

## Research topics:

1. Drinking water supply, waste water management - identification of specific megaurban health risks



2. Vulnerability related to water supply and waste water disposal - identification of risk areas for different spaces (physical, social)



3. Development of methodologies in remote sensing - identification of vulnerability by visible spatial structures, as well as landuse structures and dynamics



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In collaboration with the  
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## Vulnerability in MegaCities: New approaches to analyse the urban water system in Delhi / India

An integrated GIS approach  
using high resolution remote sensing data  
and qualitative/quantitative social analysis



Research project sponsored by the German Research  
Foundation (DFG)

**DFG**

Deutsche Forschungsgemeinschaft

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## MegaCities: Challenging topics of global concern

MegaCities play a distinct role in the world-wide process of urbanisation. Almost 60 of them, with more than 600 million people altogether, are expected to exist by 2015. MegaCities are characterized by unprecedented scales, new dynamics, new complexities, i.e. the largest population figures and densities and highest development dynamics, as well as intense and complex interaction of different demographic, social, political, economic and ecological processes. Moreover, highly dynamic processes take place simultaneously, thereby often reinforcing themselves.

For Asian MegaCities, common features are largely uncontrolled spatial expansion, high traffic volumes, and often severe infrastructural deficits, high concentrations of industrial production, ecological strain and overload, unregulated and disparate land and property markets, insufficient housing provision and, in some cases, extreme socio-economic disparities and fragmentation.

MegaCities are prone to growing socio-economic vulnerability because of pronounced social disparities, socio-spatial and political fragmentation, sometimes with extreme forms of segregation and conflicts. The juxtaposition of very different local life worlds, life-forms and lifestyles (including ethnic, social and behavioural groups) plays a significant differentiating role.



*Different types of settlements in Delhi*

## Vulnerability in MegaCities: Scientific background

MegaCities in rapidly urbanising regions are hot spots of demographic and socio-economic dynamics. Their rapid growth results in uncontrolled processes of fragmentation which counteracts governance and steering. Quantitative and qualitative undersupply with basic infrastructure is one of the major consequences, affecting large parts of the urban population. This is particular true for adequate water supply and the disposal of waste water. In this respect the population of MegaCities faces certain types and degrees of vulnerability especially the marginalized citizens. This internal and external conditions and processes responsible for rising vulnerability normally develop with high dynamics, which can not be identified quickly enough with traditional methods, such as statistical and regional analysis or fieldwork. This requires the development of new methodologies.

Against this background the research project focuses on the following aspects, taking the example of Delhi/India:

- (1) Analysing the supply with water and waste water disposal – in respect of physical and socio-economic aspects in certain risk areas;
- (2) Identifying and analysing of types and degrees of vulnerability regarding water supply, waste water disposal and management;
- (3) recognition vulnerability by visible spatial structures with high resolution satellite data and Geographic Information Systems (GIS);
- (4) Critical assessment of methods and development of analytical tools.

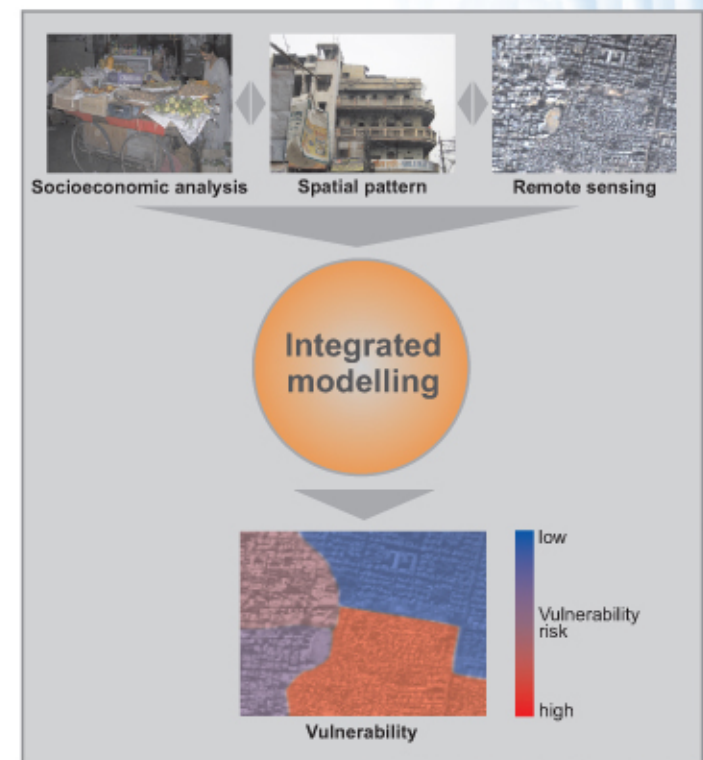


*Urban life*

## Research objectives:

The major aims of the research project are to develop new, object-oriented analytical methods for high resolution satellite data and Geographic Information Systems (GIS) and to use them in order to identify recent small-scale land use structures and dynamics in MegaCities. With the results specific megaurban risk areas and living quarters of vulnerable population will be identified. These will be evaluated – in combination with quantitative and qualitative socio-economic informations – in regard to place-specific infrastructure deficits and – potentials of water supply and health infrastructure.

This is understood to be a first step to the development of stable indicators which will help to identify and understand the different forms, actors and processes within the megaurban systems. Selected case study areas in Delhi will be analysed.



*Methodological approach*