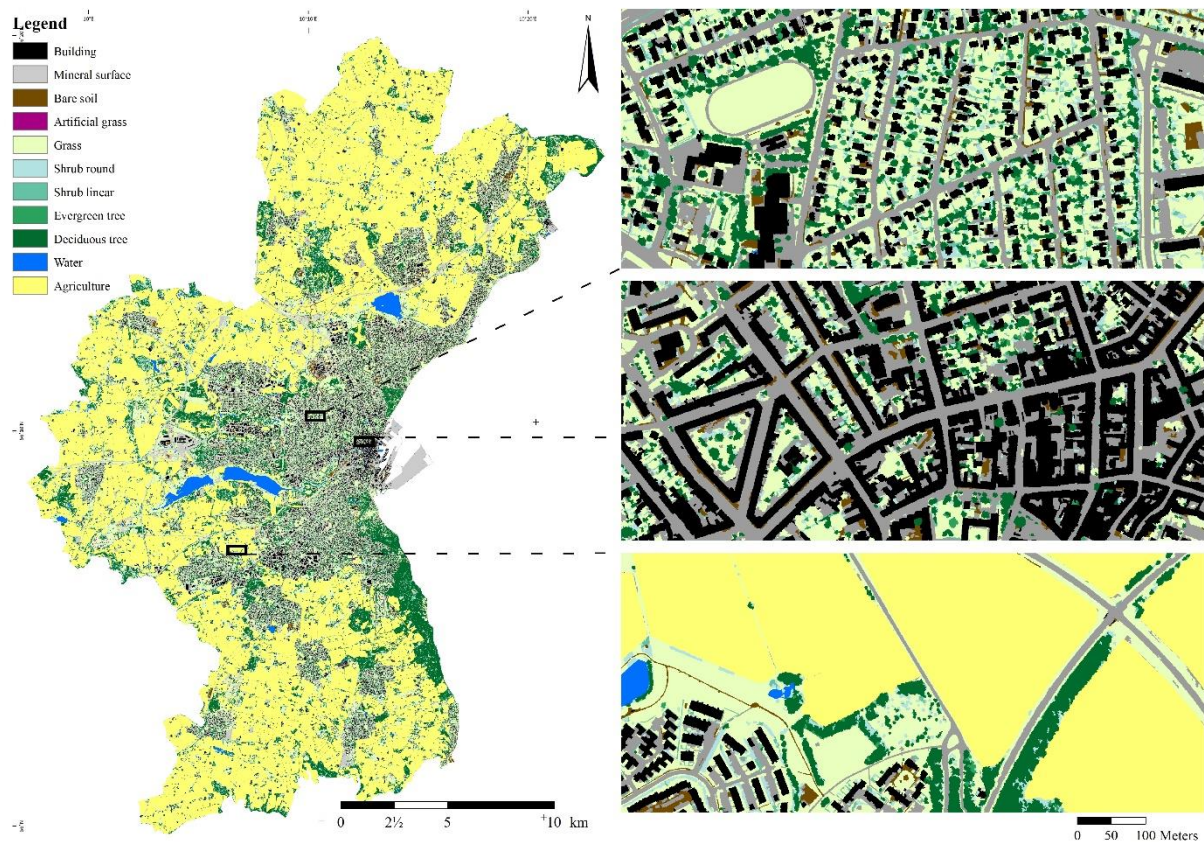


Enhancing Urban Resilience and Climate Adaptation through Advanced Land Use Mapping

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Amid urban challenges from climate change, the need to enhance land-use and land-cover (LULC) understanding in diverse urban spaces is critical. High-resolution urban mapping proves invaluable for categorisation. Integrating semantic data into administrative frameworks, amid the global trend of data sharing, further enhances its significance. Our study introduces a method using multitemporal orthophotos and LiDAR-derived height data for urban mapping. This automated process extracts data on vegetation, relying on spectral thresholds and real-world classifications. Incorporating cadastral data enriches the approach, especially for specific land-use categories like agriculture. This fusion results in a comprehensive LULC product, seamlessly fitting urban planning. It is especially valuable on privately owned parcels, as these are not always part of municipal land-cover surveys. Our research delivers a detailed 2015 LULC map for Aarhus Municipality, with 20 cm spatial resolution and ten classes. The thematic resolution is very high, as we distinguish tree by evergreen and deciduous ones, as well as round and linear shrubs, which can indicate different management practices, e.g. maintained hedges and shrubs or undergrowth. The synergy of orthophotos and elevation data refines landscape classification. The methodology holds promise for Denmark and comparable nations, enabling repeatable LULC mapping with minimal user input. The presented approach pioneers high-resolution LULC products, transferable for broader applications, even in countries like Denmark. Focused on urban structural vegetation, it supplements cadastral data, aiding urban planning. By coupling with parcel accessibility, it facilitates urban green space exploration and deficiency identification. Its replicability is a highlight, with potential for time series analysis and expansion to similar data-rich nations. Thus, this work adds to the EU nature restoration law, which requires cities to map urban ecosystems.

Further reading: J. M. Knopp, G. Levin and E. Banzhaf, "Aerial Data Analysis for Integration into a Green Cadastre—An Example from Aarhus, Denmark," in *IEEE Journal of Selected Topics in Applied*

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