

Assessing the Plant Diversity's Quality, Threats and Opportunities for the Support of Sustainable City Development of the City Raipur, India

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Abstract : Worldwide urban areas are growing. Urbanization has a great impact on social and economic development and ecosystem services. This global trend of urbanization also has significant impact on habitat and biodiversity. The impact of urbanization on the biodiversity of cities in Europe and North America is well studied, while there is a lack of data from cities in currently fast growing urban areas. Indian cities are expanding. The scientific community and the governmental authorities are facing the ongoing urbanization process as an opportunity for the environment. This case study supports the evaluation of urban biodiversity of the city Raipur in the North-West of India. The aim of this study is to assess the overview of the environmental and ecological implications of urbanization. The collected data and analysis was used to discuss the challenges for the sustainable city development. Vascular plants were chosen as an appropriate indicator for the assessment of local biodiversity changes. On the one hand, the vegetation cover is sensible to anthropogenic influence, and in the other hand, the local species composition is comparable to changes at the regional and national scale, using the plant index of India. Further information of abiotic situation can be gathered with the determination of indicator species. In order to calculate the influence of urbanization on the native plant diversity, the Shannon diversity index H' was chosen. The Pielou's pooled quadrat method was used for estimating diversity when a random sample is not expected. It was used to calculate the Pielou's index of evenness. The estimated species coverage was used for calculating the H' and J . Pearson correlation was performed to test the relationship between urbanization pattern and plant diversity. Further, a SWOT analysis was used in for analyzing internal and external factors impinging on a decision making process. The city of Raipur (21.25°N 81.63°E) has a population of 1,010,087 inhabitants living in an urban area of 226km², in the district of the Indian state of Chhattisgarh. Within the last decade, the urban area of Raipur increased. The results show that various novel ecosystems exist in the urban area of Raipur. The high amount of native flora is mainly to find at the shore of urban lakes and along the river Karun. These areas of high Biodiversity Index are to protect as urban biodiversity hot spots. The governmental authorities are well informed about the environmental challenges for the sustainable development of the city. Together with the scientific community of the Technical University of Raipur many engineering solutions are discussed for implementation of the future. The case study helped to point out the importance environmental measures that support the ecosystem services of green infrastructure. The fast process of urbanization is difficult to control. Uncontrolled creation of urban housing leads to difficulties in unsustainable use of natural resources. This is the major threat for the urban biodiversity.

Keywords : India, novel ecosystems, plant diversity, urban ecology

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