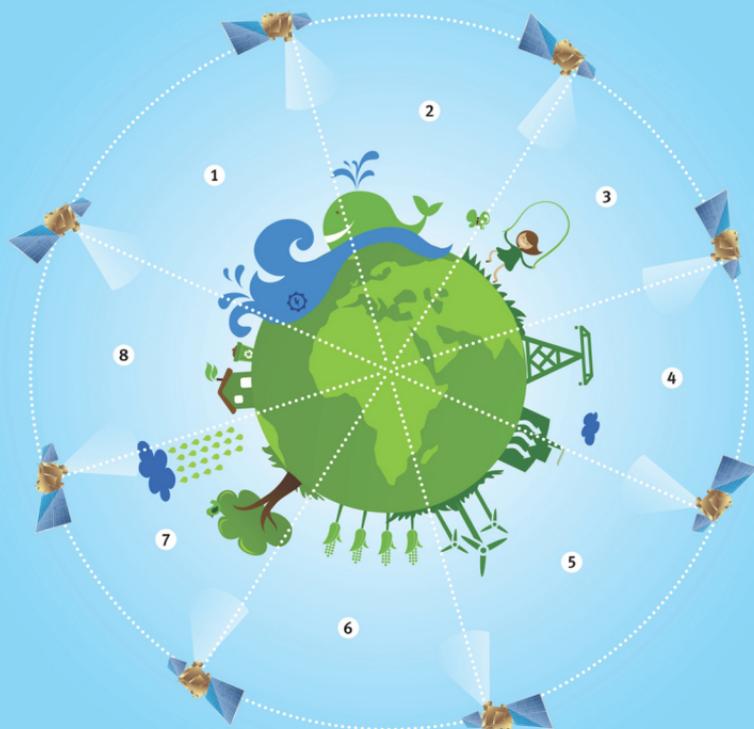


# Remote Sensing

## Principles and Applications



**A.N. Patel**  
**Surendra Singh**



# **REMOTE SENSING**

## **PRINCIPLES AND APPLICATIONS**

**2nd Revised Edition**

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# PREFACE

It is an established fact that for proper application of remote sensing techniques in the identification and mapping of natural resources, wastelands, temporal environmental changes, sand dunes, present and palaeo drainage systems and desertification, the knowledge of the basic principles of remote sensing is of paramount importance. Accordingly, an attempt has been made in this book to discuss the basic principles and applications of remote sensing.

In all, there are fourteen chapters, first eight chapters deal with basic principles of remote sensing and remaining three chapters highlights applications of remote sensing. In the chapters one and two (Introduction and Signatures in Remote Sensing), necessity, importance, scope and basis of remote sensing techniques have been highlighted.

The third chapter (Electromagnetic Radiation) deals with radiant energy from the sun, the electro-magnetic spectrum, atmospheric effects of radiation, absorption, transmission, reflection, atmospheric windows and black body radiation. The basis of signatures such as spectral, spatial, polarisation and temporal variations and methods for obtaining signatures based on laboratory, airborne and spaceborne sensors have been discussed in chapter four (Interaction of Electromagnetic Radiation with Matter).

In chapter five (Sensors Used in Remote Sensing), spectral bands for sensors, classification of sensors and types of sensors needed for different spectral bands ranging from ultraviolet to visible, infrared, thermal infrared and microwave regions have been highlighted.

The types of platforms such as balloons, aircrafts, rockets and satellites for the sensors to record the images of terrain features have been dealt with in chapter six (Remote Sensing Platforms).

In chapter seven (Data Product), the type of remotely sensed data in the form of photographs, paper prints, satellite imagery, Computer Compatible Tapes (CCT's) 'multi' concept in acquiring remote sensing data, advantages of Landsat imagery and conversion of data into information have been highlighted.

The chapter eight (Analysis and Interpretation Techniques)

deals with the image processing and enhancement of remotely sensed data for visual and digital analysis.

In chapter nine (Application of Remote Sensing in the Appraisal and Management of Natural Resources), the physical potentials and limitations of the natural resources such as landforms, soils, vegetation, landuse and water resources for regional planning have been discussed.

The chapter ten (Role of Remote Sensing in the Detection of Temporal Changes) highlights the temporal changes in saline areas, morphology of landforms, drainage systems, water bodies, grazing lands and forest cover. The types, extent and distribution of wastelands in India and Jodhpur district of Rajasthan and their management have been discussed in chapter eleven (Application of Remote Sensing in Wastelands Mapping).

In chapter twelve (Distribution and Management of Sand Dunes Using Remote Sensing Techniques), distribution and morphology of sand dunes, digital Landsat spectral characteristics of sand dunes, management and stabilisation of sand dunes have been discussed.

The chapter thirteen (Impact of Present and Palaeo Drainage Systems on Geoenvironment using Remote Sensing Techniques) highlights the positive and negative impact of present and palaeo drainage systems on Geoenvironment.

In chapter fourteen (Remote Sensing in Monitoring and Combating Desertification), the status of desertification, digital analysis of Landsat data for assessment of land vulnerability to desertification and measures for combating desertification have been highlighted.

It is hoped that this book will help the academicians, scientists, students, planners and policy makers in understanding the basic principles and applications of remote sensing for rational regional development planning.

The authors wish to express their sincere thanks to Prof. Alam Singh for providing an opportunity to write this book. The sincere thanks are due to the Director and Head, Division of Resource Survey and Monitoring, Central Arid Zone Research Institute, Jodhpur for granting permission to the second author to write the book. The help rendered by the colleagues in writing, typing, tabulation, drawing and photography is thankfully acknowledged.

**A.N. PATEL**  
**SURENDRA SINGH**

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