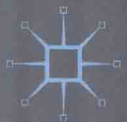


CRITICAL STUDIES OF
THE ASIA-PACIFIC

INTERNATIONAL CONFLICT OVER WATER RESOURCES IN HIMALAYAN ASIA

**Robert G. Wirsing,
Daniel C. Stoll and
Christopher Jasparro**



International Conflict over Water Resources in Himalayan Asia

Robert G. Wirsing

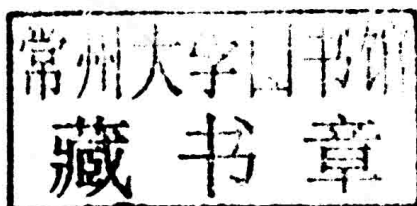
Professor, School of Foreign Service in Qatar, Georgetown University, State of Qatar

Daniel C. Stoll

Associate Dean for Academic Affairs, School of Foreign Service in Qatar, Georgetown University, State of Qatar

Christopher Jasparro

Associate Professor, US Naval War College, Rhode Island, USA



palgrave
macmillan

Mikael Weissmann
THE EAST ASIAN PEACE
Conflict Prevention and Informal Peacebuilding

Robert G. Wirsing and Ehsan Ahrari (*editors*)
FIXING FRACTURED NATIONS
The Challenge of Ethnic Separatism in the Asia-Pacific

Robert G. Wirsing, Daniel C. Stoll and Christopher Jasparro
INTERNATIONAL CONFLICT OVER WATER RESOURCES IN HIMALAYAN ASIA

Critical Studies of the Asia Pacific Series
Series Standing Order ISBN 978-0-230-22896-2 (Hardback)
978-0-230-22897-9 (Paperback)
(*outside North America only*)

You can receive future titles in this series as they are published by placing a standing order. Please contact your bookseller or, in case of difficulty, write to us at the address below with your name and address, the title of the series and the ISBNs quoted above.

Customer Services Department, Macmillan Distribution Ltd, Houndmills, Basingstoke, Hampshire RG21 6XS, England

Critical Studies of the Asia Pacific Series

Series Editor: **Mark Beeson**, Winthrop Professor of Political Science and International Studies at the University of Western Australia, Perth, Australia

Critical Studies of the Asia Pacific showcases new research and scholarship on what is arguably the most important region in the world in the twenty-first century. The rise of China and the continuing strategic importance of this dynamic economic area to the United States mean that the Asia Pacific will remain crucially important to policymakers and scholars alike. The unifying theme of the series is a desire to publish the best theoretically informed, original research on the region. Titles in the series cover the politics, economics and security of the region, as well as focussing on its institutional processes, individual countries, issues and leaders.

Titles include:

Stephen Aris

EURASIAN REGIONALISM

The Shanghai Cooperation Organisation

Toby Carroll

DELUSIONS OF DEVELOPMENT

The World Bank and the Post-Washington Consensus in Southeast Asia

Aurel Croissant and Marco Bunte (*editors*)

THE CRISIS OF DEMOCRATIC GOVERNANCE IN SOUTHEAST ASIA

Shahar Hameiri

REGULATING STATEHOOD

State Building and the Transformation of the Global Order

Lee Jones

ASEAN, SOVEREIGNTY AND INTERVENTION IN SOUTHEAST ASIA

Hiro Katsumata

ASEAN'S COOPERATIVE SECURITY ENTERPRISE

Norms and Interests in the ASEAN Regional Forum

Jikon Lai

FINANCIAL CRISIS AND INSTITUTIONAL CHANGE IN EAST ASIA

Erik Paul

OBSTACLES TO DEMOCRATIZATION IN SOUTHEAST ASIA

A Study of the Nation-State, Regional and Global Order

Joel Rathus

JAPAN, CHINA AND NETWORKED REGIONALISM IN EAST ASIA

William Tow and Rikki Kersten (*editors*)

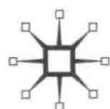
BILATERAL PERSPECTIVES ON REGIONAL SECURITY

Australia, Japan and the Asia-Pacific Region

Barry Wain

MALAYSIAN MAVERICK

Mahathir Mohamad in Turbulent Times



© Robert G. Wirsing, Daniel C. Stoll, and Christopher Jasparro 2013

All rights reserved. No reproduction, copy or transmission of this publication may be made without written permission.

No portion of this publication may be reproduced, copied or transmitted save with written permission or in accordance with the provisions of the Copyright, Designs and Patents Act 1988, or under the terms of any licence permitting limited copying issued by the Copyright Licensing Agency, Saffron House, 6–10 Kirby Street, London EC1N 8TS.

Any person who does any unauthorized act in relation to this publication may be liable to criminal prosecution and civil claims for damages.

The authors have asserted their rights to be identified as the authors of this work in accordance with the Copyright, Designs and Patents Act 1988.

First published 2013 by
PALGRAVE MACMILLAN

Palgrave Macmillan in the UK is an imprint of Macmillan Publishers Limited, registered in England, company number 785998, of Houndmills, Basingstoke, Hampshire RG21 6XS.

Palgrave Macmillan in the US is a division of St Martin's Press LLC, 175 Fifth Avenue, New York, NY 10010.

Palgrave Macmillan is the global academic imprint of the above companies and has companies and representatives throughout the world.

Palgrave® and Macmillan® are registered trademarks in the United States, the United Kingdom, Europe and other countries.

ISBN 978–0–230–23783–4

This book is printed on paper suitable for recycling and made from fully managed and sustained forest sources. Logging, pulping and manufacturing processes are expected to conform to the environmental regulations of the country of origin.

A catalogue record for this book is available from the British Library.

A catalog record for this book is available from the Library of Congress.

10	9	8	7	6	5	4	3	2	1
22	21	20	19	18	17	16	15	14	13

Preface and Acknowledgments

The authors of this book formally joined forces on this project in early spring 2009. All, however, had a history of involvement in water politics scholarship beginning long before then. As a young United States Foreign Service officer, Daniel Stoll co-edited and was a contributing author to *The Politics of Scarcity: Water in the Middle East*, published in 1988. A posting in Baghdad thereafter awakened his interest in the politics of the Euphrates-Tigris basin. He and Robert Wirsing, both having relocated in recent years to the Middle East, team-taught an undergraduate course on River Resource Rivalry in World Politics in 2009 at Georgetown University's School of Foreign Service at Qatar. Christopher Jasparro and Wirsing, faculty colleagues at the Asia-Pacific Center for Security Studies in Honolulu, Hawaii, team-taught an executive-level course there (along with Jim Rolfe) for four years, and they together carried out research on river resource issues first in India in 2001 and then in Bangladesh and Nepal in 2005. In 2007, their reflections on that experience resulted in an article in the journal *Water Policy*. Wirsing's interest in water issues goes back several decades, an unavoidable offshoot, very likely, of his early and sustained scholarly attachment to the Kashmir dispute between India and Pakistan. His interest in water issues expanded greatly about 12 years ago, however, on a visit to Nepal, and it has remained a passionate commitment – in regard to both teaching and writing – ever since.

This book does not examine water issues in a neatly historical or country-by-country manner. Neither does it treat these issues exclusively from a legal, economic, political, or strategic angle. Its organization is thematic in structure, taking up transboundary water conflicts in particular river basins of Himalayan Asia to illustrate the workings of the chosen themes. It is analytically driven, in other words, the aim being to deliver a clear and objective explanation of the contemporary impact of river resource rivalry on interstate relations in that region. It offers no apology for largely excluding from the discussion a number of countries in the Himalayan Asian region as well as a number of water-related topics of undeniable importance. Instead, it boasts of a deliberate effort to examine river resource rivalry from a multidisciplinary perspective: in this regard, it uses sources from across the social and physical sciences, including political science, international relations, history, geography, archeology, biology, geology, climatology, hydrology, and so on.

All three of the authors have acquired intellectual debts to an enormous number of people over the years: colleagues at the several institutions that have given us professional berths, students of many nationalities who have helped greatly to ground realistically our comprehension of water conflicts

in their regions of the world, and, by no means least, the many hundreds of people in the Himalayan Asian region and elsewhere in the world – politicians, diplomats, bureaucrats, journalists, hydrologists, and professional analysts – who have shared their experiences and insights with us. To all of them we are deeply and everlastingly grateful.

With but one exception, the maps in this book were prepared by Robert Laws, the Additional Services Librarian at Georgetown University's in Doha, Qatar. Absent his computer wizardry and unswerving commitment to this project, the book would have been denied a vital visual dimension. The authors are hugely grateful to him.

The authors wish to express their sincere thanks also to Christina Brian, Amanda McGrath, and others of the editorial team at Palgrave Macmillan, UK, for their encouragement, constant support, and admirable skill in converting the manuscript into a book.

Lastly, and of course most lovingly, Dan and Robert say thanks to their wives – Barbara and Nancy – who are in more ways than can be counted the co-authors of their lives.

About the Authors

Christopher Jaspardo is an associate professor at the US Naval War College (NWC) in Rhode Island, USA. He is a geographer specializing in environmental and non-state security threats. Prior to joining NWC, he was an associate professor at the US Marine Corps Command and Staff College. Before that he spent six years on the faculty of the Asia-Pacific Center for Security Studies in Honolulu. He earlier served on the geography faculty of Framingham State College and has also taught geography and field archeology at a number of other institutions. He also has professional experience in economic development, transportation, and planning. Recent publications have appeared in *Geopolitics*, *Water Policy*, and *Jane's Intelligence Review*.

Daniel C. Stoll is Associate Dean for Academic Affairs at Georgetown University's School of Foreign Service in Doha, Qatar (SFS-Qatar). Prior to joining School of Foreign Service in Doha, Qatar, he held a number of positions at the University of Missouri-Kansas City (UMKC), including those of Assistant Vice Provost for International Initiatives as well as Adjunct Professor of Political Science. From 1988 until 1998, he was a foreign service officer with the US Department of State, with foreign postings in Baghdad, Iraq, and Johannesburg, South Africa. He received his PhD from UMKC and his MA in Arab studies from Georgetown University. His research interests include the role of multilateral institutions in the international system, as well as US foreign policy in the Middle East. He is co-editor of and contributing author to *The Politics of Scarcity: Water in the Middle East*.

Robert G. Wirsing is a professor at Georgetown University's School of Foreign Service in Qatar (SFS-Q). Before joining School of Foreign Service in Qatar in 2008, he held positions at the Asia-Pacific Center for Security Studies (APCSS) in Honolulu, Hawaii (2000–2008), and at the University of South Carolina (1971–2000). A specialist on South Asian politics and international relations, he has made over 40 research trips to the South Asian region since 1965. Major published works include *Pakistan's Security under Zia, 1977–1988* (1991); *India, Pakistan, and the Kashmir Dispute* (1994); *Kashmir in the Shadow of War* (2002); *Religious Radicalism and Security in South Asia* (co-editor, 2004); *Ethnic Diasporas and Great Power Strategies in Asia* (co-editor and author, 2007); *Baloch Nationalism and the Geopolitics of Energy Resources: The Changing Context of Separatism in Pakistan* (Strategic Studies Institute, US Army War College, 2008); and *Fixing Fractured Nations: The Challenge of Ethnic Separatism in the Asia-Pacific* (co-editor and contributing author, 2010). Recent research focuses primarily on the politics and diplomacy of natural resources (water

and energy) in South Asia. His water resource-related writings include "Hydro-Politics in South Asia: The Domestic Roots of Interstate River Rivalry", *Asian Affairs* 34 (1) (Spring 2007), pp. 3–22; (co-author) "River Rivalry: Water Disputes, Resource Insecurity, and Diplomatic Deadlock in South Asia", *Water Policy* (UK) 9 (3) (May 2007), pp. 231–251; "Rivers in Contention: Is There a Water War in South Asia's Future?", Working Paper No. 41, Heidelberg Papers in South Asian and Comparative Politics, South Asia Institute, University of Heidelberg, October 2008; and "Perilous Waters: The Changing Context of River Rivalry in South Asia", *Whitehead Journal of Diplomacy & International Relations* (Winter/Spring, 2011).

Contents

<i>List of Illustrations</i>	viii
<i>Preface and Acknowledgments</i>	x
<i>About the Authors</i>	xii

Part I Fundamentals of River Rivalry in Himalayan Asia

1 Water Insecurity in Himalayan Asia	3
The crisis over freshwater resources	3
Himalayan Asia: Geographic scope of the study	5
The argument	8
Himalayan Asia's freshwater crisis: Overview	13
Organization of the book	17
2 Challenge of Climate Change in Himalayan Asia	19
What does a changing climate portend for regional water geopolitics?	19
Assessing climate change and freshwater in Asia	19
Glaciers: Impact on Asian freshwater supplies of deglaciation in the Himalayan–Tibetan Plateau region	22
Glacial recession and effects on water availability	27
Glacial lake outburst floods	28
Glaciers and climate change	29
Floods and drought: Too much water or too little?	30
Sea-level rise and sinking deltas	33
What does it all mean?	37

Part II Sources of Transboundary River Disputes

3 Damming the Rivers – I: The Irrigation Imperative	45
Negotiating water shares: The problem of food security	45
India, Pakistan, and the Indus basin: Dividing the spoils of war	46
Indus Waters Treaty: Partition's river legacy	47
Indus basin: Food (in)security and the irrigation imperative	54
India, Bangladesh, and the GBM basin: Leveraging inequality	63
A barrage on the Ganges: Feud over the Farakka	64
Damming the Teesta: A collision of ambitions	75
The bilateral approach to water sharing	79

4 Damming the Rivers – II: The Energy Imperative	83
The quest for hydroelectric power	83
Hydropower and India's energy security	85
India, Pakistan, and the hydropower resources of Kashmir	88
Kashmir: The Indus runs through it	88
Damming the Chenab – The Baglihar dispute	92
Damming the Jhelum – The Kishenganga dispute	95
Hydropower politics: Last rites for the Indus Waters Treaty?	98
China, India, and the hydropower resources of the Brahmaputra basin	100
China, Southeast Asia, and the hydropower resources of the greater Mekong basin	104
Making way for the hydrohegemon	108
5 Damming the Rivers – III: The Diversion Imperative	113
Mega schemes for relieving water scarcity: On the way to mega rivalry?	113
China, India, and the Brahmaputra basin: Diversion on the drawing board	114
Tapping the Tibetan freshwater tower: A convergence of divergence?	118
Bangladesh and the vanishing Brahmaputra: In the middle of mega schemes?	125
 Part III Alternatives to Water Conflict	
6 Cooperative River Basin Management	133
The regional multistate solution: Is Asia ready for integrated river governance?	133
UN convention on the law of non-navigational uses of international watercourses	134
Middle East river systems	138
Euphrates–Tigris river basin	138
Nile river basin	146
Jordan river basin	162
Summary	170
7 Water Technology Innovation	173
Is there a technology “fast track” to water security?	173
Desalination of seawater: From salt to shining sea	173
Irrigation: Water-saving technologies in agriculture	183
Additional technological food for thought	189
Wastewater recycling: Can greywater help “green” Himalayan Asia?	189

Rainwater harvesting	193
Back to the future: Rediscovering ancient water technologies	195

Part IV The Future of Himalayan Asia's Rivers

8 Conclusion: Swimming against the Tide	203
Water wars or pacific waters ahead?	203
Perils on the path to water cooperation	204
Tools for change	206
The rise of resource nationalism	208
The revenge of geography: The enduring curse of geopolitics	210
The urgency of regional cooperation	212
<i>Notes</i>	214
<i>Index</i>	260

Illustrations

Tables

1.1	Major Rivers of the Greater Himalayas–Tibetan Plateau Region	7
1.2	Population and Water Resources: Total Renewable Per Capita (Actual) (m ³ /inhab/yr)	15
3.1	Top Ten Irrigated Countries in the World (2003–2009)	54
3.2	Food Insecure Population in Pakistan, 2009	56
3.3	Top Countries in the World in Total Renewable Freshwater Resources (km ³ /year)	67
4.1	India's Power Sector – Total Installed Capacity (as on 31 July 2010)	86
4.2	China's Power Sector – Total Energy Consumption by Type, 2008	101
4.3	Water Resource Distribution in the Mekong River Basin	105
4.4	Water Availability in the Lower Mekong River Basin, 2004	106
6.1	Water Use in Agriculture in Jordan Basin Countries	164
7.1	World's Top Ten Users of Sprinkler and Micro Irrigation (in Descending Order of Total Sprinkler and Micro Irrigated Area)	187

Figure

1.1	Water Stress and Scarcity Definitions	16
-----	---------------------------------------	----

Maps

1.1	Major Rivers of Himalayan Asia	6
2.1	Glacial Lake Growth in Bhutan	26
3.1	Indus River Basin	48
3.2	GBM Basin	64
3.3	Ganges River and the Farakka Barrage	65
3.4	Transboundary Rivers of Bangladesh	68
3.5	India's Teesta Barrage Project	78
4.1	Baglihar, Kishenganga, and Neelum Jhelum Hydroelectric Projects	93
5.1	China's South–North Water Diversion Project (SNWDP)	116

5.2	India's River Linking Project (RLP)	117
5.3	Proposed Grand (or Major) Western Canal on Brahmaputra	124
6.1	Euphrates–Tigris River Basin	138
6.2	Nile River Basin	147
6.3	Jordan River Basin	163

Part I

Fundamentals of River Rivalry in Himalayan Asia

1

Water Insecurity in Himalayan Asia

The crisis over freshwater resources

Scientists and policy makers are fast approaching unanimity that a fresh-water crisis is in progress the world over. Both the severity of this crisis and its content vary widely among the world's regions, sub-regions, and countries, and there is intense debate over its causes and reversibility. No longer much debated, however, is whether the crisis exists. On the contrary, its huge scale, potentially calamitous consequences, and imminent dangers to the political stability and security of the planet's many water-crisis-afflicted nations are now commonplace topics both in scholarly literature and in global public discourse.¹

There is not much debate over the severity of water resource problems in Himalayan Asia, a vast and variously defined area which, for this book's purposes, embraces the six mainland members of the eight-nation South Asian region, a grouping of states formally joined together in the South Asian Association for Regional Cooperation (SAARC),* the five mainland members of the ten-nation Association of Southeast Asian Nations (ASEAN),[†] and China. While this region possesses abundant river resources, including some of the world's mightiest rivers,[‡] its hosting of rapidly modernizing, increasingly affluent, and demographically multiplying societies at the same time ensures the emergence of constant resource challenges, including

* Ranked by size of population, the six mainland nations included in SAARC are: India, Pakistan, Bangladesh, Nepal, Afghanistan, and Bhutan.

† Ranked by size of population, the five mainland members of ASEAN, excluding the peninsula portion of Malaysia, are: Vietnam, Thailand, Myanmar/Burma, Cambodia, and Laos.

‡ River resources are defined broadly in this book to include water for navigation, fisheries, irrigation, hydroelectric power generation, ecological balance and biodiversity, and domestic and industrial uses. Hydropower qualifies also, of course, as an energy resource.