Chapter 8
Seasonal Contrast of Land Surface Temperature in Faridabad:
An Urbanized District of Haryana, India

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ABSTRACT

The chapter has highlighted the adverse impact of conversion of natural land cover into urban concrete over inter-seasonal variation of land surface temperature (LST) in Faridabad district which is a major threat for sustainable urbanism. Apart from high LST in the dense urban area built-up in Faridabad city, inter-seasonal variation of LST has been observed in dry deciduous forested areas due to defoliation, fallow land, and over-grazed land in rural surrounding areas. Compared to NDVI, NDBI has significant positive and stable correlation with LST in all seasons (Pearson index: 0.35 to 0.60). Weaker correlation (Pearson index: 0.02 to 0.48) between NDVI and LST accounts for the seasonal impact over NDVI due to defoliation and agricultural practices over the study area. Overall, it can be remarked that image-based spectral indices and thermal band can be used for the evaluating thermal environmental contrast across seasons. Use of in situ measurement with good network of meteorological stations can validate satellite-derived LST better and increase the accuracy of the study.

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INTRODUCTION

Urbanization, a dynamic process involving remarkable changes in the vast area of land cover associated with human population concentration (Ramachandra et al., 2012), has become a global issue (Newbold and Scott, 2013). Such ongoing urbanization accompanied by population growth has been predicted to contribute 2.5 billion people of the world urban population by 2050 which is about 2/3 of the total global population and 90% of that increase will concentrate over African and Asian countries. Between 2018 and 2050, India together with China and Nigeria expected contribute 35% of the projected growth of world urban population. Among such countries, India having an unprecedented urban population growth from 290 million to 340 million from 2001 to 2008 (Sankhe et al., 2010) solely has been predicted to add 416 million urban occupants. Although, many mega-cities have been formed since 1990 and by 2030, the world is expected to have 43 mega cities; yet, nearly half of the world's urban inhabitants dwell in comparatively small settlements (UN, 2018).

Planned and well-managed urbanization has greatly accelerated economic growth of a nation. However, such unprecedented urban expansion and urban sprawl has resulted into urban encroachment in green cover and agricultural land (Chadchan and Shankar, 2012; Pandey and Seto, 2015) leading to conversion of natural land-cover into urban concrete which gives rise to numerous socio-environmental problems. Some of them are: alteration of thermal properties of urban areas (Van and Bao, 2010), atmospheric pollution (Alves and Skole, 1996), undesirable hydrological impact in terms of supplying pollutants to surface water and causing erosion (Weng, 2001), ongoing downfall in the urban services apparent from the basic issues in slum, housing, lack of treated water supply, insufficient infrastructure, higher pollution levels, traffic congestion, degraded quality of life and many more (Ramachandra et al., 2012). In such a scenario, 'sustainable urbanism' is the key to achieve the benefit of urbanization for the human society. Sustainable urbanism has become a major target which the national, local governments and planners of any developing countries are keen to achieve.

Sustainable urbanism is the way to construct, plan and manage the city with the principles to maintain equity between urban growth and natural resources to prevent ecological imbalance and make the city climate resilient as well (Sharifi 2016). It is well-linked with the concept of Sustainable Development. Sustainable development is the combination of principles and approaches for the growth of the present society by judiciously using resources required to meet human development goals without compromising the stability of the ecosystem and conserve the resources for the future generations too (UN, 1987). Sustainable urbanism principally focuses on amalgamation of social, economic and environmental aspects of sustainable