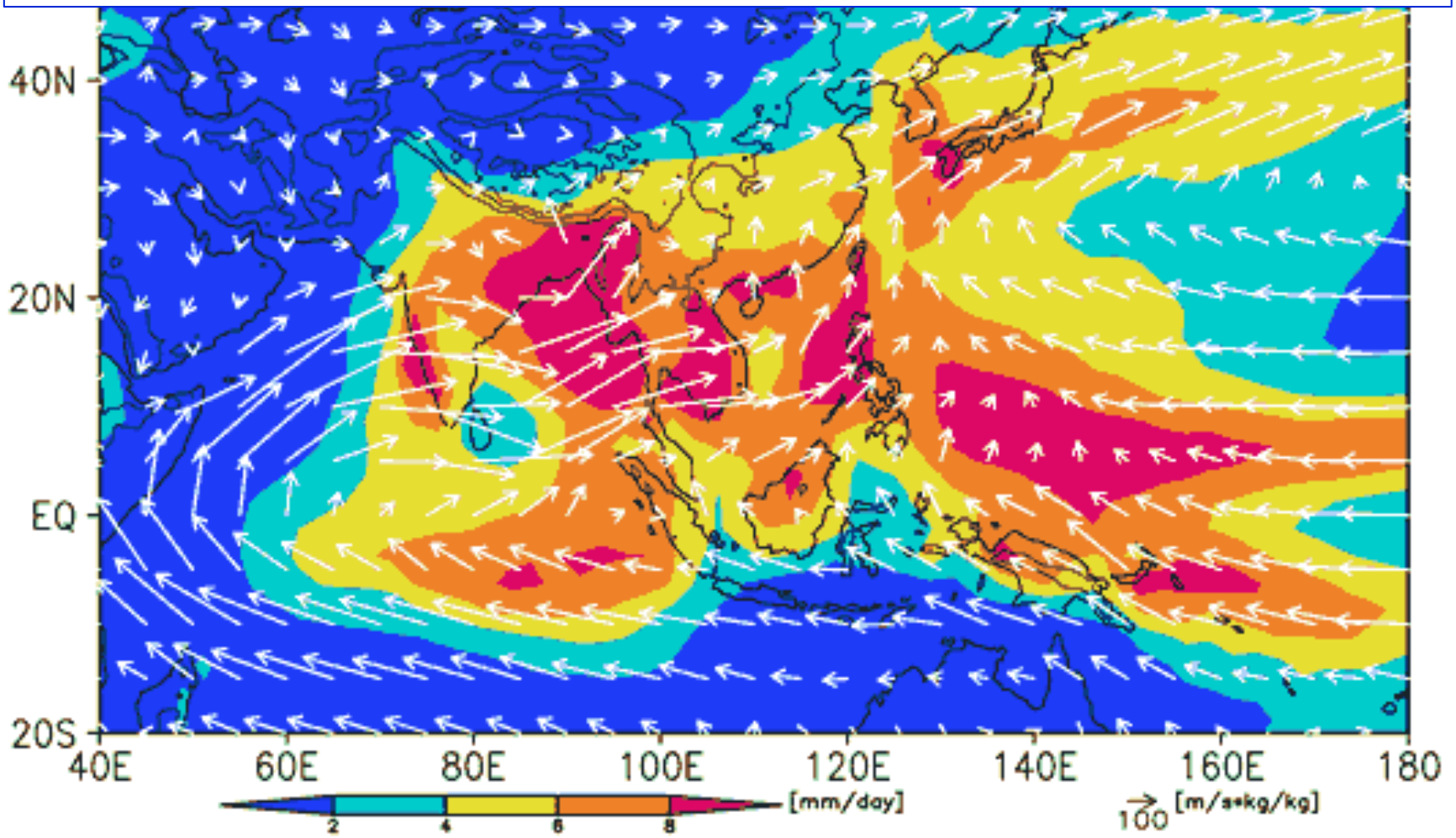
Precipitation and water vapor flux over Asia (June, July August)

The Asian monsoon climate system underpins the ecosystem services on which the livelihoods and wellbeing of billions of people depend·

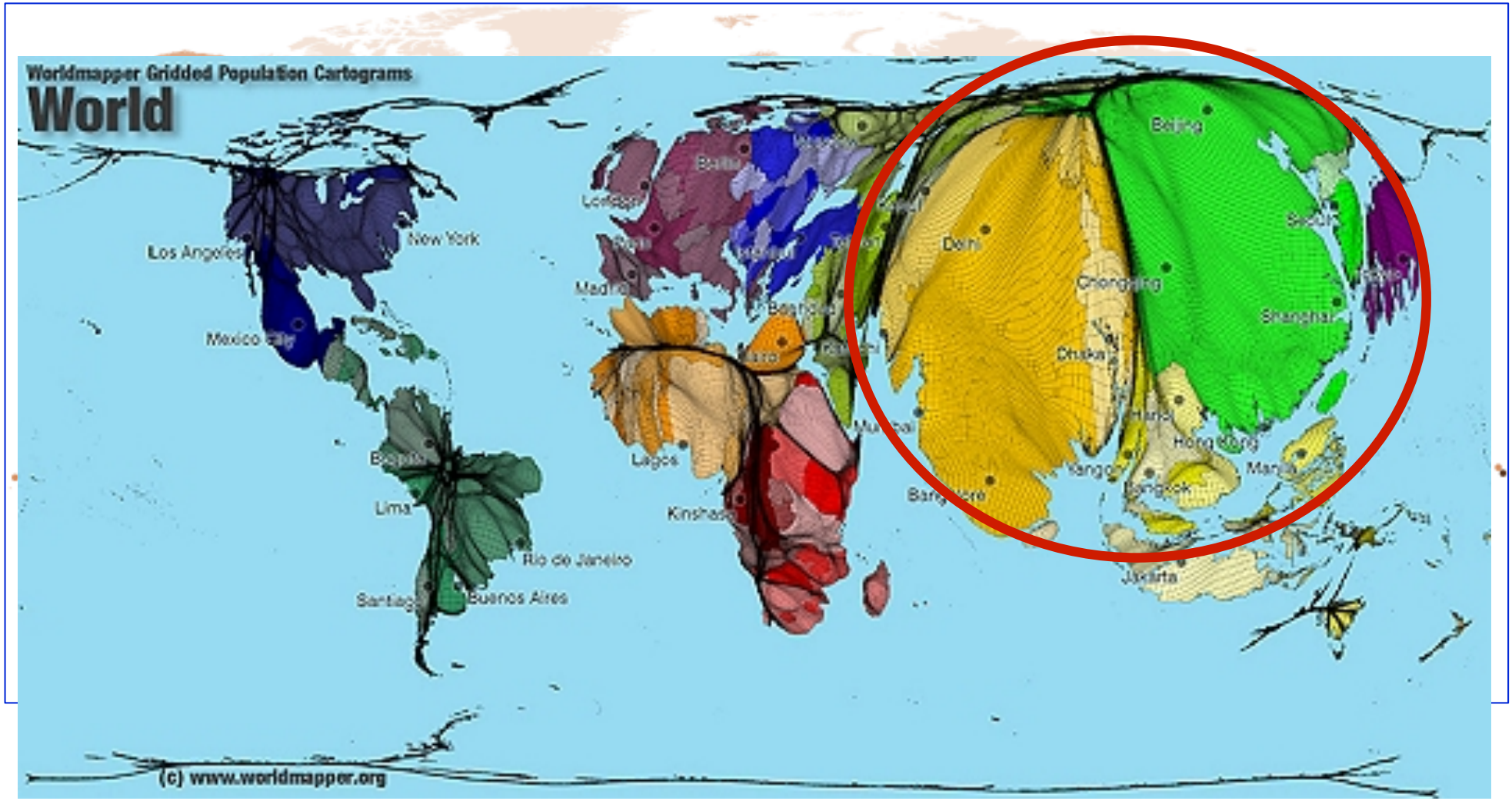


Rice paddy field - A typical landscape of monsoon Asia

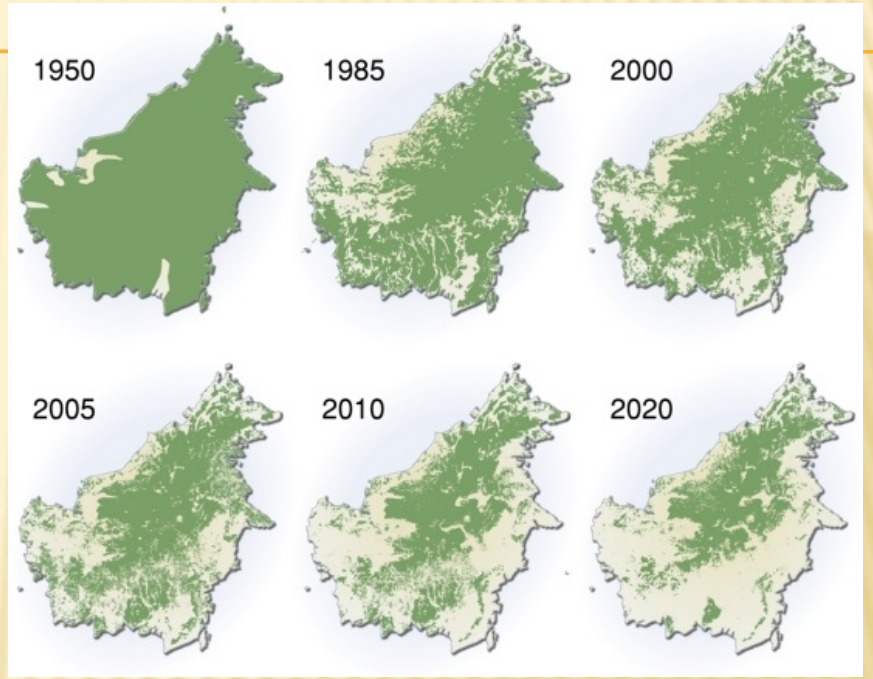
Asia contains a complex mosaic of social and ecological systems developed through a long history of human interaction with nature. Many customary but large-scale systems of resource management, such as a complex systemof paddy-rice, pastrol and forestry system "Satoyama" and/or "Satoumi", contributed to agro & coastal biodiversity and maintained intensive food & fishery production, employment opportunities and community livelihood over long periods of time.

World Population

ensity.svghttp://en.wikipedia.org/wiki/File:Countries_by_population_d

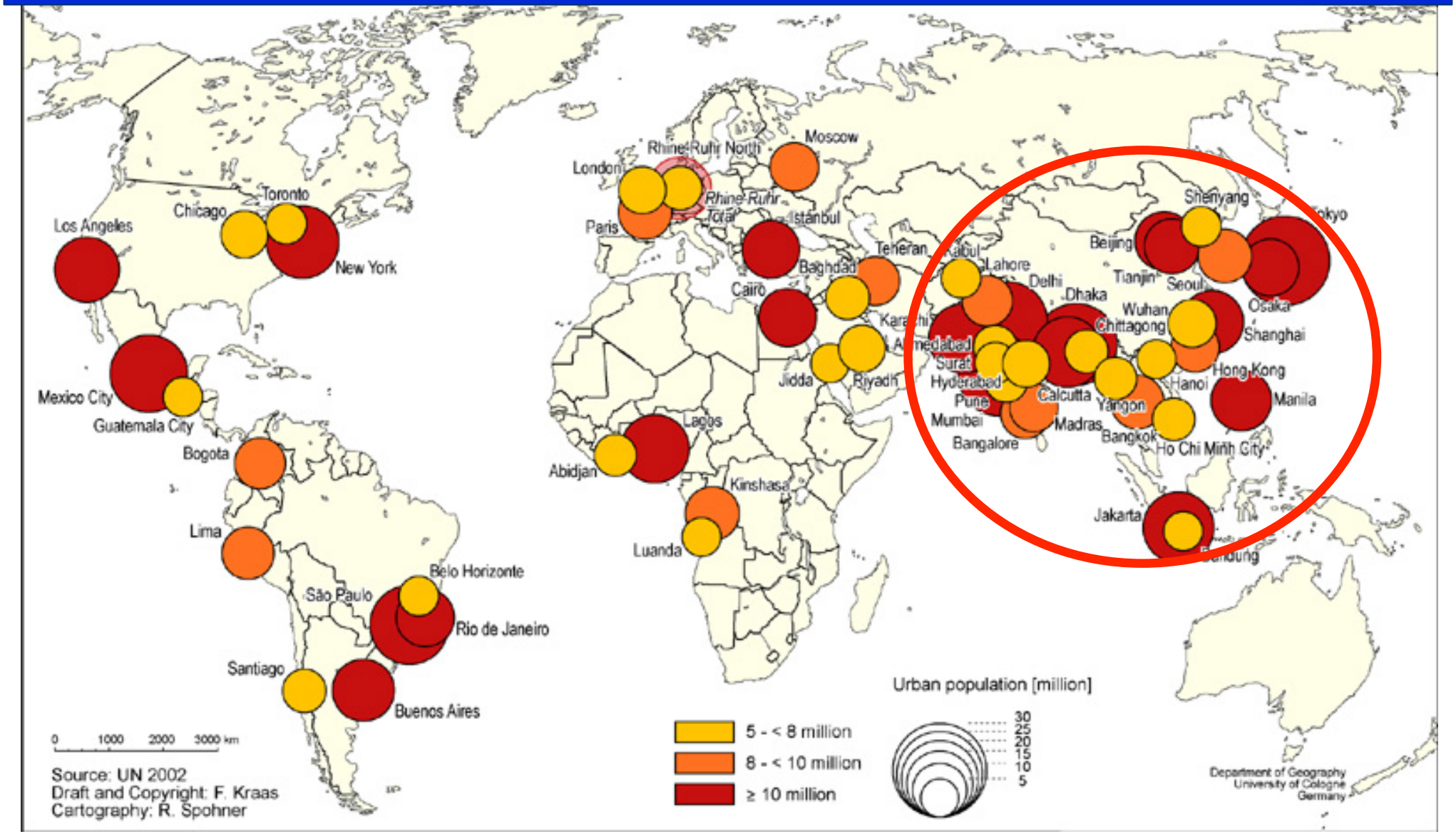


RAPID FOREST LOSS IN SOUTH EAST ASIA



Asia is experiencing significant transformation of terrestrial and aquatic ecosystems.
Most extensively, forest disruption and conversion continues in developing countries, particularly in the tropics in the late 20th century.

Mega-cities in the world are concentrated in Asia

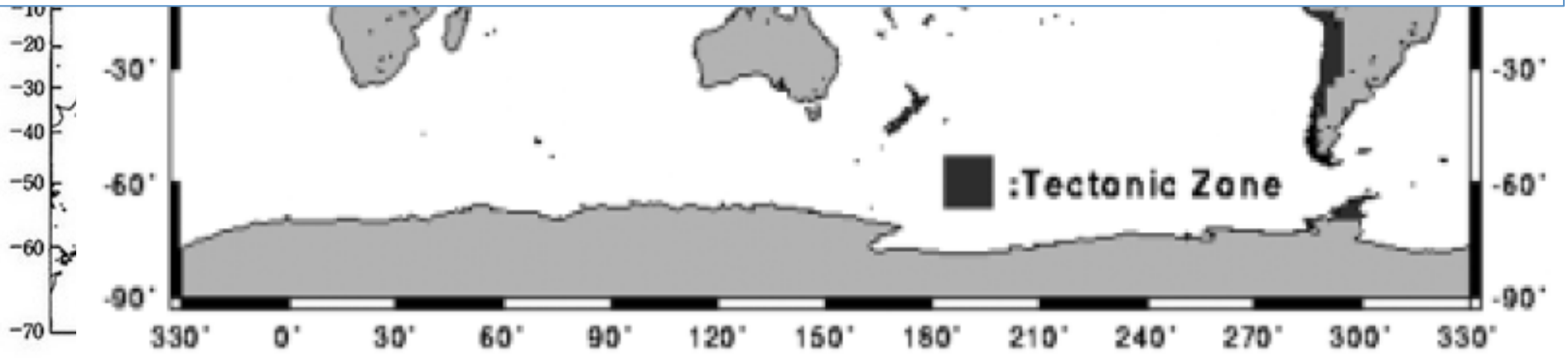


http://www.megacities.uni-koeln.de/documentation/megacity/map/MC-2015-PGM.jpg

World distribution of earthquake and techtonic zone

図２　変動帯の世界分布

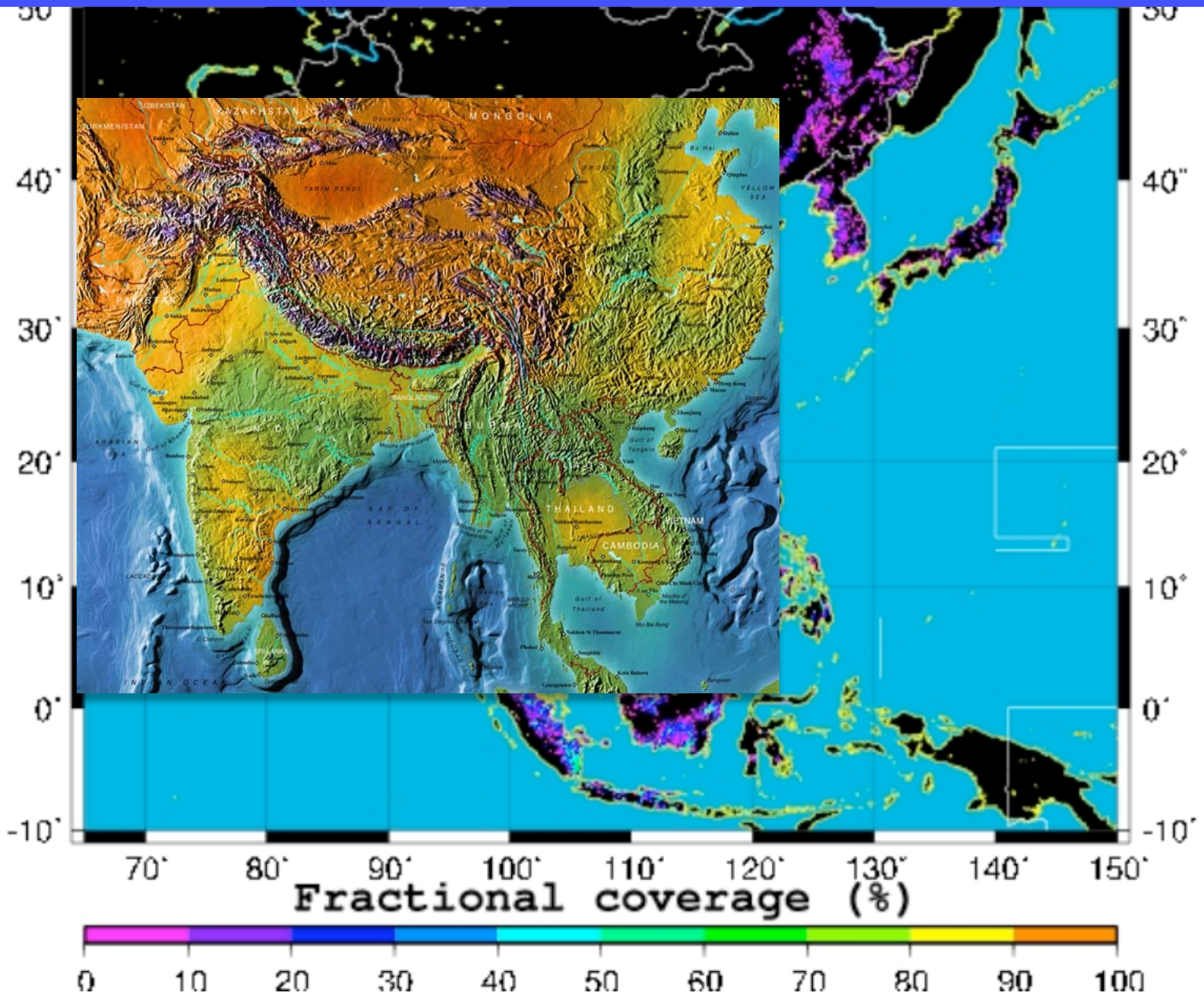
Asia must improve its capacity for risk management of both natural and human-caused disasters, since the region exhibits high human vulnerability to extreme hydro-climatological and tectonic events (e.g. typhoons, heavy rains, floods and droughts, landslides, earthquakes and tsunamis).

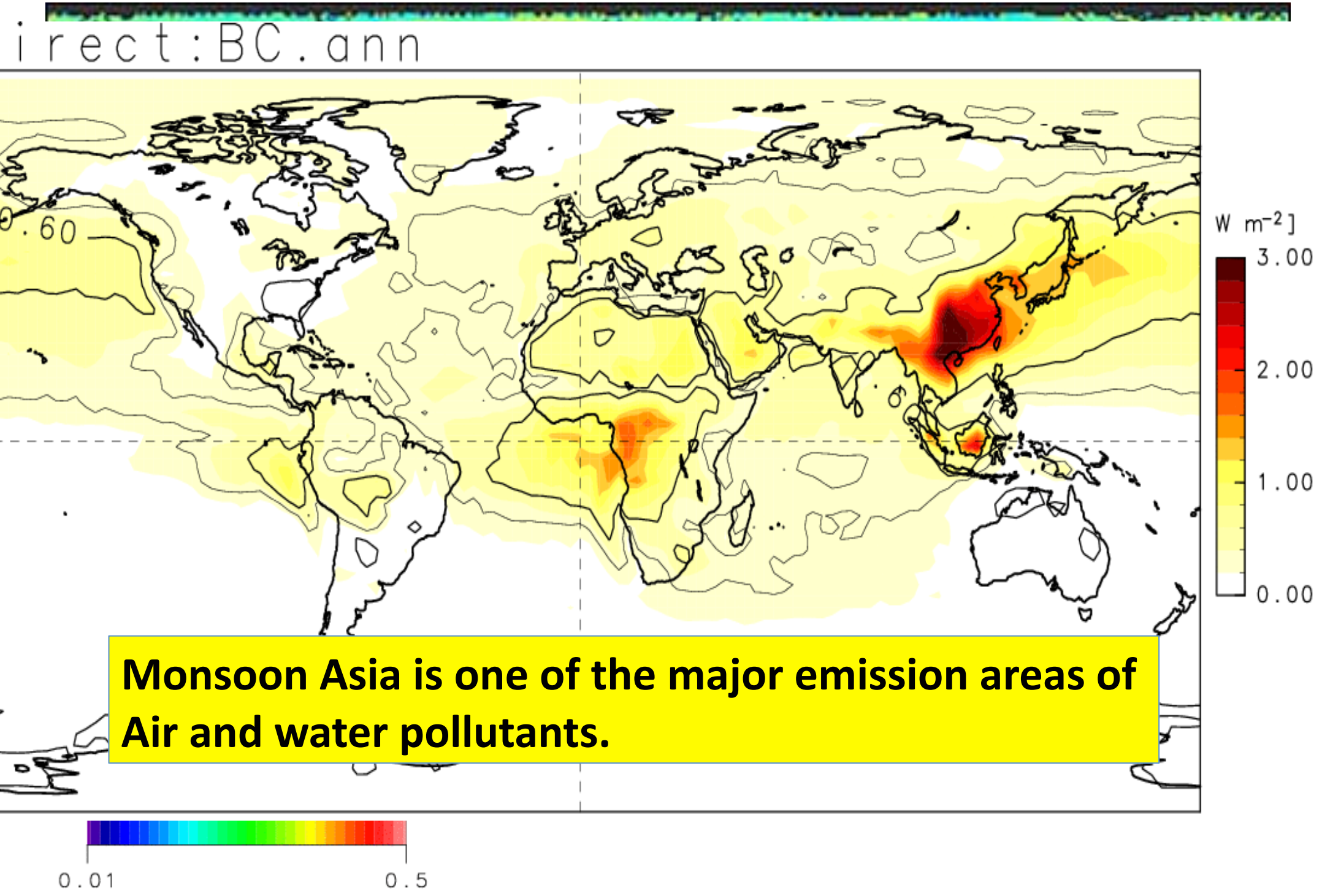


出所：Strahler, A.H. And Strahler, A. N.(1992) *Modern Physical Geography*, John Wiley & Sons, Inc.より作成。

The Great Earthquake and Tsunami in Eastern Japan 2011.3.11

Rice paddy fields in monsoon Asia have well utilized the alluvial basins & plains fomed as part of the tectonic zone



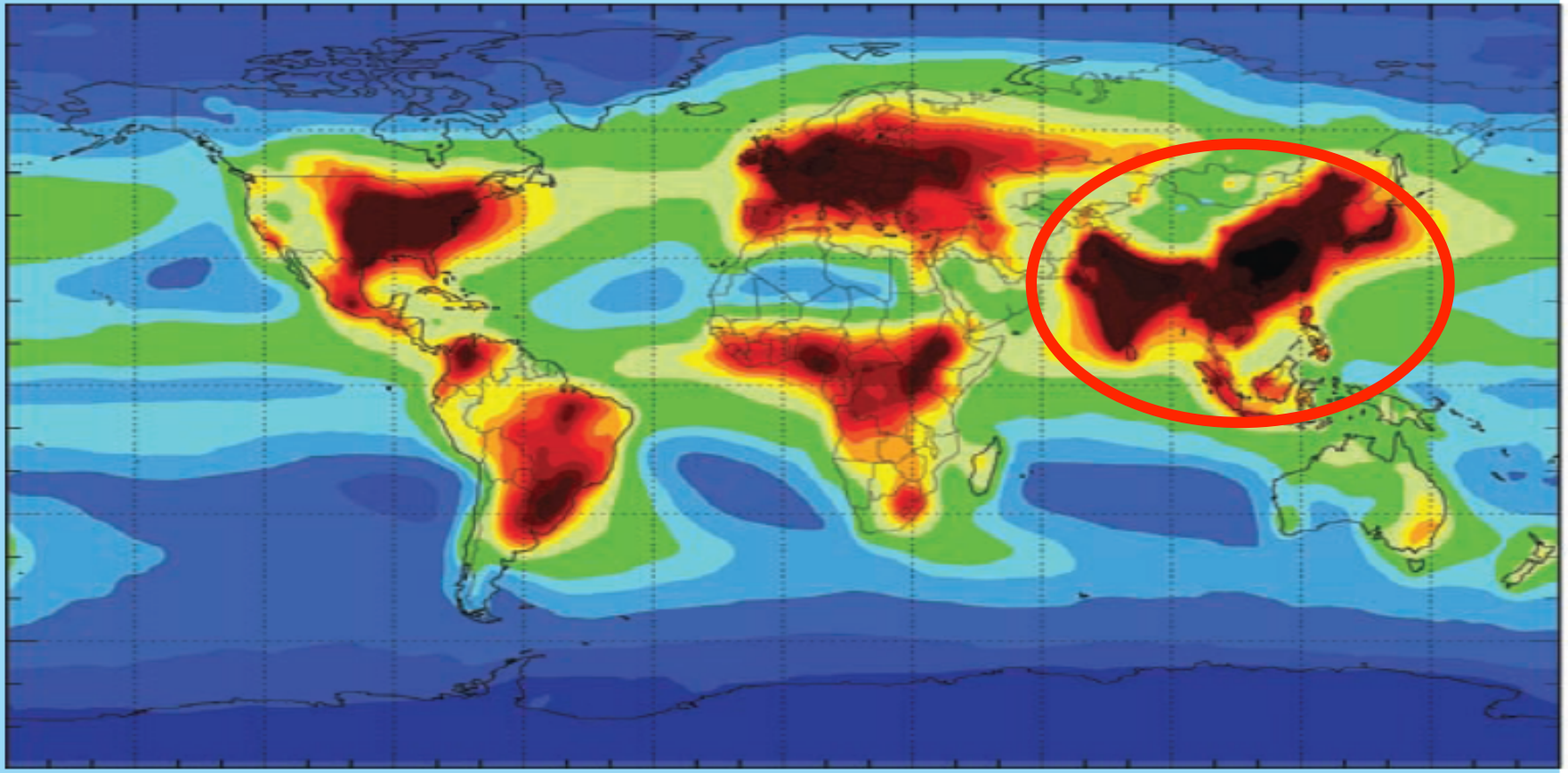


Monsoon Asia is one of the major emission areas of Air and water pollutants.

（肥料使用による）窒素の負荷はすでに生命圏を壊しつつある

Nitrogen Loading is already damaging the biosphere

N Deposition rates (0 – 60kg/ha/yr)



Galloway et al Science 2008

The Asian Challenge

- The region as a whole is characterized by rapid population and economic growth and urbanization, great disparities of wealth both within and between countries, and social and ecological vulnerability to the potential impacts of climate change.
- Associated with this rapid population & economic growth, this region has become a huge hot-spot of air and water pollutions, affecting regional to global climate change.
- **This region is located in the midst of world tectonic zone and monsoon climate, which cause high frequency of natural disasters (e.g., massive earthquakes, Tsunamis, landslides, typhoons, floods and droughts).**

Some key points raised

- **Basic research & adaptive management should be emphasized due to great water stress & uncertainty related to climate change and human activity.**
- **Ecosystem resilience depends on species diversity. It is now necessary to disseminate through education and policy initiatives the long-term social and economic value of preserving biodiversity as a basis for sustaining human societies.**
- **The vulnerability of Asian mega cities against climate change, sea level change and natural disasters, as well as their impact on regional and global environment should be assessed urgently.**

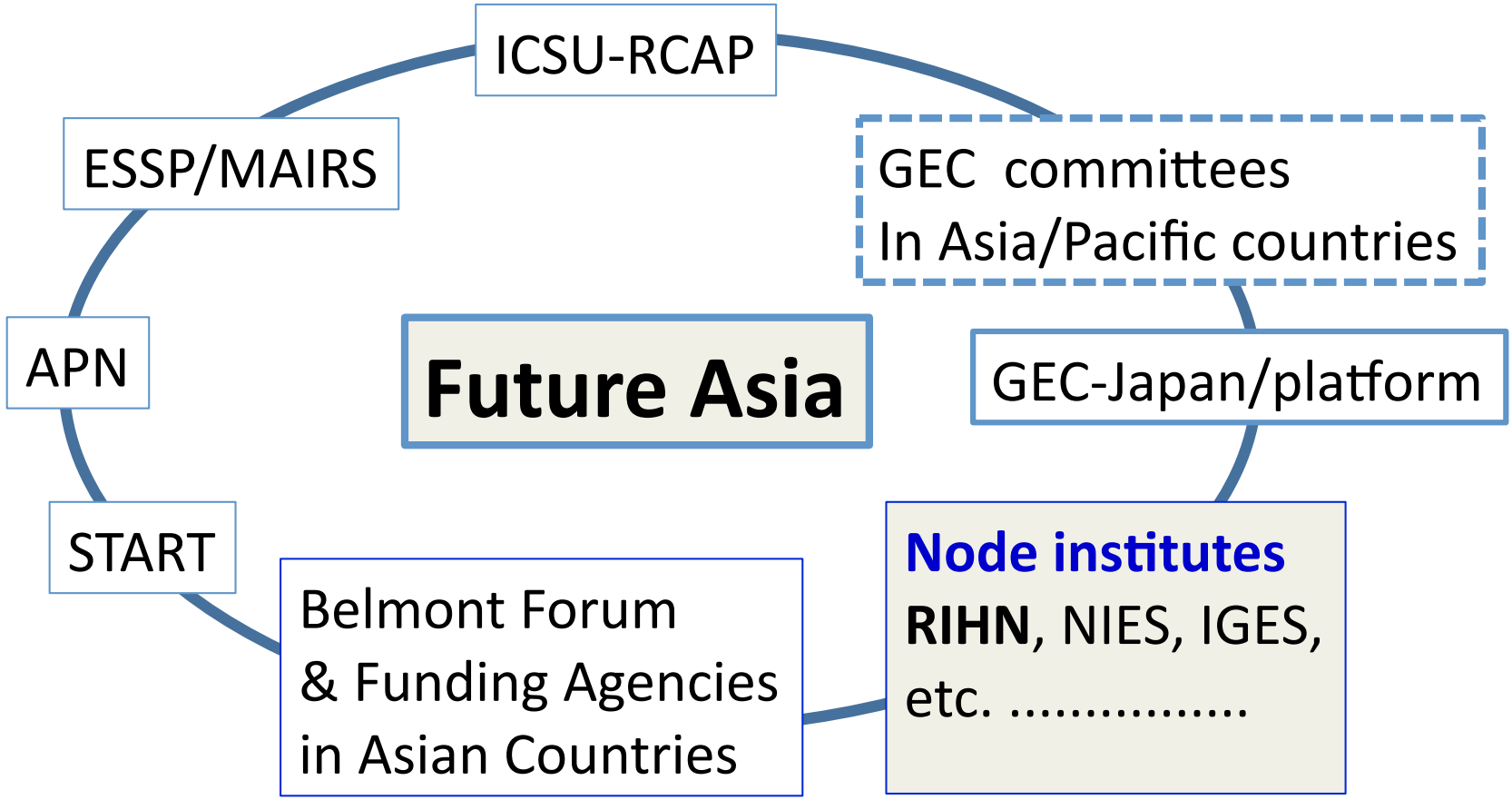
“The Asia vision “

- **Some contemporary sustainability challenges in Asia will require wholly new approaches in science, technology and governance; “innovation” will also entail more active recognition of the wisdom already embedded in traditional thought and patterns of livelihood. ⇒「温故知新」**
- **Designing sustainable interactions between humanity and nature in Asia is a global challenge, because there can be no global sustainability without it.**

Needs for International and multi-national collaboration

- To promote sustainability studies, innovative funding sources and institutional support mechanisms need to be established by national science foundations, relevant government agencies, and multi-national actors and institutions.
- The complexity of sustainability issues in Asia requires visionary political and scientific leadership and high level of exchange and coordination between different epistemic communities in the region.
- The international GEC programs and science community should tightly collaborate with IRDR and its related programs/projects particularly in Asia, where both long-term climate-related changes and short-term natural hazards seriously threat sustainability.

Future Asia contributing to Future Earth



Scientists and Stakeholders in Asia/Pacific region need to tightly collaborate to construct sustainable society In A/P region as part of the Future Earth Initiative.