CIB TG97
Nature-based solution for climate resilient buildings and communities

Background Information

The building sector is responsible for nearly 40% of global direct and indirect CO2 emissions and buildings account for 28% of global energy-related GHG emissions; this share is even greater in large cities. Strategic implementation and maintenance of urban green infrastructure (UGI), which includes trees, vegetation, green roofs and vegetated facades, can reduce urban CO2 emissions and support necessary climate change adaptations. While promising an array of cost-effective options for municipal climate action, these nature-based solutions provide many public policy co-benefits, such as enhanced urban livability. As well, and though there has been research in the area of holistic urban design through the use of urban modelling software tools, additional work is needed in further devlopeing such tools to permit adaptating to and mitigating the effects of climate change in urban agglomerations.

Objectives and scope of work (set out the specific plan for this TG/WC)

A multidisciplinary team of researchers from around the globe would share research on nature-based solution to: 1) Quantify the contribution of existing and future Nature-based solutions and UGI to sequester carbon, reduce carbon emission from buildings, and moderate the urban micro-climate to reduce urban heat island effects; 2) Demonstrate the approach in developing Nature-based solutions and UGI solutions for carbon-neutral, climate-resilient buildings and communities through simulations that consider current and projected climate and development scenarios; 3) Develop Nature-based solutions and UGI best practices, guidelines that enable professionals and policymakers to implement these solutions with confidence across the globe.

Researchers focusing on nature-based solution for climate resilient buildings and communities would include, amongst other specialists, those involved in: Urban landscape architecture and planning; Urban development and community level modeling of building energy use and carbon emission calculations of future climate scenarios; urban carbon cycle modeling for carbon sequestration calculation; Urban forestry; Urban tree mapping growth forecasting; Human-environmental interactions; Urban policy making; Urban microclimate modeling; Building operations, energy efficiency and indoor environment; Building thermal and hygrothermal response and energy use simulation.

Researchers currently working on mitigating the effects of climate change in an urban setting, in particular those focused on reducing Urban Heat Island (UHI) effects on buildings and communities through the implementation of nature-based solutions, will be sought.

Planned research outputs

    i.   State-of-the art report on Nature-based solutions for climate resilient buildings and communities

    ii.   Journal articles to be published in a special issues of MDPI *Buildings*, focused on Nature-based solutons

    iii.   Advances in Nature-based solutions and UGI solutions to sequester carbon, reduce carbon emissions from buildings, and moderate the urban micro-climate

    iv.   Best practices and guidelines for Nature-based and UGI solutions