



ELSEVIER

Contents lists available at ScienceDirect

Urban Climate

journal homepage: <http://www.elsevier.com/locate/uclim>

Local Climate Zone classification for Indian cities: A case study of Nagpur

Rajashree Kotharkar *, Anurag Bagade

Department of Architecture and Planning, Visvesvaraya National Institute of Technology, VNIT Campus, South Ambazari Road, Nagpur, Maharashtra 440010, India

ARTICLE INFO

Article history:

Received 13 October 2016

Received in revised form 7 March 2017

Accepted 16 March 2017

Available online xxxxx

Keywords:

Urban heat island

Local Climate Zone

Indian cities

ArcGIS

LCZ sub-classes

ABSTRACT

The land classification system called 'Local Climate Zone' (LCZ), developed by Stewart and Oke (2012), deals with the physical properties like surface cover and surface structure of the city which introduces a logical approach in studying urban heat island. Indian cities are characterized by the heterogeneous type of built forms. The primary task of mapping LCZ in such cities poses difficulty due to its complex urban form and data insufficiency. This paper aims at resolving the issues pertaining to the identification and classification of LCZ by taking a case of Nagpur city from India. The paper explains the various stages involved in the mapping and the issues confronted while delineating the LCZs. It explains the integration of various secondary data to generate LCZ map at 1 km, 500 m and 250 m. 21 LCZs are found in Nagpur including standard 7 built types and 7 natural types of LCZ. Additional 7 LCZ subclasses were observed as a result of mixing of two or more classes of built type LCZ. The paper explains typical features of the LCZ map of Nagpur and concludes with the discussion on the effectiveness of mapping method adopted for preparation of LCZ maps.

© 2017 Published by Elsevier B.V.

1. Introduction

Cities are the drivers of the global change (Mills, 2007) and changing urban form and urban function results in the significant modification of overlying atmosphere (Grimmond et al., 2015; Mills, 2014). The most significant and widely documented man-made climatological modification is 'urban heat island' (UHI) (Oke, 1973). UHI, defined by the temperature difference between urban and its surrounding rural areas, is

* Corresponding author.

E-mail addresses: rskotharkar@gmail.com, rskotharkar@arc.vnit.ac.in (R. Kotharkar), anuragcnp@gmail.com (A. Bagade)

the resultant of this change. But mere traditional urban and rural land classification is not sufficient to understand the urban heat island effect within the city; variety of landscapes that falls into the category of ‘urban’ or ‘rural’, for example, airports and institutional buildings can represent either ‘urban’ or ‘rural’ classification (Stewart, 2007). A more effective land classification system is required to study the thermal behaviour of

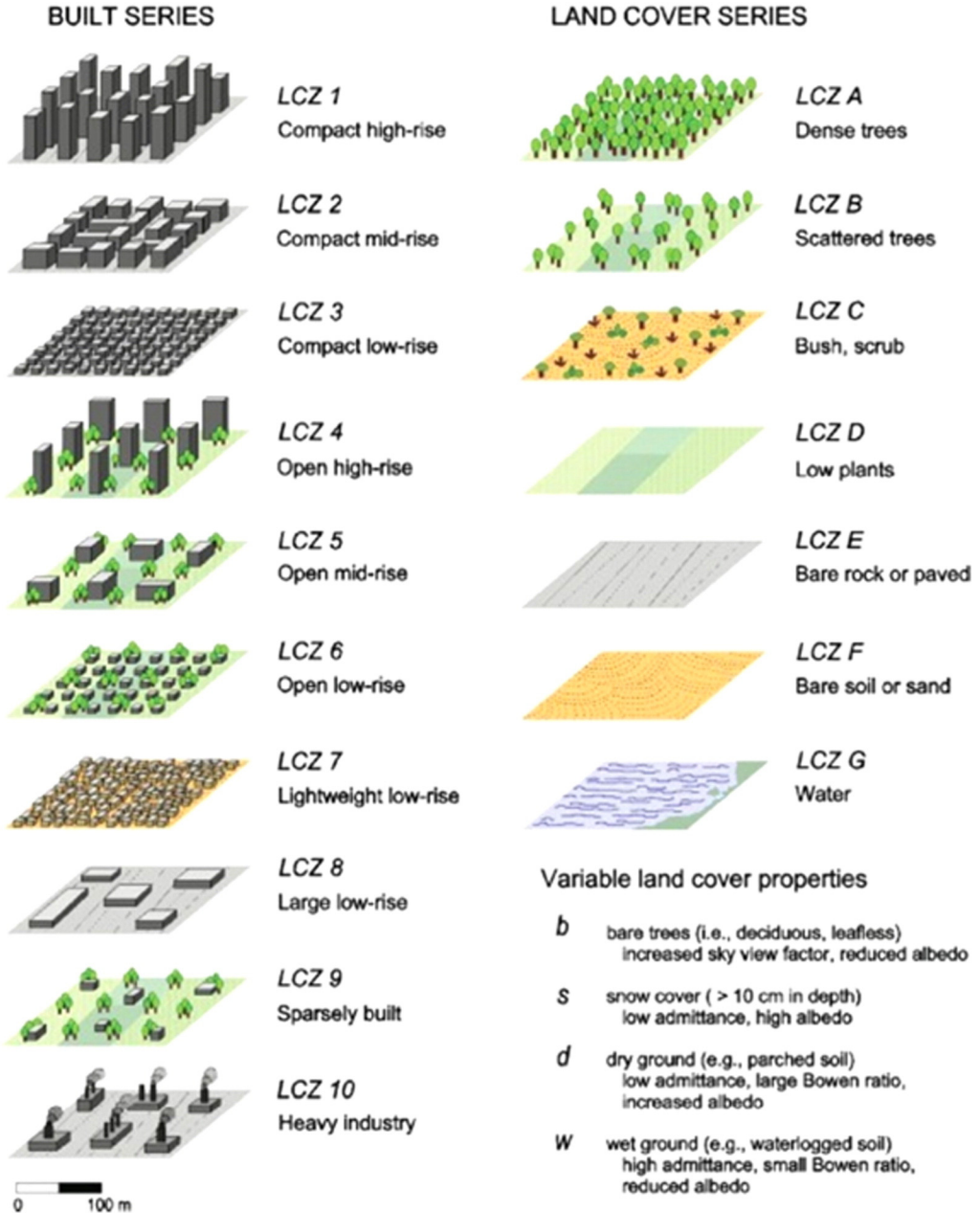


Fig. 1. LCZ classification.
(Source: Stewart and Oke, 2012).

Download English Version:

<https://daneshyari.com/en/article/6576879>

Download Persian Version:

<https://daneshyari.com/article/6576879>

[Daneshyari.com](https://daneshyari.com)