

Foundation (MSSRF) set up by him in 1988 in Chennai. Kesavan refers to it as Swaminathan's 'magnum opus'. Since skill enhancement needs knowledge/awareness integration, the author describes how modern information and communication (ICT) technology for rural communities was facilitated. Swaminathan's 'Village Knowledge Centres' spreading all across India parallel his other accomplishments such as the Green Revolution and Evergreen Revolution. The organization of 'biovillages' and Village Knowledge Centres are dealt with at length in chapters 8 and 9 respectively.

In chapter 10, the author unravels Swaminathan's innovations and strategies to link biodiversity conservation with livelihood and food security of rural and tribal people. Kesavan describes how Swaminathan played crucial roles in preservation (e.g. Svalbard, Norway, frozen seed in a frozen mountain) and *in situ* conservation of landraces. His unique idea of 'banks with a difference' – gene bank → seed bank → grain bank → fodder bank → water bank – integrates functions of conservation and lending of food grains/fodder in crisis caused by extreme natural events. Kesavan also describes Swaminathan's role in developing the 'Plant Variety Protection and Farmers' Right Act' enacted by the Parliament of India in 2001, that recognizes the role of farmers as conservers of biodiversity and breeders in addition to their traditional role as cultivators. The footprints of Swaminathan in revitalizing biodiversity conservation in developing countries are well reviewed. Kesavan elaborates on Swaminathan's outstanding contributions in the formation of 'Iwokrama International Centre for Rainforest Conservation and Sustainable Development' in Central Guyana and of the Amerindian legend that forests are foundations of life, not just carbon sink. The chapter discusses Swaminathan's role in establishing a Global Network of Mangrove Genetic Resources Conservation Centre, in the Gulf of Mannar Biosphere, below sea level cultivation of paddy in Kuttanad (Kerala) and in getting it the recognition of 'globally important agricultural heritage system'.

Chapter 11 places in context how Swaminathan was in the 1980s cautioned against impending adverse effects of global warming on agriculture, when climate change was not an issue at all. In

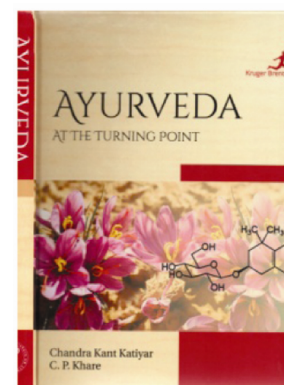
1998, Swaminathan was the first agricultural scientist to write on 'El Niño and monsoon management', and in the 1997 Japan Climate Conference he drew attention to sea-level rise due to global warming, melting of glaciers and how ingression of sea water could cause salinization of land and aquifers. While genetically shielding coastal agricultural crops with salinity, drought and submergence tolerance, he also led a programme at MSSRF to develop salinity-tolerant rice varieties.

In chapter 12, the author describes Swaminathan's deep concerns on hunger and under-nutrition. The then UN Secretary General, Ban Ki-Moon launched a 'Zero Hunger Challenge' in 2012, for the elimination of hunger, malnutrition and food insecurity. Kesavan describes how the innovative idea of 'farming system for nutrition' of Swaminathan was designed as a pathway to achieve nutrition security – a system for enhancing farmers' income while alleviating nutritional maladies with agri-horticultural remedies.

With a plethora of facts, analyses and deep insight, this book reflects the close collaboration Kesavan has had with Swaminathan and his family for over five decades. More than a traditional biography, it brings out Swaminathan's leadership. Kesavan's excellent authorship makes the connect between friendship with the Swaminathan family and intellectual skills to find a balance between involvement on the one hand and objectivity on the other. The book is an important and stimulating piece of work that all those interested in the role of science in society and those seeking commitment of young and old scientists, must read.

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**Ayurveda: At the Turning Point.**  
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While modern science was progressing in the West leading to Renaissance and Industrial Revolution, the geopolitical situation in India was not conducive for research or development. Although significant knowledge, wisdom and competence existed in this region, hardly any scientific advancement was possible. Indian communities were more concerned about preserving knowledge. This, in a way, led to the compartmentalization and monopolization of knowledge. India has witnessed a long period of great stagnancy that continued even during the pre- and post-independence periods.

India has a long history of knowledge generation. The Vedic and Upanishadic periods have marked excellence and leadership in several knowledge domains. Charaka (400 BC), considered as the 'Father of medicine', is the best representative example. His rational and critical approach opened a new era of cause-effect relationship and evidence-based medicine as opposed to prevalent ritualism. He compiled a comprehensive encyclopaedia of medicine, the *Charaka Samhita*, which elaborates principles, diagnoses and treatments. This classic text provides detailed knowledge of human anatomy, embryology, pharmacology, blood circulation, and diseases like diabetes, tuberculosis, heart disease, and of thousands of medicinal plants used in Ayurveda. This legacy was interrupted when India was in turmoil of invasions and instability. However, the situation started changing during the last two decades and has gained momentum during

last three years with an independent Ministry of AYUSH. Ayurveda indeed is at the turning point, getting ready for the long-awaited revitalization, and thus is at crossroads. Today, rational approach, critical thinking and an open mind are needed again in the spirit of Charaka to decide the right trajectory.

The book under review is a scholarly attempt in this direction. It provides in-depth description and analysis of prospects and interrogations faced by Ayurveda today. The book is a result of critical thinking and review of classical Ayurveda from contemporary outlook to project a blueprint for future practice, research and development. It serves as an effective instrument for change in the right direction when Ayurveda is at crossroads.

The two editors, Katiyar and Khare, bring extensive experience in classical Ayurveda as well as modern perspectives of science and technology. Both have contributed immensely to the field of Ayurveda and herbal medicine through several books, encyclopaedias and monographs. A book, *Modern Ayurveda: Milestone beyond the Classical Age*, published by them in 2012, reviewed the classical phase of Ayurveda. This thought process has been logically extended in the book under review with greater focus on contemporary research.

This is not merely a book but the result of a systematically executed project that analysed emerging trends during the last three centuries. This book is the product of an extraordinary effort involving 14 expert contributors dealing with relevant themes in 17 chapters. It is appreciable that the editors themselves have contributed to several key chapters of the book.

A lucidly worded Foreword by eminent scientist Sukhdev Swami Handa, provides an overarching introduction to the subject. When the world is moving from curative health care to disease prevention and wellness, the importance of Ayurveda is being intensely realized. Ayurveda in the 21st century needs emergence of new ideas, adventure and liberation from self-pride–past-glory attitude. Handa rightly warns that a myopic view may enhance marginalization, insecurity and complacency in the sector. Integrating Ayurveda, modern science and biomedicine to improve quality of health care and public health seems to be the right way ahead.

For the purpose of review, this book can be broadly divided into two parts. Part one (chapters 1–10) deals more with the history of Ayurveda and also reviews various efforts in the past for its revival. Part 2 (chapters 11–17) focuses more on scientific and technical aspects of Ayurvedic medicine. The opening chapter by Katiyar sets the stage by deliberations on Ayurveda at the crossroads. The chapter opens interesting comparative discussions such as purist versus progressive, North India versus South India, etc. This chapter covers other key aspects regarding research, education, Government policies, regulations, services, industry in context to the current scenario. The chapter on the state of Ayurveda and its revival movement describes efforts undertaken in the pre-independence period during the last three centuries in India.

A special chapter from the Presidential address of Col R. N. Chopra at the 35th Indian Science Congress on the theme of ‘Rationalization of Medicine in India’ is well conceived by Khare. Nomenclature dynamics of classical Ayurvedic texts may help ease the confusion arising from lingual dissimilarities. Divergent uses of classical Ayurvedic plant drugs are discussed in the light of the synonyms of classical Ayurvedic plants and variations in their uses according to the geographical distribution in India. An overview and recent leads obtained from Ayurveda, as a result of Indian efforts and initiatives of the Indian Council of Medical Research (ICMR), help understand efforts for revival of Indian traditional systems of medicine. Medicinal plants research and documentation by ICMR has played a key role in the revival process. The contribution of the Council for Scientific and Industrial Research (CSIR) in research and development of Ayurvedic plant drugs is substantial. A mention of the golden triangle project and a short section on New Millennium Indian Technology Leadership Initiative (NMITLI) herbal drug development project could have added more value to this book. This section of the book provides glimpses of activities undertaken by the Government of India through CSIR and ICMR and other councils like Central Council for Research Ayurvedic Sciences.

A chapter on selected research on Ayurvedic medicinal plants published in Indian journals provides handy compilation of important abstracts of research

studies conducted on Ayurvedic medicinal plants in various diseases, including diabetes, inflammation and pain, liver diseases, heart diseases, infectious diseases and reproductive health. This exhaustive chapter can serve as a good reference material for global researchers because it covers many Indian journals, which may not be easily available online.

The second section of the book mainly deals with the technical aspects of mainstreaming Ayurvedic formulations. This section focuses on problems faced in pharmacopoeia standardization of Ayurvedic drugs, marker standardization for various herbs in commerce, bioactive phyto-constituents used as natural medicine and challenges in developing pharmaceutical dosage forms. The emerging research interests in herb–drug interactions of Ayurvedic medicines and prescription drugs are also discussed.

A chapter on pharmacological and clinical researches on frequently used Ayurvedic medicinal plants is another special feature of this book. Thirty-five important Ayurvedic medicinal plants have been carefully reviewed for research articles available from online databases such as Scopus, PubMed and Google Scholar. This chapter contains handy tables providing essential information, including title, type of study, design, form and dose of the respective medicinal plant, summarized efficacy and conclusion with authentic reference. This chapter provides valuable information on research carried out on a wide range of medicinal plants. For example, a section designated to *Amlaki* (*Embllica officinalis* Linn) describes 10 studies specifying the form and dose of *Amlaki* ranging from fresh juice to phenolic extracts along with its uses as anti-arthritis, antioxidant, natural cognitive enhancer, anti-osteoporosis, anti-inflammatory, anti-hyperglycaemic, and immunomodulatory agent. Such diverse information at one place is very helpful for students, researchers, industries and clinicians.

*Ayurvedic Pharmacopoeia of India (API)* published in two grand volumes is an authentic and legal source for providing the standards of quality of raw materials as well as finished products of Ayurvedic medicinal plants. *API 1* covers raw materials in eight volumes, while *API 2* covers finished products in two volumes. However, referring to these 10 volumes can be cumbersome and

time-consuming if one is not acquainted with the nature of pharmacopoeia. The editors have developed a concise version of *API* which compiles information on common Ayurvedic plant names, their botanical names, parts used, constituents, chemical formulae, properties and actions, important formulations, and therapeutic uses and dose. A total of 600 entries have been documented in this useful chapter. The editors and authors must be complimented for providing simple, easy-to-use, ready reference of *API* for the convenience of readers.

To conclude, this book takes a timely and critical look of Ayurveda to chart a progressive path towards future health care. The scientific evidence is essential to ensure quality, safety and efficacy of Ayurvedic drugs. The editors have accomplished an extraordinary task of organizing and summing-up essence from various fields for creating this valuable reference book. The hard-bound cover and layout of 625 pages is attractive and user-friendly. The back cover provides key points of the content. As depicted by a beautiful photograph of

saffron flowers, this book gives the best fragrance and flavour of Ayurveda at the turning point. The extraordinary efforts by the editors in compiling this handy, yet informative reference volume deserve to be applauded.

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