To sum up, this is possibly the first book on the subject of seafaring. The volume has helped to clarify both the areas of agreement and dissent, and identify the gaps in our understanding of the subject. The glaring gaps in the global coverage in the volume relating to eastern Asia (except Japan), Arabian Sea, and the Americas have been already pointed out by the editors. We hope that the present organizers will arrange another conference, sooner rather than later, to fill the missing gaps in our information, and possibly also identify the use of newer tools and techniques to unravel the mysteries of seafaring.

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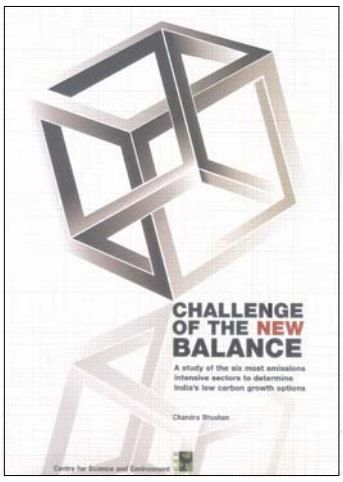

Challenge of the New Balance: A Study of the Six Most Emissions Intensive Sectors to Determine India's Low Carbon Growth Options. Chandra Bhushan. Centre for Science and Environment, 41 Tughlakabad Institutional Area, New Delhi 110 062. 2010. v + 149 pp. Price: US$ 39.

Greenhouse gases (GHGs) make up only about 1% of the atmosphere, but they act like a blanket around the earth, or like the glass roof of a greenhouse – they trap heat and keep the planet some 30°C warmer than it would be otherwise. Human activities are making the blanket 'thicker' – the natural levels of these gases are being supplemented by emissions of carbon dioxide (CO_2) from the burning of coal, oil and natural gas; by additional methane and nitrous oxide produced by farming activities and changes in land use; and by several long-lived industrial gases that do not occur naturally. These changes are happening at an unprecedented rate. If emissions continue to grow at the current rates, it is almost certain that the atmospheric levels of CO_2 will double from the pre-industrial levels during the 21st century resulting in the rise of average global temperature by 1.8°C to 4.0°C by the year 2100. Over a decade ago, most countries joined an international treaty – the United Nations Framework Convention on Climate Change (UNFCCC) – to begin to consider what can be done to reduce global warming and to cope with whatever temperature increases are inevitable. More recently, a number of nations approved an addition to the treaty, the Kyoto Protocol, which has more powerful (and legally binding) measures, especially for high carbon-emitting nations in the developed world. The recent Copenhagen summit was a further step in this direction, but failed to produce the desired results owing to various reasons.

The book under review provides a succinct description of the above-mentioned issues on carbon emissions and climate change, and what low carbon growth options are available for key industrial sectors with high carbon emission rates. The book is a compilation of the statistics and research done by the Centre for Science and Environment (CSE), New Delhi as part of the recent Green Rating Project, which looks carefully at the lifecycle of different industrial sectors to benchmark performance and gather information on energy and water usage in various industries. The author has put in tremendous effort in compiling and analysing the statistics and in gradually developing this book, giving clear strategies for selected industrial sectors (power, steel, aluminium, cement, fertilizer, paper and pulp) to achieve low carbon growth.

It is a short book running into about 150 pages, but is extremely focused and crisply written. It is rich in data, and most of the analysis and interpretation is objective rather than subjective. As also highlighted, the book assumes importance owing to the recent voluntary declaration (on 30 January 2010) by the Ministry of Environment and Forests, Government of India, to the UNFCCC regarding reduction in emission intensity of its GDP (excluding the agriculture sector) by 20–25% by 2020 in comparison to the 2005 level. The industrial sectors covered in the book account for 61.5% of India's CO_2 emissions in 2008–2009. The style of writing and presentation in this book is different but impressive, and makes reading much more interesting and enjoyable for the general reader. Each chapter starts with a short abstract and few important punch lines from them. Further, separate boxes are used within the chapters to highlight the important contents. The complete book is divided into six chapters, with each chapter devoted to one industrial sector. Additionally, there is one summary section called 'the study' before the first chapter and two other additional sections on 'low carbon growth' and 'overview' after the sixth chapter. All the six chapters are evenly structured, which makes it easy for the general reader to comprehend the contents. Each chapter starts with a short summary followed by an overview of that particular industrial sector. Further, it presents the details of the study, including the present energy consumption and GHG emissions for that sector. Next, the chapter presents various options available and the production projections for that sector. Finally, it presents the future emissions scenario, both for business as usual (BAU) and low carbon (LC) scenarios.

The first chapter is devoted to the industrial sector of 'power'. It is highlighted that the average specific CO_2 emissions from coal-based thermal power plants in India (1.1 kg/kWh) is equal to the global average. However, there is potential to reduce emissions using advanced steam parameters, and better grid and load management practices. But, high temperature and humidity along with poor coal quality will be an impediment to achieve the level of efficiencies currently being touted for supercritical plants. The chapter concludes that the emission intensity of the power sector in the BAU scenario would reduces by 18% between 2008–2009 and 2030–2031, whereas in LC scenario the reduction will be by 35%, largely because of massive deployment of renewable energy technologies.

The second chapter focuses on the industrial sector of 'steel'. The author points out that the per capita steel consumption in India is one-fourth that of the global average, and massive growth in infrastructure and the housing sector, as projected by the Government agencies, will lead to high growth in the demand of steel products in the future.

However, CO_2 emission intensity of the Indian steel industry is high compared to the global average. The chapter highlights that this sector has a high energy-saving potential vis-à-vis best available techniques. The chapter concludes that by 2030, the emission intensity of steel production will reduce only by about 8% in the BAU scenario. In LC scenario, the emission intensity will stagnate after 2020 owing to limited technology options.

The third chapter focuses on the 'aluminium' sector and highlights that the Indian aluminium industry is among the lowest users of electricity in aluminium smelters in the world. By adopting pre-baked anode technology it also has one of the lowest perfluorocarbon emissions in the world. But because of very low efficiency of coal-based captive power production, carbon intensity in this sector is well above the global average. The reduction in emission intensity between 2008–2009 and 2020–2021 will be about 17% for BAU and about 40% for LC scenario for the aluminium sector. However, beyond 2020–2021, the intensity will stagnate in both cases.

'Cement' is the focus of the fourth chapter. It is pointed out that the Indian cement industry is probably the most energy-efficient in the world today. While the market share of blended cement (which is less energy and emission intensive than ordinary Portland cement) is high in India, the percentage of blending material in cement is still lower than what is possible, which can be useful in further decreasing the emissions. In the BAU scenario, the authors expect a reduction in specific energy consumption and CO_2 emission by 25% by 2030, largely on account of blended cement and greater blending proportion, whereas in the LC scenario this reduction is expected to be 35%.

The fifth chapter is devoted to the 'fertilizer' industry. The author points out that the Indian fertilizer industry is energy-efficient owing to the best practices adopted in gas-based plants. Some of the Indian gas-based plants are the best in the world. However, at present, 22% of India's urea production is from less-efficient heavier feedstock and the way forward is to move to natural gas. The emission intensity of urea products in MT CO_2-e/tonne is expected to reduce from 0.7 in 2008–2009 to 0.56 and 0.43 in 2030–2031 under BAU and LC scenarios respectively.

The focus of the sixth chapter is on 'paper and pulp' industry. The chapter highlights that the sector will always lag behind global best performance in energy and emission intensities, which is because of its inability to profitably scale down the best practices. Indian mills are small and likely to remain so in the future. Inconsistency in the nature and quality of raw materials, and the fact that Indian mills are multi-product in nature, pose further limitations. The emission intensity of paper and pulp industry in MT CO_2-e/tonne is expected to marginally reduce from 3.0 in 2008–2009 to 2.1 and 1.6 in 2030–31 under BAU and LC scenarios respectively.

The additional section on 'low carbon growth' summarizes the carbon emission scenario and throws some important points on natural resource requirements in future. The section highlights that the total GHG emissions from the six sectors in 2030–2031 is likely to be 3.6 times and 3.0 times the 2008–2009 emissions in BAU and LC scenario respectively. It is also interesting to observe from this section that the freshwater withdrawal in 2008–2009 by the six sectors was equivalent to the daily freshwater needs of about 1.1 billion people, i.e. the entire drinking and cooking needs of the country. Further, the freshwater requirement is expected to increase by 40% by 2030–2031 under BAU scenario. Even the effect of LC scenario will be minimal on the reduction in freshwater requirement. Further, from now up to 2030–2031, an estimated 1 m ha of additional land will be required for mines and to set up plants for the six sectors in the BAU scenario and the land requirement will be 30% higher than BAU for LC scenario.

This book has many positive points. It is an excellent guidebook for practitioners, bureaucrats, policy-makers and politicians to devise strategies to reduce carbon emission intensity from the six sectors covered in the book. What the book clearly shows is that there are relatively easy options to reduce emissions in the short term in the BAU scenario. Therefore, even in the current situation, with the use of technology now being adopted by new plants across sectors, the emission intensity of the GDP from these sectors together can easily be reduced to achieve the target of 20–25% reduction by 2020. Nevertheless, what is needed is to speed-up the pace of implementation of the different policy and regulatory changes already announced by the government, which will push the process a little faster. But the worry is that what we do today will constraint and seriously limit any options for real emission reduction beyond 2020. On the negative side, the book is heavily number-centric and statistics-based. In other words, the description of methodological approaches and modelling behind various trends and figures and suggested measures is minimal or often missing in the book. This makes it unattractive for students and inappropriate to be used as a textbook.

Overall, the author's effort in covering the subject is commendable. It will provide the right direction for many such books to be written in future focusing on other sectors as well.

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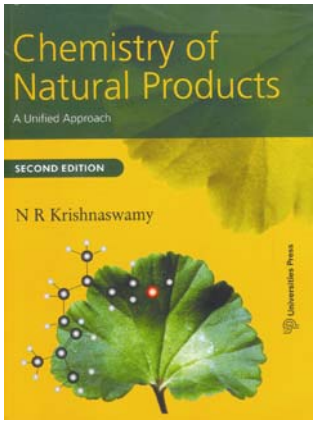

Chemistry of Natural Products: A Unified Approach. N. R. Krishnaswamy. Universities Press (India) Private Limited, 3-6-747/1/A and 3-6-754/1, Himayatnagar, Hyderabad 500 029. 2010. xiv + 418 pp. Price: Rs 475.

In the last two decades, interest in natural products chemistry has declined due to the strategic shift in major pharmaceutical companies towards combinatorial chemistry as the primary source of hits and leads. Interestingly, this decline coincided with the drying up of the pipeline of the 'first-in-class' drugs for unmet medical needs. These issues have been