

The Singapore Water Story Sustainable Development In An Urban City State Author Cecilia Tortajada Published On June 2013

Institutional Governance and Regulation of Water Services aims to provide the key elements of policy, governance and regulation necessary for sustainable water and sanitation services. On policy matters, it covers important aspects including separation of policy and delivery, integrated planning, sustainable cost recovery, provisions for the poor, and transparency. Regulation and Regulatory Bodies are presented in their various forms, with discussion of why some form of independent scrutiny is essential for sustainability. The focus is on what works and what does not, based on consideration of basic principles and on case studies in both developing and developed countries. The early chapters discuss the key elements, with later chapters considering how these elements have come together in successful reforms of public sector operations. A chapter is devoted to the successful use of the private sector based on lessons learnt from 'failures' of private contracts and the need for the application of sound procurement principles. The current trend is for a public sector model which benefits from business approaches, the so-called corporatised public utility. Experience since the publication of the first edition in 2007 reinforces the importance of the key elements for sustainable water services. This second edition brings the material up to date and with some increased emphasis on public participation in its many forms. It refers to the opportunity for progress provided by the UN Declaration of Water and Sanitation as a Human Right, but only if it is implemented in a practical and sustainable way. Institutional Governance and Regulation of Water Services is aimed at providing an informative source for national and local governments responsible for water policy, for water utility managers, and for students who will be the policy makers of tomorrow. It is a teaching aid for courses on water policy, governance and regulation.

Global trends such as climate change, digitalisation, enhanced concepts of democracy and the consequences of the 2008 financial crisis are changing the playing field of cities across the world. Urban development objectives are shifting away from being purely concerned with wealth creation and competitiveness, to increasingly combining social and environmental dimensions. In this context, how can cities influence and sustain their competitive position over time? Which new types of urban strategies are emerging, and which organising capacities are proving the most important? This book provides insight into the complex issue of delivering sustainable competitiveness by analysing a number of innovative urban development strategies in context. Questions and topics addressed include: how can new legacies of city events be secured; how can clean technology industries be nurtured through urban regeneration initiatives; and how

can the impact of urban safety strategies be enhanced? These and other pivotal questions are explored through close attention to the enabling factors linking ideas with results, such as distributed leadership, collaboration, communication and experimentation. Combining case studies from Europe, Africa, South America and Southeast Asia, the book provides a truly international perspective on the potentials and limitations of a new generation of urban development and competitiveness strategies.

Singapore's progress as an independent nation and the uplifting of its people's livelihood have been made possible by stable social and political conditions. A more important factor in driving these positive changes lies with people-centric leadership. One can contrast the case of Singapore with societies led by self-serving leaders whose lack of honesty and integrity brings about immense social and economic hardships to various communities. When people suffer under undesirable circumstances, they often migrate to seek better future for themselves and their families. This book reveals how Singapore's governance grounded on the principle of asset building facilitates the country's growth and development. Policies being discussed in this volume include multi-culturalism, accessible housing, social mobility for low-income families, water resource management, and national conscription. Highly relevant for students, policy makers and the general public interested in socio-political and economic development issues, this unique piece of work not only gives readers a documentary account of what has been undertaken to empower and assist citizens in the last 50 years or so, but also prompts them to reflect on Singapore's future trajectory.

This book traces the evolution of Singapore's parks system, from colonial to present times. Further, it contextualizes the design and planning of parks in the general discourse on western and eastern traditions: early twentieth century western conceptions 'imported' during colonialism; modernism; postmodernism, and the contemporary ecological debate. Park system planning products respond to national policies and result in structural urban elements and a range of park types. Global (western ideology) and local issues have influenced park system planning and the physical design of individual parks over time. However, in Singapore the eastern literature has not addressed the development of parks and urban green spaces in terms of historical perspective. The publication reveals the interrelations between visual representations and changing political ideologies. Singapore's system of public parks is shown to represent an iconography created by the state. Its set of constructed narratives elucidates on the potential social, cultural and environmental roles of public parks. However, Singapore's park system presents a novel paradigm for expanding Asian cities, characterized by evolving urban imaging strategies. In framing Singapore's case study within the broader perspective of eastern applications of western planning and design practices, and constructions of nation in post-colonial countries, the manuscript establishes the contribution of the Singaporean model of design and planning of parks to the international

Contents:EndorsementsPrefaceAbout the EditorAbout the ContributorsAppreciationJourney to the Present:Reflections on Singapore's Environmental Journey (Tan Yong Soon, Lee Tung Jean and Karen Tan)Cleaning the Land and Rivers (Tan Yong Soon, Lee Tung Jean and Karen Tan)Applying Economic Principles to Environmental Policy (Tan Yong Soon, Lee Tung Jean and Karen Tan)The Search for NEWater: The Singapore Water Story (Lee Ek Tieng)Environmental Planning For Sustainable Development (Tan Yong Soon)Present Challenges:Frontier Research in Environment and Water: Integrated Research Approach for Sustainable Solutions (Lee Lai Yoke and Ong Choon Nam)Energy Transitions — Energy Efficiency and Renewable Energy Challenges in the Tropics (Nilesh Y Jadhav, Subodh Mhaisalkar and Hans B (Teddy) Püttgen)Developing a Vibrant Sustainable Energy Industry (Edwin Khew, Christophe Inglin, Sanjay Kuttan and Low Kian Beng)Community Engagement to Promote Environmental Ownership and Secure Our Future (Chew Gek Khim)Island in the World: Singapore's Environment and the International Dimensions (Simon Tay and Cheong Poh Kwan)Moving into the Future:Environmental Sustainability and Sustainable Development (Tan Yong Soon and Kwek Leng Joo) Readership: General readers who are interested in learning more about Singapore's environmental journey, present day developments, and the potential environmental challenges in the future. Key Features:Contains a great variety of contributions from leading individuals in the public, private and people sectors, and leading academics at the forefront of environmental research and developmentProvides a good overview of Singapore's history in improving environmental conditions, present challenges, and possible future developments for Singapore's environmentSuitable for a variety of readers, ranging from the general reader to academics and practitionersKeywords:Singapore;Environment;Sustainability;R&DReview: "Singapore's transformation from an impoverished and polluted island to the world's beacon of environmental progress has been nothing short of miraculous. Miracles, however, are hard to repeat elsewhere, therefore, we are very fortunate that Singapore's environmental transformation was not at all a miracle. Instead, it happened thanks to clever and consistent strategies and brilliant execution. Over the last 30 years, as I got to gradually know the Singapore miracle workers and their methods, I often prayed that other jurisdictions would learn the steps involved. This book about the Singapore miracle provides an opportunity for environmental leaders everywhere to extract the policies and procedures they need to bring about progress in their own jurisdiction." Dr Andrew Benedek Founder, Chairman and CEO of ZENON Environmental Inc. and Anaergia Inc. Winner of the inaugural Lee Kuan Yew Water Prize in 2008 "For a seriously resource-constrained nation, Singapore has come a long way since its independence in 1965. Very few people, if any, 50 years ago would have predicted that this city-state would become the envy of the world by 2015. While everyone knows and admires the remarkable progress of the past half century, not many people are familiar with the achievements in the field of environment and the enabling conditions that made this possible. One of the very few serious studies that is available is Tan Yong Soon's earlier book Clean, Green and Blue: Singapore's Journey Towards Environmental and Water Sustainability. The present text is a worthy complement that adds to the in-depth analysis of this important journey. The book is strongly recommended." Professor Asit K Biswas Distinguished Visiting Professor Lee Kuan Yew School of Public Policy, Singapore and Co-founder, Third World Centre for

Water Management, Mexico "This book charts a 50-year visionary journey that began on the right foot, with recognition that sustainable economic growth and a clean environment are mutually reinforcing goals. Over these decades, Singapore has moved from cleaning up the land and rivers, through controlling pollution and meeting water needs, to the current use of cutting-edge research and technology to build clean and renewable energy for the future. With the city-state now ranking near the top of the world in terms of environmental standards, the book offers many lessons for other countries looking for ways to meet the growing demand for water and energy while preserving a health-promoting environment." Dr Margaret Chan Director-General, World Health Organization "Singapore celebrates its 50th anniversary of nationhood in a milestone year as countries of the world come together to agree a climate-safe path to sustainable development. Since its establishment, Singapore has sought to leverage sound environmental stewardship and social engagement into prosperity and growth. Singapore has been remarkably successful. The 50 Years of Environment publication demonstrates how progressive policy such as ecologically sound natural resource management, incentives to innovate and emphasis on clean development are at the heart of this vibrant modern economy. This is a welcome addition to the global dialogue on development as a powerful case study for what is possible. As governments move towards a set of Sustainable Development Goals and a new, universal climate change agreement in Paris this year, the knowledge and experiences in this book showcase real world policy success and inspire the world." Ms Christiana Figueres Executive Secretary, UN Framework Convention on Climate Change "Singapore's success in becoming a developed country and, at the same time, taking good care of its environment, is a vindication of what we were trying to achieve at the 1992 Earth Summit. This important book explains how Singapore did it and outlines present and future challenges as Singapore continues its journey into environmental sustainability and sustainable development." Professor Tommy Koh Chairman, Preparatory Committee and Chairman, Main Committee UN Conference on Environment and Development 2006 Champion of the Earth, awarded by UNEP 2006 President's Award for the Environment, Singapore "Singapore is well known globally for its brilliant economic success story. It deserves to be equally well-known for its environmental success story. It is truly remarkable that unlike other successful economies, Singapore did not sacrifice its environment in pursuit of economic growth. This is why this book edited by Tan Yong Soon could not be more timely. The world can learn a lot of lessons from this volume." Professor Kishore Mahbubani Dean, LKY School of Public Policy, National University of Singapore, and author of *The Great Convergence: Asia, the West, and the Logic of One World* "With a population density of around 7,500 people to the square kilometre, Singapore is one of the most densely populated countries on Earth. This book of essays by some of those most closely involved shows how the country evolved through half a century of commitment and foresight into one of the world's most liveable cities with green spaces and fresh water and how it is addressing present environmental challenges to develop sustainable strategies and solutions. Others take notice and follow!" Lord Ronald Oxburgh Former Rector of Imperial College of Science, Technology and Medicine (1993–2000) Former Chairman of the UK House of Lords Select Committee on Science and Technology (2000–2004) Honorary President of the Carbon Capture and Storage Association

This book unveils how the world in the twenty-first century will need to manage our most fundamental resource need, water. It outlines how stakeholders can improve water use in their homes, their businesses, and the world. In particular, it focuses on the role of stakeholders in crafting a twenty-first century paradigm for water. Investors not only drive innovation through direct investment in new technologies but also by highlighting risk and driving reporting and disclosure within the business community. Water Tech highlights the business drivers to address water related issues. These include business disruption, regulatory risk and reputational risk along with opportunities in the commercialization of innovative technologies such as desalination and water reuse and treatment. The authors argue that through increased attention on water scarcity through activities such as reporting and disclosure we are now accelerating innovation in the water industry. They show how we are just now capturing the true cost and value of water and this is creating opportunities for investors in the water sector. The text takes the reader through key aspects of emerging innovative technologies along with case studies and key issues on the path to commercialization. A roadmap of the opportunities in the water sector is presented based on interviews with leading authorities in the water field including innovators, investors, legal, regulatory experts and businesses.

This open access book highlights Singapore's development into a city in which water and greenery, along with associated environmental, technical, social and political aspects have been harnessed and cultivated into a liveable sustainable way of life. It is also a story about a unique and thoroughgoing approach to large-scale and potentially transferable water sustainability, within largely urbanized circumstances, which can be achieved, along with complementary roles of environmental conservation, ecology, public open-space management and the greening of buildings, together with infrastructural improvements.

This book makes available original case studies on how institutions developed in Singapore. Up until now, these case studies have been used exclusively in Singapore to teach public governance, and have been well-received in the Singapore Civil Service College's milestone programmes. With this publication, more will be able to access this material. Students, researchers and policy-makers can now use these case studies for pedagogy or to derive insights on Singapore's approach on governance. Designed around the theme of "building institutions", the case studies also present facets of how institutions developed which are universal to management studies. These case studies highlight a core aspect in the development of institutions, namely, how people and organisations change the culture of institutions, how leaders influence their organisations, and how policies define the systems that build institutions. The book contains 5 case studies, each profiling a unique sector and key institution in Singapore. They present how public agencies and leaders helped to build Singapore institutions over the last forty years. Although there are more cases studies on management and strategy than public policy and administration, there is growing interest in Asian case studies, and more specifically, case studies on Singapore public governance. This collection of case studies on Singapore institutions provides the perspective from Singaporean case writers themselves, on the role of government in Singapore's development.

HANDBOOK OF CATCHMENT MANAGEMENT In 2010, the first edition of the Handbook of Catchment Management provided a benchmark on how our understanding and actions in water management within a catchment context had evolved in recent

decades. Over ten years on, the catchment management concept is entering a new phase of development aligned to contemporary and future challenges. These include climate change uncertainty, further understanding in ecological functioning under change, the drive for a low-carbon, energy efficient and circular society, multiple uses of water, the emergence of new pollutants of concern, new approaches to valuation, finance and pricing mechanisms, stewardship and community engagement, the integration of water across the Sustainable Development Goals (SDG) and the link between water, energy and food. These developments are framed within an increasingly data rich world where new analytics, sensor technology and processing power are informing increasingly real-time decision making. The challenge is also to increase cross-compliance and policy integration to meet multiple stakeholder objectives, and to link actions to achieve cost-effective outcomes. In addition, there are a number of new and exciting city, region and basin-scale real-world examples of contemporary and new catchment thinking; integrating science, technology, knowledge and governance to address multiple drivers and complex problems from across the globe. The time is now right, to capture the new challenges facing catchment management and water resources management globally. This revised and updated edition of the Handbook of Catchment Management features: Thoroughly rewritten chapters which provide an up-to-date view of catchment management issues and contexts New case study material highlighting multi-sectoral management in different globally significant basins and different geographical locations Up-to-date topics selected for their resonance not only in natural sciences and engineering, but also in other fields, such as socio-economics, law and policy The Handbook is designed for a broad audience, but will be particularly useful for advanced students, researchers, academics and water sector professionals such as planners, consultants and regulators.

Ever since Singapore became independent in 1965, its leaders have invested tremendous efforts and resources to develop its economy in order to create jobs for its people and to support national development. This book describes the challenging journey of Singapore in developing a knowledge-based economy driven by research and innovation and the roles played by research institutes, universities, research manpower and appropriate collaboration between research institutes and industry. The book traces the foundations of Singapore's research story from the time of its independence in 1965 to the present day. Through interviews with the key players and research into the records, the establishment of the key institutes and the roles of a global cast of researchers, scientists and engineers in setting up the R&D infrastructure are outlined. The impact of the concerted efforts to build up a credible and world-class research capability in Singapore over the last 25 years is discussed, as are the tremendous challenges faced by the key players in the drive to develop a knowledge-based economy and the ultimate goal of an innovation-driven economy. Contents:Foreword by PM Lee Hsien LoongAcknowledgementsCover Photo CreditsAbout the ContributorsIntroductionSetting the Stage (Hang Chang Chieh and Yeoh Keat Chuan)Shifting Gear into Research (Hang Chang Chieh, Low Teck Seng and Yeoh Keat Chuan)The Multi-Agency Approach (Hang Chang Chieh, Low Teck Seng and Raj Thampuran)Research in Physical Sciences and Engineering (Hang Chang Chieh and Raj Thampuran)The Biomedical Sciences: Research for Better Health (Raj Thampuran and Kong Hwai Loong)Developing Research-Intensive Universities (Barry Halliwell

and Bertil Andersson) Partnering Multinational Corporations in R&D (Low Teck Seng, Raj Thampuran and Yeoh Keat Chuan) Developing R&D in Local Enterprises (Hang Chang Chieh, Raj Thampuran and Png Cheong Boon) Towards Innovation & Entrepreneurship (Low Teck Seng, Raj Thampuran, Tan Kai Hoe and Philip Ong) Appendices: Singapore's Science & Technology, R&D Timeline Chairmen, Executive Directors and Directors Honouring Scientific Talent Oral History Interviews Acronyms Select Bibliography Index Readership: Researchers, professionals, academics, and laymen interested in all aspects of research and development.

This book highlights the relationship between the water sector and various other sectors in order to establish an improved understanding of the importance of water resources as an essential cross-cutting vector of socio-economic development. The book is both policy and practice oriented and is not constrained by existing definitions on water security. It includes actual experiences of policy, management, development and governance decisions taken within the water sector, and examples on how these have affected the energy and agricultural sectors as well as impacted the environment, and vice versa, as appropriate. It also discusses trade-offs, short and long-term implications, lessons learnt, and the way forward. The book includes case studies on cities, countries and regions such as Australia, China, Singapore, Central Asia, Morocco, Southern Africa, France, Latin America, Brazil and California.

Ensuring that everybody has access to drinking water, sanitation and enough nutritious food, which depends on water to grow it, are prerequisites for a healthy life. Water management is not just about the technical aspects of water supply and sanitation. It is equally about our water governance systems, including policies, regulation and societal perception of water rights. This book presents many helpful examples of how different societies are dealing with these issues and of the performance of public and private sector players in this important arena. Æ Colin Chartres, International Water Management Institute (IWMI), Colombo, Sri Lanka Æ I congratulate the Institute of Water Policy, the two editors and the contributors for a very thoughtful book on urban water governance. Our objective is to deliver sustainable water and sanitation services to our people. This book contains useful lessons on how to achieve that objective. Æ Tommy Koh, Chairman, Governing Council, Asia-Pacific Water Forum This insightful book explores urban water governance challenges in different parts of the world and highlights the advantages and disadvantages of publicly run, privatized, and public-private partnership managed water facilities. The contributors expertly discuss various types of public and private water governance architectures as well as identifying the trends, challenges, opportunities and the shifts in perceptions with regard to the provision of water supply services. Many chapters are dedicated to analyzing the urban water supply scenarios in selected countries, with specific focus on legal, policy and institutional frameworks. The study reveals that while private sector participation has been largely promoted by multilateral institutions as part of institutional and financial reforms, ultimately governments bear the major responsibility for provision of water supply services either as service provider or as regulator and policy-maker. Containing a detailed overview and analysis of the global urban water supply sector, this timely compendium will strongly appeal to academics, researchers and university students following water-related courses. Water sector

professionals, water regulators and public officers as well as managers and researchers employed by private sector water operators will also find plenty of invaluable information in this important book.

"This book describes the journey of Singapore's development and the fundamental role that water has had in shaping it. What makes this case so unique is that the quest for self-sufficiency in terms of water availability in a fast-changing urban context has been crucial to the way development policies and agendas have been planned throughout the years"-- How Singapore's solutions to common problems can provide examples for other societies. Nearly everyone knows that Singapore has one of the most efficient governments and competitive, advanced economies in the world. But can this unique city-state of some 5.5 million residents also serve as a model for other advanced economies as well as for the emerging world? Respected East Asia expert Kent Calder provides clear answers to this intriguing question in his new, groundbreaking book that looks at how Singapore's government has harnessed information technology, data, and a focus on innovative, adaptive governance to become a model smart city, smart state. Calder describes Singapore as a laboratory for solutions to problems experienced by urban societies around the world. In particular, he shows how Singapore has dealt successfully with education, energy, environmental, housing, and transportation challenges; many of its solutions can be adapted in a wide range of other societies. Calder also explains how Singapore offers lessons for how countries can adapt their economies to the contemporary demands of global commerce. Singapore consistently ranks at the top in world surveys measuring competitiveness, ease of doing business, protection of intellectual property, and absence of corruption. The book offers concrete insights and a lucid appreciation of how Singapore's answers to near-universal problems can have a much broader relevance, even in very different societies.

This book analyses how a water utility from a developing country, Phnom Penh Water Supply Authority, that was totally dysfunctional, corruption-ridden and literally bankrupt in 1993, became one of the most successful water utilities of the developing world in only about 15 years. By 2010, some of the performance indicators of this public sector utility were even better than London, Paris or Los Angeles. The book further analyses the enabling conditions that made this remarkable transformation possible. Based on this analysis, a framework is recommended for water utilities from developing countries so that they can also be transformed into functional, efficient, equitable and financially viable institutions on a sustainable basis.

One of Asia's best-respected writers on business and economy, Hong Kong-based author Mark L. Clifford provides a behind-the-scenes look at what companies in China, India, Japan, Korea, the Philippines, Indonesia, Hong Kong, Singapore, and Thailand are doing to build businesses that will lessen the environmental impact of Asia's extraordinary economic growth. Dirty air, foul water, and hellishly overcrowded cities are threatening to choke the region's impressive

prosperity. Recognizing a business opportunity in solving social problems, Asian businesses have developed innovative responses to the region's environmental crises. From solar and wind power technologies to green buildings, electric cars, water services, and sustainable tropical forestry, Asian corporations are upending old business models in their home countries and throughout the world. Companies have the money, the technology, and the people to act—yet, as Clifford emphasizes, support from the government (in the form of more effective, market-friendly policies) and the engagement of civil society are crucial for a region-wide shift to greener business practices. Clifford paints detailed profiles of what some of these companies are doing and includes a unique appendix that encapsulates the environmental business practices of more than fifty companies mentioned in the book.

Released every three years since March 2003, the United Nations World Water Development Report (WWDR), a flagship UN-Water report published by UNESCO, has become the voice of the United Nations system in terms of the state, use and management of the world's freshwater resources. The report is primarily targeted at national decision-makers and water resource managers, but is also aimed at educating and informing a broader audience, from governments to the private sector and civil society. It underlines the important roles water plays in all social, economic and environmental decisions, highlighting policy implications across various sectors, from local and municipal to regional and international levels. Similarly to the first two editions, this report includes a comprehensive and up-to-date assessment of several key challenge areas, such as water for food, energy and human health, and governance challenges such as institutional reform, knowledge and capacity-building, and financing, each produced by individual UN agencies.

Sustainable interdisciplinarity focuses on human–nature relations and a multitude of contemporary overlapping research between society and the environment. A variety of disciplines have played a large part in better understanding sustainable development since its high-profile emergence approximately a quarter of a century ago. At present, the forefront of sustainability research is an array of methods, techniques, and growing knowledge base that considers past, present, and future pathways. Specific multidisciplinary concentrations within the scope of societal changes, urban landscape transformations, international environmental comparative studies, as well as key theories and dynamics relating to sustainable performance are explored. Specializations in complex sustainability issues address international governance arrangements, rules, and organizations—both public and private—within the scope of four themes: sustainability, human geography, environment, and interdisciplinary societal studies. This book contains eleven thoroughly refereed contributions concerning pressing issues that interlink sustainable interdisciplinarity with the presented themes in terms of the human–nature interface.

' 50 Years of Urban Planning in Singapore is an accessible and comprehensive volume on Singapore's planning

approach to urbanization. Organized into three parts, the first section of the volume, "Paradigms, Policies, and Processes", provides an overview of the ideologies and strategies underpinning urban planning in Singapore; the second section, "The Built Environment as a Sum of Parts", delves into the key land use sectors of Singapore's urban planning system; and the third section, "Urban Complexities and Creative Solutions", examines the challenges and considerations of planning for the Singapore of tomorrow. The volume brings together the diverse perspectives of practitioners and academics in the professional and research fields of planning, architecture, urbanism, and city-making.

Contents:Paradigms, Policies & Processes:The Early Years of Nation-Building: Reflections on Singapore's Urban History (Alan F C Choe)Planning & Urbanisation in Singapore: A 50-Year Journey (Liu Thai Ker)Economic Planning for Productivity, Growth, and Prosperity (Philip Yeo)Environmental Planning for Sustainable Development (Tan Yong Soon)The Built Environment as a Sum of Parts:Planning to Overcome the Constraints of Scarcity (Ng Lang)Making Singapore a Liveable and Sustainable City: Our Urban Systems Approach (Khoo Teng Chye and Remy Guo)The Evolution of HDB Towns (Cheong Koon Hean)Transportation: Mobility, Accessibility, and Connectivity (Mohinder Singh)Industry Planning in Singapore (Tang Hsiao Ling)Greening Singapore: Past Achievements, Emerging Challenges (Tan Puay Yok)50 Years of Urban Planning & Tourism (Pamelia Lee)Shaping Singapore's Cityscape Through Urban Design (Goh Hup Chor & Heng Chye Kiang)Urban Complexities & Creative Solutions:Conserving Urban Heritage: Remembering the Past in a Developmental City-State (Lily Kong)Public Housing and Community Development: Planning for Urban Diversity in a City-State (Tan Ern Ser)Era of Globalisation: Singapore's New Urban Economy and the Rise of a World Asian City (Ho Kong Chong)Towards Greater Sustainability and Liveability in an Urban Age (Heng Chye Kiang and Yeo Su-Jan)Perspectives on the Future of Urban Planning in SingaporeChallenges for a New Era (Peter Ho) Readership: Urban planning, architecture, and urban conservation and heritage practitioners; introductory-level urban studies, public policy, and urban administration students; and members of the general public interested in learning more about the history of urban planning in Singapore over the past 50 years. '

Global growth is in low gear, and the drivers of activity are changing. These dynamics raise new policy challenges. Advanced economies are growing again but must continue financial sector repair, pursue fiscal consolidation, and spur job growth. Emerging market economies face the dual challenges of slowing growth and tighter global financial conditions. This issue of the World Economic Outlook examines the potential spillovers from these transitions and the appropriate policy responses. Chapter 3 explores how output comovements are influenced by policy and financial shocks, growth surprises, and other linkages. Chapter 4 assesses why certain emerging market economies were able to avoid the classical boom-and-bust cycle in the face of volatile capital flows during the global financial crisis.

Modern science communication has emerged in the twentieth century as a field of study, a body of practice and a profession—and it is a practice with deep historical roots. We have seen the birth of interactive science centres, the first university actions in teaching and conducting research, and a sharp growth in employment of science communicators. This collection charts the emergence of modern science communication across the world. This is the first volume to map investment around the globe in science centres, university courses and research, publications and conferences as well as tell the national stories of science communication. How did it all begin? How has development varied from one country to another? What motivated governments, institutions and people to see science communication as an answer to questions of the social place of science? *Communicating Science* describes the pathways followed by 39 different countries. All continents and many cultures are represented. For some countries, this is the first time that their science communication story has been told.

Increasingly, water-stressed cities are looking to the oceans to fix unreliable, contested and over-burdened water supply systems. Desalination technologies are, however, also becoming the focus of intense political disagreements about the sustainable and just provision of urban water. Through a series of cutting-edge case studies and multi-subject approaches, this book explores the political and ecological debates facing water desalination on a broad geographical scale.

At publication date, a free ebook version of this title will be available through Luminos, University of California Press's Open Access publishing program. Visit www.luminosoa.org to learn more. This exciting volume presents the work and research of the Rivers of the Anthropocene Network, an international collaborative group of scientists, social scientists, humanists, artists, policy makers, and community organizers working to produce innovative transdisciplinary research on global freshwater systems. In an attempt to bridge disciplinary divides, the essays in this volume address the challenge in studying the intersection of biophysical and human sociocultural systems in the age of the Anthropocene, a new geological epoch of humans' own making. Featuring contributions from authors in a rich diversity of disciplines—from toxicology to archaeology to philosophy—this book is an excellent resource for students and scholars studying both freshwater systems and the Anthropocene.

Recent decades have seen pivotal changes in the management and protection of water resources, with human rights, environmental and water law each developing a strong interest in the conservation of fresh water. This surge in interest has meant that dispute settlement mechanisms, along with diplomatic tools, are becoming increasingly necessary for conflict resolution. This Handbook offers an analysis of the interaction between law and various forms of knowledge and expertise, ranging from economics to environmental and social sciences. Leading scholars examine general and specific

water legal regimes and analyse the interplay between various disciplines in order to establish the extent to which law is informed by each.

Singapore's journey during the past 45 years is an outstanding example that, in spite of multiple hardships, pragmatic policies, clear visions, long-term planning, forward-looking strategies and political will, as well as a relentless urge to improve, can result in strong foundations for sustainable development. This book describes the journey of Singapore's development and the fundamental role that water has had in shaping it. What makes this case so unique is that the quest for self-sufficiency in terms of water availability in a fast-changing urban context has been crucial to the way development policies and agendas have been planned throughout the years. The authors analyse plans, policies, institutions, laws and regulations, water demand and water supply strategies, water quality and water conservation considerations, partnerships and importance of the media. They assess overall how all these issues have evolved in response to the dynamic needs of the city-state. The study of Singapore shows how a dynamic society can address development without losing its focus on the environment. In the city-state, environmental concerns in general, and water concerns in particular, have played a major role in its transformation from a third world to a first world country. How and why this transformation took place is the main focus of this authoritative book.

This book chronicles the journeys of educational researchers and academics who have engaged in research and development to improve teaching and learning at universities. It highlights the research evidence, approaches, and in many cases, the journey of transformation rather than prescribing certain principles of and approaches to effective instruction. In other words, it not only describes the destination, but also various pathways leading toward it. Further, it focuses on mechanisms for improving the approaches discussed, rather than simply determining whether one works better than the other. As such, novice and seasoned academics and teaching staff in higher education will benefit from this book, not just from the teaching and learning approaches it highlights, but also from the insights into the respective journeys. The research and development methods and approaches discussed here will also appeal to researchers working in teaching and learning in higher education.

This handbook is currently in development, with individual articles publishing online in advance of print publication. At this time, we cannot add information about unpublished articles in this handbook, however the table of contents will continue to grow as additional articles pass through the review process and are added to the site. Please note that the online publication date for this handbook is the date that the first article in the title was published online. For more information, please read the site FAQs.

This book describes the existential threats facing the global water systems from population growth and economic

development, unsustainable use, environmental change, and weak and fragmented governance. It argues that 'business-as-usual' water science and management cannot solve global water problems because today's water systems are increasingly complex and face uncertain future conditions. Instead, a more holistic, strategic, agile and publically engaged process of water decision making is needed. Building Resilience for Uncertain Water Futures emphasises the importance of adaptation through a series of case studies of cities, regions, and communities that have experimented with anticipatory policy-making, scenario development, and public engagement. By shifting perspective from an emphasis on management to one of adaptation, the book emphasizes the capacity to manage uncertainties, the need for cross-sector coordination, and mechanisms for engaging stakeholder with differing goals and conflict resolution. This book will be a useful resource for students and academics seeking a better understanding of sustainable water use, water policy and water resources management.

Perspectives on the Security of Singapore: The First 50 Years explores the security of Singapore in the last 50 years and its possible trajectories into the future. This volume brings together the diverse perspectives of a team of academics with different expertise, ranging from history to political science to security studies with a common interest in Singapore. The book is further boosted by the recollections of key civil servants involved with foreign affairs and defence, such as S R Nathan, Peter Ho, Bilahari Kausikan and Philip Yeo. Contents: Introduction Part 1: Singapore's Conception of Security (Ang Cheng Guan) National Security and Singapore: An Assessment (Norman Vasu and Bernard Loo) Deliquescent Security Threats: Singapore in the Era of Hyper-Globalisation (Alan Chong) Singapore and Global Governance: Free-Rider or Responsible Stakeholder? (Tan See Seng) The Challenge of Strategic Intelligence for the Singapore Armed Forces (Kwa Chong Guan) Desecuritisation and after Desecuritisation: The Water Issue in Singapore–Malaysia Relations (S R Joey Long) Singapore's Security in the Context of Singapore–Malaysia–Indonesia Relations (Bilveer Singh) Singapore's Relations with Malaysia and Indonesia (Theophilus Kwek and Joseph Chinyong Liow) International Missions of the Singapore Armed Forces: How Far Would You Go? (Katie Tan and Ong Weichong) Why the FPDA Still Matters to Singapore (Ralf Emmers) Singapore in ASEAN's Quest toward a Security Community (Mely Caballero-Anthony) Singapore and the Great Powers (Khong Yuen Foong) The Changing Terrorist Threat Landscape in Singapore (Rohan Gunaratna) Managing Religious Diversity in Singapore: Context and Challenges (Mohammad Alami Musa and Mohamed Imran Mohamed Taib) Part 2: Personal Reminiscences Safeguarding Singapore's Security: Defence and Diplomacy (S R Nathan) Organising for National Security — The Singapore Experience (Peter Ho) Pragmatic Adaptation, Not Grand Strategy, Shaped Singapore Foreign Policy (Bilahari Kausikan) Dr Goh Keng Swee and the Building of Singapore's Defence Industrial Capability (Philip Yeo) Conclusion: Strategic Certainties Facing Singapore in 2065 (Barry

Desk) Readership: Undergraduate and graduate students, researchers and academics, and general public interested in security studies in general and in Singapore. Key Features: This is possibly the first scholarly collective effort/book on the subject of security of Singapore. The contributors are academics within (and associated with) the S. Rajaratnam School of International Studies (RSIS), the only school cum think-tank that specialises in security issues in Singapore. The contributors include former top civil servants who played a significant role in the shaping and conduct of Singapore's foreign and defence policies. Keywords: Security; Foreign Policy; Singapore

This anthology discusses important issues surrounding environmental law and economics and provides an in-depth analysis of its use in legislation, regulation and legal adjudication from a neoclassical and behavioural law and economics perspective. Environmental issues raise a vast range of legal questions: to what extent is it justifiable to rely on markets and continued technological innovation, especially as it relates to present exploitation of scarce resources? Or is it necessary for the state to intervene? Regulatory instruments are available to create and maintain a more sustainable society: command and control regulations, restraints, Pigovian taxes, emission certificates, nudging policies, etc. If regulation in a certain legal field is necessary, which policies and methods will most effectively spur sustainable consumption and production in order to protect the environment while mitigating any potential negative impact on economic development? Since the related problems are often caused by scarcity of resources, economic analysis of law can offer remarkable insights for their resolution. Part I underlines the foundations of environmental law and economics. Part II analyses the effectiveness of economic instruments and regulations in environmental law. Part III is dedicated to the problems of climate change. Finally, Part IV focuses on tort and criminal law. The twenty-one chapters in this volume deliver insights into the multifaceted debate surrounding the use of economic instruments in environmental regulation in Europe.

This book is a point of departure for cities that would like to reap the many benefits of ecological and economic sustainability. It provides an analytical and operational framework that offers strategic guidance to cities on sustainable and integrated urban development.

This book highlights the likely impacts of climate change in terms of global and national water securities, how different countries are attempting to address these complex problems and to what extent they are likely to succeed. A major global concern at present, especially after the social and economic havoc that has been caused by COVID-19 in only one year, is how we can return to earlier levels of economic development patterns and then further improve the process so that sustainable development goals are reached to the extent possible by 2030, in both developed and developing countries. Mankind is now facing two existential problems over the next several decades. These are climate change and

whether the world will have access to enough water to meet all its food, energy, environment and health needs. Much of expected climate change impacts can be seen through the lens of extreme hydrological events, like droughts, floods and other extreme hydrometeorological events. Chapter 7 is available open access under a Creative Commons Attribution 4.0 International License via link.springer.com. Chapter 12 is available open access under a Creative Commons Attribution-NonCommercial 4.0 International License via link.springer.com.

This book highlights what are likely to be the future megatrends in the water sector and why and how they should be incorporated to improve water governance in the coming decades. In this first ever book on megatrends for the water sector, 22 leading world experts from different disciplines representing academia, business, government, national and international organisations discuss what the major megatrends of the future are and how they will radically change water governance in the coming decades.

In conjunction with Singapore's 50th birthday in August 2015, *50 Years of Environment: Singapore's Journey Towards Environmental Sustainability* takes the reader through Singapore's environmental journey over the past 50 years, to its present day challenges and solutions, and seeks to explore what lies ahead for Singapore's environmental future. This book is divided into three parts. The first, drawn largely from the book *Clean, Green and Blue: Singapore's Journey Towards Environmental and Water Sustainability*, will explore the historical developments in Singapore's environmental journey and the development of NEWater. The second part will be a collection of essays that examine the present environmental challenges that Singapore faces and the ways in which it is addressing those issues through community engagement, international engagement, research and technology, and industry solutions in order to develop sustainable strategies and solutions. Part Three will bring the book to a close by tying the historical and contemporary threads together and discusses the future challenges for Singapore's environment.

The Singapore Water Story Sustainable Development in an Urban City-state Routledge

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