

Nature-based Solutions (NbS) strategies for urban nature construction and restoration – A case study in Shanghai

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Urbanization has led the development of cities in the direction of “high population density” and “high-rise buildings”, causing social and environmental problems. Improving urban carrying capacity and the mixed use of public space become the main strategies for solving “urban diseases” such as heat islands, waterlogging, and biodiversity loss. Nature-based solutions are proposed for urban greening by using modern technologies to enhance the adaptability of plants in cities and achieve multiple functions such as mitigating the urban heat island effect, reducing building energy consumption, enriching biodiversity, and increasing the comfort of urban environments. Based on the distinct urban master plan, Shanghai Chenshan Botanical Garden develops a planting plan from three dimensions of species selecting, habitat optimization, and maintenance management, to achieve the construction of a new nature in city. Firstly, plant species adapted to the urban environment and desirable landscaping traits were selected from the middle and lower reaches of the Yangtze River in China. Secondly, soil improvement methods were proposed to enhance permeability following local climate, soil, high water table conditions and diverse urban habitats. Lastly, long-term monitoring of tree growth dynamics was conducted after tree transplantation. In conclusion, Shanghai Chenshan Botanical Garden puts forward the concept of urban nature construction and habitat restoration, and develops a series of greening technologies with planting plans as the core for the restorative targets of many architectural spaces, roads and squares in the city.