



Institute of Transport Economics
Norwegian Centre for Transport Research



Coping with Climate: Assessing Policies for Climate Change Adaption and Transport Sector Mitigation in Indian Cities in the CLIMATRANS study

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A challenging project in partnership with:



Indian Institute of
Science, Bangalore



Indian Institute of
Technology Bombay



Norwegian
Meteorological
Institute



School of Planning and
Architecture Delhi

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The Research Council
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The objectives of the project

- Examine and understand the problems facing urban transport in India with special focus on mega cities
- Examine the drivers of urban transport in the next 20-30 years
- Examine how the transport sector can contribute to the visions, goals at national and urban level
 - Economic development
 - Environmental sustainability (global and local)
 - Social inclusion
 - Urban livability
 - Safety & health concerns related to the emissions of pollutants
 - Resilience to adverse climate change
- Develop alternative scenarios that meets the visions/goals
- The scenarios integrate climate change scenarios
- Examine the barriers to the implementation, in particular related to finance and governance,
- Provide support for political decision making at local and national levels



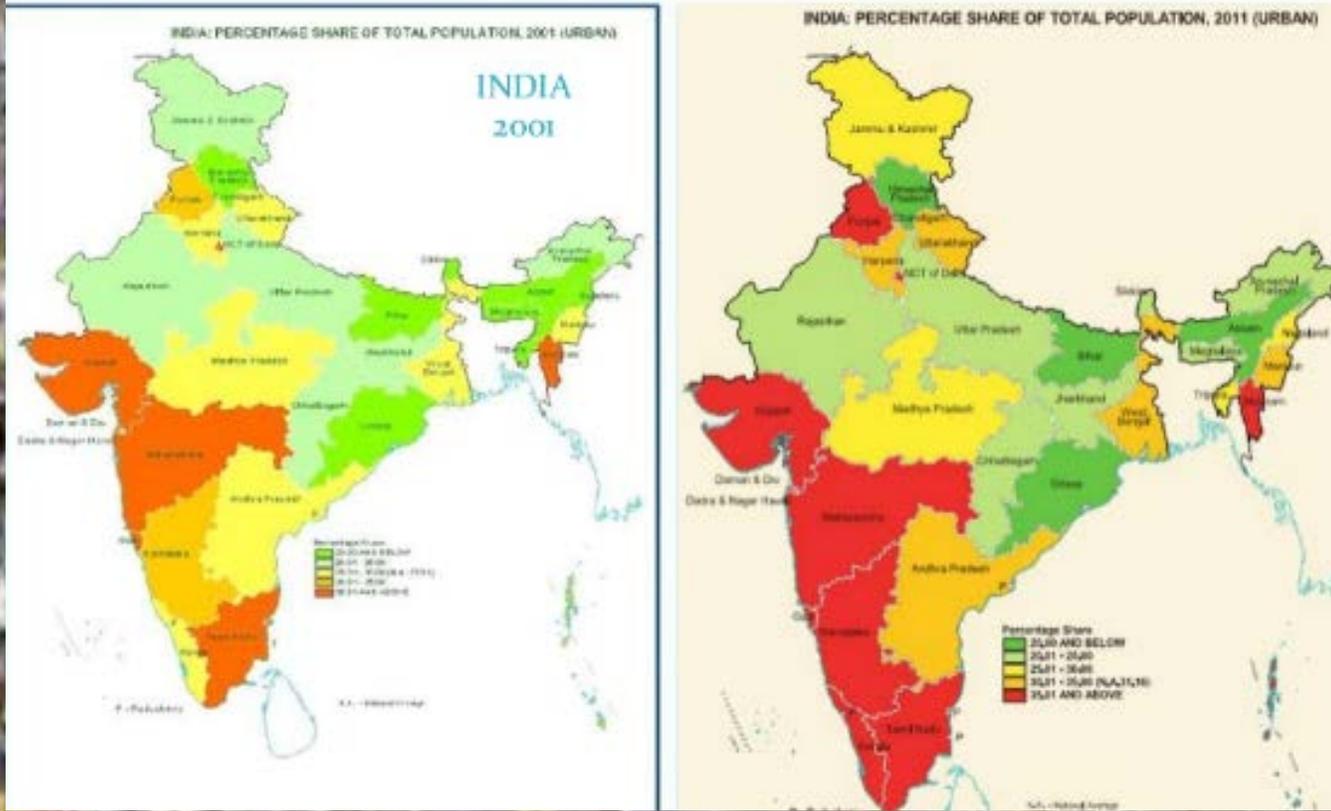
- The project by no means matches the enormity of the problems and challenges that face urban transport and in particular mega cities in India.
- We hope and drive for contributing to the solutions, in particular, by close engagement of case city and national stakeholders.
- We believe our project would benefit greatly from consultations with stakeholders during the course of our research

The outline of the presentation

- A picture of challenges faced by urban India
- Role of the transport sector in the picture

Population growth and urbanization in India

Percentage share of Urban Population in Total Population - India, 2001 & 2011



- Population in 2015: 1.27 billion
- Population in 2028 : 1.45 billion, world's most populous country
- Urbanisation in India is taking place at a fast pace.
- Reasons a rapidly growing population: poverty, illiteracy, high fertility rate, rapid decline in death rates/mortality rates and immigration
- Urban population
 - in 1901: 11.4%.
 - In 2001: 28.53%
 - In 2011: 30%
 - In 2007: 31.16%
 - By 2030: 40.76%



Advantages of urban India (McKinsey Global Institute)

- Cities could generate 70% of net new jobs created in 2030, produce 70% of GDP, and increase the per capita incomes by fourfold nationally
- Cost of delivering basic services is 30 to 40% lower than rural areas
- To meet the urban demand, India needs to build
 - 700-900 million sqm of residential and commercial space a year.
 - 350 to 400 kilometers of metros and subways every year
 - 19,000 -25,000 kilometers of road lanes would need to be built every year (including lanes for bus-based rapid transit systems), nearly equal to the road lanes constructed over the past decade.
- Cities can also deliver a higher quality of life.
- India needs thriving cities
- A major challenge: finding sources of funding the capital investment in cities in India

Problems with urbanisation

Problem of urbanization is manifestation of lopsided urbanization, faulty urban planning, urbanization with poor economic base and without having functional categories.

Hence India's urbanization is followed by some basic problems in the field of :

- 1) Unemployment
- 2) Housing
- 3) Slums and squatter settlements
- 4) Transport
- 4) water supply and sanitation
- 5) water pollution and air pollution
- 6) inadequate provision for social infrastructure (school, hospital, etc).



The losses from environmental pollution are equivalent to about 4% of GDP



Economy and economic development

India is the world's largest democracy and fast-growing economy with a large and skilled workforce but India has corruption and poverty.

Prime Minister Narendra Modi “..to make the **21st century India's century**“

Good governance and development were the main focus of his campaign

- To lift more than a billion of people out of poverty will require economic growth to continue.
- To succeed, it will have to deepen regional and domestic demand.
- Role of the transport sector is central in this picture.
- Every corner of the country should be linked to domestic and international markets through roads, railways, ports, and airports.

Income disparities

INDIAN INCOME PYRAMID

Entire country stratified by NCAER-CMCR 2010 annual income data



Transport overload



Traffic growing worse



Public transport



Environment

India admits that Delhi matches Beijing for air pollution, threatening public health

World Health Organisation study finds Indian capital had dirtiest atmosphere of 1,600 cities around the world for PM2.5 particles



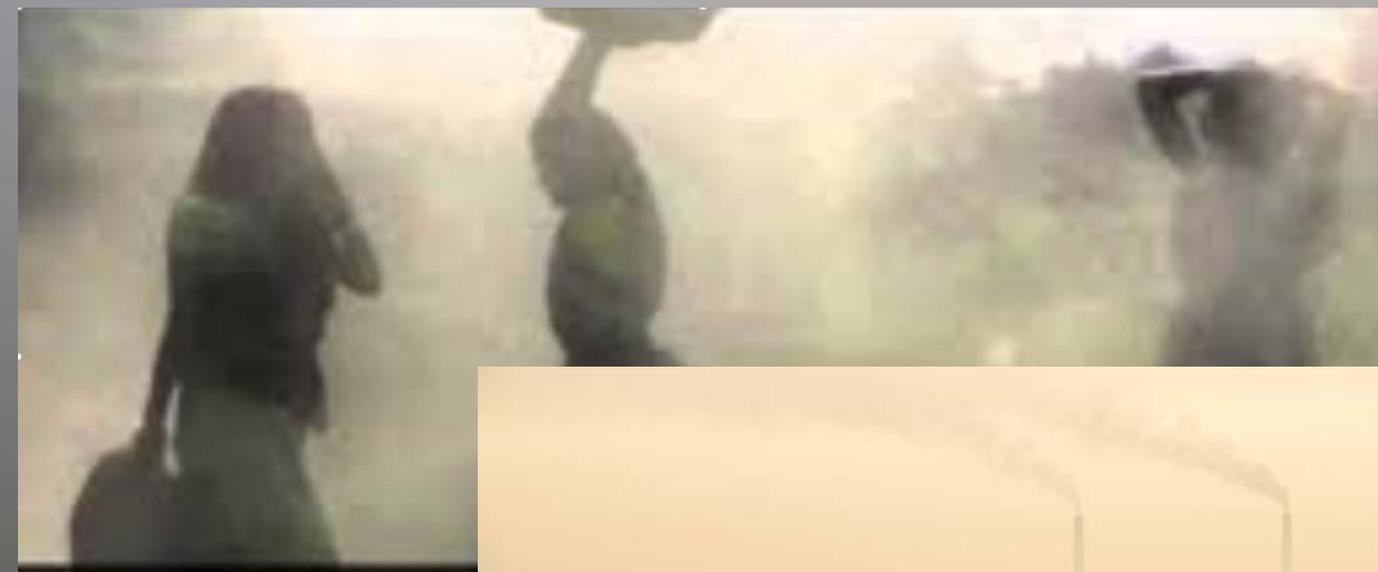


Delhi has worse pollution than Beijing, according to new research from India's Centre for Science and Environment.

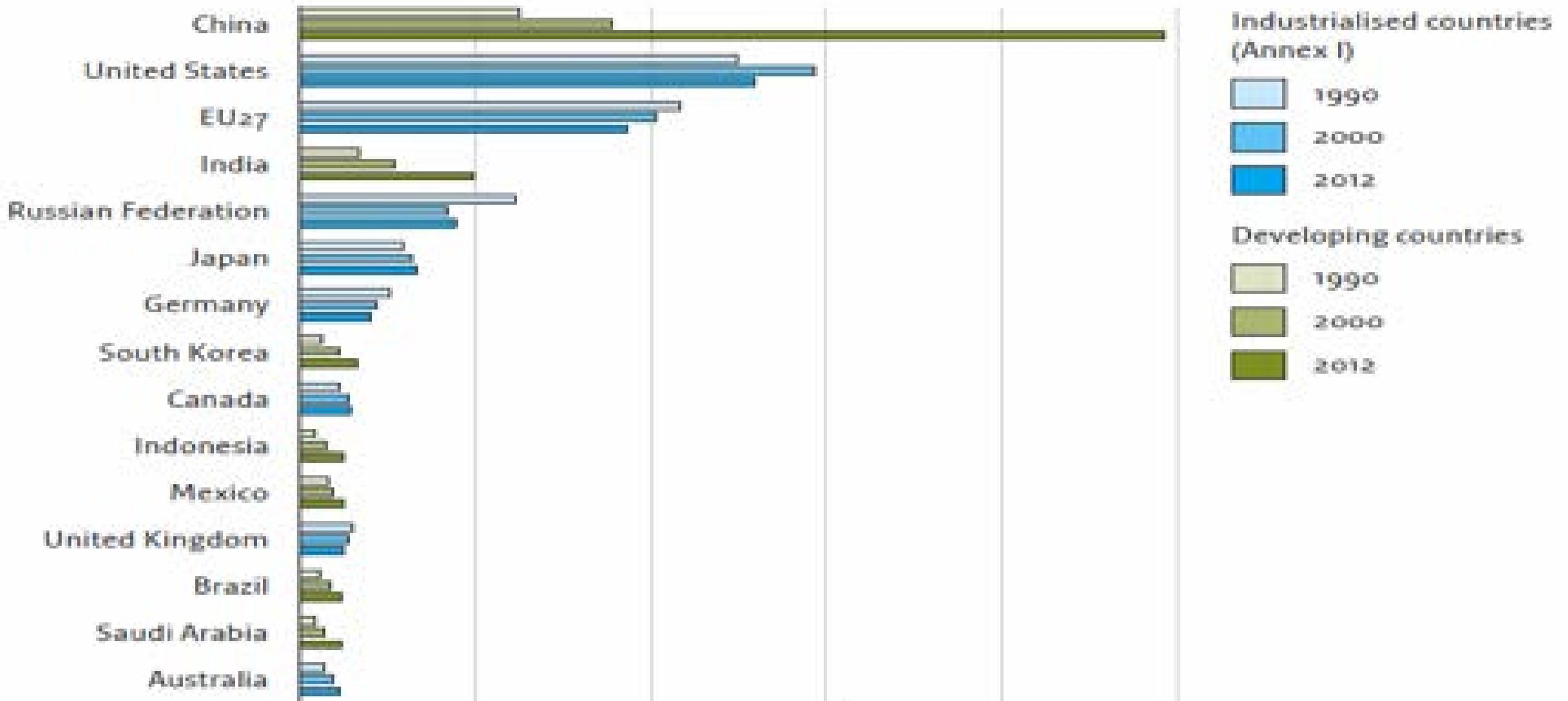


**WHO: air pollution 'is single biggest environmental health risk
New Delhi helps India make the top 10 list of the world's most polluted cities**

Air pollution in India has become so severe that yields of crops are being cut by almost half (further pressure on urbanization)

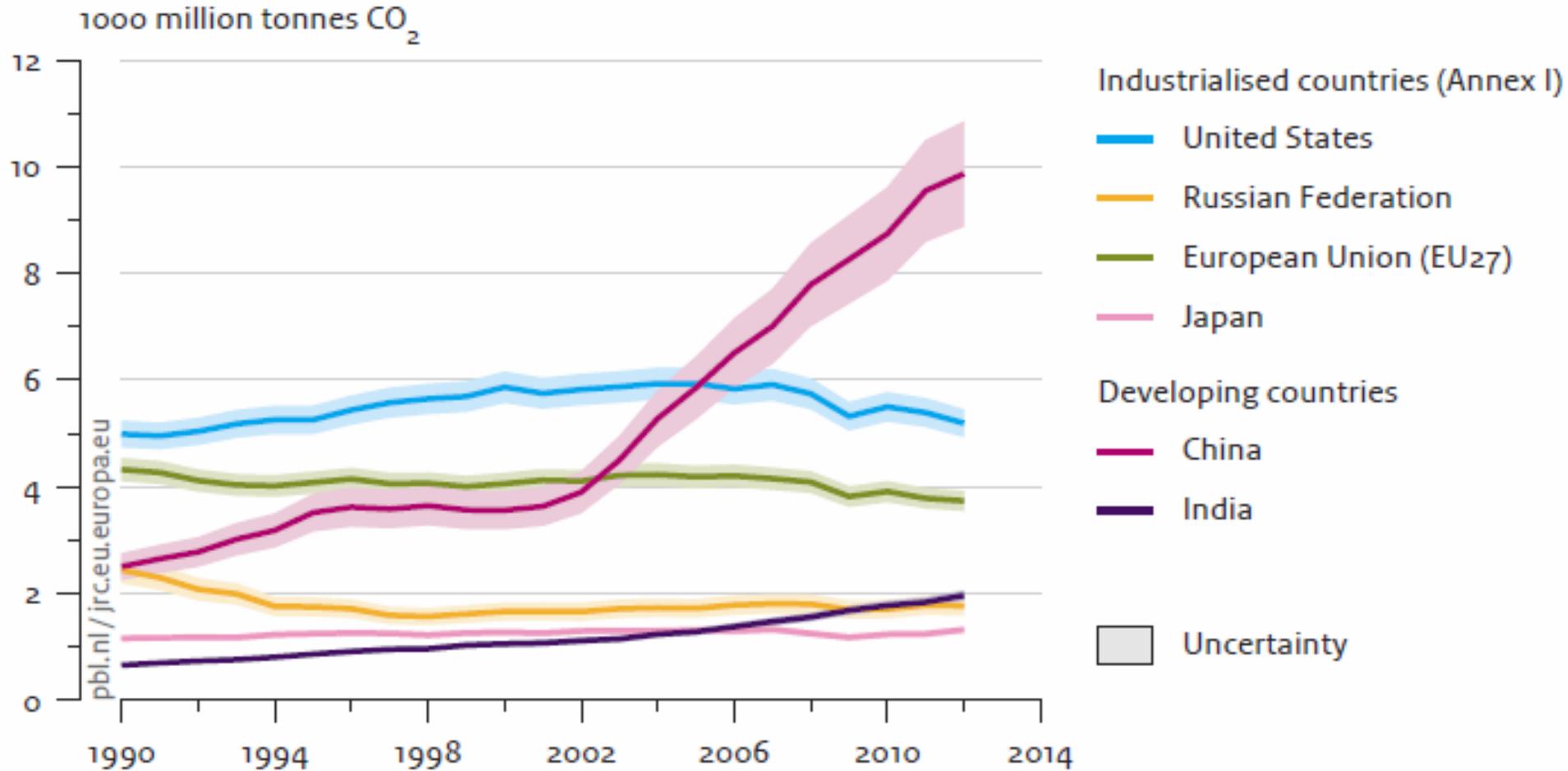


CO2 emissions from fossil fuel use and cement production



CO₂ emissions from fossil fuel cement production

CO₂ emissions from fossil-fuel use and cement production in the top 6 emitting countries and the EU

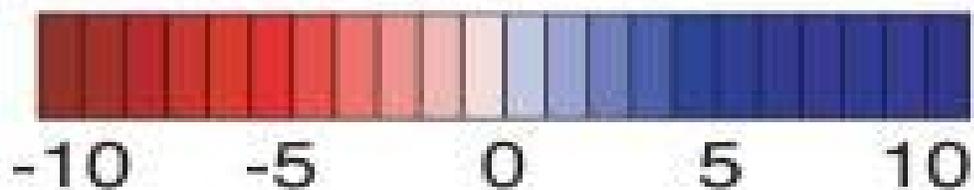
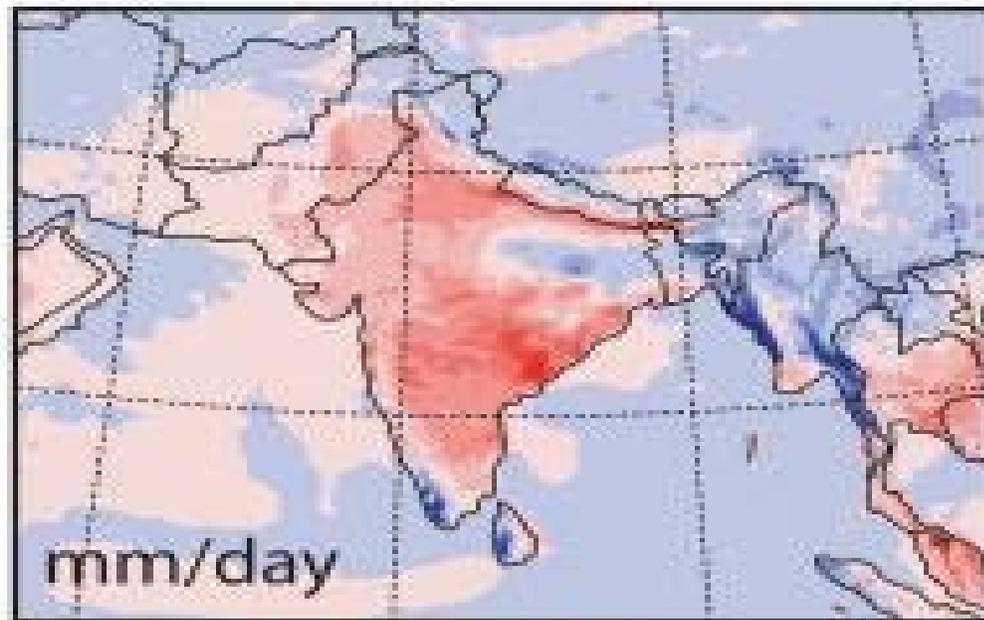


Source: EDGAR 4.2FT2010 (JRC/PBL, 2012); BP, 2013; NBS China, 2013; USGS, 2013; WSA, 2013; NOAA, 2012

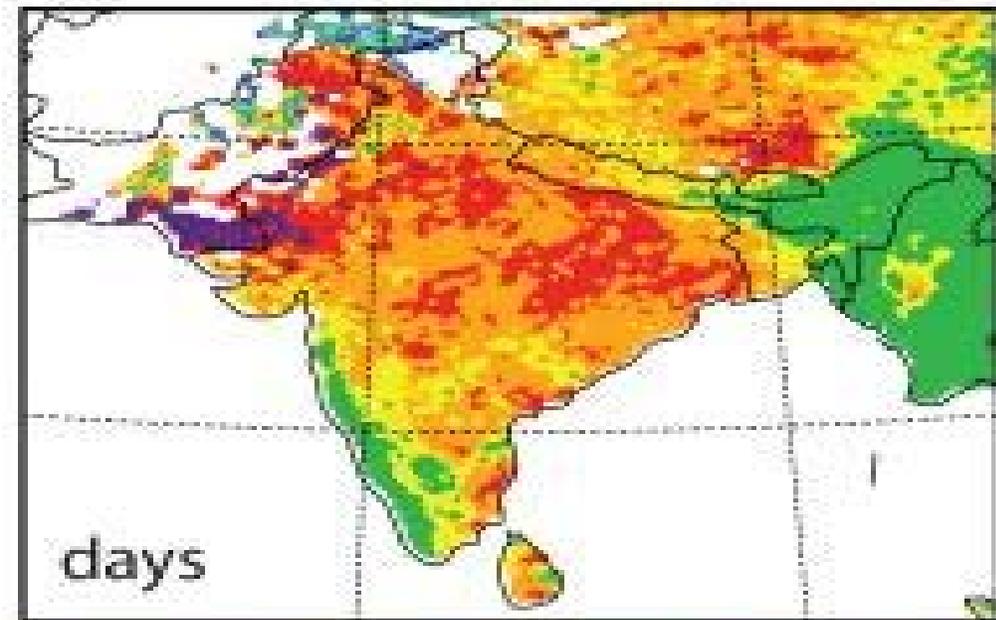
The Indian Monsoon in a Changing Climate

Monsoon patterns will change both in the timing of the advent of rains and in the amount of precipitation..

Future Change in Summer Convective Precipitation



Future Change in Monsoon Onset Date



Lack of uniform trends but increasing spatial variability in observed Indian rainfall extremes





Resilience



Actions have been developed and needs further development against the following principles:

- Environmental sustainability (local and global)
- Economic viability
- Social inclusion
- Livability
- Resilience
- Integration of transport and land use planning;
-
- **Local leadership**
- **Governance**

We need to change course



A long and winding road, but gets us there



We hope that **CLIMATRANS** would/could contribute to the change of course



Thank you