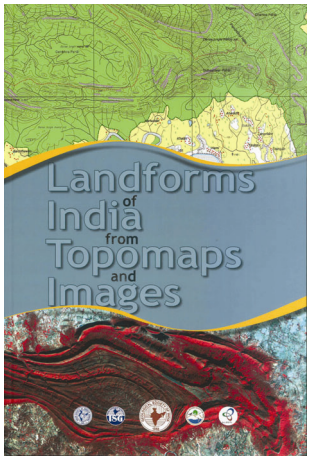

Landforms of India from Topomaps and Images. R. Vaidyanadhan and K. V. Subba Rao. Geological Society of India, Kavita Apartments, No. 63, 12th Cross, Basappa Layout, Gavipuram P.O., Bengaluru 560 019. 2014. xxviii + 136 pp. Price: Rs 3200 (including postage)/ US$ 150.

Earth is an enormous dynamic object. Direct observations, measurements and monitoring (which are the requisites in order to understand it) of each small part of it on the ground, are not humanly possible. With progress there is a demand for data and information in order to understand the forms/features, materials and processes connected with the Earth to take appropriate, quick and timely decisions for their conservation, where required, and optimum use. This is exactly the reason why 'information possession' and the 'ability to take decisions' have now become two important parameters to measure the 'level of development' of a country or the people.

We are on foot, on the wheels, in the air and have soared into space in our quest to collect data about the object of our study – the Earth. For direct observations, lateral view by standing at a point, commands only a limited area to be observed. But, with cameras on-board aircraft we can get a greater view of parts of the Earth through aerial photos, and with satellites as platforms carrying multi-spectral sensors we can get synoptic views of large parts of the Earth covering the entire globe periodically, at short intervals of time, say once in every 18 or 22 days. Synoptic coverage of large parts of the Earth in single scenes and periodical/repetitive coverage are the added advantages of satellite-based remote sensing data over aerial photographs. With a constellation of remote sensing satellites of different countries, including those of India in space, enormous amount of data are coming to us from remote sensing satellites. These data are meaningful only when useful information is extracted out of them.

There are two types of information – quantitative and qualitative – that can be extracted from remote sensing data. Quantitative information – elevations, distances, cut-and-fill volumes, planimetric areas, slopes, forest density, etc. can be extracted through mechanical methods using computer routines by trained technicians. Qualitative information – location, origin and texture of various unconsolidated deposits and soils; origin, type and structural characteristics of bedrock; location of sand, gravel, clay, boulder fields and organic deposits; delineation of well-drained, imperfectly drained and waterlogged areas; location of areas of shallow or variable overburden; location of side-hill seepage, potential landslide areas, springs, faults, fractures; nature of vegetation complex; of surficial drainage and erosion net; of land-use complex and of environmental relationships, on the other hand, is extracted from remote sensing imageries, either from hard prints or from digital data, using computers with image processing software through visual appreciation and 'interpretation'; and, interpretation which depends on a long process of learning, experience and sound theoretical knowledge about the 'terrain', is considered both an art as well as a science.

Nowadays, there is explosion of Geographical Information Systems (GIS). Remote sensing data and information from them are the important sources of inputs into GIS databases. There is requirement of manpower to deal with the enormous amount of remote sensing data that have come or are coming from remote sensing satellites of different countries, including India. We have our own mine of remote sensing data from our own satellites, but, unfortunately they are not mined because of lack of trained manpower. The book under review serves as one of the many tools to learn to interpret remote sensing data. It is a result of efforts by two veteran teachers of earth sciences. Starting from the jacket/cover in the first few pages, the book contains stupendous views of several parts of India showing rocks, peaks, rivers, etc. As has been mentioned in the Preface, the background for this book had been laid long back in the form of two small booklets (Index to a Set of Sixty Topographic Maps – Illustrating Specified Physiographic Features from India – 1968 and Index to a Set of Seventy Aerial Stereopairs – Illustrating Physiographic Features from India – 1973) authored by R. Vaidyanadhan, the lead author of this book. For the benefit of uninitiated readers, the authors have taken care to introduce in the first few pages, methods of studying topographic maps and images.

The book covers a wide array of examples of physiographic features and geological structures from 60 different parts of India. They represent almost all the physiographic regions of the country, the locations of which are indicated in a separate map of India. The authors are honest to declare that they have personally made close observations in 20 areas and the rest have not been directly studied by them. For a probing reader, a geological map and geological timescale are included in the book. True to its title, the book contains a topographic map of Survey of India of selected areas on to the left and corresponding remote sensing imagery in false colour composition on the right page. A few sketches, diagrams and photographs of features/forms (though often not necessarily belonging to the same area) are added at the bottom of the left side pages below the topographic map. These and a brief description give the reader, a visual impression of the various physiographic and other notable features listed at the bottom of each of the satellite images. Not only this, at the end of the book, a useful Glossary containing all the features/forms that have found a place in the book are defined and briefly described. This particular combination of topographic map of an area, remote sensing imagery of the same area (almost on comparable scales), visual pictures of some of the forms/features and list of physiographic features and brief descriptions of notable features along with some information on the geology of the area, is what makes the book unique, in the sense, that it would help teachers and students to comprehend better how real-world forms/features look like and how they are represented through contours on a map and how they appear in a bird's

eye view of a remote sensing imagery. Being a teacher, I know the difficulty faced by some teachers when they need to impress on students how real-world features are represented in topographic maps and how they appear in imageries. This book would solve such teaching problems.

There are many academic institutions offering M Tech and M Sc courses in remote sensing and GIS or geoinformatics, for graduates of computer science, engineering and technology, with no background in earth sciences and remote sensing. They become experts in image processing on computers, but are clueless when questions regarding earth sciences arise. This book would be of great help to such students as well.

The size of the book, 40 × 27 cm, in hard cover is quite handy with good paper and print quality. It is worth having many copies of it for the purpose of teaching and training in institutes dealing with earth sciences in general and remote sensing and GIS in particular, because it presents excellent photographs of earth features of India, both from space as well on land. It could be an excellent coffee-table book in every home as well.

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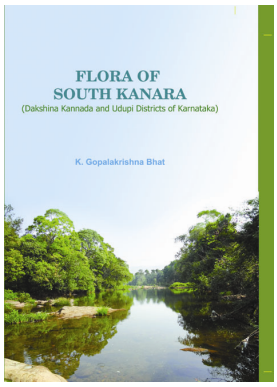

Flora of South Kanara: Dakshina Kannada and Udupi Districts of Karnataka. K. Gopalakrishna Bhat. 'Madhuca', Srinivasa Nagara, Chitpady, Udupi 576 101, India. 2014. 928 pp. Price: Rs 2000.

Biodiversity is nature's fabric of life. The economic prosperity of any country depends on this natural capital. Today we are in a global battle for conservation of this natural wealth. 'Being driven primarily by climate disruption, habitat changes and overexploitation, biodiversity loss is pushing earth towards the sixth mass extinction', says lead researcher Rodolfo Dirzo from Stanford University. 'Plants and animals are disappearing ten times faster than is widely believed in the scientific community', warns Stuart Pimm from Duke University. 'Nearly half of the world's biodiversity hotspots have less than ten per cent of primary vegetation left. Western Ghats currently is one of the few hotspots that have lost most vegetation since 2004', says William Laurance from James Cook University.

Further, ecologists are intensely studying the relationship between biodiversity and ecosystem function. The Millennium Ecosystem Assessment points to a clear role of biodiversity in the loss of ecosystem services. Natural forests of diverse native plant species function as watersheds, wildlife habitats and a source of livelihood for tribal farming and fishing communities, contributing to long-term human well-being in ways not captured by indices such as annual GDP growth.

Knowledge about species, documented from a given region, state or district, largely increases the efficiency and economic viability of conservation initiatives. Systematic documentation of identity, including description, ecology, status of conservation and such other basic information on plant species of a region, therefore, is fundamental for prioritizing areas for conservation and management action. Further, knowledge management mechanism and its implementation are essential for the developing countries, especially in today's competitive world of intellectual property rights.

Floras and similar botanical accounts of several regions are the most dependable source of authentic information about plants. Documentation of floral wealth of Karnataka and associated traditional knowledge has largely come from its district floras. Most of these works are at least three decades old. Also, some districts in the state do not have their plant wealth explored and the studies published so far. The composite 'South Kanara' (Dakshina Kannada and Udupi districts) is one among the under-explored areas and has not seen a comprehensive account of its vegetation published till now. This book, a fresh survey and assessment of plant wealth of the area by K. Gopalakrishna Bhat, therefore, is a welcome publication that fulfils a long-standing need.

Flora of South Kanara that lies along the Western Ghats manifests itself in thousands of species and several hundred genera of plants. The forests are reckoned for harbouring several endemic and rare plants. This zone of the southwestern peninsula, therefore, forms a place of exceptional botanical interest. In his brief introductory account, Bhat attributes this phenomenal range of diversity to the combined effects of South Kanara's physiographical disposition and topography, viz. coastline, hill ranges of the Western Ghats, and the vegetation being under the direct influence of elevation ranging from sea-level to almost 4500 ft.

The book under review truly is an outstanding effort that translates several decades of intensive field observations and laboratory studies of Bhat into taxonomic information of enormous value. Each one of the 1888 species of flowering plants belonging to 928 genera from 166 families has been described with utmost accuracy in crisp botanical terms. Species profiles are further spruced up with criteria of flowering and fruiting time, native range, endemism, conservation status and such ecological and information notes as 'very rare: collected only once' for *Hemisorghum venustrum*; 'sometimes cultivated' for *Piper longum*; 'frequent along back waters and streams' for *Crinum viviparum*; 'common near the sea in sand' for *Drimia indica* and 'common on moist rocks' for *Cyanotis burmanniana*. Further, the English common name, the local Kannada and Tulu vernacular names recorded for most species help bring even non-botanists connected and engaged with plants and their

Connarus wightii Hook. f. [Connaraceae].