fits, does it contribute to significant cost savings or profit maximization, etc. Many actors need to play roles to make the energy interventions happen. The actors at multi-level play roles as enablers, supporters, implementers, managers, beneficiaries and pressure groups. The next chapter delves on how these actors in the domain of government, business, society and consumers perceive the benefits and drawback of energy efficiency. The actions and inactions of these actors also result in emergence of barriers, which prevent implementation of energy efficiency. Removal of these barriers is essential and this is typically done through adoption of strategies related to effective policies, economic incentives, market transformation and capacity development. The authors, in chapter 6, introduce the concept of barriers and elaborate on the existence of different types of barriers at the macro, meso and micro level of the economy. Importantly they contribute to the development of a detailed analytic taxonomy of barriers to energy efficiency.

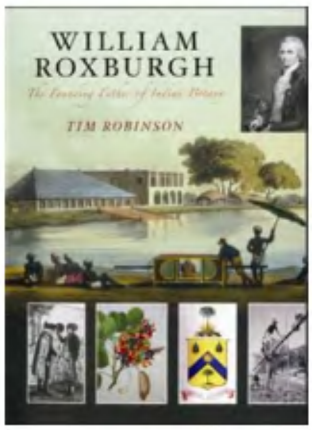
Climate change and energy efficiency as a technological option to mitigate it is largely perceived as a new investment without any corresponding benefits, either public or private. This prevented the governments, public and private sector organizations from taking any actions and the international community felt the need for framing of binding international laws to force countries to participate in climate change mitigation and private sector to make contributions to such efforts. Chapter 7 contains a detailed discussion on the availability of many types of international conventions, laws and mechanisms. Some of the important ones discussed are the United Nations Convention on Climate Change, Kyoto Protocol and Marrakech Accords, emissions trading, etc. In the presence of long serving and preferred, though inefficient, energy technologies, the newly introduced energy efficient technologies as substitutes are bound to fail because of the unfair competition. Also, lack of market pull forces and non-availability of private capital prevent emergence of such technologies from the R&D labs into the broader market. This process, commonly called as commercialization of technologies, is an important step in diffusion of energy-efficient technologies. The authors have dealt in detail the process of commercialization and the enabling mechanisms in Chapter 8. Commercialization requires financial resources but they are hard to come by. In the context of energy-efficient technologies, the financing mechanisms need to be innovative, the financial institutions should be risk taking and governments and international organizations have to be taking active roles, and only then the process can become successful. Chapter 9 elaborates on factors influencing financing energy efficiency and many types of financial institutions that have invested and forthcoming to invest in energy efficiency. The title of chapter 9 has terms 'transition economies' which are unclear and could have been avoided.

Institutional support is very much essential for transforming the initial scientific idea into fully commercialized energy efficiency product and making it available for the larger community at affordable prices. Chapter 10 has a good discussion on role of institutions like government, R&D labs, utilities, industries and financial institutions in facilitating this process. Uniqueness in this effort is that the authors have gone beyond just explaining the roles of various institutions by including the issue of performance analysis of these institutions. Authors have dealt in detail on the aspect of selection of performance standards, evaluation methods and factors influencing success or failure of an institutional approach. The book ends with an epilogue by giving the dichotomy of the issues related to climate change and energy efficiency. It is a herculean task to internalize the so-called unwanted externalities. In other words, the attempt is to present an environmentally and socially desirable action as most profitable for the government, private sector and individuals to act upon. Overall, the book is a significant contribution towards enhancing this understanding.

This book would be of immense use to both students and professionals specializing in energy and environmental planning and policy, climate change, sustainable development, energy management, etc. It is recommended as a reference book for students of energy and environment management, public policy, and development economics and studies. It will also be useful to professionals who would like to become trained energy and environmental auditors, energy managers, international consultants, etc. It serves as a reference source in energy efficiency and climate change, and best purchased by libraries.

BALACHANDRA PATIL

Belfer Center for Science and International Affairs,
Harvard Kennedy School,
Harvard University,
Cambridge MA 02138, USA
e-mail: balachandra_patil@hks.harvard.edu



William Roxburgh: The Founding Father of Indian Botany. Tim Robinson. Phillimore & Co. Ltd, England in association with Royal Botanic Garden, Edinburgh. 2008. xviii + 286 pp. Price: £ 50.00.

This treatise is an outcome of dedicated research and in-depth analysis done by Tim Robinson on the life and scientific contributions of 18th century botanist, William Roxburgh (1751–1815) who is aptly referred to as father of Indian botany. Roxburgh's nearly 40 years of sojourn in India and stunning contributions has laid firm foundation and opened new vistas in botanical studies. His pioneering investigations in unravelling the economic potentials and cultivation practices of plant species yielding fibres, dyes, spices, etc. have immense bearing in augmenting the agrarian practices and economy of the country. The scholarly account well organized in 3 parts and 15 chapters, followed by 10 appendices, notes, bibliography, glossary and index, coupled with 129 figures and 26 tables evinces keen interest of the lay and professional reader.

Part 1 spread in 5 chapters deals with 'The Life of William Roxburgh'. In chapter 1, his childhood, education, influence by his teacher, John Hope and arrival to India are presented. In chapters 2 and 3, the author provides in-depth

details of the activities that happened during Roxburgh's stay in Coromandel Coast area during 1776–93 and as Superintendent of the Calcutta Botanic Garden from 1793 to 1813. Chapter 4 deals with the personal life sketch. Chapter 5 provides details of Roxburgh's life after stay in Calcutta during 1813–15.

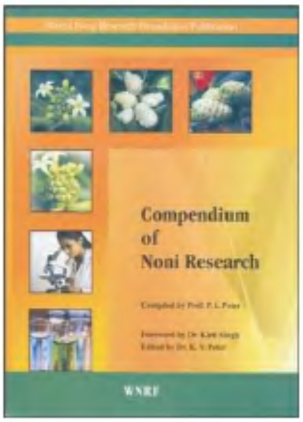
Part 2 arranged in 2 chapters forms the fulcrum of the book which highlights the scientific contributions of William Roxburgh. Chapters 6 and 7 elucidate Roxburgh's botanical contributions, early beginnings of botanical drawings by local artists, field equipment used for collection and transport of plant specimens, introduction of plant species having economic potential, contributions to the field of meteorology, mineralogy and animal sciences.

Part 3 comprises chapters from 8 to 15. Chapters 8–12 provide pioneering contributions of Roxburgh in initiating and popularizing the introduction and cultivation of dye yielding plants, hemp and fibrous plants, pepper and spices and sugar. Roxburgh's notable contribution in mitigating the sufferings of the people by introducing novel irrigation techniques and in tapping the Godavari water resources judiciously is highlighted in the 13th chapter. Chapter 14 deals with Roxburgh using the excuse of ill health to spend 18 months plant-collecting in the Cape of Good Hope during 1798–99. Chapter 15 looks at the importance of Roxburgh and how he was viewed by his contemporaries: two comments stand out – 'the founding father of Indian botany' and 'the greatest botanist since Linnaeus', both of which appeared in his obituaries. He was a man standing at the cross-roads of botanical development, looking back to the 17th and 18th centuries yet laying the foundations for the expansion of the 19th century. In the concluding part are 10 appendices enumerating Roxburgh's publications, location of his drawings and herbarium collections, plants introduced at Kew gardens, botanical correspondents, family tree of Roxburgh, genera described in commemoration of leading personalities and statement of accounts related to building repairs and plant collecting costs.

In conclusion, this praiseworthy book is a complete source of information on William Roxburgh. Tim Robinson deserves commendation for vividly portraying the life sketch and achievements of Roxburgh. The author's proficiency as historian and biologist has greatly enhanced the readership of the book. This book must be read by all to get first hand information on the value and richness of Indian flora.

P. V. PRASANNA[1]
P. LAKSHMINARASIMHAN[2]

[1]*Botanical Survey of India,*
Deccan Regional Centre,
Zoological Survey of India Campus,
Plot No. 366/1, Attapur (V),
Hyderguda (P.O.), Inner Ring Road,
Hyderabad 500 048, India
e-mail: prasanna_parigi@yahoo.co.in
[2]*Central National Herbarium,*
Botanical Survey of India,
P.O. Botanic Garden,
Howrah 711 103, India



Compendium on Noni Research – compiled by P. I. Peter. K. V. Peter (ed.). World Noni Research Foundation, 12, Rajiv Gandhi Salai, Chennai 600 096. 2009. 884 pp. Price not mentioned.

Noni is the popular name for the plant *Morinda citrifolia* which belongs to the coffee family Rubiaceae and is native to India and known as Indian mulberry. It is distributed in many tropical countries including Polynesian Islands where it enjoys a significant reputation. Noni with the Sanskrit name 'Achuka' is said to have beneficial properties in Ayurveda. However it does not figure in the list of 89 plants given in *A Selection of Prime Ayurvedic Plant Drugs. Ancient–Modern Concordance* by Sukh Dev (Anamaya Publications, New Delhi, 2006) or *Indian Medicinal Plants, A Compendium of 500 Species* (Arya Vaidyasala, Kottakkal, Orient Longman, 1994). The latter has a monograph on *M. pubescens* (also Indian mulberry!) with the Sanskrit name 'Paphanaha', which besides having medicinal value, is also a commercial source for 'morindone' or 'suranji', an anthraquinone used for dyeing of cotton, silk and wool in shades of purple, chocolate or red. The dye is also present in *M. citrifolia*.

The Noni plant, particularly the fruit juice is stated to afford remarkable health benefits and is being used widely in Polynesian Islands and other parts of the world as a health supplement. It is popular in Malaysia as 'Mengkudu'. It is legally sold in the European community since 2003. The total world market was reported to have reached USD 1.3 billion in 2007 and Noni was number one for sale of single herbs in USA. It is not surprising therefore that an enormous amount of research has been conducted on Noni and published. Reflecting this interest, a Chennai-based organization called the World Noni Research Foundation has been established which in turn brings out two journals, *International Journal of Noni Research* and *Noni Clinical Research Journal* to post scientific activities on the plant.

The compendium under review has put together a number of papers, articles, journal abstracts, conference abstracts and a few reviews under the sections Original Research Papers, Abstracts of Research Papers, Antioxidant and Anticancer Activity of Noni, Abstract (sic) of Antibacterial, Viral (sic) Activity of Noni, Abstract (sic) of Toxicology and Pain Killing Effect of Noni, Abstract (sic) of Reviews and General Articles on Noni, Miscellaneous Papers and Bibliography to record the results of various research activities including agronomy, phytochemistry, biosynthesis, biological testing, and potentials in human therapy and health and supplemented these with a bibliography of 925 references. In a review article in 2002 by M. Wang *et al.* (pp. 35–49), medicinal uses of Noni juice are listed as treatments for arthritis, diabetes, high blood pressure, muscle ache and pain, menstrual difficulties, headache, heart diseases, AIDS, cancer, gastric ulcers, sprains, mental depression, senility, poor digestion, atherosclerosis, blood vessel problems and drug addiction. The comprehensive and valuable review by A. D. Pawlus and A. Douglas Kinghorn published in 2007 (pp. 203–225) reports that phytochemists have iso-