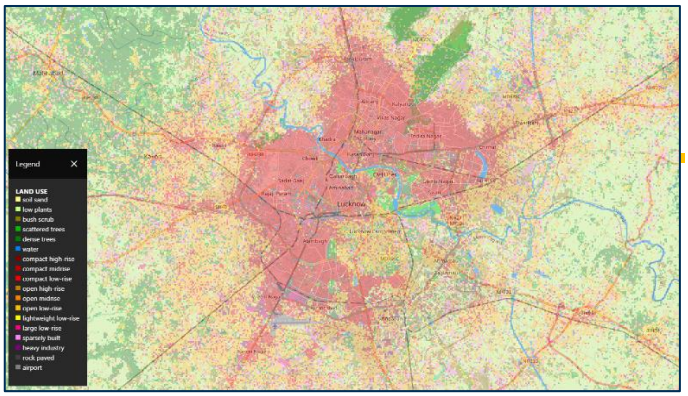
Information Decision Support System to support Climate-related health risk adaptation planning

Because of a growing urban population, cities are particularly vulnerable to the impacts of progressing climate change. Adaptation measures are required for urban areas to remain livable and functional in the future. The CHARISMA dashboard is a web-based GIS information repository, supporting decision-making of no-regret adaptation plans to minimize impacts of heat stress and vector borne diseases in Indian cities.

Coupled urban growth and climate change

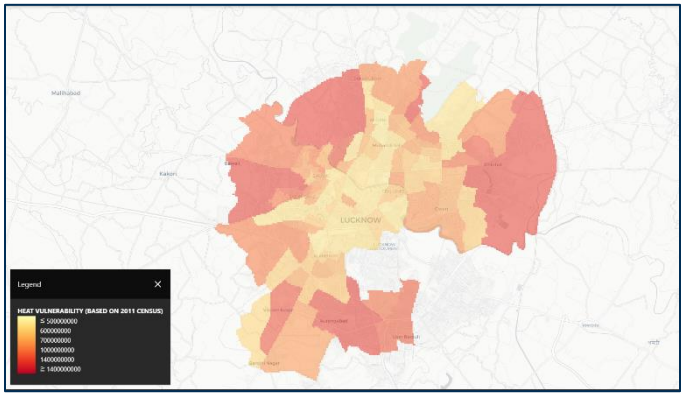
While global temperatures rise, cities can experience even higher temperature increases because of the urban heat-island effect. Adaptation planning for cities therefore requires both urban expansion and climate change to be incorporated.
The information platform allows decision-makers and urban planners to evaluate the urban expansion up to 2070, with or without masterplans, distinguishing 11 different land use classes, at 100 meter resolution. The platform is unique in that it provides data layers regarding future climate impact in which urban evolution is coupled with future climate model output. The user thus has information for the present and future at hand, enabling quantitative assessment of the severity of upcoming changes in terms of heat stress, identification of urban areas of concern in terms of vector borne diseases and the design of localized robust adaptation strategies.



The decision support system couples urban growth up to 2010 at 100m resolution with climatic changes, enabling the planning of localized adaptation strategies.

Tailored heat stress indicators

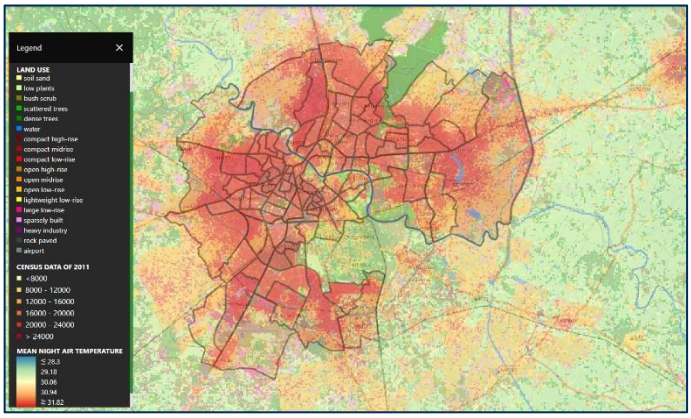
Rather than providing general climatic data, the platform contains indicators tailored to heat stress, such that the user is able to properly assess the impact of climate change. Parameters such as the number of heatwave days, heatwave severity, cooling degree days (indication of electric cooling requirement), minimum and maximum day and night parameters, etc. are provided for four seasons and various definitions.
The health impacts are further expressed in terms of future heat vulnerability indices, relative risk of mortality and thermal comfort. All indicators are provided at a resolution of 100 meters to enable spatial prioritization and locally tailored actions.



The information platform contains tens of derived climate indicators relevant for planning tailored adaptation measures to heat stress, per season, both present and mid-century, as well as dedicated health indicators.

Integrated urban climate resilience

Climate adaptation is a multifaceted task and requires an integrated approach. The platform allows the superposition of cross-thematic data layers, such that the user can visually understand and consider all relevant aspects.
The platform can be extended to include additional data layers (e.g. census data, flooding, air quality, etc.), pending their availability, tailoring the platform to the user's needs. For selected cities, the platform already includes risk maps of dengue and malaria.
Based on such data, for example, future urban areas prone to increased heat stress or risk of vector borne diseases, with a higher density of vulnerable population can be highlighted, based on which targeted city resilience plans can be developed.

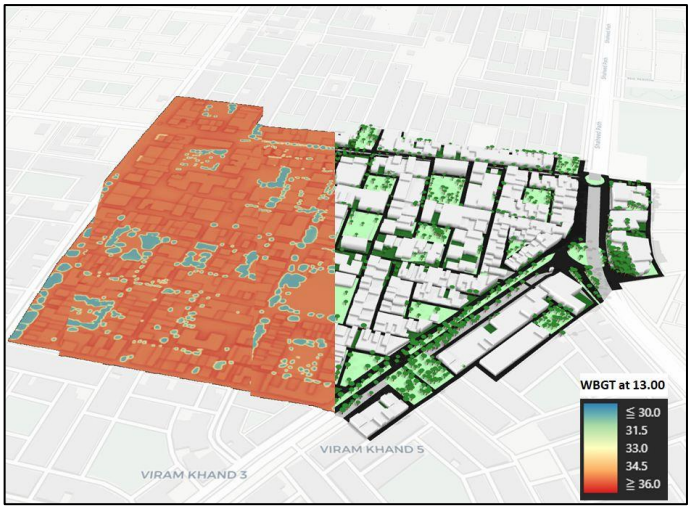


The decision support system allows superposition of data layers to enable integrated adaptation planning.

High resolution mapping for tailored planning

One-meter resolution mapping can be included, from which a 3D view of the environment can be generated. This high-resolution data can subsequently be used to evaluate thermal comfort.

Thermal comfort is different from standard air temperature in that it includes environmental parameters such as radiation (reflecting from buildings), the cooling effect of wind, humidity, etc. Associated maps, for different time instances, allow targeted actions to be planned considering the local environment. The impact of such measures can also be evaluated and added as an available data layer.



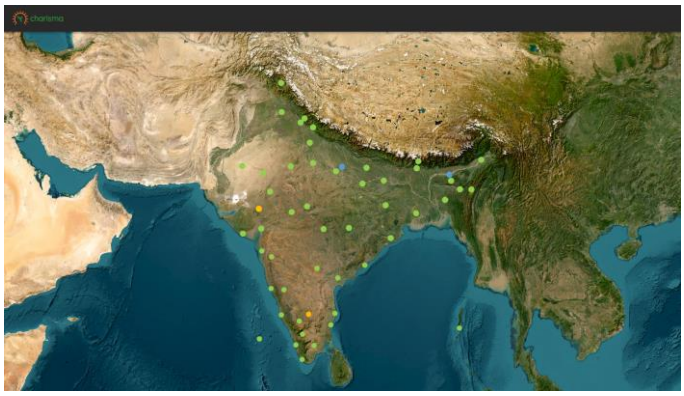
High resolution (1m) mapping of the urban environment maps reveals details of the local urban fabric and forms the basis of derived analyses from which specific and tailored adaptation measures can be designed.

Tiered service across India

Fifty Indian cities have already been incorporated in the platform, adopting a tiered level of data content.

All urban land use is derived from public satellite imagery, which, which allows readily available climate model outputs to be downscaled to approximately 100 meter. In tier 3 the future climatic conditions, utilizing the present urban layout are available. In the second tier urban growth is considered and incorporated in future climate assessment. In tier 1 both urban growth, future climate data vector borne disease data is available in the repository.

While tier 3 offers approximately 60 data layers, this goes up to over 300 layers in tier 1.



The platform contains over fifty Indian cities for which data is accessible only after registration. Cities are divided into tiers, categorizing the amount of data content: urban growth + climate change + vector borne disease risk (tier 1, ~300 data layers), urban growth + climate change (tier 2, ~100 data layers), pure climate change (tier 3, ~60 data layers),

Co-creation

The platform has been created by VITO (Belgium) as part of the CHARISMA project (www.charisma-india.eu) in partnership with Avia-GIS (Belgium) and PHFI-CEH (India), funded through International Climate Financing by the Government of Flanders, and in consultation with Indian stakeholders, city authorities (Lucknow and Guwahati) and support of AKTU-FoAP, Dharatal and Abhitech IT Services Limited.

Find out more

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