

## BOOK REVIEWS

measure the happiness of their people and to use this to help guide their public policies. As a follow-up, the first World Happiness Report for 156 countries was published in 2012, presenting a wide range of internationally comparable data, including a ranking of national average life evaluations based on Gallup World Poll data from 2005 to 2011. It also contained three case studies: one on Bhutanese Gross National Happiness framework, the second efforts by the United Kingdom to devise and collect measures of well-being, and the third on well-being measurement guidelines of OECD for the use of National Statistical Offices. The 2015 World Happiness Report, published by the Sustainable Development Solutions Network, shows India at the 117th position out of 158 nations compared for Global Happiness Index based on indicators, including GDP per capita, life expectancy, social support, perceptions of corruption and freedom to make life choices. Countries in the top five positions are: Switzerland, Iceland, Denmark, Norway and Canada.

Increasingly, happiness is considered a better measure of social progress and goal of public policy, and more refined concepts of happiness and well-being are likely to help guide progress towards inclusive sustainable development. The biohappiness concept, proposed by Swaminathan, on further elaboration and with suitable indicators, may assist in evolving another national well-being index as a more realistic measure of social progress, particularly in biodiversity-rich developing countries like India.

This revised edition, with an added chapter, takes the reader in search for biohappiness through several pathways and options described in its 28 chapters grouped into four broad sections. It covers a wide range of topics; though these may not appear to be evolving in a sequential pattern, yet all of them are strongly bonded by the common thread of biodiversity and food, health and livelihood security. The first section broadly covers conservation, cultivation, consumption and commerce as pathway links for achieving biohappiness through sustainable food security and application of biotechnology and integrated gene management for improvement of crop plants, while also drawing attention to mangroves in coastal zones. This is followed by a section on science and sustainable food security with a discussion

on Ever Green Revolution, so as to extend the 1960–1970s Green Revolution to eastern and other states that have not yet received full benefits of modern tools and techniques. This section also discusses natural disaster management and striving for food security under adverse conditions. The third section draws attention to food security in the face of climate change and inequalities in drawing benefits from economic growth while pleading for development of common international goals in this context.

These three sections have not been revised in this second edition, but a new section entitled ‘Towards furthering biohappiness’ has been added bringing a renewed focus on new technologies for transforming small farm productivity, making full use of traditional knowledge, overcoming malnutrition and meeting the zero-hunger challenge. A Preface has also been provided to this edition, further clarifying the thematic approach giving background information for planning and scoping of this publication. Its concluding chapter elaborates the distinguished author’s vision of a food-secure India, with an expectation that a focused drive during the 2016 International Year of Pulses would help in bridging the demand–supply gap though the forecast for the current year seems to be disappointing in view of the prevailing unfavourable weather conditions and abnormal rainfall pattern.

A noteworthy suggestion emerging from this book is that farmers should receive proper insurance support and the relevant procedures should promote group insurance on an agroecological basis. The Pradhanmantri Fasal Bima Yojana, announced in January 2016, appears to meet this recommendation by offering low premium rate for farmers and one premium rate each season for all food grains, oilseeds and pulses (*kharif* crops @ 2% and *rabi* crops @ 1.5%), removing all variation in premium rates across crops and districts within a season. Another significant proposal is that the Government should promote an ‘Indian single market’, so that agricultural commodities can move across State frontiers without hurdles, since this single step would help eliminate a major cause of price volatility, particularly for perishable commodities like vegetables.

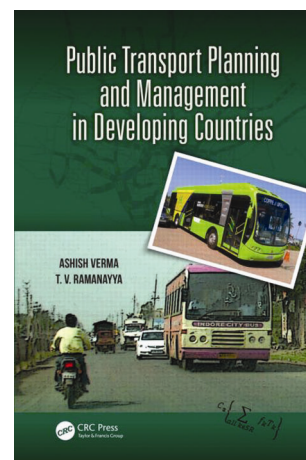
The author’s pointed reference to the role of traditional knowledge, and implied cultural diversity, in achieving bio-

happiness deserves urgent attention. This will need developing appropriate guidelines on this aspect and also proper legal framework for its protection as required to meet our national obligations under the legally binding Nagoya Protocol on Access and Benefit Sharing which entered into force in October 2014, and to which India is a contracting party.

Written in an easy-to-read style and printed in comfortable typeset, the book is a must read for students, researchers, managers, policy-makers, community workers and general public interested in promoting biodiversity conservation and inclusive sustainable development in a win-win situation and learning more about the biohappiness concept.

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**Public Transport Planning and Management in Developing Countries.** Ashish Verma and T. V. Ramanayya. CRC Press, Taylor & Francis Group, 6000 Broken Sound Parkway NW, Suite 300, Boca Raton, FL 33487-2742, USA. 2015. xiv + 264 pages. Price: £ 54.39.

World over, urbanization and economic development have invariably progressed hand in hand. While economic development is certainly desirable, its negative fall-outs need to be proactively addressed at the outset. Moreover, for sustainable development, it is imperative that each of its individual components

needs to be sustainable as well. Since the transport sector is an essential component of any economy, the sustainability of this sector is vital in enhancing or, at least, maintaining the current rate of development. Sustainable transport is simply defined as one that satisfies the current mobility needs without compromising the ability of the future generations to meet these needs. While defining 'sustainability', it is important to take into consideration the social, environmental and climate impacts of the existing and future proposed transportation infrastructure.

In this regard, the book under review plays an important role in addressing the major issues pertaining to public transport planning and management in the context of developing economies in general, and India in particular. Owing to twin factors, viz. poor land use and the lack of urban planning on the one hand, and growing income, rapidly rising car ownership and increasing travel demand (owing to suburbanization) on the other, the developing countries face peculiar issues in terms of planning and management of their public transport needs. The book attempts to look into the analyses of these issues in detail and supports the same with rich data and case studies mostly based on the authors' own research studies. It may potentially be looked upon as a one-stop-shop for students/researchers looking for appropriate reference material pertaining to this arena. The material compiled by the authors has been systematically organized in the form of nine chapters.

The first three chapters are mostly introductory in nature. The first chapter sets the context for analysis. It discusses the broad urbanization trends and points out how the current transportation infrastructure is grossly unsustainable in the light of these trends. The gravity of the issue is brought out by discussing some stark statistics about how the private vehicle ownership is set to increase by 13 times its current levels by the year 2035 in the absence of suitable measures to improve the quantum and quality of public transport. The inevitable impact of this increasing motorization is on the mobility (average speeds and the volume to capacity ratios), energy consumption and consequently CO<sub>2</sub> emissions.

The second chapter introduces the reader to the broad demographic trends in the Indian context. It has been well-

explained that owing to their distinctly different demographic structures, the problems confronting the urban-rural demographics are exactly contrary to one another. While the lack of connectivity and accessibility resulting in severe mobility issues seems to plague the rural settlements, the limitation of the existing network to meet the ever-increasing travel demand is the main challenge encountered by the urban transport infrastructure. The third chapter is mostly descriptive in nature – it mainly deals with different transport modes (public and private) and their characteristics. Finally, it lays down the vision for public transportation in the future based on the dimensions of mobility, connectivity, complementarity (complementary to other private means of transport), exclusivity (public transport as the exclusive means of travel in high-density areas) and sustainability.

Chapter 4 is a deep-dive into the current state of public transportation in India. The public transport encounters the classic dilemma of conflicting goals of simultaneously attaining social objectives along with commercial viability. In India, most of the urban transportation needs are primarily met by bus transport. The social commitments combined with the poor operating practices often result in huge losses for the public transport companies. Despite the operating costs (per bus km) exceeding revenues, the bus fares need to be kept low. This results in poor upkeep of the existing buses and prevents addition of superior quality ones to the existing stock. Consequently, many cities are dominated by old and fuel-intensive buses that are often overcrowded with undependable service standards. The poor state of the existing public transport infrastructure is further confirmed by the results from the service quality survey conducted on the BMTC bus users in Bengaluru – it is below par across all of the service-quality dimensions. Even in cities where there exist multiple means of public transport, there is very little coordination among them. What is particularly striking is the absence of a master plan for public transport. In fact, most public transport corporations in India do not have transport planning and modelling divisions, and most decisions are taken reactively via demand-response techniques alone.

Chapter 5 discusses the challenges with respect to public transport planning

in rural areas. Two key issues in this context are mobility and accessibility. While the former refers to the 'ability of a person for getting around (faster travel)', the latter refers to the relative ease with which a person can reach a scheduled destination (connectivity). The thrust of policy formulation in the past has been primarily on mobility, whereas now it has shifted to accessibility (with projects such as Pradhan Mantri Gram Sadak Yojna that emphasizes on connecting rural settlements via all-weather roads). However, it is not advisable to regard mobility and accessibility to be mutually contrary to each another. Rather, in the Indian context, both these issues need to be addressed simultaneously if rural areas are to emerge as the thriving regions of economic activity. It is moreover important that, rather than the current ad-hoc strategy, it is better to have a simple and direct network approach to rural public transport based on a hierarchy of routes that translates to consistency and reliability. However, this approach needs to be effectively presupposed with systematic segmentation of freight and passenger road transport patterns and estimation of the demand in each of these segments. Moreover, to suit the peculiar patterns and volume of rural traffic, certain innovative solutions would be needed such as designing smaller buses or liberalizing para-transit operations (shared autos) for rural and intra-district mobility.

Chapter 6 is more technical and focuses on the mathematical approaches to public transport planning in the urban areas. It starts with a technical description of the basic structure of the classical transport model that is made up of four distinct categories of models. (a) Trip generation (frequency of origins and destinations of trips by trip purpose). (b) Trip distribution (estimation of target year trip volume by matching the origins



Median bus lane in Ahmedabad (Janmarg)

with destinations). (c) Mode choice (estimating the mode choice). (d) Route assignment (choice of path). Further, it discusses in detail the travel demand modelling, which refers to simulations based on the replication of real-world multi-modal transport network conditions. The chapter also deals with the routing and scheduling of public transport and explaining optimum transit unit (TU) capacity.

Chapter 7 focuses on practical solutions pertaining to urban transport management. These fall under the purview of the transportation system management (TSM) programme which is the short-term element of the overall transportation improvement plan (TIP). The TSM includes less capital-intensive options that can improve transportation in the short term. Most of these pertain to aspects such as improved vehicular flow, preferential treatment of high-occupancy vehicles, reducing peak-period travel, parking management, and so on. The chapter also analyses the performance of public (State Transport Undertakings (STUs)) and private transport operators in India, and outlines the major impediments encountered by each of them.

Chapters 8 and 9 deal with the financial performance and economics of public transport in India. The data presented here reveal that barring a few, most of the STUs in India make perpetual losses. The major causes for this poor economic performance have been identified as high motor vehicle taxes, uneconomic fare structure and high manpower costs. In the light of the growing debt burden of the STUs, a strong case is made for establishing an institutional financing channel to cater to their funding requirements. Further, a range of innovative methods is suggested for generating revenue surpluses – such as peak-load pricing, ridership points (similar to airlines mileage points), variety in bus services (to cater to diverse sections of the population), all aimed at enhancing the ridership and revenue. Moreover, it is recommended that an approach of estimating the benefits of public transport cannot be based on an assessment of the direct financial benefits alone. Rather, there exists a strong case for performing a social cost–benefit analysis. In this context, it is proposed that the economic value-added methodology be adopted to incorporate the opportunity cost of meeting socio-economic objectives.

Overall, the book is informative and insightful, and presents rich data supported by relevant case-studies. However, the flip-side is the overload of information that may often cause the reader to get lost in the wide array of figures and tables. Given the fact that each chapter touches upon a range of diverse issues, it might be useful from the viewpoint of the reader, if a clear outline was laid out at the beginning of each chapter. This will also serve the purpose of logically linking each sub-section to the next one. In its current form, many of the sections often appear abrupt and leave the reader wondering how the same are related to what has been discussed in the earlier part of the chapter. There are also some issues with respect to formatting, typographical errors and resolution of the figures. Moreover, it would have been useful if the authors could have thrown light on how some of the more recent phenomena such as the arrival of app-based taxi operators (Uber, Ola, etc.) or car rentals (Zoom cars) would impact the existing public transport infrastructure. Further, it would have been interesting to understand the Indian experience in terms of the usage of electric and hybrid vehicles (particularly since these contribute directly to sustainability). To summarize, the book scores high on content, but low on readability. Nevertheless, as stated earlier, it might still be a one-stop-shop for students/researchers looking for consolidated information related to this topic at one place.

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**Annual Review of Neuroscience, 2014.** Steven E. Hyman, Thomas M. Jessell, Carla J. Shatz, Charles F. Stevens and Huda Y. Zoghbi (eds). Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, California 94303-0139, USA. Vol. 37. x + 550 pages. Price: US\$ 96.

Neuroscience is the scientific study of the nervous system whose huge advances in the last few decades is strongly linked

to the progress in other related fields like molecular biology, electrophysiology and computational neuroscience. It emerged as a unified discipline only around 1971. This has enabled neuroscientists to better understand aspects related to the structure of the brain, its development, function, neurological disorders and ways to treat these abnormalities. Its interdisciplinary nature is becoming stronger and closely linked with subjects like computer science, chemistry, mathematics, psychology, medicine and engineering. The interdisciplinary work has resulted in the emergence of different branches of neuroscience like molecular neuroscience, cellular neuroscience, developmental neuroscience, computational neuroscience, cognitive neuroscience, neurophysiology, behavioural neuroscience, affective neuroscience, clinical neuroscience, neuroinformatics, neuro-engineering, neuroimaging and systems neuroscience.

This volume is a collection of articles on the current work being done in different branches of neuroscience, although not in any particular order. There are quite a few reviews related to cognitive neuroscience and the neurobiological basis of certain cognitive disorders. Cognitive neuroscience emerged as a combination of the theoretical aspects of cognitive science and neuroscience, including neuropsychology, and attempts to understand how the neural circuits in the brain produce behaviours or psychological functions, i.e. the brain–mind connection. Recent advances in functional neuroimaging such as functional magnetic resonance imaging (fMRI) and PET coupled with presentation of natural stimuli and tasks are used to understand these aspects. fMRI relies on blood-oxygen-level-dependent (BOLD) signal. The basis for the signals is the coupling between the local blood flow in the brain and neuronal activity by the process of neurovascular coupling. There is an interesting review by Hillman that examines the cellular (astrocytes, pericytes, interneurons and neuronal networks) and vascular bases of neurovascular coupling in the BOLD signals. In human languages, we have both syntax–grammatical structure using lexical building blocks, and semantics – the meaning associated with such grammatical constructions. Using meta-analysis, a statistical approach combining results from multiple neuroimaging studies, Hagoort and