**Remote Sensing solution to detect and quantify extent of desertification's effects on cities.**

Remote sensing enables modelling, monitoring, and prediction of the behaviour of several elements of desertification.

The country with most studies of desertification using remote sensing is China.

In terms of satellite data, Landsat images provide the bulk of data used to study desertification, especially the Thematic Mapper (TM) sensor. Classification and change detection are the most used methods to study desertification from remote sensing data. Additionally, land cover/land use change and vegetation and its attributes (e. g., Normalized Difference Vegetation Index - NDVI) are the most used variables to study desertification using remote sensing techniques.

**Definition**-

Land degradation occurring in arid, semi-arid and sub-humid ecosystems is often referred to as desertification. Desertification can be defined simply as “the making of the desert” or “the production of desert conditions”. (Verstraete, 1986).

“Land degradation in arid, semi-arid, and dry sub-humid areas resulting from human activities and climate variation”, including the human effects on climate variation beyond the economic loss (United Nations, 1994).“land degradation in arid, semi-arid, and dry sub-humid areas resulting from human activities and climate variation which can lead to desert-like conditions”.

**ISSUES**-

Desertification has been recognised as one of the biggest concerns for the international community given the many environmental problems associated with it such as soil degradation, soil salinization, silting and dust storms (United Nations, 2015). In addition, desertification can lead to some significant social-economic problems such as food shortage, poverty, and health problems (e.g., malnutrition to respiratory problems)(Xiao et al., 2006; United Nations, 2015).

Desertification is considered as an irreversible process driven by natural factors such as temperature, precipitation, loss of vegetation cover, and human factors such as land use/land cover change, industrialisation, and urbanisation (Stringer, 2008; Santini et al., 2010; De Pina Tavares et al., 2015; Xu et al., 2016). Environmental and social problems caused by desertification have become one of the key factors preventing sustainable development in arid, semi-arid and sub humid areas (Li et al., 2016; Helld´en and Tottrup, 2008; Wang et al., 2006).

Recognising the potential impacts of desertification on economy, environment, and society, to combat desertification, it was included as one of the Sustainable Development Goals of the 2030 Agenda for Sustainable Development.

The Sustainable Development Goal 15 aims to *“protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss”* (United Nations, 2015)*.*

Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.

<https://sdgs.un.org/2030agenda>

**Methods used for Desertification**

“Temporal analysis of desertification”.

studies about desertification over time, some of them made a comparison over time of variables

change detection-classification-land use land cover - spectral vegetation indices.

Quantification of the desertification process