

A satellite-style map of South Asia and the Indian Ocean. The landmasses are shown in shades of brown, tan, and green, with intricate river networks. The Indian Ocean is a deep, dark blue, with white-capped waves visible along the southern coast of India and the eastern coast of Africa. The title text is overlaid on the upper portion of the map.

THE ROUTLEDGE ATLAS OF
SOUTH ASIAN
AFFAIRS

ROBERT W. BRADNOCK

CARTOGRAPHY BY CATHERINE LAWRENCE

The Routledge Atlas of South Asian Affairs

South Asia has developed from a group of newly independent post-colonial states of at most secondary importance to the wider world to its current position as a region of central strategic importance to both global economic development and world peace and stability.

This *Atlas* highlights the global significance of South Asia in relation to economic, geopolitical and strategic interests. It provides a coherent descriptive and analytical account of the key elements of the complex societies that make up the region and its component countries. It is illustrated with more than 100 original maps and offers concise entries on key issues, including population growth, the geopolitics of trans-boundary water resources, natural disaster management and climate change. The book is structured thematically in these sections:

- Global context
- Geographical environments
- Historical evolution of South Asia
- Key issues in modern South Asia
- Economy and security

Designed for use in teaching undergraduate and graduate classes and seminars in geography, history, economics, anthropology, international relations, political science and the environment, as well as regional courses on South Asia, this book is also a comprehensive reference source for libraries and decision makers focusing on South Asia.

Robert W. Bradnock has published extensively on South Asian Affairs, first at SOAS, where he became Head of the Department of Geography, and subsequently at King's College London. Here most recently he has been a Senior Visiting Research Fellow in the Department of Geography. He continues to lecture, broadcast and publish widely on the politics and current affairs of South Asia. His recent work includes *Paths to Peace*, a Chatham House report based on the first-ever opinion poll to be undertaken in both Indian and Pakistani-held Kashmir.

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This Atlas is dedicated to my grandchildren

Manon Arkinstall

George Warnett

Rowan Cameron

Alba Cameron

Thomas Warnett

Jessie-Mai Morton

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Preface

‘South Asia’ remains an enigmatic term. It has failed to gain the widespread currency and immediate recognition of the colonial description ‘the Indian sub-continent’, with which it is most closely identified. Although the name has been in common use among academics and many Government agencies for over 50 years, international bodies have still not agreed upon a common definition for the region and its members, and the general public often has only a hazy notion of ‘where South Asia is’.

This failure may be the result of the universal recognition of India and the much narrower public awareness of the many ties India has with the post-Colonial states of its neighbourhood. It may also reflect the fact that the term ‘South Asia’, introduced to meet the needs of the post-colonial reality of the region, means little to an audience that sees its parts in isolation. Thus, it is a common perception at the time of writing in mid-2015 that India is a rising power, with great potential to influence world affairs. In contrast, few see Pakistan or Bangladesh in such a positive light. A more common focus is either on the risks of a rising Islamic militancy or of the continuing challenge of tackling poverty in the face of overwhelming environmental odds.

None of these perceptions bears close scrutiny. The world of the eight nation states that make up contemporary South Asia is immensely diverse and dynamic. That they see for themselves a common identity and interest is reflected in their membership of the regional grouping of the South Asian Association for Regional Cooperation (SAARC). This finds a place for the tiny states of Bhutan and Maldives, the middle sized Afghanistan, Nepal and Sri Lanka, the large states of Pakistan and Bangladesh, and the giant, India, at its heart. Together these states are home to approaching 1.5 billion of the world’s 7 billion people. While sharing millennia of civilisational history, they embrace a cultural social, economic and political diversity often baffling to the outside observer.

As a region South Asia has a growing role in world affairs. The scale and dynamism of the Indian economy are already attracting global attention, but each of the countries has its success stories to tell. Alongside these, however, are clear challenges of global significance, whether in terms of terrorism and national security, the continuing scourges of poverty, hunger and disease, or the challenges of environmental stress. In common with other books in this Routledge series, this Atlas tries to put these challenges, and the different ways of approaching them, into context in a succinct and accessible form.

It would not have been possible to write this book without the support of many colleagues. I owe particular thanks to Dorothea Schaefer, who commissioned the Atlas, and her colleagues at Routledge who have seen it through various production stages with unfailing helpfulness. Catherine Lawrence has managed the very large scale process of originating the maps to the highest of standards with unfailing patience and skill. I also owe a debt to colleagues at King’s College London, where a Visiting Senior Research Fellowship has given me a continuing

academic home, and in particular to Richard Schofield, whose resourcefulness and determination have seen research and teaching in geopolitics flourish, first at SOAS and more recently at King's. I am also grateful for the unfailing support of my family. My brother James Bradnock read an early manuscript, and my step-daughter Catherine Cameron made countless corrections and suggestions on the final draft. Above all I am indebted to my wife Roma, who has not only sustained her interest in the Atlas through a very lengthy gestation process, but provided her knowledge, skill and insights at every stage. I am immensely grateful. Any errors and omissions remain mine.

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Notes

Place names The spelling of place names has changed through time and is still under revision across South Asia. The current official spelling for place names is used throughout the Atlas except where reference is to places during the colonial period. Thus Kolkata and Chennai are used throughout except when the reference is to the colonial period, when Calcutta and Madras are used.

Statistical data Sources of data used throughout this Atlas are given in the text. However, it should be noted that there are often significant discrepancies in published data, and even sources such as the World Bank, the CIA, or FAO's Aquastat, which are often quoted as 'standard' are subject to the variability of their original sources. There is great variability in the sophistication and accuracy of data collected in different countries of South Asia, and the reader should use the data in this book with caution.

Abbreviations, acronyms and glossary

ADB	Asian Development Bank
ADR	Association for Democratic Reforms
AL	Awami League (Bangladesh)
aman	Monsoon season crop (Bangladesh)
AP	Andhra Pradesh
ARWR	Actual renewable water resources
aus	pre- or early monsoon season crop (Bangladesh)
barrage	Low-head river diversion dam
BBC	British Broadcasting Corporation
BBS	Bangladesh Bureau of Statistics
BCM	Billion cubic metres
BD News	Bangladesh News
BGS	British Geological Survey
bigha	unit of area approximately 0.16 of a hectare
BIMSTEC	Bay of Bengal Initiative for Multi-Sectoral, Technical and Economic Cooperation
BJP	Bharatiya Janata Party (India)
BNP	Bangladesh National Party
BoB	Bay of Bengal
boro	Dry season crop (Bangladesh)
CENTO	Central Treaty Organisation
CFL	Ceasefire Line
CIA	Central Intelligence Agency
CIS	Commonwealth of Independent States
cm	centimetres
Coriolis effect	deflection of an object in motion relative to a rotating 'frame of reference'
CSE	Centre for Science and the Environment (India)
Cumecs	Cubic metres per second (flow)
Cusecs	Cubic feet per second (flow)
Dalit	'the oppressed', the lowest Indian castes
EAG	Empowered Action Group States (India)
ENSO	El Nino Southern Oscillation
EPRLF	Eelam People's Revolutionary Liberation Front (Sri Lanka)
FAO	Food and Agriculture Organisation
FDI	Foreign Direct Investment

FII	Foreign Institutional Investment
FPTP	First Past the Post electoral system
GAP	Ganga Action Plan
GCC	Gulf Cooperation Council
GCM	Global Climate Models
GDP	Gross Domestic Product
ghat	Hill, mountain, slope or bank
GLOF	Glacial Lake Outburst Flood
GOI	Government of India
Gram Panchayat	Village council
GW	Gigawatts
Harijan	'people of God', Gandhi's term for outcastes
Harkat ul Mujahideen	Terrorist organization (Pakistan)
HEP	Hydroelectric Power
HIV	Human Immunodeficiency Virus
HP	Himachal Pradesh
Huji-B	Harkat ul Jihad al Islami Bangladesh
IAEA	International Atomic Energy Authority
IAF	Indian Air Force
IBIS	Indus Basin Irrigation System
ICC	International Chamber of Commerce
ICJ	International Court of Justice
IMD	Indian Meteorological Department
INC	Indian National Congress
INCOIS	Indian National Centre for Ocean Information Services
INDOEX	Indian Ocean Experiment
INS	Indian Naval Ship
IPCC	Inter Governmental Panel for Climate Change
IRIN	Integrated Regional Information Networks
ISI	Inter-Services Intelligence (Pakistan)
ISIL	Islamic State of the Levant
ISIS	Islamic State of Iraq and Syria
IUCN	International Union for the Conservation of Nature
JeM	Jaish e Mohammad (terrorist group, Kashmir/Pakistan)
JS	Jana Sangh
JTWC	Joint Typhoon Warning Centre
JVP	Janatha Vimukhti Peramuna (People's Liberation Front, Sri Lanka)
karez	underground water channels for irrigation (Iran, Afghanistan, Pakistan)
kattu karuval	<i>Prosopis juliflora</i> , or thorn scrub
kavalai	bullock operated ramp-system well irrigation (Tamil Nadu)
km	kilometer
km ³	cubic kilometers
KW	Kilowatts
KWh	Kilowatt hours
LAC	Line of Actual Control (China-India)
LDCs	Least Developed Countries

LeT	Lashkar e Taiba (terrorist group, Kashmir/Pakistan)
LoC	Line of Control (Jammu and Kashmir)
Lok Sabha	Assembly of the People (Lower House of the Indian Parliament)
LTTE	Liberation Tigers of Tamil Eelam (Sri Lanka)
m	metre
M	Moment of Magnitude, measure of earthquakes' energy
m ²	square metre
m ³	cubic metre
MAB	Man and Biosphere Programme
maha	main (wet) season rice crop (Sri Lanka)
majlis	council, assembly (Muslim)
Majlis e Shoora	Parliament (Pakistan)
Mcm/yr	million cubic metres per year
MDG	Millennium Development Goals
MLA	Member of the Legislative Assembly
mm	millimeters
MP	Madhya Pradesh
MQM	Muttahida Qaumi Movement ('United National Movement' - Pakistan)
MTDF	Medium Term Development Framework
MW	Megawatts
NALCO	National Aluminium Company
NAM	Non Aligned Movement
NASA	National Aeronautical and Space Administration
NATO	North Atlantic Treaty Organisation
NDA	National Democratic Alliance (India)
NFE	Non-Formal Education
NGO	Non Governmental Organisation
NOAA	National Oceanic and Atmospheric Administration
NRLP	National River Linking Project (India)
OIC	Organisation for Islamic Conference
PAF	Pakistan Air Force
PDP	People's Democratic Party (Indian Jammu and Kashmir)
Persian wheel	bullock operated lift irrigation system, wells (northern South Asia)
PM	Particulate matter
PNS	Pakistan Naval Ship
ppmv	parts per million by volume
‰	per thousand
PPP	Purchasing Power Parity (economic indicator)
PPP	People's Party of Pakistan (political party)
PRC	People's Republic of China
PTI	Pakistan Tehrik e Insaf ('Pakistan Movement for Justice')
Rajya Sabha	Assembly of States (Upper House of the Indian Parliament)
RCD	Regional Cooperation for Development (Pakistan, Iran and Turkey)
RGS	Royal Geographical Society
RWR	Renewable water resources
SAARC	South Asian Association for Regional Cooperation
SAFTA	South Asia Free Trade Area

SAPTA	South Asia Preferential Trade Area
SC	Supreme Court (India)
Scheduled castes	castes listed in Government schedule for affirmative action
Scheduled tribes	Tribal peoples listed in Government schedule for affirmative action
SEATO	Southeast Asia Treaty Organisation
Sikh Panth	The Sikh path to salvation
SLFP	Sri Lanka Freedom Party
SMHI	Swedish Meteorological and Hydrological Institute
SOAS	School of Oriental and African Studies, London
SREX	Special Report on Extreme Events (IPCC)
SRS	Sample Registration System (India)
tank irrigation	small-scale reservoir based irrigation
TB	Tuberculosis
Thalweg	Line defining deepest part of river course
TI	Transparency International
TULF	Tamil United Liberation Front
UEA	University of East Anglia
UK	United Kingdom
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNCTAD	United Nations Commission on Trade and Development
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNFPO	United Nations Family Planning Organisation
UNHCR	United Nations High Commission for Refugees
UNHRC	United Nations Human Rights Commission
UNICEF	United Nations Children's Fund
UNSC	United Nations Security Council
UP	Uttar Pradesh
UPA	United Progressive Alliance
UPFA	United People's Freedom Alliance (Sri Lanka)
USA	United States of America
USCENTCOM	United States Central Command Area
USEUCOM	United States Europe Command Area
USGS	United States Geological Survey
USPACOM	United States Pacific Command Area
USSR	Union of Soviet Socialist Republics
water table	The surface of saturated bedrock
WB	World Bank
WHO	World Health Organisation
WTO	World Trade Organisation
WWF	Worldwide Fund for Nature
yala	dry season crop (Sri Lanka)
$\mu\text{g}/\text{m}^3$	microgrammes per cubic metre

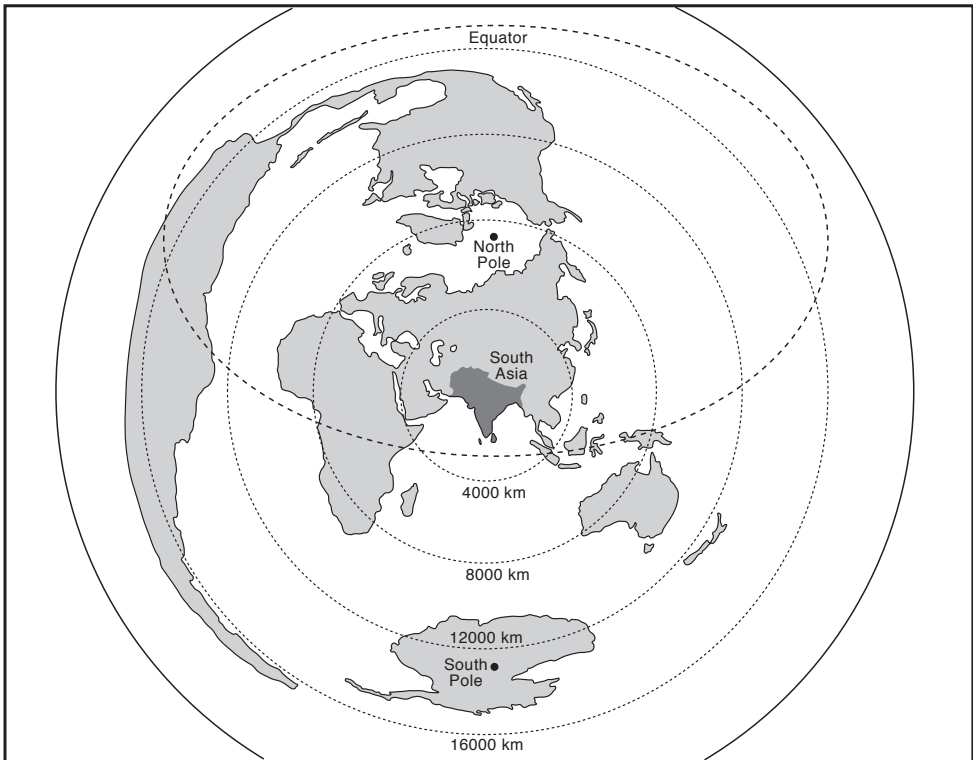
Section A

The global context

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I South Asia and the world powers

Modern South Asia faces the ocean to its south and the Eurasian continent to its north. At its centre, India runs due south from the Himalaya into the heart of the Indian Ocean. From Pakistan and Afghanistan in the northwest, the remaining states of the region encircle India, from the Himalayan states of Nepal and Bhutan in the north, Bangladesh in the northeast, and Sri Lanka and the tiny atoll state of Maldives to the south.



Map 1 South Asia: a global view

South Asia's character and interests have been greatly influenced by maritime trade, migration, and global political powers. The Indian Ocean continues to be a major trade artery and an area where competitive interests between the countries of the region and beyond embrace the movement of goods and access to resources on the sea floor. At the same time, as Map 1

shows, South Asia has an extended continental boundary, touching four major global regions: the Middle East, Central Asia, China and South East Asia. Despite the natural boundary created by the world's highest mountain range, the 2000 km long range of the Himalaya, each of these regions interacts with modern South Asia in ways that are vital to the region's security.

South Asia is an integral part of the wider Asian world. Yet the world beyond Asia – especially Europe and the United States – has also interacted powerfully with the evolution of South Asian interests. The era of European colonialism – notably British and Portuguese, but also French and Dutch – left profound marks on South Asian society, politics and economies. After the Second World War, Independence movements finally succeeded in transforming the world of Empire into the modern world of independent states. What had been known as the Indian sub-continent, ruled largely or indirectly by the British in the British Indian Empire, was transformed into the region known today as South Asia.

British India had stretched from Iran and Afghanistan in the northwest to Burma in the east. It was made up of territory ruled directly by the British Crown since 1858. For a hundred years and more before that it was largely under the control of the British East India Company. However, even after 1858, nearly a third of the territory remained under the control of more than 550 Indian Princes, whose territories ranged from a few hectares to the size of France. On the margins of this core territory, controlled directly or indirectly by the British, were territories that had much in common socially, historically and economically with British India, but that had different relationships with the British Crown. These were immensely diverse. Afghanistan, a classic landlocked border state to India's northwest, had been criss-crossed through history by a succession of foreign powers. However, it never became fully integrated in the core cultural regions of any of its neighbouring regions, be it South Asia, Iran or the Arab world, Central Asia, or the Mongol and Chinese worlds to the north and northeast. The two independent or quasi-independent Himalayan states, Nepal and Bhutan, were sandwiched between the regional superpowers of India and China. Burma, to the east, always had strong ethnic and cultural ties with South East Asia. Ceylon (re-named Sri Lanka in 1972), heavily influenced throughout its political history by contact with neighbouring India to its north, sustained strong elements of a discrete identity.

Of all these states, Afghanistan and Burma had always been regarded as belonging as much to their neighbouring regions of Central Asia and South East Asia respectively, if not more. Today, while Afghanistan has been brought into the South Asian Association for Regional Cooperation (SAARC), of which all the other South Asian states are members, Myanmar (Burma) remains outside the Association and is more frequently seen as an integral state of South East Asia.

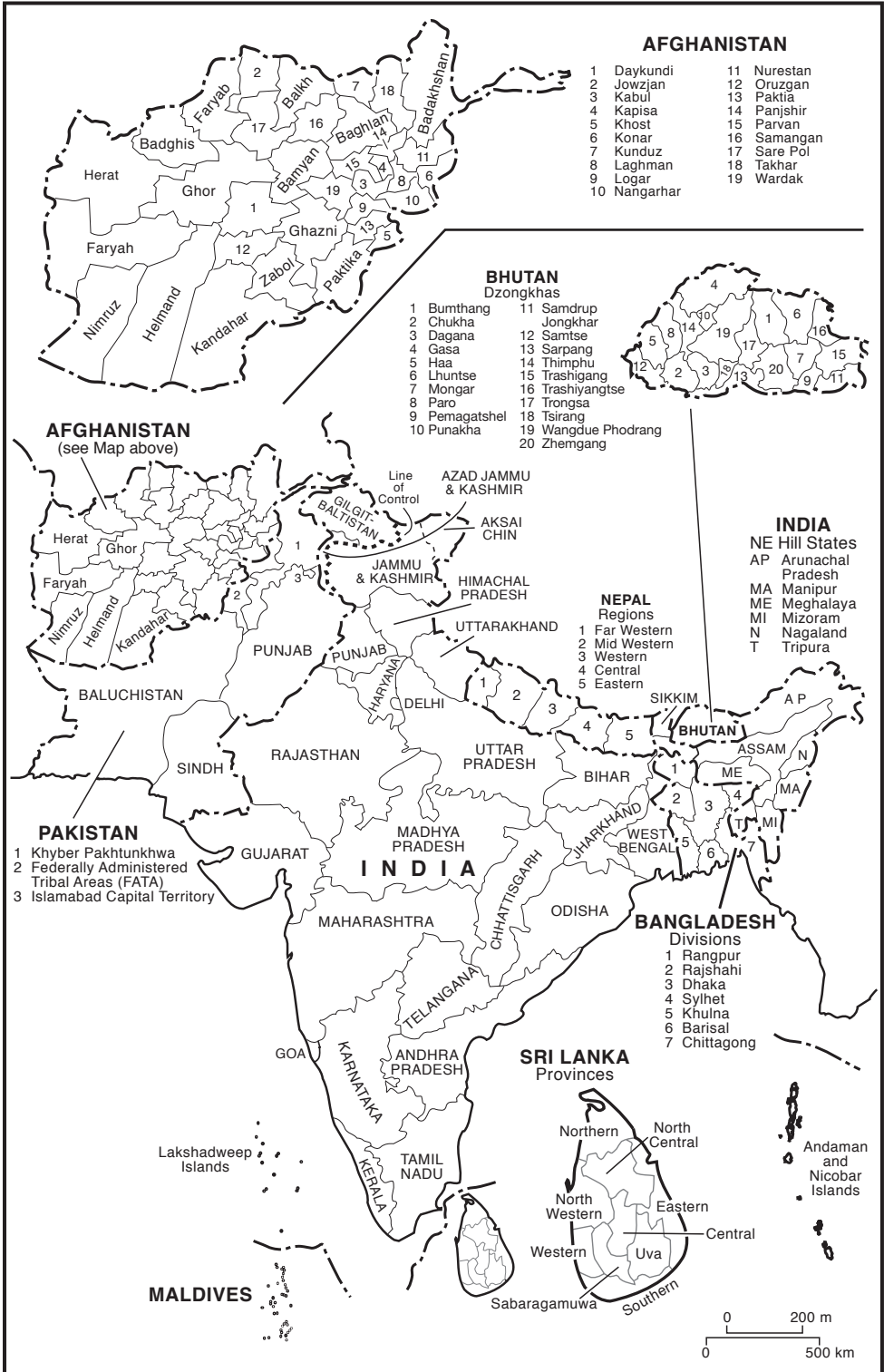
The overall scale of the South Asian region can be gauged from international comparisons. With just 3 per cent of the world's area, South Asia has nearly one quarter of the world's population. In terms of area, South Asia is smaller than Brazil, yet in 2015 India's most populous state, Uttar Pradesh, had almost exactly the same population as Brazil as a whole, just over 200 million.

The precise boundaries of the South Asian region have been fluid in the past and remain subject to widely differing definitions. For the first forty years or so after the Independence of the South Asian countries, the region was often seen as marginal to the core security interests of the United States and the Soviet Union, then the two major world powers. In his map, *View of the World from Washington*, Zbigniew Brzezinski, President Jimmy Carter's National Security Adviser from 1977–1981, illustrated graphically the sense that India and its region were of largely peripheral interest to US policy makers at that time (Map 6).



Map 2 South Asia and Brazil

Maps 5 and 6 illustrate how the region today is defined in two quite different ways by the two major institutions of contemporary US foreign policy. The US Pentagon puts India and the eastern states of South Asia (India, Sri Lanka, Nepal, Bangladesh, Bhutan and Maldives) in its Pacific Command Area (USPACOM). The two western states (Afghanistan and Pakistan) are put in Central Command Area (USCENTCOM). With the rising focus on terrorism and the continuing war in Afghanistan after 2001, the US increasingly used the sub-regional term 'Af-Pak', much disliked in South Asia itself. In contrast to this US strategic division of South Asia the US Department of State groups all the South Asian countries together, and attaches them to the countries of Central Asia, as shown in Map 4.

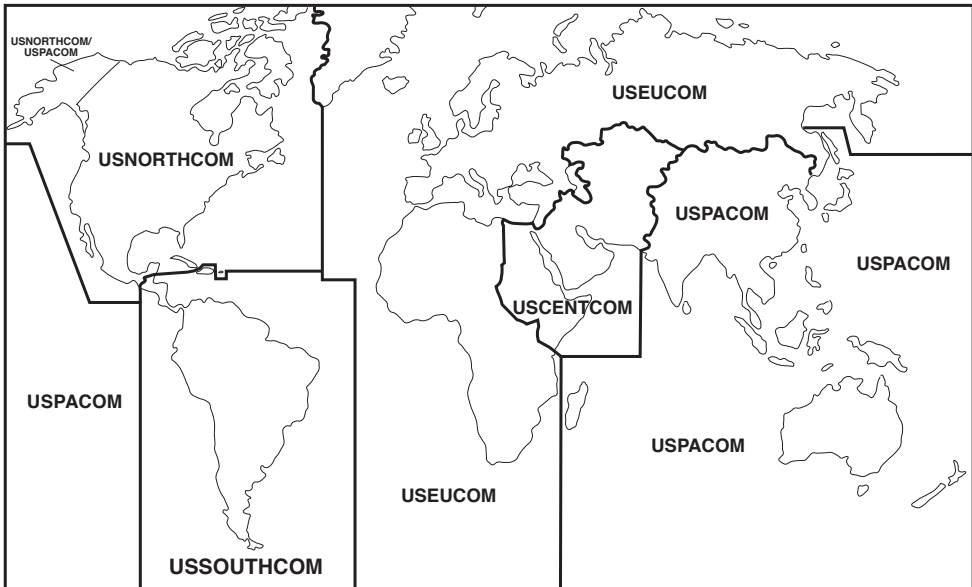


Map 3 South Asia: the modern States and their administrative units



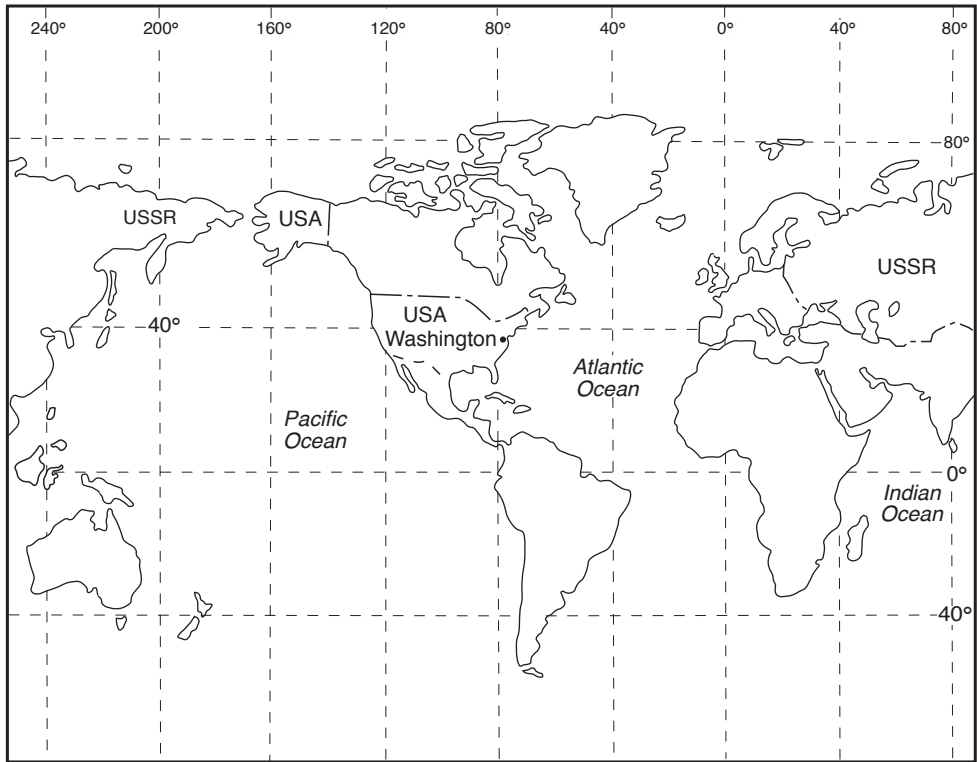
Map 4 South Asia: the US Department of State's definition of South and Central Asia

Source: Data from US Department of State (2015)



Map 5 South Asia: the US Pentagon's Strategic Command Areas

Source: US Department of Defense (2015)



Map 6 The 1980s view of the world from Washington

Source: Brzezinski, Z. (1988)

Such differences of definition are also characteristic of world institutions like the United Nations, which places Iran in South Asia. When talking of South Asia as a cultural region some institutions, such as the Centers for South Asian Studies at the University of Michigan and the University of Virginia, include Tibet. However, the core identity of modern South Asia as a geopolitical region is clear. Bound together by strong common bonds of historical evolution, social structure and longstanding mutual interaction, the eight countries that make up the modern institution of the South Asian Association of Regional Cooperation (SAARC) have far more in common with each other than they do with their regional neighbours. Nonetheless the relationships of the SAARC member states continue to experience great stress, externally in relation to each other and internally as they struggle with profound economic, social and political challenges.

The countries of South Asia have seen far-reaching changes since the break up of the British Empire in 1947, when India and Pakistan became independent, and 1948 when Ceylon followed suit. The complex evolution of South Asian history is outlined in brief in Chapter 12. The overlay of an Indo-Aryan society over earlier Dravidian roots, both originating from regions to the northwest of the sub-continent, laid the foundations for three major indigenous religious traditions, Hinduism, Buddhism and Jainism. These provided the context into which Muslim power spread eastwards from its first contact with India in the eighth century. Initially Islam followed

the trade routes through which the pre-Muslim and Roman worlds had traded with the Far East, using ports down the west and southern coasts of India and Sri Lanka en route to South East Asia. From 1000 AD onwards, Islam spread across the Punjab plains of northwestern South Asia. From 1198, when Muhammad Ghuri conquered Delhi, Islam spread rapidly eastwards. By the end of the seventeenth century, through the power of the Mughal Empire, Islam touched virtually every part of South Asia.

The first European contact with India was made as the Mughals were beginning their dramatic rise to dominance. After 1498, when Vasco da Gama first made landfall in South India, South Asia was drawn inexorably further into the world of European interests. Up to 1858 the British East India Company's sea borne trading interest became increasingly dominant, though the Portuguese, French, Dutch and Danes all had varying degrees of contact with India. To the north the expansion of the Russian Empire from the fifteenth century up to the Russian Revolution in 1917 cast a new shadow over the sub-continent. In the form of the 'Great Game' this was to play a prominent part in British thinking in India at the end of the nineteenth century. Writing in 1904, Sir Halford Mackinder argued that narrowly defined national geopolitical interests had been superseded by a new global geography of world power. At the start of the twentieth century this had resolved into a conflict between those who could control the resource-rich, easily traversed 'Heartland', linked by railway networks stretching from Western Europe to the Pacific, and the countries surrounding the Heartland where power was exercised through control of the sea lanes. The overthrow of the Tsars and the rise of the Soviet Union brought a new ideological dynamic to the nature of the global struggle for power.

This new dynamic took hold with the transformation of global geostrategic interests at the end of the Second World War. The American strategic thinker Nicholas Spykman (1944) envisaged a post-World War II world in which, with the Soviet Union occupying all and more of Mackinder's Heartland, it would be in the interest of the United States to build protectionist alliances of the 'Free World' in the maritime ring of countries surrounding the Soviet Union. Into that Cold War scenario the countries of independent South Asia were born. It was a scenario that was to shape their strategic relations for over forty years. China also played an important strategic part in the region. Unwilling to accept Soviet leadership of the 'Communist World', and until President Nixon's visit in 1972 deeply hostile to the United States, China is becoming a vitally important influence in South Asian geopolitics.

The reaction of the newly independent South Asian countries to their strategic environment differed radically. From the outset India distanced itself from the Cold War, a stance that earned it the deep distrust of the United States and the scorn of Stalin's Soviet Union. It refused to join the US-led South East Asia Treaty Organisation (SEATO, 1954–77) or the Central Treaty Organisation (CENTO, 1955–79), arguing that membership would compromise India's true independence. In contrast Pakistan, fearing India's dominance and looking to American guarantees, joined both, its eastern wing giving it a South East Asian interest alongside the more Middle East focused interests of West Pakistan (see Chapter 16).

Although the war between India and China in 1962 provoked a brief rapprochement between Nehru's India and Kennedy's USA, it was not to last. To a degree the US tilt towards China was enabled by Pakistan. After China's humiliating victory over India in 1962 Pakistan perceived a strategic advantage in getting closer to China and in encouraging the United States to do likewise. Meanwhile in 1971 India, newly wary of its giant Chinese neighbour, signed a Treaty of Friendship with the Soviet Union. While this stopped well short of a military pact, it encouraged the development of shared strategic interests through the twenty years up to the collapse of the Soviet Union.

Through the 1980s the Soviet occupation of Afghanistan had profound effects on Afghanistan itself and on Pakistan and India. As a spin-off from the Soviet defeat in Afghanistan, Pakistan decided to try to take advantage of the collapse of governance in Indian-held Kashmir by training foreign guerrillas and sending them to cross the Line of Control into the Vale of Kashmir. This led to a massive Indian military crackdown and a military presence which was still potent in Kashmir in 2015.

In Afghanistan itself the defeat of Soviet forces in 1989 left a power vacuum that Pakistan was desperate to fill. It sought to weld together a pro-Pakistani regime from the very disparate tribal forces that continued to fight in what rapidly became an Afghan civil war. Instrumental in the rise of the Taliban, Pakistan hoped to have a dominant influence on the new government that finally seized power in Kabul, while India backed the smaller and nominally weaker faction, the Northern Alliance. In 2001 the 9/11 Al Qaeda attack on New York and Washington turned the decision of the Afghanistan-based Taliban to give a home to Al Qaeda into a strategic catastrophe. The immediate US response led to the overthrow of the Taliban government in Afghanistan, the installation of the Karzai government and more than a decade of military campaigns. From the Pakistani perspective it led to the conversion of its Northwest frontier region into a battle zone and to the rise of the Pakistani Taliban, which in 2015 continued to threaten the state. It also opened the door to a large-scale Indian presence on Afghan soil, albeit for peaceful reconstruction, which was the antithesis of Pakistani strategic ambitions.

Conclusion

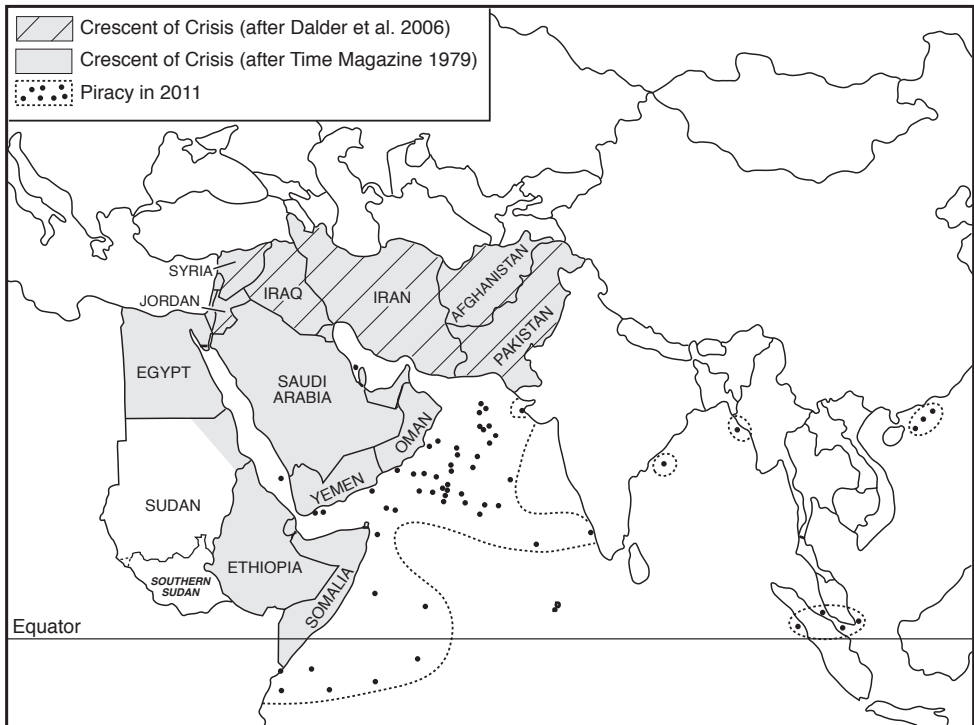
Today the geopolitics of South Asia is in flux. Pakistan and Afghanistan are struggling to build states in which their citizens can live free from terror. As the withdrawal of NATO combat troops from Afghanistan was completed, effective governance became essential if the major challenges of development were to begin to be seriously addressed. Nepal is still not free from the destructive effects of civil war, which continue to threaten its political, social and economic fabric, and exacerbated by the catastrophic earthquake of April 2015. While Sri Lanka's own Civil War has now ended, the bitter trauma of nearly three decades of conflict has taken a big toll. Bangladesh, often at the mercy of its environment, has made real economic progress, but faces daunting demographic and resource pressures. India, rising rapidly in global perceptions as a regional power in the making, also faces unresolved problems of urban and rural poverty and the political conflict that has become endemic in extensive regions – the Northeast and a belt running from the Nepal border south into Andhra Pradesh. The election of a BJP government in May 2014 raised new questions as power changed hands after ten years of Congress-led rule. Externally, South Asia has growing economic and political interests in its wider Asian region and the world.

This Atlas lays out some of the key dimensions of South Asia's current and future challenges. After an overview of the region's main geographical features and historical evolution, it explores a series of key issues in modern South Asia. It concludes with an outline of the governance and economies of South Asian countries, their defence and security concerns, and their interactions with the regional and world communities.

2 South Asia and its neighbours

South Asia is bordered by countries belonging to four contrasting worlds: the Middle East, Central Asia, China and South East Asia. Each region has a distinctive relationship with the South Asian region and with individual countries within it.

In 2015 South Asia's Middle Eastern neighbourhood was locked in a series of crises. The civil war in Syria, the rise of Isis/Isil and the challenges to Iraq were all of vital importance to South Asia. Further afield, the upheavals of the so-called 'Arab Spring' had produced turmoil in much of North Africa. Yet in some senses none of this was new. After the Iranian Revolution in 1979 the Middle Eastern neighbourhood of South Asia was repeatedly interpreted as a region in crisis. The precise definitions of both the region embraced by the term and the nature of the 'crisis' itself have varied widely through time and according to the particular context. In 1979,



Map 7 South Asia and the Middle East: the 'Crescent of Crisis'
Source: Dalder et al (2006); Time Magazine (1979)

for example, *Time Magazine* carried a map that showed the crescent stretching from Somalia to Pakistan. It included Ethiopia, Egypt and the whole of the Arabian Peninsula. More recent use of the term has restricted it to the countries stretching from the Mediterranean to Pakistan.

Although India, Pakistan and Afghanistan have important links across the Arabian Sea with the Gulf States and beyond, Iran is the only Middle Eastern state to have direct land borders with any South Asian country. It is in some senses both a bridge and a barrier to the rest of the Middle East. One of the world's largest Islamic states, Iran has a population of 74 million (just under half that of Pakistan, while having twice the area). Its distinctive Shi'a identity marks it out from most of its own Middle Eastern neighbours and shapes its perception of core interests. This often leads it into conflict with major Sunni countries in its own neighbourhood, notably Saudi Arabia.

Iran only has direct South Asian land borders with Afghanistan and Pakistan. However, all the South Asian countries have Muslim populations, some with a significant Shi'a population alongside the Sunni majority. This is true not only in Afghanistan and Pakistan themselves but also in India, notably in Jammu, Kashmir and central India. Bangladesh, Sri Lanka and Maldives all have very small numbers of Shi'a Muslims. The Shi'a presence gives a distinctive twist, and sometimes tension, to Iran's relations with each of those states. In addition, Afghanistan faces bilateral disputes with Iran over sharing the waters of the Helmand River and over Iran's alleged support for sections of the Taliban and the Shi'a minority.

Iran has generally had good relations with Pakistan, though not to the exclusion of maintaining close ties with India. Furthermore, Pakistan's close relations with Saudi Arabia and the United States have often proved contentious. They backed different sides in the Afghan civil war immediately following the Soviet occupation and continue to have different interests in a long-term peace settlement. However, Iran, Pakistan and India have all shown an interest in developing a gas pipeline to Pakistan and India. This is still under active consideration despite strong opposition from the United States.

Piracy

Over the first decade of the twenty-first century, piracy in the Arabian Sea provided a new focus of common interest among many of the states bordering the Indian Ocean. Piracy also affected those well beyond the region, for whom the Indian Ocean represents a vital transit route from Western Europe and the United States across to South East Asia, China and Japan. Map 7 shows the distribution of incidents of piracy at its peak in 2011–12, when it cost the world economy more than \$5bn a year. According to the International Chamber of Commerce (ICC) in July 2012, there had been 67 attacks in the first six months of the year, 13 ships and 195 hostages having been taken by Somalia-based pirates. By the end of 2014 the number of attacks had dropped into low single figures, due to a combination of increased naval intervention and increased stability, development and justice systems in Somalia itself. According to Nick Kay, UN Ambassador to Somalia speaking to the press in Abu Dhabi, an improved justice system and greater economic development had done much to curb Somalian piracy (Carroll 2014). Regular updates on this situation are available from the International Chamber of Commerce (ICC 2015).

The Central Asian Republics

To the north and northwest of South Asia, the Central Asian Republics all have largely Muslim populations. They also have historical and continuing geopolitical links with Russia. Rich in

energy resources, but with relatively sparse populations, the republics have often been the focus of global power struggles. These were most pronounced in the second half of the nineteenth century, as the Russian Empire consolidated its power eastwards. At the same time, the British Empire sought first to expand and then to strengthen its hold over South Asia against a perceived Russian threat – the ‘Great Game’.

The incorporation of the Central Asian Republics into Russia, and then into the Soviet Union, saw them firmly under Soviet control throughout the Cold War. The end of the Cold War led to the sudden emergence of five republics. Turkmenistan (5 million), Uzbekistan (28 million) and Tajikistan (7.8 million) all have direct borders with Afghanistan. Kazakhstan (16.5 million) and Kyrgyzstan (5.5 million) lie immediately to their north. Although South Asia covers just over 5 million km², compared with the Central Asian Republics’ nearly 4 million km², its population is 40 times as large.

India, Pakistan and Afghanistan all see the Central Asian Republics as a very important element of their economic and security interests. The soft power of expanded trade and economic ties is being actively promoted, especially in terms of energy security. For Afghanistan, ethnic ties cross the border with its neighbouring states, carrying a risk of destabilisation if the security of ethnic communities on one side of a border is threatened.

China

China has cast its shadow over South Asian political interests throughout the Independence period. Through its western autonomous regions of Xinjiang and Xizang (Tibet, as it is referred to in this Atlas), it has direct borders with Afghanistan, Pakistan, India, Nepal and Bhutan. Xinjiang, with an area of 640,000 sq miles (half that of India) has a population of only 22 million. Tibet, with two thirds of the area, has only 3 million people. The border with India includes two disputed territories (the Aksai Chin, occupied by China in 1954 but still claimed by India) and Arunachal Pradesh, now an Indian state but claimed by China as part of Tibet. In 2014 the entire India-China border remained unresolved (see Chapter 23 for a full discussion of border issues). The Chinese border with Pakistan, in the northern part of the former Princely State of Jammu and Kashmir, although held by Pakistan since 1949, is still claimed by India.

China has maintained strong relationships with Sri Lanka, Bangladesh and Maldives. It is only in the last decade, however, that economic ties between China and South Asia have really developed, most strikingly between India and China. These new, mutual economic interests offer the hope of changing a political scenario that has been dominated by mistrust and competitive nationalist claims over territory. However, despite the boom in trade between India and China during the first decade of the 2000s, and China’s growing interest in most South Asian countries, there are sharp differences between the South Asian states in their perceptions of China’s role in the region. In large measure these contrasts reflect India’s perceived dominance within South Asia and the wish of India’s smaller neighbours to have a balancing regional ‘giant’ on their side. China is investing heavily in infrastructural projects in South Asia. These include the construction of the Karakoram Highway, running from Xinjiang to Karachi, and the new port of Gwadar on Pakistan’s Makran coast. From 1783 until 1958 the old port town of Gwadar had been under the suzerainty of the Sultan of Oman. Its port facilities were relatively rudimentary until the Chinese-funded development of the new port and its transport links to the rest of the country. In 2013 China proposed the joint development of a new railway line across the Khunjerab Pass, following the route of the Karakoram Highway, ultimately to link China directly with Gwadar port. In addition, China has invested heavily in port infrastructure around the Indian Ocean coastline.

South East Asia

Historically, cultural links between South Asia and its Southeast Asian neighbours have been strong. Buddhism, which originated in the India-Nepal borderland, had spread through the whole of South Asia by the end of the Mauryan Empire in the second century BCE. Sri Lanka is still a predominantly Buddhist country and retains strong Buddhist links with Thailand. More recently, Burma, as it was then known, was administered as part of British India until 1937, though the links between Burma and South Asia weakened significantly after Independence in 1947. The military government of Burma changed the country's name to Myanmar in 1989, though 'Burma' is still often used. Unresolved issues among the tribal populations on its borders with Bangladesh and India continue to pose political problems, both domestically and internationally.

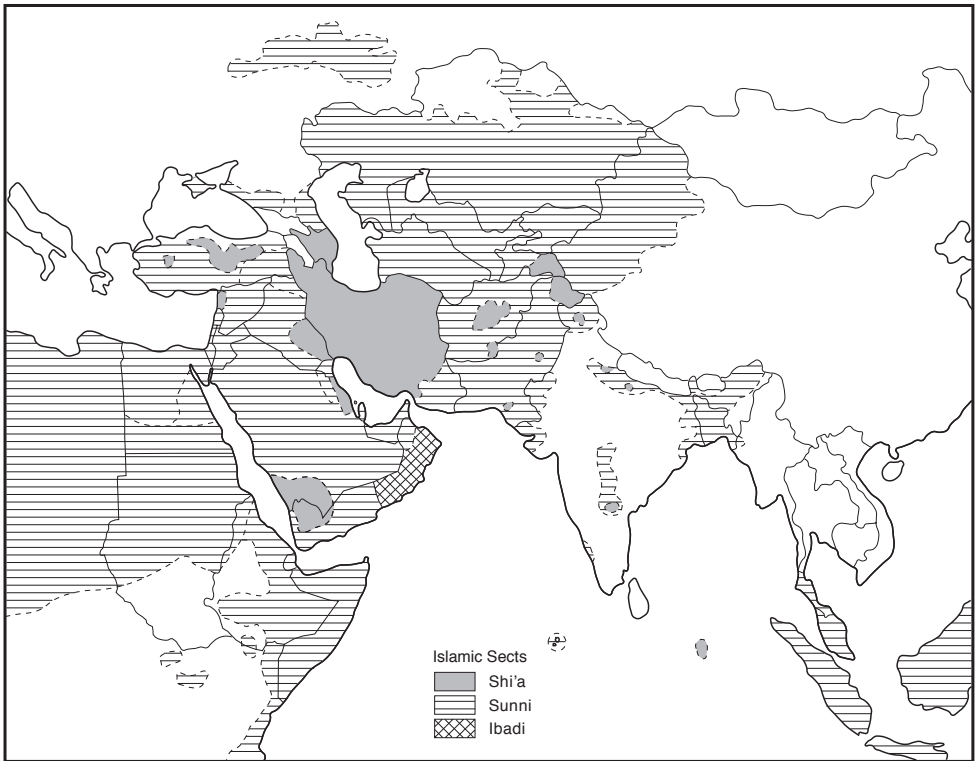
Although in the 1960s and 1970s Sri Lanka tried to promote itself as a Southeast Asian rather than a South Asian country – an attempt to break the perceived dominance of India – real links between South Asia and the Southeast Asian states have only been forged since the late 1990s. In the 1990s Thailand began to promote a 'Look West' policy, at the same time India was beginning its own strategy of 'Look East'. This suggested common ground, and by 2004 BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation) had developed from its tentative origins in 1997 to a full-fledged institution for trade and technical and economic cooperation. Its membership - India, Nepal, Bhutan, Bangladesh, Sri Lanka, Myanmar and Thailand - straddles South and South East Asia. With an ASEAN population of 1.3 billion and a combined GDP of US\$750 billion, trade generated under the BIMSTEC Free Trade Area had reached \$11bn in 2001. An August 2011 report from the Associated Chambers of Commerce and Industry of India suggested that BIMSTEC trade 'could reach \$60 billion' at current levels of GDP.

Conclusion

The most important political relationships for each of the South Asian countries are with each other. However, the wider neighbourhood offers political and economic challenges and opportunities. The political and economic upheavals in much of the Middle East in 2013 increased concerns about wider regional security and stability for South Asia itself. Some of the opportunities, visible in the transformation of the region's trade, are outlined in the next Chapter.

3 South Asia and the Muslim world

Four of the South Asian countries – Afghanistan, Pakistan, Bangladesh and Maldives – are members of the Organisation for Islamic Cooperation (the OIC, which until 2011 was known as the ‘Organisation for Islamic Conference’). However, the interests of the OIC are as diverse as its membership, and its influence in South Asia is relatively small. India, with the third largest number of Muslims in the world, after Indonesia and Pakistan, has been excluded from membership by Pakistan’s veto, despite support from Saudi Arabia, among others. India’s case is strengthened by the fact that Muslims are a minority in a number of member states. Uganda, for example, with 12 per cent of its population Muslim, a similar proportion to that of India, is included. It could be argued that the Gulf Cooperation Council (GCC), comprising the more geographically



Map 8 South Asia and the Muslim world
Source: Pew Research Centre (2011)

restricted states in the Gulf region, is of much greater consequence for South Asia as a whole than the OIC. Not only is it geographically contiguous with South Asia, it has historically vital trading links with both India and Pakistan. Furthermore, over the last forty years, the countries of the Gulf have imported labour from South Asian countries, including India, on a very large scale. This has bolstered the South Asian economies through substantial remittances from the Gulf to India, Pakistan, Sri Lanka, Maldives, Bangladesh and Nepal.

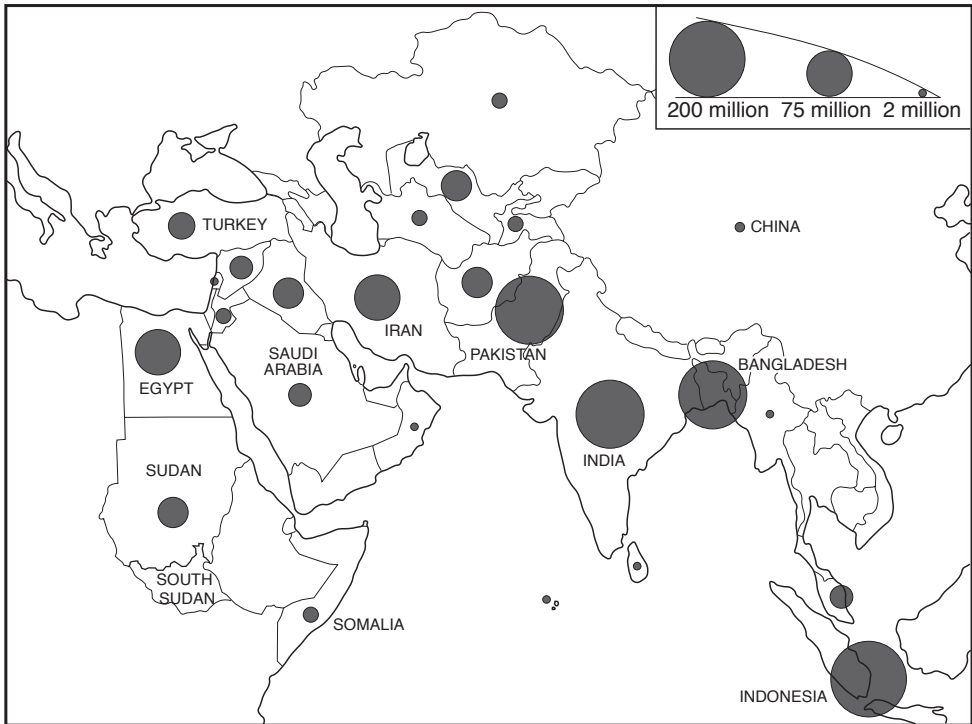
Religious identity plays an important, though rarely dominant, part in the geopolitics of most South Asian countries. Hinduism is the religion of the majority in India and Nepal, Islam in Afghanistan, Pakistan, Bangladesh and Maldives, and Buddhism in Sri Lanka and Bhutan. These 'majority religions', however, also comprise large minorities in some of the other South Asian countries. Hindus are significant minorities in Bangladesh and Sri Lanka, for example, while Buddhists form a minority in Nepal and India. Muslims form a large minority in India and small minorities in Sri Lanka and Nepal. In addition to the majority religions there are religious communities who do not form a majority in any of South Asia's nation states but who may do so within some areas of those states. Sikhs are concentrated in the Indian state of Punjab (66 per cent of the population is Sikh), and Christians form a majority in the Indian north eastern hill states of Nagaland (90 per cent) and Mizoram (87 per cent).

The significance of this religious diversity is explored more fully in the next chapter. However, only Islam has a geopolitical significance both between South Asia's nation states and beyond South Asia's borders. South Asia lies on the eastern fringes of the Muslim homeland but has been within Islam's religious and political influence for more than a thousand years. The present day Muslim populations of South Asia dwarf those of the Muslim heartland. South Asia's four Muslim majority states alone account for about 360 million Muslims. Only Indonesia comes close in terms of Muslim adherents. At approximately 156 million, India's Muslim population is the third largest in the world, after Indonesia (230 million) and Pakistan (178 million). Bangladesh is fourth with 143 million. Yet these numbers do not paint a complete picture, and the geopolitical significance of South Asia's Muslim populations is in some ways less than might be expected.

South Asia's Muslim populations are extremely diverse. About 85 per cent of Muslims in each of the South Asian countries is Sunni and 15 per cent Shi'a. As elsewhere in the Muslim world (the Ibadis of Oman or the Ahmadiyyas of Pakistan, for example), different schools or sects are found. Some of these are regarded as heretical. Locally, concentrations of Shi'a communities in South Asia rise to over 50 per cent, with important political effects, as in southwestern Afghanistan, or parts of Jammu and Kashmir. Culturally, however, even the major communities are very diverse. Urdu, the culturally élite language of South Asian Islam, is spoken as a mother tongue by a tiny proportion of most South Asian Muslims, all of whom speak one of a number of local South Asian languages, often shared with their non-Muslim neighbours.

The spread of Muslim communities across the sub-continent makes any calculation of the geopolitical significance of Islam for South Asia and its neighbourhood difficult. The creation of Pakistan at Independence in 1947 was predicated on the belief, promulgated by the Muslim League, that Hindus and Muslims were two separate nations and should therefore have two separate countries. In practice, the geographical concentration of India's Muslims in two discrete areas of the sub-continent, the northwest and the northeast, and the wide scatter of Muslim communities elsewhere across India where they were minorities, posed an immediate problem for the creation of a single Muslim state. Cultural and political diversity has left all the Muslim majority states struggling to find strong and permanent nation-building forces, which will override such regional tensions.

The 1947 Partition created the Muslim-majority state of Pakistan in two wings, East and West Pakistan. These were separated both by 800 miles of Indian territory and by very different cultures. West Pakistan, the dominant partner in the relationship both politically and



Map 9 Muslim populations of the Middle East, South and Southeast Asia

Source: Pew Research Centre (2011)

economically, was always fearful of perceived Indian intentions to take Pakistan back into India's fold. They looked to their Muslim neighbours to the immediate west for support. Yet relations with the Islamic world have been complicated by a variety of competing regional interests. The Sunni-Shi'a split has ramifications in relationships with the Gulf states, long-standing antagonism between Saudi Arabia and its Gulf allies with Iran being the most potent of the divisive influences. The rise of Isis/Isil in 2014/15 and the civil war in Syria exposed many of these fault-lines.

Although there is a strong geographical logic in strengthening the ties among Afghanistan, Pakistan and Iran, repeated attempts to achieve lasting treaties have failed to deliver effective, long-term economic, political or military alliances. Alternative regional groupings of the neighbouring Muslim states of the Middle East have not fared much better. The Regional Cooperation for Development (RCD), signed in 1964 by Turkey, Iran and Pakistan, laid out a framework for regional cooperation. This was widely seen both in Pakistan and the Shah's Iran as being a deliberate step away from the United States and in particular the ties of the Central Treaty Organisation (CENTO), which were deeply unpopular with many in both countries. However, the RCD failed to deliver much substantive cooperation and in Pakistani eyes was largely ineffective where it counted most, in Pakistan's confrontations with India. Iran gave modest diplomatic backing to Pakistan's attempts to prise Kashmir from Indian control in 1965 and to oppose the secession of Bangladesh in 1971. However, it was powerless to influence events, and the RCD never raised the profile of regional cooperation. The prospects for this tripartite regional cooperation were dealt a major blow in the 1970s when Zulfikar Ali Bhutto decided to court Saudi Arabia, a centuries-old enemy of Iran. The ties between Pakistan and Saudi Arabia

have continued. In addition to specific disaster relief aid, such as following the 2005 Kashmir earthquake, when Saudi Arabia gave more than any other country, its aid to Pakistan between 2006 and 2009 totalled over \$1.2bn. Pakistan has also offered extensive military training and assistance to the Saudi government.

The RCD was succeeded by the Treaty of Izmir (March 12, 1977), which established the Economic Cooperation Organisation. This marked a new start in the world, again with Turkey, Iran and Pakistan as its signatories. The Iranian Revolution in 1979, and the subsequent Soviet occupation of Afghanistan, gave the geopolitics of regional cooperation a new level of complexity. The new grouping survived and was widened subsequently to include by 1996 Afghanistan and the Central Asian Republics. However, wider geopolitical challenges prevented much by way of substantive cooperation. The 'War on Terror', the US-led war in Iraq and Afghanistan, and the continuing hostility between Saudi Arabia and its allies and Iran have made progress in developing either economic or political ties slow. The problems have been exacerbated by the huge difficulties of national construction and reconstruction in the region. The rebuilding of Iraq and the efforts to develop a sense of national unity in Afghanistan under the control of a single, effective and democratic government, remain far from complete.

Competing regional interests within each of those states have complicated the problem. Thus, for example, Pakistan fears the intentions of both Iran and India in Afghanistan. Furthermore, Iran's pariah status with the United States and its allies up to 2015 made even clearly beneficial cooperative economic developments hugely difficult to get off the ground. The pursuit of Iran's nuclear programme, feared in much of the rest of the Gulf as well as in Israel and the West, may have drawn practical and political support from Pakistan at key moments in its development but made Iran's wider engagement in the region far more difficult.

There are some exceptions. As Iran and the United States have not had diplomatic relations since 1979, in mid-2015 the Pakistan Embassy in Washington was still looking after Iranian interests in the United States. Since December 2011 there has also been a virtual US embassy online. Discussions over the construction of a new gas pipeline from Iran to Pakistan, and ultimately India, are under way, moves that could make a significant contribution to meeting Pakistan's – and India's – growing energy demand. Furthermore, the Gulf countries play an extremely important part in facilitating India-Pakistan trade. Formally banned for many years, trade between India and Pakistan has in fact been carried on extensively through the intermediaries of the Gulf states.

The overwhelming interest of most South Asian countries to their Middle Eastern neighbours lies in the volume of remittances sent back by migrant workers to their home country. By 2005 India was the leading recipient of remittances in the world, totalling over \$23 billion, over 3 per cent of the GDP (Chishti 2007). By 2013 India's total inward remittances had reached over \$60 billion. In the same year Pakistan and Bangladesh each received \$14 billion (Makhlouf and Mughal 2013). In 2011 India was estimated to have 6 million migrant workers in the Gulf (Kumar 2012). Between 2001 and 2005, 250,000 Bangladeshis migrated every year. By 2008 the number had risen to 800,000. Every country in South Asia has a share in this movement and in the remittances that are returned.

Conclusion

With easily the largest concentrations of Muslim peoples in the world, all the countries of South Asia have strong interests in good relations with the Muslim world. Yet these interests are played out in contexts that are socially, culturally and politically diverse. For the larger South Asian countries those contexts provide a vital framework through which specifically Muslim concerns are mediated.

4 South Asia

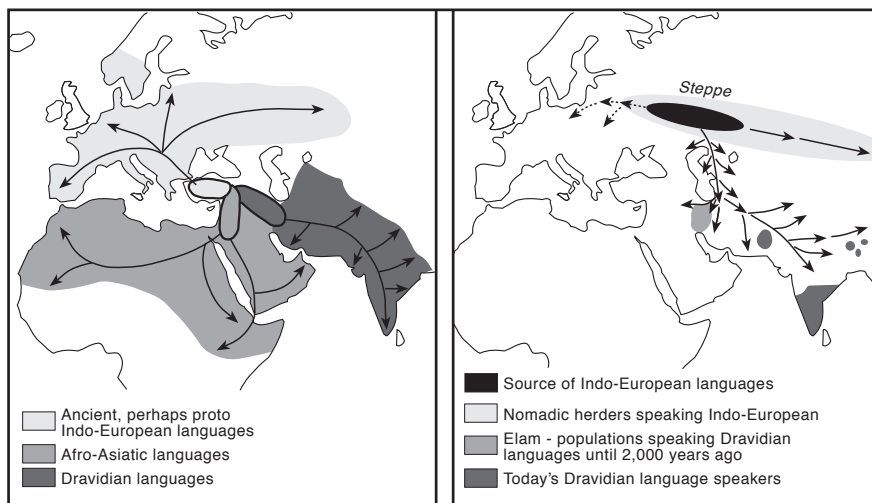
The cultural fabric

Language, religion, sect and caste, all play a role in shaping the political identity of individuals and of social groups (Frankel and Rao 1989; Phadnis and Ganguly 2001; Richardson and Samarasinghe 1998). All may therefore have a profound influence on the political identity and perceived interests of nation states. All of South Asia's large contemporary states have great diversity along each of these identity markers. It is thus impossible to draw simple political conclusions from the broad outlines of South Asia's linguistic or religious identities. That said, both language and religion have had a profound influence on the geopolitics of South Asia's recent past and continue to be powerful political influences. Religious political identity played a critical role in the form in which the nation states emerged from the colonial period, especially on the peninsular mainland of what became India and Pakistan. The Shi'a/Sunni divide in Islam remains politically significant in many parts of South Asia. The evolution of perceptions of Buddhist identity have been particularly important in post-Independence Sri Lanka, while in India Hindu identity plays an important part in the ideology of the Bharatiya Janata Party, which was elected to power in May 2014. At the same time, language and its associated cultural political identity continues to be influential from Nepal and Bhutan in the north to Sri Lanka in the south.

The origins of South Asian languages

Most modern South Asian languages belong to either the Dravidian or Indo-European language family. The term Dravidian, a group that includes the four southern languages of Tamil, Telugu, Kannada and Malayalam, as well as the Pakistani outlier Brahui, was first identified by the nineteenth century missionary Robert Caldwell. Each of these has its own script and literary history, in the case of Tamil going back well before the Christian era. Caldwell's years of linguistic and archaeological research in Tirunelveli, South India, led him to recognise the roots of what he termed Dravidian languages as being the most ancient of India's major language families. One hypothesis suggests that speakers of 'proto-Dravidian' languages spread southeastwards into India from their homeland between the Caspian and Black Seas. Others dispute this and claim a wholly Indian origin for Dravidian languages. What is clear is that the Dravidian languages were once spoken far more widely across South Asia than their current distribution would suggest and long before Indo-Aryan languages first arrived. These almost certainly originated to the north of the Caspian Sea around 2000 BCE, and subsequently were brought into South Asia through the passes of the northwest.

Today the Dravidian languages are spoken by approximately 250 million people, about one sixth of the population of the sub-continent. Indo-Aryan languages predominate across Afghanistan, Pakistan, northern India, Nepal, Bhutan and Bangladesh. Sinhala, the majority language in Sri Lanka, is also an Indo-Aryan relative of the north Indian languages.



Map 10 The spread of Dravidian and Indo-European languages

Sources: Marr, J.R. (1975); Mallory, J.P. (1989)

Language and political identity

According to recent census records South Asia has more than 2000 languages. No state is entirely monolingual, though over 90 per cent of the populations of Bangladesh, Nepal, and Maldives speak the country's dominant language as their mother tongue. In Bhutan, Dzongkha, the national language, is one of 18 Tibeto-Burman languages, which together make up between 60 and 70 per cent of the total population. No single language group forms a majority in India, Pakistan or Afghanistan. In Sri Lanka, where Sinhala is spoken by over three quarters of the population and Tamil by the majority of the remainder, the civil war that ravaged the island for thirty years was widely interpreted as a conflict engendered by competition between these two major language groups.

In both Pakistan and India, language is a powerful undercurrent in national and regional politics. This is despite the fact that in 1947 Pakistan's Partition from India was based not on language, but rather on Pakistan's Islamic identity. However, from the moment of their creation, languages posed major political challenges for both Pakistan and India. They responded in contrasting ways.

In the decade preceding Independence, the core demand for Pakistan had come from Muslims in the north central states of India. Here, Urdu had been the language of the Mughal court in the sixteenth to eighteenth centuries and the language also of literature and high culture. The product of the fusion of Hindi and Persian among Mughal camp followers, Urdu was written in versions of the Persian script. It continues to be used by some (mainly Muslim) speakers in India, though it is known and loved as a language of high culture by intellectuals of other faiths. Many Muslims from central North India migrated to West Pakistan at Independence. As the *muhajir* (also spelt Mohajirs; literally, migrant) community, Urdu is their mother tongue. In modern Pakistan they have retained a powerful sense of social and political identity, in which Urdu plays a vital role.

To the Muhajirs, Urdu seemed the natural choice for a national language for Pakistan. For the rest of Pakistan's people Urdu's claims were weakened by the fact that it was the mother tongue of less than 3 per cent of undivided Pakistan's population. The most widely spoken language in post-Independence Pakistan was Bengali. Spoken by over 90 per cent of East Pakistanis, it was totally

Mohammad Ali Jinnah, Pakistan's first Governor General, sensed that Urdu had the cultural prestige to be accepted as a national language. He also believed that the small numbers claiming it as a mother tongue gave it the advantage of being unthreatening to any of the languages with far greater native currency. In 1947 he proposed its adoption as Pakistan's national language. However, he underestimated the reaction in East Pakistan. By many in East Pakistan, Jinnah's announcement was seen as an act of West Pakistan's cultural imperialism. Its adoption left a bitterness that contributed significantly to the ultimate secession of East Pakistan to form Bangladesh in 1971. Today Pakistan uses Urdu and English as official languages, with Panjabi, Sindhi, Balochi and Pashto as the languages of the Provinces.

At Independence, India faced a similar linguistic problem to that of Pakistan. No single language was spoken by the majority of the population. Hindi, the language with greatest numerical currency and widest geographical spread, was spoken as the mother tongue by about 40 per cent of the population, although it was understood in many parts of India where it was not the mother tongue. Many of the other major languages were spoken by tens of millions of speakers but were often spread across the different political provinces and states inherited from the British period. Nehru, India's first Prime Minister, proposed that within fifteen years of India becoming a republic on January 26, 1950, Hindi should be adopted as the national language across the country, a proposal that became law.

In the mid-1950s India reorganised its federal states, accepting, after a frequently bitter debate, a linguistic basis for many of the states. Thus in the south, the Tamil, Telugu, Malayalam and Kannada speaking areas were allocated to the four states of Tamil Nadu, Andhra Pradesh, Kerala and Karnataka. To their north Marathi (Maharashtra), Gujarati (Gujarat), Oriya/Odiya (Orissa/Odisha), and Bengali (West Bengal/Paschimbanga) were all given statehood in the 1956 re-organisation of the states.

This re-organisation gave legitimacy to linguistic identity as a basis for statehood, where other cultural markers, notably religion, were not. As a result some subsequent demands for statehood have been justified on the basis of language when the true basis was a claim to religious or other cultural distinctiveness. The demand for a separate state for Sikhs, for example, was granted in 1966, not on the basis of Sikh religious and cultural identity – the true root of the claim for separation – but on the basis of a distinction between the Panjabi and Hindi languages. Panjabi, written in the Gurmukhi script, became the language for the new state of Punjab while Haryana adopted Hindi in the Devanagari script. Himachal Pradesh, which had been a Union Territory until 1950, was given statehood with Hindi as its language, joining the contiguous group of other Hindi speaking states in the north, Uttar Pradesh, Bihar, Madhya Pradesh and Rajasthan.

Other Indian states have been created either from what were previously Union Territories (Goa and Arunachal Pradesh) or pre-existing states (Jharkhand from Bihar, Chhattisgarh from Madhya Pradesh, and Uttarakhand from Uttar Pradesh). In June 2014 Andhra Pradesh was divided into the new state of Telangana, comprising the inland districts around the judicial capital, Hyderabad, and Andhra Pradesh, the coastal districts of the former state, which now has Vijayawada as its administrative capital. Other proposals are on the table. Linguistic identity is a claimed part of some, though not all, of these proposals. Against some expectations, the creation of linguistic states has broadly defused political tensions around language. In the mid-1960s, as the scheduled adoption of Hindi as the sole national language drew near, these had sometimes appeared threatening to the Indian state. In South India Tamils were deeply resentful at the proposed adoption of Hindi as the sole national language. Language riots in Tamil Nadu in 1965 forced a change of policy, and all state languages were granted national language status,

Hindi and English being accorded official language status, in recognition of the universal use of English in business and among the educated.

The role of Tamil and the political status of Tamil speakers has been an issue in Sri Lanka since Independence in 1948. Many Sinhalese were resentful of the relatively well-educated and high status positions held in the Colonial period by Sri Lankan Tamils. The Sri Lankan Tamils, whose roots in Sri Lanka go back over 2000 years, currently number about 2.3 million. Apart from significant numbers living in Colombo, most live in Jaffna and elsewhere in the north and northeast. The Sri Lankan Tamils are quite distinct from the two other Tamil-speaking communities in Sri Lanka, the so-called Indian Tamils and the Moors. The Indian Tamils were brought from South India as indentured labour, largely in the nineteenth century, to work in the Central Highlands on coffee and subsequently tea plantations. In 1948 they were declared stateless by the new Ceylonese government. They remained stateless until 1964 when a repatriation agreement was signed between President Bandaranaike and Prime Minister Shastri (the Bandaranaike-Shastri Pact), allowing for 525,000 to return to India, 300,000 to be granted Sri Lankan citizenship and the future of the remaining 150,000 to be decided later. The 1974 Bandaranaike-Indira Gandhi agreement divided this number equally between India and Sri Lanka.

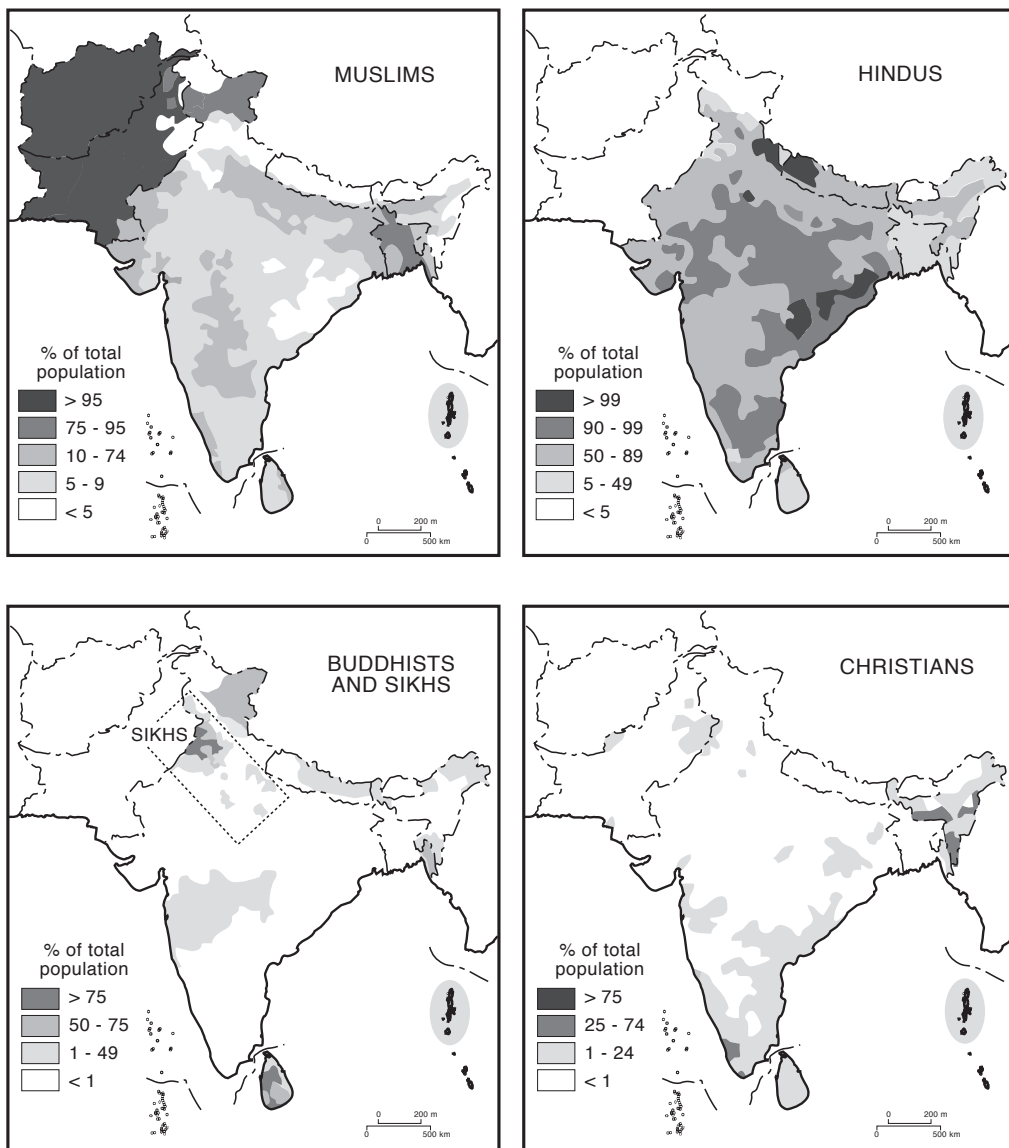
At Independence, Sri Lankan Tamils held a disproportionate number of higher-level posts in governmental and educational institutions. This fed resentment among the Buddhist Sinhalese majority, which was seized on by S W R D Bandaranaike's Sri Lanka Freedom Party in the early 1950s. Elected to power in 1955, Bandaranaike replaced English as the official language of Sri Lanka with Sinhala in the Official Language Act No. 33 of 1956 – what became known as the 'Sinhala Only Act'. From that moment a breach was opened between the Tamil and Sinhala-speaking communities, which culminated in twenty-five years of civil war. This ended in a military victory by the Sri Lankan Army in May 2009, in the eyes of its critics no less brutal than the activities of the Tamil Tigers since they seized the north in 1983. In March 2014 the UN Human Rights Council committed itself to holding an enquiry into war crimes allegedly committed by both the Sri Lankan army and the Tamil Tigers in the civil war. A UN report estimated that as many as 40,000 people were killed in the last months of the civil war (UNHCR 2014). Maithripala Sirisena was elected as President in January 2015 with widespread support from the Tamils and other minorities and a commitment to re-engage with Sri Lanka's critics in the international community, opening the door to ending the diplomatic stalemate.

The Moors, Sri Lanka's third Tamil-speaking community, came to Sri Lanka as Arab traders and settled in the ports and coastal districts of the south and east. By the twentieth century the great majority spoke Tamil as their mother tongue, though they retained their Muslim religion.

Religious identity in South Asia

Four of the world's major religions – Hinduism, Buddhism, Christianity and Islam – have a significant presence, while Sikhism and Jainism also originated in South Asia. The religions all have important sects and sub-sects. There are also many groups, especially among South Asia's tribal peoples, who cannot be categorised along any of these religious lines, and South Asia is still home to tribal groups whose cultures long pre-date those of any of the major religions.

Broad categories of religious identity and affiliation such as Hindu, Muslim, Christian and Sikh are shown in Map 12, but such categories have within them a great variety of belief and practice. Furthermore, the statistics of religious affiliation may in some contexts be untrustworthy. In Nepal, for example, many Hindus and Buddhists follow practices of both religions. The response to surveys may be influenced by a range of factors, including perceived political pressures.



Map 12 The major religions of South Asia

Politics and religion in South Asia

In modern South Asia politics and religious identity are often intertwined. India adopted a secular constitution when it became a Republic in 1950, and this remains in force. However, religious identity and the institutions of caste continue to play a vital role in political life in many parts of the country. Until the overthrow of King Gyanendra in 2006, Nepal was the only Hindu kingdom in the world, though it too has now been declared a secular state. The number of people classified as Hindu in Nepal has fallen from over 90 per cent in 1991 to 81 per cent. Even now, that figure includes the

followers of Nepali communities like the Kiratis (about 5 per cent) who have their own animist faith. The balance is made up of Buddhists (16 per cent), Muslims (4 per cent) and a tiny percentage of Christians.

Afghanistan, Pakistan and Maldives are Muslim polities, though sectarian Islam is often a significant political factor. Bangladesh, today with nearly 90 per cent of the population Muslim, has a secular constitution. 70 per cent of Sri Lanka's population are Buddhist, 15 per cent being Hindu and the remaining 15 per cent shared equally between Christian and Muslim, but Buddhist identity has played a powerful part in the nation's post-Independence politics. Three-quarters of Bhutan's population follows Mahayana Buddhism, the remainder being Hindu Nepali migrants, whose numbers are seen by many in Bhutan as threatening Buddhist cultural values.

Hindu religious and political movements

The beliefs and practices of Hinduism have touched every part of South Asia over its 3000 years and more of evolution. In India, just over 80 per cent of the present population was classified as Hindu by the 2011 Census of India. Almost 10 per cent of the population of Bangladesh are Hindus, while Hindus account for nearly 13 per cent of Sri Lanka's population.

Hinduism's political influence is as diverse as its social practices and religious ideas. A Hindu-focused nationalist ideology underlies organisations like the Rashtriya Swayamsevak Sangh (RSS - 'National Patriotic Organisation'), founded in 1925, and the Vishva Hindu Parishad (VHP - World Hindu Council), founded in 1964. These groups have supported mainstream political parties such as the Bharatiya Jana Sangh (JS, 1951–77) and its successor the Bharatiya Janata Party (BJP, 1977 to the present). The BJP formed the national government, in coalition with regional parties, from 1998 to 2004, following a two-week government in 1996. It has also formed state level governments and in 2012 was in power in Gujarat, Madhya Pradesh, Karnataka, Chhattisgarh and Goa and in coalition in Punjab, Nagaland and Bihar. In the 2014 Lok Sabha elections the BJP came to power again under the leadership of the former Chief Minister of Gujarat, Narendra Modi. However, Hinduism is regionally and philosophically diverse. There is no single Hindu organisation or leadership and no formal membership, and large numbers of Hindus do not subscribe to the political ideology of the BJP.

Caste and tribe in South Asia

Social features of Hinduism such as caste, which are widely seen as defining core identities within Hinduism, vary from group to group and from place to place. They are also dynamic through time. Thus caste today is expressed differently in most parts of India from the ways in which it was lived in 1947, at Independence. In part these contrasts reflect wider social, economic and demographic changes that are transforming South Asian life. Some of the changes have been institutionalised in law. Discrimination on the basis of caste is banned, and a wide range of positive anti-discrimination measures have been introduced to enable outcaste and backward caste groups to enter the social and economic mainstream.

Outcastes, given the name 'Harijan' ('people of God') by Gandhi in his pre-Independence movement, have rejected that term in favour of 'Dalit' – 'the oppressed'. The *Dalit* movement of the last thirty years has developed effective political pressure in many states. Despite these developments, many forms of discrimination exist, especially in rural areas, where extreme poverty is often allied to caste discrimination. Map 13 shows the current distribution of the Scheduled Caste populations. The term refers to the listing of low caste groups, from the nineteenth century

onwards, in official lists of castes, or 'schedules'. While Scheduled Castes are found in nearly every part of India, still nearly always restricted to the most menial of jobs, the concentration in the northern states is evident.

A second category of Indian society, deemed to lie completely outside the caste system and indeed outside Hinduism, is that of the Scheduled Tribes. Such tribes, most heavily concentrated in the Northeast but found in a band across central India from the heavily forested tracts of Odisha to the much more open forests of Gujarat, have enjoyed special status since the British tried to protect their ways of life from encroachment by settled agriculture. It is a way of life severely at risk in many parts of South Asia.

Islam

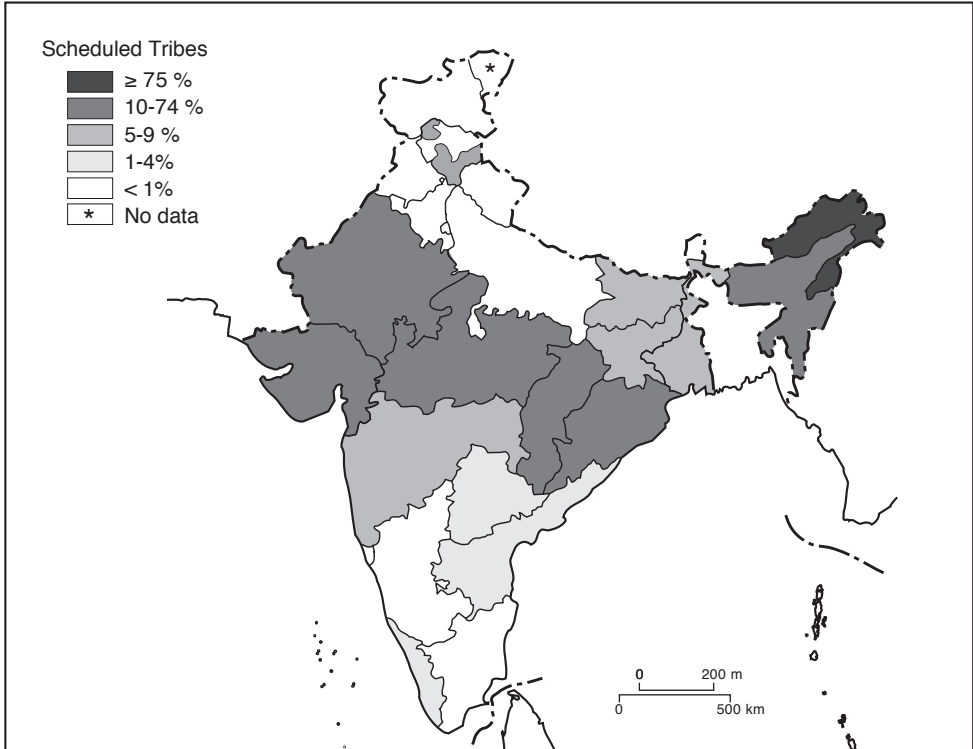
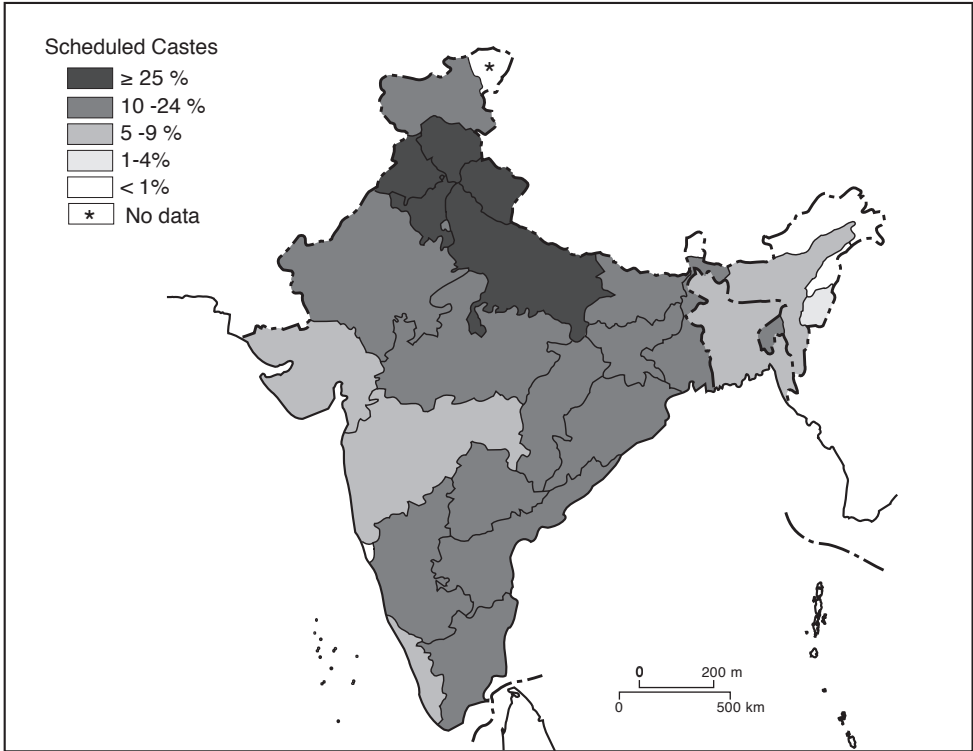
The Shi'a Sunni divide means very different things in contrasting political contexts. Kargil in Kashmir, Hyderabad in India and Helmand in Afghanistan all have significant Shi'a communities, but their political significance reflects the regional political environment.

The influences of South Asia's immensely diverse cultures and societies are intimately interwoven through all the strands of modern South Asia's political fabric. Even the peoples of Pakistan, Afghanistan and Maldives, who are almost 100 per cent Muslim, have diverse religious beliefs and practices. In part, this diversity reflects the contrasting nature of the pre-Islamic communities from which, with the arrival of Islam in South Asia, Muslim converts came. It also reflects the differing strands of Islamic belief brought into the sub-continent. The tribal communities of Afghanistan and the Afghan-Pakistan frontier region, for example, could scarcely be more different from the once-élite Muslims of the cities of India.

These differences often underlie contemporary geopolitical issues. Madrassa schools, a traditional medium of Islamic education in South Asia, have taken on a wholly new dynamic. Funded by Saudi-based Wahhabi Muslim groups they have provided a flow of young recruits to the Afghan and Pakistani Taliban. Linguistic, religious and cultural identities underlay the post-Independence competition and conflict between the Sinhalese majority and Tamil minority in Sri Lanka. The transformation of economic and social opportunity has acted as a trigger for conflict between migrants and non-migrants in communities as diverse as those of the tribal northeast of India or the central Deccan region of Andhra Pradesh. Every state in South Asia has elements of conflict and competition rooted in the social differentiation of their societies. Some of their key implications are examined in more detail in Chapter 30, focused on governance in South Asia.

Christianity

Christianity has found a home in South Asia for nearly two thousand years. In India's north-eastern hill states of Nagaland and Mizoram the majority of the population is Christian. Elsewhere, including Kerala and Tamil Nadu in South India, the Christians form sizeable minorities. Overall, Christians make up just over 2.3 per cent of India's population, giving a total of over 25 million. They belong to a wide range of Christian denominations, reflecting the varied history of Christian missionary activity in South Asia. Sri Lanka also has a significant Christian population, with approximately one and a quarter million Roman Catholics and a quarter of a million Protestants. Pakistan has two and a half million Christians, Bangladesh 600,000, and Nepal 420,000. Bhutan is believed to have over 10,000 Christians, while Afghanistan and Maldives do not allow their citizens to be Christians.



Map 13 “Scheduled Castes” and “Scheduled Tribes”

Buddhism

Buddhism traces its origins to Gautama Buddha, believed to have been born in 653 BCE, at Lumbini in modern Nepal. Adopted as the religion of the Mauryan Empire in the second century BCE, Buddhism spread across mainland South Asia and into Sri Lanka. Although there are significant cultural remnants of the Buddhist tradition right across South Asia, Buddhists today form a tiny minority of the populations of all South Asian countries, except Sri Lanka (where Theravada Buddhism predominates) and Bhutan (where Mahayana Buddhism is constitutionally the 'spiritual heritage' of the country). Approximately 11 per cent of Nepalis identify themselves as Buddhists, and there are small though important communities of Buddhists in India's Himalayan border regions.

Jainism

Like Buddhism, Jainism began as a reformist movement in opposition to the then-prevalent forms of Brahmanism in the sixth century BCE. Founded by Prince Mahavir ('great hero'), Jainism developed an ascetic philosophy, with the principle of *ahimsa*, 'non-harming', at the centre of its beliefs. The sect remained numerically small, currently just over 4 million in India, and until the twentieth century remained almost entirely based in India. However, some of its beliefs are highly respected by many Hindus, and it has been an influential philosophical force. Jains play a prominent part in banking and service sector industries in modern India.

Sikhism

Sikhism has just under 20 million adherents in India today and has a significant global diaspora. Founded by Guru Nanak (1469–1539), Sikhism developed in the Punjab, the region of Guru Nanak's birthplace, Nankana Sahib near modern Lahore. The teachings of Guru Nanak, enshrined in the writings of the Granth Sahib, are still the focus of Sikh worship and teaching. While the Sikh community remains predominantly rural, Sikhs have risen to high positions in government (such as the economist and Prime Minister of India from 2004–2014, Manmohan Singh). The core Sikh homeland straddled the modern border between Pakistan and India, and at Partition most Sikhs in Pakistan migrated to India or abroad.

Conclusion

In the period since Independence all of the countries of South Asia have witnessed the growth of secular politics. Major institutions of governance, at the national and the state level, are established within secular conventions. Political parties often cross linguistic or other social lines, and alliances between parties representing diverse social groups are commonplace. Nonetheless, social and religious identity are very important parts of contemporary South Asian political life and come into play from the village to the national level. The diversity of religious and social ideologies that is embedded in South Asian life often plays a significant part in the framing of policy and the setting of political priorities, as well as in the day-to-day management of political affairs.

Section B

The geographical environments

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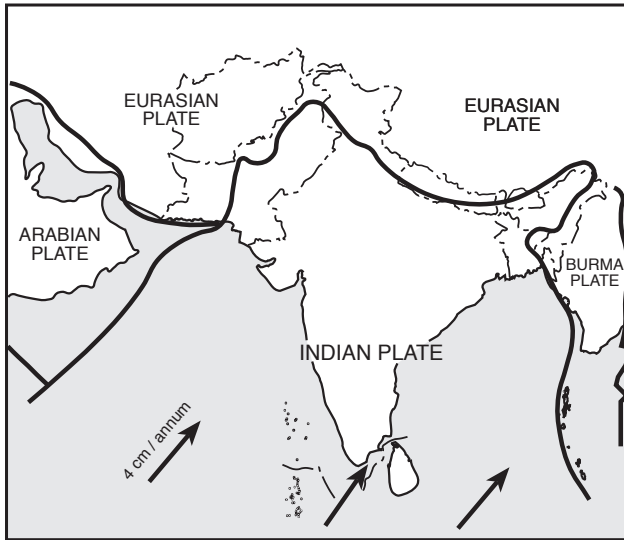
5 Plate tectonics and South Asia's contemporary environments

Plate tectonics is now known to be responsible for the current location of the continents and for many features of their environments (Kious and Tilling 2015). Many characteristics of South Asia's highly diverse environments today owe their origins to the breakup of the ancient supercontinent Gondwanaland about 140 million years ago. As Gondwanaland fractured, its constituent parts drifted away from each other at varying speeds. The Indian Plate, which had been attached to south-eastern Africa, moved north eastwards, initially at as much as 20 cm a year. Even today, after crashing into the Eurasian Plate about 50 million years ago and causing the subsequent – and still continuing – uplift of the Himalaya, it is moving north-eastwards at between 4 and 6 cm a year.

Recent research suggests that the Indian Plate is about 100 km thick – no more than half the thickness of the plates on which some of its Gondwanaland neighbours ride their course across the oceans (Kumar et al 2007). South America, Africa, India, Australia and Antarctica began to move apart when a plume of molten rock from the mantle forced its way upwards to break the supercontinent apart. It is now thought that in the process it may have melted the lower part of the Indian sub-continent, making it lighter and speeding its progress across the Indian Ocean.

The collision of the Indian Plate with the Eurasian landmass had dramatic consequences. The northern edge of the plate was forced down under the Eurasian plate and ultimately back into the mantle where it was reabsorbed in the molten material. This process – 'subduction' – all along the margins of the plate from Pakistan in the west to Bangladesh in the east, has had several consequences. Subduction zones are regions of great seismic activity. Earthquakes accompany vertical and horizontal movements of the plate. They are also zones of relatively rapid changes in elevation. Fifty million years ago, the southern edge of the Eurasian Plate was 2000 km south of its present position. As the Indian Plate pushed northwards the Eurasian Plate was compressed, buckled and forced to rise. On the uplifting edge of the Eurasian Plate itself the Himalaya are still rising in places at a rate of approximately 1 cm a year (USGS 2014).

Long before humans inhabited South Asia these earth movements left their mark on the landscape. The Himalaya themselves were created out of the pre-existing rocks. The highly complex geology of the Himalaya is thus the result of the processes of uplift of these rocks, accompanied by their folding and faulting throughout their length. This has shaped not only the broad character of the world's highest mountain range, but also the micro-regional detail that characterizes them. Evidence of these processes comes from a variety of sources. The presence of seabed fossils more than 50 million years old now found at altitudes of over 6,000 m testifies to the scale of uplift, while the geological formations themselves provide evidence of the nature and patterns of the mountain building processes.



Map 14 The Indian Plate and its boundaries

Source: USGS (2014)

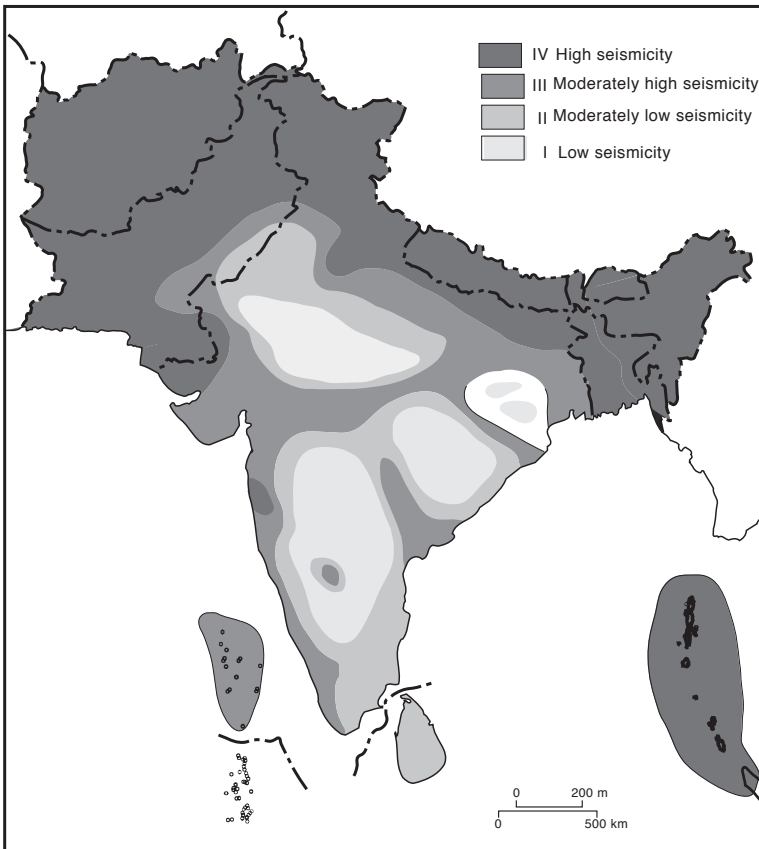
Map 14 shows that nearly all of South Asia lies on top of the Indian Plate. Only peripheral regions lie beyond the plate itself: the Hindu Kush and the rest of Afghanistan; the westernmost part of Pakistan; the Himalayan regions from Kashmir to the Brahmaputra; and the narrow strip of India's north-eastern hill states. The Indian Peninsula rests squarely on the northward moving plate, while the alluvial plains of the Indus and Ganga, while still resting on top of the Indian Plate, lie above the zone where the plate is being subducted under the Himalayan massif. The consequences of this movement are particularly evident in the Ganga-Brahmaputra-Meghna delta and especially in coastal Bangladesh today.

The effects of India's plate tectonic origins are clearly visible in every part of the sub-continent. The Indian Peninsula in the south had been attached to Antarctica, Australia and southern Africa as part of the global Pangaea. Some of peninsular India's rocks, such as the Charnockites of South India and Sri Lanka, are among the oldest on earth, formed 2500 million years ago. The rupture from its African base in Gondwanaland is marked by the range of mountains that runs down India's west coast, the Western Ghats.

After the creation of the Himalaya themselves, the most visible impact of the movement of the Indian Plate lies in the formation of the plains separating the Peninsula from the Himalaya. These are associated today with the two major river systems that cross them, the Indus and the Ganga. The Indo-Gangetic plains owe their origin to the relentless build-up of sediment deposited by rivers pouring off the rising Himalaya. As the north-westernmost point of the Indian Plate made first contact with the Eurasian Plate the narrowing channel between the Indian Peninsula and the Eurasian landmass was finally closed and a gulf formed.

For millennia rock, gravel, sand and silt were washed down into the gulf, which was ultimately closed by the continuing northward movement of the Indian Plate and the deposit of sediment on its floor. For more than 10 million years erosion debris from the Himalaya filled in the trough between the Peninsula and the rapidly rising Himalaya, creating the Indo-Gangetic plains. Such sedimentation has continued to more than keep pace with the continued down-warping of the

plate margins under the Bengal delta (discussed in more detail in Chapter 27). Since the end of the last Ice Age about 2 billion tonnes of silt have been brought down the Ganga and Brahmaputra rivers every year. Despite the rapid sinking of the crustal margins, sediment has raised the land level and pushed the coastline southwards into the Bay of Bengal. As a result of these processes, which continue today, the sediment in the coastal regions of Bangladesh reaches depths of 18 to 20 km.



Map 15 Seismic zones of South Asia
After: UNISDR (2008)

In the last ten thousand years these alluvium-covered plains have become one of the most densely populated regions in the world. The largely flat and easily worked lands benefit from seasonal rains and perennial rivers that have made them highly productive. However, the appearance of stability given by a settled and intensively cultivated landscape can be misleading. Where the Indian and Eurasian Plates meet, the movement of the plate and the active subduction zone have resulted in the continued susceptibility of the zone to catastrophic movements. The pattern of seismic activity in South Asia, illustrated in Map 15, demonstrates the importance of the plate boundaries. Some of the greatest earthquakes over the last century or so have occurred around

the rim of the Indian Plate: in the east, Shillong (1881) and Assam (1950); in the north, Kashmir (2005) and Nepal (2015); in the west Bhuj (2001) and Balochistan (2013). Although the Bhuj earthquake was as much as 400 km from the plate boundary itself, the fault movements that caused the earthquake are directly related to the movements on the plate rim. In the zone of high seismicity there are hundreds of tremors and earthquakes every year. However, as the 1993 earthquake at Latur in central India showed, nowhere is completely exempt from the risk of earth movements.

When very large earthquakes take place on the sea floor they can also generate tsunamis. Such events have been extremely rare in the Indian Ocean. However, the earthquake of December 24, 2004 caused a vertical uplift of 10 m along 1200 km of the sea floor from the Andamans to Sumatra. The resulting tsunami, known as the Great Sumatra-Andaman tsunami (Lay et al 2005), devastated parts of coastal South Asia. Southern India, Sri Lanka and Maldives were particularly badly affected. The energy released in this quake has been calculated as equivalent to more than the total energy consumed in the United States in over 370 years or the detonation of more than 23 thousand times that of the Hiroshima atom bomb. According to the United States Geological Survey more than one quarter of a million people around the Indian Ocean shoreline lost their lives.

Conclusion

The geology and the plate tectonic origins of South Asia are of continuing significance to the contemporary character of its environment. They have shaped the distribution of major resources, but the dynamism of South Asia's plate tectonic environment can now be seen to play an active part in critical environmental resource management across the sub-continent, from the availability of groundwater to protection against environmental hazards. As is shown in Chapters 26–28, they also pose challenges that have to be addressed in the struggle to achieve sustainable development.

6 Mountains, valleys and plains

The relief of South Asia

Looking at a relief map of South Asia it is easy to get the impression of a region isolated by a high mountainous rim on one side and a long coastline on the other. It is certainly true that the mountains have formed a barrier to easy movement, as well as providing high altitude environments very difficult to settle or control. In contrast the lowland plains, and even the forested uplands of the peninsular interior, have offered an extensive base for settled agriculture and relatively easy transport for establishing trade networks and political control.

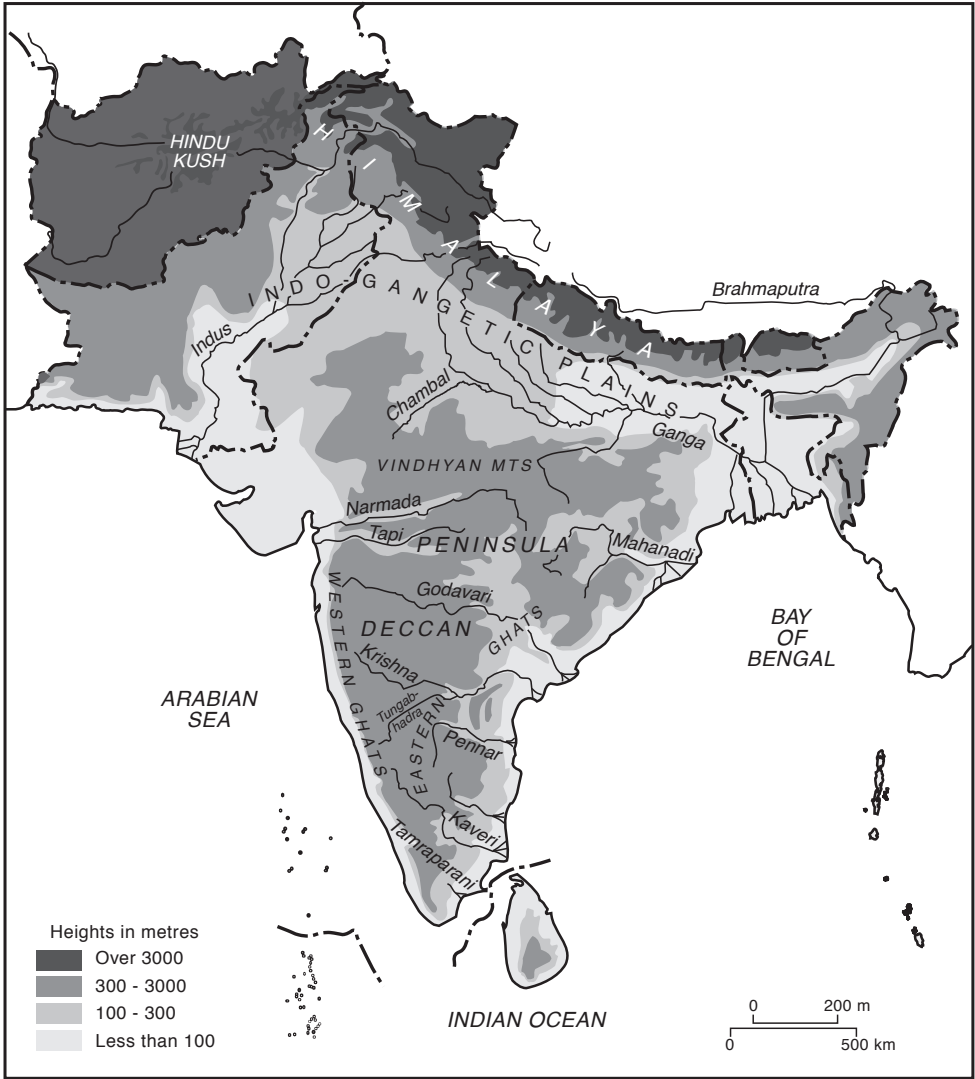
As its plate tectonic history suggests, mainland South Asia's relief is remarkably varied. Map 16 picks out three broad relief regions of the South Asian landmass – the Himalaya and their associated ranges, the plains of the Indus and Ganga river systems and the peninsula to the south. Each of these regions has its own environmental and social diversity, a diversity that extends to the Indian Ocean island states of Sri Lanka and Maldives and the island chains that form part of India, the Andaman and Nicobar Islands in the east and the Lakshadweep Islands in the southwest.

The mountain rim

The Himalaya and the Karakoram contain all fourteen of the world's mountains over 8000 m and more than a hundred further peaks over 7000 m high. The ridge-line of the Himalayan mountain core runs from the Karakoram in the northwest, through Ladakh to the high Annapurna and Everest ranges of Nepal and Tibet, to the easternmost bend on the Brahmaputra River. To the west the Hindu Kush forms a slightly lower extension of the mountain range into Afghanistan.

The broadly northwest to southeast alignment of the Himalaya and their associated ranges reflects the thrust of the Indian Plate from the south, described in Chapter 5. In contrast, the ranges in Balochistan to the west and the Mizo and Manipur Hills to the east of the northward moving Indian Peninsula have a broadly north-south configuration. This reflects the intense warping effect as the front of the Eurasian landmass, which originally lay over 2,000 km to the south of its present position, was forced up and twisted round by the movement of the Indian Plate. These processes are well discussed by Avouac (2007).

Despite superficial appearances, the wall formed by South Asia's bordering mountain ranges is far from impenetrable. As Map 16 shows, much of Afghanistan forms a high plateau. It gives onto the Indian plains through a number of passes, including perhaps the most famous, the Khyber Pass. In fact, the main significance of South Asia's mountain rim lies in its impact on drainage patterns rather than as a barrier to movement. The south flowing rivers from the Himalaya water the densely cultivated plains from those of the Ganga-Brahmaputra in the east to the Indus in the west. The small deltas of peninsular India, from the Mahanadi in the north to



Map 16 Mountains, valleys and plains: the relief of South Asia
 After: Schwartzberg, J.E. (1978, p. 3)

the Kaveri and Tamraparani in the south, have acted as centres of social identity and political power through centuries of settlement (Stein 1980).

Although the western Himalaya receive most of their rain from westerly depressions that originate in the Mediterranean, the central and eastern Himalaya depend entirely on the monsoon system. Most of the rivers that rise in the Himalaya flow onto the Indian plains. The chief exceptions are in Afghanistan (see page 199), where the Helmand River drains from the snow fields of the Hindu Kush south and then west into the lowland deserts of Iran and the rivers of the northern basins, which also flow inland. In eastern Afghanistan, the Kabul River is the last tributary to reach the Indus before it enters the sea. The Indus itself, and its five major tributaries, drain south-westwards into the Arabian Sea. All the other major rivers of Himalayan origin drain into the Bay of Bengal.

The Indo-Gangetic plains

The break between the plains and the mountains is remarkably sharp. The outermost ranges of the central and eastern part of the Himalaya, the Shiwalik Hills, are made up of very recently raised sediments, often barely consolidated. Rising to above 2000 m, these provide the last barrier between the higher, central ranges of the Himalaya and the plains. In terms of their relief, the plains of South Asia's two greatest rivers are almost without distinguishing features. Himalayan alluvium has created the foredeep, where coarse sediments are deposited in a trough formed as the Indian Plate has been pushed under the Eurasian landmass. The sediment gradually filled in the marine estuary, creating a broad plain. At its highest this is less than 500 m above sea level. Thus the Indus drops as little as 350 m in the 1580 km from Tarbela to the Arabian Sea. Similarly, the Ganga drops from around 300 m at Haridwar to the Bay of Bengal, over 1600 km to the southeast. Ambala, in modern Haryana, lying close to the watershed between the Indus and the Ganga, has an altitude of just 275 m.

While the relief of the two great river basins of the Indus and the Ganga shows strong similarities, their precipitation, discussed in the next chapter, is sharply contrasted. It is this contrast that differentiates the often flooded delta landscape of Bengal from the deserts of Sindh and the Indus delta. However, the flatness of the terrain and the ease of cultivation of many of the alluvial soils have exercised a powerful influence on South Asia's history. The frequently flooded banks of the Indus gave rich potential for the earliest of South Asia's civilisations, that of the Indus Valley, between 4000 and 2000 years BCE. The open plains that form the relatively sparsely vegetated watershed between the Indus and the Ganga gave easy access for early settlers down into the Indian Peninsula. By the first millennium BCE they had penetrated southeastwards down the Ganga plains, reaching Bengal by at least the second century BCE. That pattern of settlement opened the door to the rise of trading powers, kingdoms and ultimately South Asia's second great empire, the Mauryan Empire. From that point on, through a succession of dynasties with differing religious identities, the plains of the Ganga remained at the centre of South Asian political systems. They are still regarded as the political heartland of modern India.

The Indian Peninsula

Its ancient history as part of Gondwanaland has contributed greatly to the distinctive relief of the Indian Peninsula, of which Sri Lanka is essentially an extension, separated by the Palk Straits, which were flooded less than 10,000 years ago. Running from well to the north of Mumbai right down to the southern tip of India, the mountain range of the Western Ghats marks the Indian Peninsula's greatest divide. Lying directly across the flow of the southwest monsoon, the ridge of the Ghats reaches heights of between 1500 m in the north and nearly 2700 m in the far south, all within 50 to 100 km of the Arabian Sea coastline. That narrow strip of coastal land, heavily watered by the monsoon rains, has a wholly distinctive natural ecosystem. With heavy rainfall for between four and six months of the year, parts of the Western Ghats have a biodiverse tropical rainforest, now under great pressure from rapid population growth and socio-economic change.

The Ghats shape most of the major drainage basins, other than the Narmada and the Tapi (Tapti) and the Chambal and the Son. The Narmada and the Tapi rise deep in the Maharashtra interior and flow west to the Arabian Sea. The Chambal and the Son rise on the northern side of the Peninsula and flow north into the Jamuna and the Ganga, respectively. All the other peninsular rivers rise on the Western Ghats and flow across the Peninsula to the Bay of Bengal. While

the interior of the Peninsula is marked by several relatively minor ranges of often ancient hills, sometimes referred to collectively as the Eastern Ghats, but in truth quite disparate ranges, the relief towards the coast gradually flattens as major river deltas open out in succession onto the Bay of Bengal. From the Mahanadi in Odisha to the Kaveri and the Tamraparani in the far south, these rivers have been the lifeblood of agricultural settlements, cultures and political powers (Stein 1980).

The off-shore islands

There could be few greater contrasts with mainland India than the atoll chains of Maldives and the Lakshadweep Islands (the latter politically a part of India). Scattered island chains, all perched on the tops of an undersea ridge, these owe their origins to the slow sinking of the volcanic ridge on which millennia of coral growth have kept pace with sea level rises. All are less than 5 m above mean sea level. In contrast the Andaman and Nicobar Islands have significant ranges of hills. Great Nicobar, in the south, rises to 300–400 m, while the highest point in the Andamans, Saddle Peak, is 732 m above sea level.

Sri Lanka

In contrast to the nearby islands of Maldives, Sri Lanka comprises a mountain block in the south-central region falling to a relatively narrow coastal plain to the west and south and a much gentler drop to the more extensive plains of the north and east. The hill country, as it is called in Sri Lanka, rises to heights of over 2500 m, slightly lower than the highest points of the Annamalai hills in South India, of which they are the southernmost extension. The hills have narrow coastal plains to the south and west, but to the north and northeast low-lying plains stretch up to the semi-arid Vanni and, at its northernmost tip, the Jaffna Peninsula.

Conclusion

Encompassing the greatest contrasts in relief in the world, the physical features of the sub-continent play a major part in the social, economic and political character of its regions, often down to the micro-scale. They continue to exercise an influence over many features of contemporary South Asia, the environmental background to both major regional contrasts and micro-regional identities.

7 South Asian climates

South Asia runs for over 3200 km from north to south and from west to east, astride the Tropic of Cancer. These are roughly the same distances as those between San Francisco and the Amazon or Darwin and Melbourne. Within its area South Asia has the most extreme range of altitudes on the globe, with heights ranging from sea level to over 8000 metres. It is therefore not surprising that South Asia experiences a wide range of climatic regimes.

South Asia's unique climatic character is enhanced by its geographical position. It stretches from the southern tip of Sri Lanka, 5°55' N, in the heart of the Indian Ocean, to the continental landmass of Asia, with which it is in contact from the northernmost tip of Afghanistan in the west, at 38°22' N, to Arunachal Pradesh's northernmost point, 29°30' N, in the east. The combination of continental and oceanic influences is a result of this position. It puts the whole of South Asia within the system of seasonal wind reversal, the monsoon (from the Arabic '*mausim*', Map 17), which shapes the fundamental features of the widely differing climates of the region.

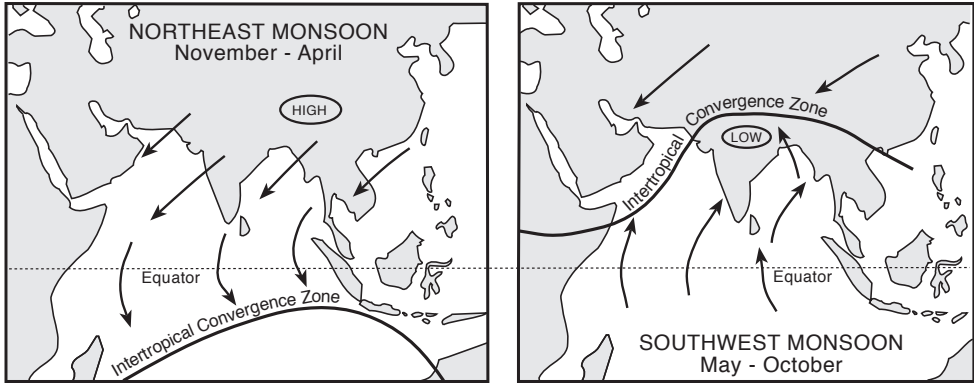
Climate classification

Several attempts have been made to classify South Asia's widely different climate regimes. These have ranged from what Spate and Learmonth (1967, p. 66) called the 'empirical, arbitrary and subjective' classification scheme of Kendrew and Stamp to Thornthwaite's 1948 classification system, designed to reflect the climatic needs of plants. Over the last century the most widely used system at a global level has been that of Wladimir Köppen, first published in 1884. This has been substantially modified over the years, but as the Köppen-Geiger classification it is still widely used today. It is based on a combination of mean annual temperature, precipitation and evapo-transpiration, indicated by two or three letter combinations (e.g., Aw – Tropical Wet and Dry Savanna, or BW, desert, with lower case suffixes denoting evapo-transpiration rates and temperature) to define the major climatic regions of the world (Peel, M. C. et al 2007).

According to the Köppen-Geiger system for classifying the world's climates, South Asia may be seen as having two subtropical, four tropical and a variety of high altitude climate regimes:

- Am** Tropical monsoon. This is found along the west coast of peninsular India to the south of Mumbai, and coastal Bangladesh. It is also represented in the southwest quadrant of Sri Lanka, the Wet Zone
- Aw** Tropical wet and dry, savanna climates, covering much of the rest of peninsular India, Bangladesh and Sri Lanka other than the Wet Zone. These areas have one month with less than 60mm (2.4 inches) of rain
- BSh** Semi-arid steppe with a hot winter dry period and the wettest month with more than ten times the rainfall experienced in the driest month. This type is found in south-central peninsular India and a strip from Gujarat into Rajasthan
- BWh** Hot desert, found in the Thar desert of India and across into Pakistan and Afghanistan

- CWa** Humid sub-tropical climate, with a dry and cool winter regime. The rainy season of three to four months starts just before the summer solstice. This climate type is found across much of the Ganga plains of India and Bangladesh
- E** Alpine or polar type climates. In detail the mountain areas of South Asia have a wide variety of micro-climates, depending on altitude, aspect and position with respect to the prevailing monsoonal wind system



Map 17 The monsoon system
After: Barry, R.G. and Chorley, R.J. (2009)

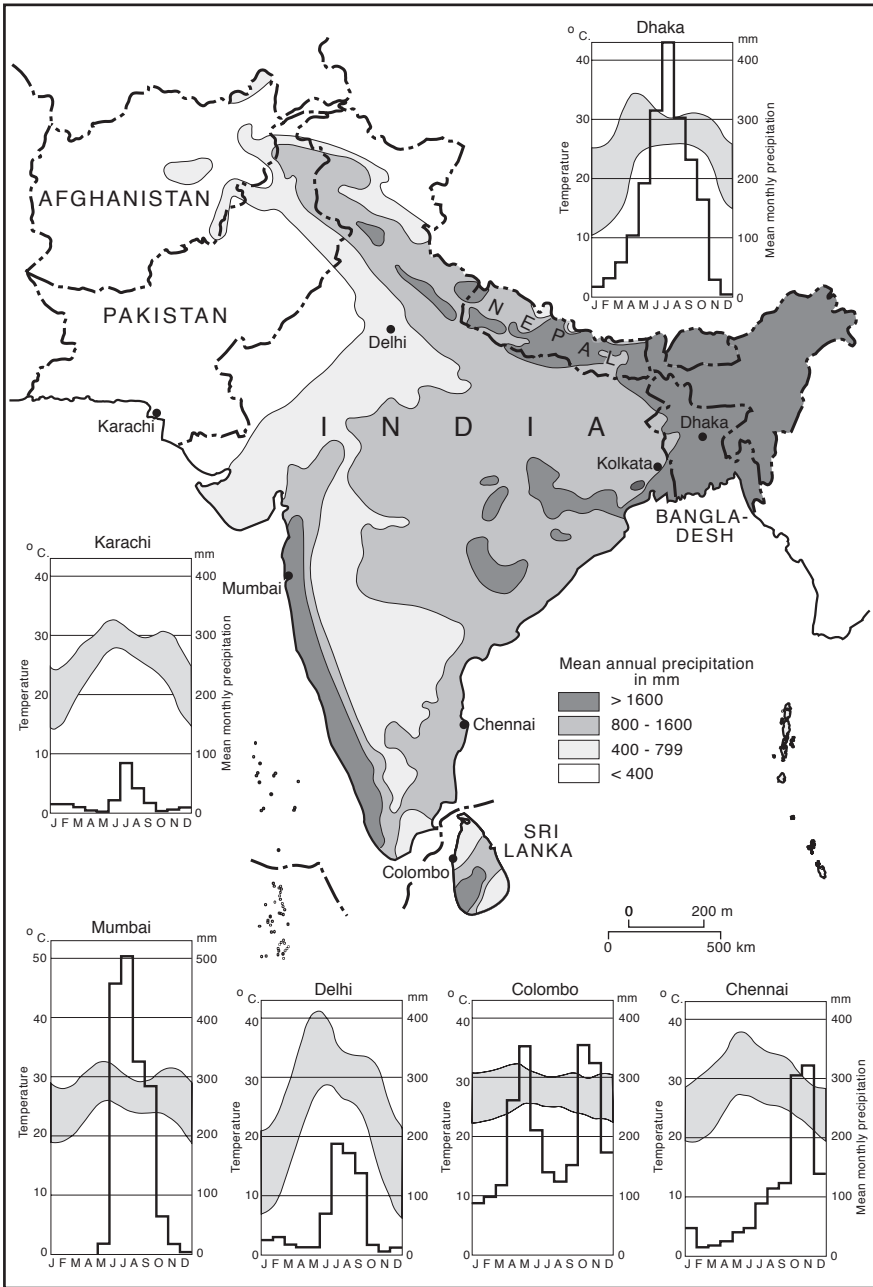
The key indicators of climate are precipitation and temperature. The great majority of South Asia receives its precipitation in the form of rain. Snowfall is restricted to the Himalayan and associated ranges westwards into Afghanistan and to altitudes of between 1000 m (winter) and 4000 m and above (summer). The permanent snow line in the Himalaya is between 4800 m in the northwest of the range and 6500 m in the southeast. Although the Western Ghats and the Central Highlands of Sri Lanka rise to over 2500 m, their low latitude means that nowhere in India south of the Himalaya, or Sri Lanka, receives snowfall, and even frost is a rarity.

Precipitation

Most of South Asia is very dry for over eight months of the year. There are, however, great regional, seasonal and year-to-year variations in the timing and amount of precipitation received. The broad average patterns are shown in Map 18. They demonstrate the importance of the two major forces creating South Asia's climates: position relative to the main monsoon systems and the effect of mountain relief. The number of rainy days per annum gives another indication of the great contrasts across South Asia (Schweinfurth et al 1970). A 'rainy day' is defined by the Indian Meteorological Department as having at least 2.54 mm rainfall precipitation in 24 hours. In India, only the Western Ghats, the north eastern Peninsula, the Bengal delta and the northeast of India receive at least that rainfall on more than 60 days a year. Sri Lanka, Bhutan and much of Nepal also have at least 60 days with 2.54 mm precipitation or more. In contrast, on more than 340 days a year much of Afghanistan, Pakistan and north western India receive virtually no rainfall at all.

The dry season

The broad seasonal pattern of precipitation is shaped by the contrast between the winter and summer monsoons, though there are great regional variations in its effects and some seasonal contrasts within South Asia in the timing of the main precipitation periods. In most of South



Map 18 Precipitation and temperature

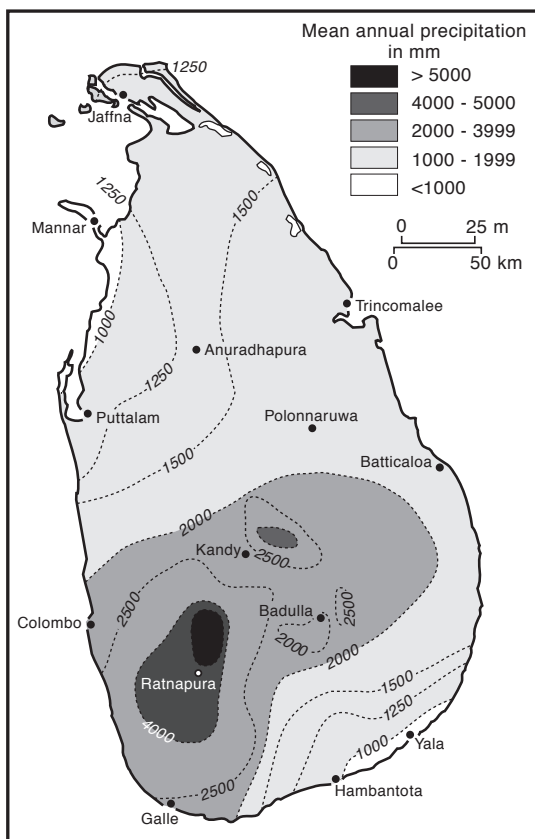
Asia the dry period runs roughly from the end of October to May. It is marked by the dominance of an intense high pressure system over the very cold Tibetan plateau and Central Asia.

In the winter, the low pressure Intertropical Convergence Zone (ITCZ) shifts with the apparent movement of the sun to the south of the Equator. The prevailing winds, deflected by the *Coriolis effect* flow from northeast to southwest across the sub-continent (Map 17). The effect is to bring cool, dry air from Central Asia over the whole of the Indian Peninsula, leading to the prevalence

of a dry season lasting four to six months. The drying effect is increased by the flow of the winds across the high ridge of the Himalaya. When the cool air flows from high altitude down the southern slopes of the Himalaya to the plains, it warms, expands and dries further – the ‘Föhn’ effect.

The great majority of South Asia experiences this long dry period from the winter season through early summer, when temperatures soar, often above 40°C in April and May. The chief exceptions are found in Afghanistan, northern Pakistan, northwest India, southeast India and northern Sri Lanka. In the former, depressions originating from the Mediterranean bring precipitation-bearing weather systems of crucial importance to local agriculture and to annual snowfall, itself a vital local source of water with the spring and summer melt. The mountains of central Afghanistan, and the narrow belt from Khyber Pakhtunkhwa in Pakistan across to the foothills of the western Indian Himalaya, all receive such precipitation from November through March. In Tamil Nadu and Sri Lanka, in contrast, the main wet season is from October to December, where late summer cyclonic disturbances bring most of the rainfall.

The pattern of relatively low winter precipitation across the great majority of South Asia is picked out in the precipitation graphs for individual cities in Map 18. These show that Colombo, with its near-Equatorial location, receives rain from both southwest and northeast monsoons, the south western region of Sri Lanka having two rainfall maxima in the year. With this exception, therefore, it is not surprising that the overall regional patterns of precipitation in South Asia are dictated by summer precipitation, overwhelmingly in the form of rainfall.



Map 19 Precipitation in Sri Lanka
After: Survey Department of Sri Lanka (1988)

The wet monsoon season

In late April and May, increasing warmth leads the high pressure system over Central Asia to break down. As the Inter-tropical Convergence Zone (ITCZ) moves north, the associated westerly jet stream shifts from its winter position south of the Himalaya and divides, one jet running to the north of the mountains and the other continuing to flow to the south. This triggers the north and north eastwards movement of the immense and very moist air masses over the Indian Ocean. The great depth and moisture bearing capacity of these air masses are the hallmarks of the monsoon. Known as the Southwest Monsoon, these rain-bearing winds reach south western Sri Lanka and the southernmost west coast of India in mid-May and progress northwards over the next four weeks. They finally cover all but the extreme northwest of the region. Both the timing of the monsoon's arrival and the amount of precipitation it brings vary considerably from year to year and from place to place. What is quite exceptional about the Indian monsoon is the depth of the moist air that crosses the sub-continent. Over South Asia the air mass is over 6000 metres thick, compared with only 2000 metres when the monsoon crosses Japan. This depth of warm moist air gives rise to the monsoon's characteristic periods of intense rainfall.

Rainfall shows three dominant regional patterns. The regions of heaviest rainfall are concentrated along India's west coast and in India's northeast. Both are regions where the orographic effect of mountain ranges forcing the monsoon air upwards produces local cooling and condensation. Along the ridge of the Western Ghats rainfall totals are often well over 2000 mm a year. Even higher totals are reached on the Shillong Plateau and the eastern Himalaya, though above an altitude of 4000 m to 5000 m this precipitation comes as snow. Mawsynram and Cherrapunji on the Shillong Plateau are two of the wettest places on earth, having had record rainfall totals of over 10,000 mm (10 m) of rain in a year. In the Himalaya, precipitation generally decreases from east to west, as shown in the map of Nepal's precipitation (Map 20).



Map 20 Precipitation in Nepal

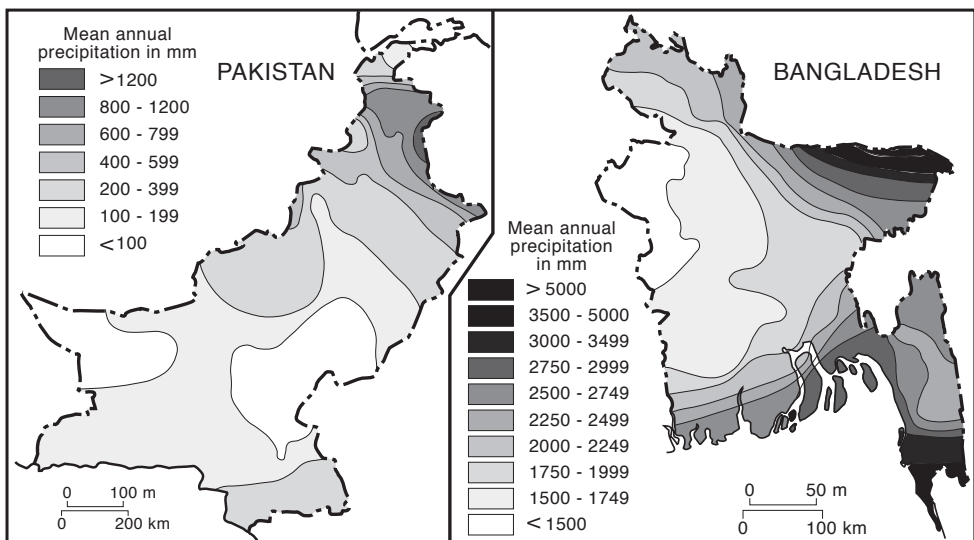
Source: Kansakar, S., et al (2004)

Peninsular India has three contrasting precipitation regions. In the extreme south, immediately in the lee of the Western Ghats, rainfall totals are lower than 400 mm a year, occasionally rising to 800 mm. The coast and much of the northeast of the Peninsula generally have rainfall of between 800 mm and 1600 mm, in small areas even higher. In comparison with other regions of the semi-arid tropics these amounts might seem generous. However the long dry season, the great variability of rainfall even during the wet season, the high evaporation rates and the variability from year to year mean that in the absence of irrigation, cultivation is often highly problematic.

Across the northwest of India and most of Pakistan precipitation falls to under 400 mm, and in many areas is less than 100 mm. This gives rise to the extensive deserts of Rajasthan and western Gujarat in northwest India, southern Pakistan and southern Afghanistan. The Hindu Kush and the highlands of central Afghanistan receive up to 1250 mm, but the northern valleys in the high Himalaya (in western India) and Karakoram (Pakistan) form high altitude desert, often with less than 100 mm.

Without the large-scale control and use of river water many of the arid areas of India, Pakistan and Afghanistan would be barren. Even regions with relatively high precipitation often need irrigation, especially during the dry season, for cultivation to be successful. This is demonstrated in Bangladesh, where despite annual flooding most of the country is too dry for five months of the year to have any cropping unless irrigation is used.

The contrast in precipitation between the western and eastern regions of South Asia is illustrated in Map 21 showing precipitation in Pakistan and Bangladesh. Southern Pakistan is extremely dry, with a narrow belt of higher rainfall running across the north. The northeast and southeast of Bangladesh have particularly heavy rainfall while the western margins are relatively dry. However, as the scales in Map 21 make clear, the wettest parts of Pakistan are actually drier than the driest parts of Bangladesh. Similarly there are great contrasts between the arid northeast and southeast of Sri Lanka and the very wet Central Highlands. Sri Lanka is far enough south for the northeast monsoon to have travelled over extensive waters of the Bay of Bengal, picking up moisture on the way and therefore bringing rain to the northeast and the Central Highlands during October to December. This is also the period when Tamil Nadu in southeast India receives most of its rain. For the southwest of Sri Lanka the Southwest Monsoon also brings heavy rain from April to October.



Map 21 Precipitation in Pakistan and Bangladesh

After: Johnson, B.L.C. (1975, 1979)

Precipitation variability

In many parts of South Asia precipitation varies widely in the short term from season to season and year to year. However, the records suggest that rainfall also varies over medium and longer cycles. The precise causes of such variability are still not fully understood. It is now believed that the long cycle of the El Niño Southern Oscillation (ENSO), which is known to influence

global weather patterns, helps to shape this variability, though the causes of the ENSO itself, entirely natural in origin, remain unknown.

Temperature

Given its location astride the Tropic of Cancer, the chief constraints on temperatures in South Asia are the apparent seasonal migration of the sun and altitude. Over most of peninsular India the normal maximum temperature range is between 25°C and 30°C in the winter to over 40°C in the summer. Cloud cover is a major influence on actual temperatures, and in much of South Asia the monsoon season is significantly cooler than the period of May and early June or late September and early October. The north Indian plains have greater temperature extremes than the Peninsula, and maximum summer temperatures are commonly over 40°C, while experiencing much cooler winters. The Delhi maximum between December and February, for example, is rarely much above 20°C while the minimum often falls to between 5°C and 10°C. The cool winter period across north India, followed by the intense heat of summer, has a marked effect on the suitability of different crops, and along with the seasonality of rainfall helps to produce sharply differentiated patterns of production of the major food grains.

Differences in micro-climate can also be highly significant, especially at altitude. In the Western Ghats, which rise to over 2500 m in the south and over 1500 m in the northern ranges inland of Mumbai, the natural vegetation forms clear zones with increasing height. Tropical rainforest gives way to high altitude grasslands within a distance of less than 50 km. In the course of the last century extensive areas at higher altitudes proved suitable for the widespread cultivation of cash crops such as cardamom, tea, coffee and grapes for wine production. However, while contrasts in vegetation within the expansive north Indian plains are generally much less sudden than in the hills, the varying combinations of rainfall, temperature, hydrology and soil conditions produce a remarkable diversity of agro-ecological environments in every part of South Asia.

Extreme climatic events

Throughout their recorded climatic history, all of the regions of South Asia have been subject to what today are often termed ‘extreme climatic events’. These range from the intense cyclones typical of the Bay of Bengal to heavy rainfall events, in which over 50 cm rainfall can occur within 24 hours. These are particularly frequent over the Bengal delta but may be experienced very widely, from the Punjab plains of Pakistan, the ranges of the Western Ghats and the west coast, or the eastern coast of Tamil Nadu. They can be extremely localised or can have catastrophic regional effects, especially through flooding. While such events are known to have been common since records began, their very patchy nature and irregularity makes precise comparisons very difficult. As the UNDP climate reports for Afghanistan, Nepal, Bangladesh and Pakistan indicate, there is no current evidence that there has been an increase in their frequency (see Chapter 29). In Bangladesh, for example, the proportion of rainfall falling in heavy events decreased slightly but significantly between 1960 and 2003 (McSweeney et al 2010).

Conclusion

The dynamic nature of all of the variables of climate has been matched by the diversity of human adaptation to South Asian environments, from the broad regional scale down to micro-level village environmental contrasts (Bradnock 1983; Brammer 2012, 2014). Such dynamism and diversity make broad generalisations about the impact of global change in climate extremely difficult, an issue discussed more fully in Chapter 28.

8 Water resources

Water has always been a key factor in the character, viability and sustainability of South Asia's ecosystems. Today it is one of the most important variables in ensuring sustainable futures. Water is a critical resource for the future of all South Asian countries. India alone has been estimated to use more than 7760 km³ of fresh water a year. At the same time it is a significant component in disputes, from the local to the international scale.

Over millennia, human settlement in South Asia has come to reflect closely the regional patterns of rainfall and surface water availability. Over the last one hundred and fifty years, large-scale water storage and distribution systems have increasingly modified the seasonal and regional distribution of water resources, changing fundamentally the resource potential of very large areas. A high proportion of the population of Pakistan today, for example, could not survive without large-scale irrigation works, and there has been a great increase in the irrigated area in many other parts of the sub-continent, especially India, Bangladesh and Sri Lanka.

Historically much of South Asia has been remarkably well endowed with precipitation and surface water resources. These provided the basis for the astonishing statistic that at Independence nearly 60 per cent of India's surface area was cultivated. This figure rose to over 70 per cent in Bangladesh. Indeed, when double and triple cropping are taken into account, over 120 per cent of Bangladesh's surface area is cultivated in total in any one year. In contrast, the arid and unirrigated parts of Pakistan, Afghanistan and northwest India have population densities below 10 per sq km, with the proportion of their total land cultivated less than 10 per cent.

As population grew, notably in the last century, demand on land and water increased dramatically. Since the early 1970s the need for increased food consumption in most of South Asia has had to be met by increased productivity of land – 'intensification' – rather than by extending the cultivated area – 'extensification'. Surface water and ground water irrigation have played an essential part in this process of intensification. In most parts of South Asia to date, the demand for more water has been met by attempts to increase the volume available for use. Limits to this form of water extensification now appear to have been reached in many parts of the sub-continent, and a rapid improvement in management methods and efficiency of water use will have to be brought into play if South Asia is to continue to supply its own needs for agricultural produce.

There is plenty of room for improvement. Large-scale irrigation projects have often delivered only a fraction of the water stored in them to productive uses. Groundwater, a vital resource across many parts of South Asia, is similarly often being squandered through inadequate management. 'Poor management' includes both physical infrastructure and economic management. Most irrigation systems in South Asia suffer huge losses through seepage and evaporation. At the same time, political pressures mean that in many areas water is treated as a 'free resource', with electric power for pumping and irrigation water being heavily subsidised. There is growing pressure for effective water charging to run alongside improved technologies of water harnessing, delivery and use.

Precipitation

South Asia's most important water source is precipitation. This comes mainly in the form of rainfall. In most of South Asia the great majority comes in the monsoon months of June through to October, though there are important regional variations. The chief of these is the October–December wet season experienced in India's far southeast, a pattern that extends into north-eastern Sri Lanka. In the Hindu Kush and the western Himalaya, westerly depressions bring most of the winter precipitation. Above 3500 metres, much of the precipitation comes in the form of snow. At even higher altitudes, generally above 5500 metres, this is often gradually converted into glacier ice. It should be noted that glacier melt itself contributes a tiny fraction – probably less than 3 per cent in most of the Himalaya – to total river flow.

Many claims have been made about the impact of global warming on glacier melt and on the consequent flow of South Asia's major rivers. Latest research suggests that the picture is variable, but even dry season flows probably only owe 10 per cent to 20 per cent of their flow to glacier melt. Given that dry season flow across South Asia is a very small part of total flow, the loss of glacier ice would be dwarfed by other factors, mainly snowmelt and rainfall. According to a report in *Nature*, Lall has claimed that the idea that the rivers could run dry because of shrinking glaciers seems to stem from a confusion about how much glaciers contribute to river flows, compared with the contribution from melting of the seasonal snowpack. 'Strictly speaking, we should separate the long-term ice in the glacier from the snow melt,' Lall says. 'The reality is that 10 to 20 per cent of the dry season flow comes from glaciers themselves' (*Nature* 2010). It should nonetheless be noted that in many of the mountain catchment areas, the annual snowmelt is a significant source of summer water supplies for local communities.

Table 1 Total annual precipitation in South Asia, 2008–2012

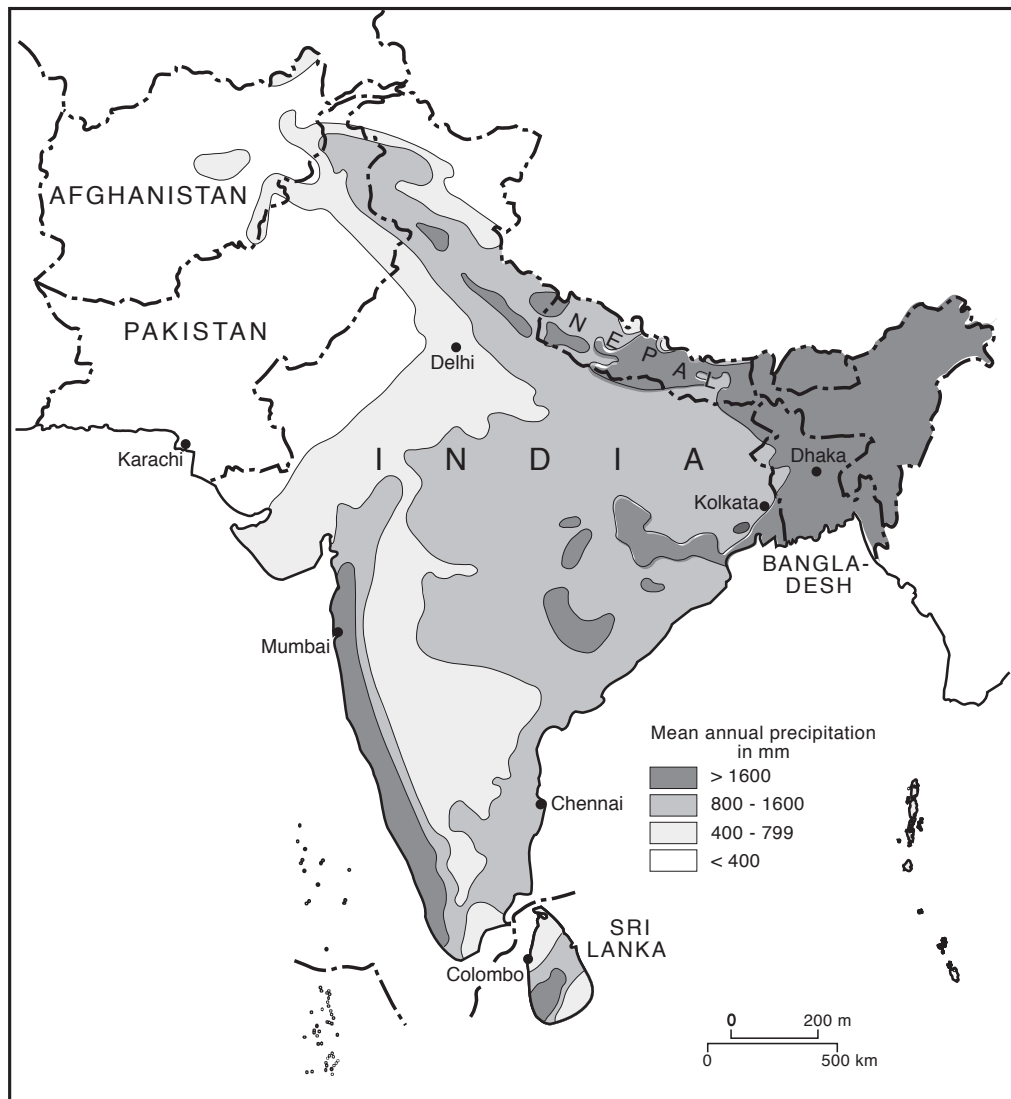
Country	Annual precipitation (mm/in) (2008–2012)	Area (km ²)	Total precipitation (km ³)	Population (millions, est. 2013)	Total precipitation (million litres, per person)
Afghanistan	327/13	647,000	212	35.00	6.04
Bangladesh	2666/105	146,000	389	151.00	2.58
Bhutan	2200/87	47,000	103	0.75	137.87
India	1083/43	3,287,000	3560	1240.00	2.87
Maldives	1972/78	300	1	0.32	1.85
Nepal	1500/59	147,000	221	31.00	7.11
Pakistan	494/19	796,000	393	177.00	2.22
Sri Lanka	1712/67	66,000	113	21.00	5.38
South Asia	1494/59	5,136,300	7675	1656.07	4.63

Source: Aquastat Country Fact Sheets South Asia precipitation (2014)

The total volume of precipitation in South Asia 2008–2012 was estimated at nearly 7700 km³ (FAO Aquastat 2014). 46 per cent of this total fell in India, the overwhelming majority of it as rain. As Map 22 shows, the great regional variability in rainfall across the sub-continent, coupled with its seasonal and inter-annual range, render the national figures of average precipitation

meaningless, unless accompanied by an understanding of the three dominant features of precipitation in South Asia: its regional diversity, its seasonal variability, and the wide contrasts in total precipitation from year to year.

The driest parts of South Asia, Afghanistan and Pakistan, have on average annual rainfall totals of under 500 mm. At the opposite extreme, Bangladesh and Bhutan receive over 2200 mm. An alternative way of looking at these figures is to compare the total cubic kilometres of precipitation each of these countries receives in comparison with its area. Bangladesh and Pakistan each receive approximately the same gross volume of precipitation, just under 400 km³, though Pakistan is five and a half times the area of Bangladesh. Bhutan, with 7 per cent of the area of Afghanistan, has almost half as much rainfall (101 km³ against 212 km³).



Map 22 Mean annual precipitation in South Asia
 After: Schwartzberg, J.E. (1978)

This broad picture gives no indication of the equally important seasonality and inter-annual variability of precipitation. As a general rule the drier the area, the greater the variability of rainfall. While the great majority of South Asia receives the bulk of its precipitation in the summer monsoon, the precise timing of rainfall within the monsoon period and the amounts of rain that fall in any given year vary widely. Variability has thus been a key feature of agricultural adaptation at every scale, from the village upwards.

Map 22 shows two regions of heavy precipitation, the Northeast, and the western coastal region of India. Smaller areas of heavy rainfall are found in the southwestern quadrant of Sri Lanka, termed the 'Wet Zone' because of its almost year-round rainfall. The broken hills of eastern peninsular India, the Eastern Ghats, and the Nepali foothills of the Himalaya, also have relatively abundant precipitation.

These patterns reflect the interaction of the main rain-bearing winds of the monsoon with local features of the topography, outlined in Chapter 8. Where the moisture-laden monsoon winds encounter mountain ranges (the Western Ghats, the Central Highlands of Sri Lanka or the eastern and central Himalaya and the Shillong Plateau), intense rainfall results. The Shillong Plateau, just to the north of Bangladesh, is one of the wettest regions on earth. The weather stations at Mawsynram and Cherrapunji have both recorded over 6000 mm of rainfall in a year. As the winds travel further across land, or down the east-facing slopes of the Western Ghats, rainfall diminishes, sometimes quite sharply. The transition from the lush rainforests of Kerala to the semi-desert coastal landscape of southeastern Tamil Nadu, for example, takes place within only tens of kilometres.

The regional scale variability in precipitation is illustrated in the contrasts between and within Bangladesh and Pakistan (Chapter 7, Map 21). Both countries show major internal contrasts in rainfall. In Bangladesh the wettest regions, receiving over 5000 mm of rainfall, are in the extreme southeast and on the foothills of the Shillong Plateau in the northeast. Rainfall diminishes away from these two areas, and in Rajshahi District in the northwest is generally less than 1500 mm a year. Even this is a large amount compared with any region of Pakistan, where the wettest regions, in the north and northeast, are drier than the driest regions of Bangladesh. Much of southern Pakistan is semi-desert or true desert. By the time the summer monsoon reaches Pakistan it is generally much diminished. Only in the narrow strip to the south of the Himalaya is the summer monsoon augmented by rainfall from winter depressions, which travel eastwards bringing moisture from the Mediterranean. The driest areas in both Pakistan and Bangladesh are also areas where rainfall is least predictable and droughts most common.

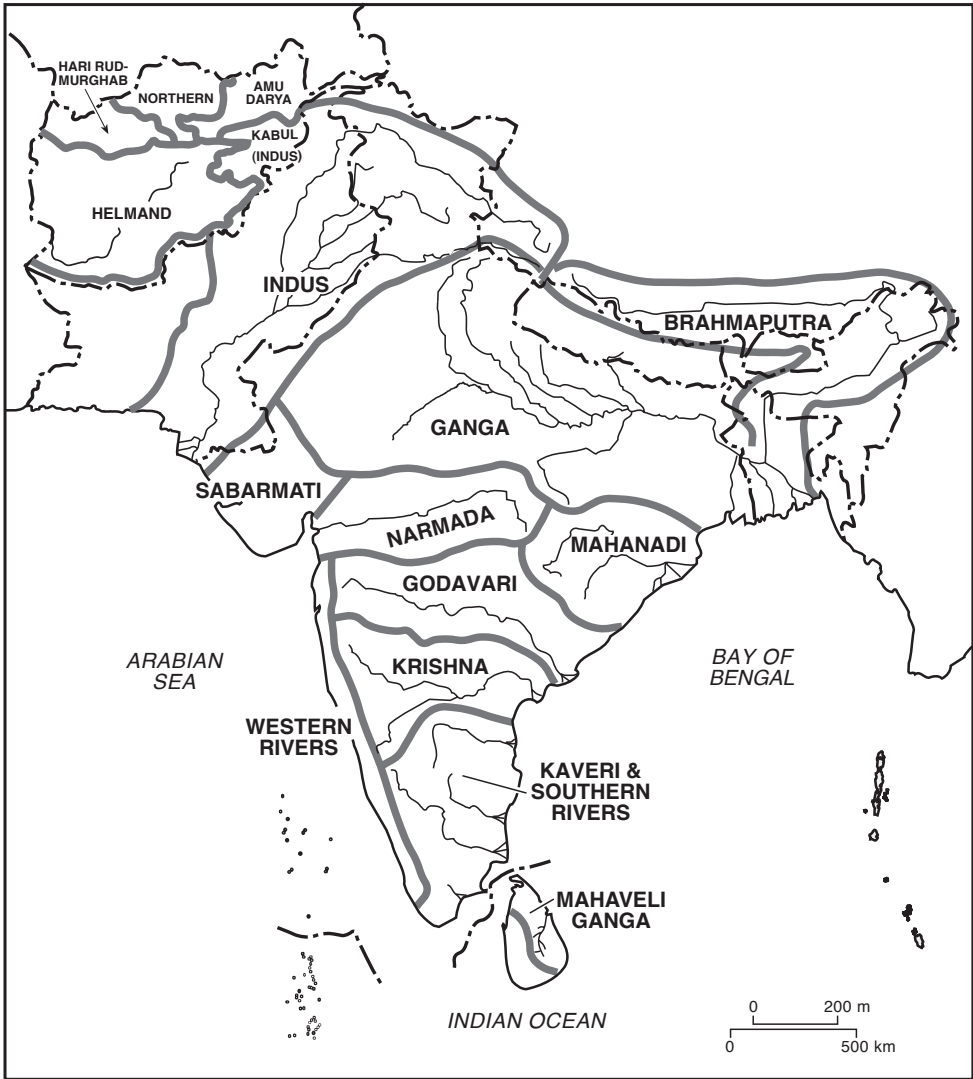
While the River Indus receives no tributaries in the last one thousand kilometres of its course, the Ganga, Brahmaputra and Meghna rivers travel across increasingly well-watered landscapes. However, the intensity of rainfall associated with the summer monsoon results in flooding being a relatively commonplace event in many parts of South Asia, including those that are normally dry for much of the year.

Surface water resources

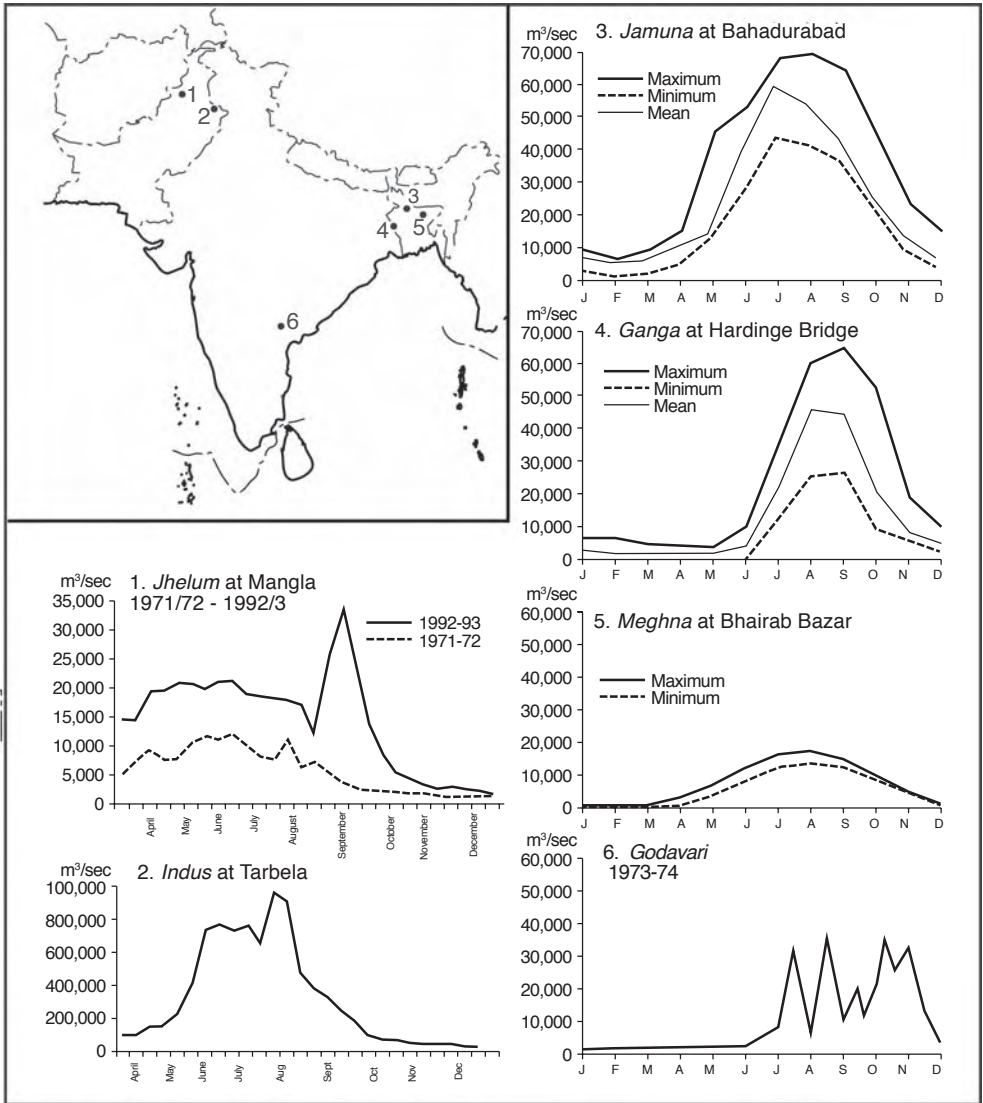
Note: statistics and definitions

Data relating to water are notoriously unreliable and are often at best educated guesses. Sources often disagree. The figures quoted in the tables above are from the FAO's Aquastat, one of the most widely quoted sources of data that purport to be internationally comparable. In practice the reliability of data on water and related issues often depends on national statistics, which can be sketchy.

For the sake of clarity, the FAO states the following ‘Water availability (or available water resources). The terms water resources and water availability are often used as synonyms in the literature. However, these terms are not always defined clearly, leading to possible misinterpretation of the data. Some authors consider water availability to be the water not yet exploited in a given year, while others consider it closer to the concept of exploitable or manageable water resources. For the sake of clarity, the term water availability should be used in the sense of water net balance in a given state of use and exploitation of the resources and not with a meaning of water offer. The ‘availability’ may be: (i) equal to ‘resources’ minus ‘withdrawal’ at the local level of a subsystem, where a part of the water withdrawn cannot be returned into the system; or (ii) equal to ‘resources’ minus ‘final consumption’ at a more regional scale (watershed, country), where the balance encompasses all the use systems. This study avoids the term ‘water availability’ in an attempt to limit possible misinterpretations.’ (FAO 2014)



Map 23 The major river basins
 After: Schwartzberg, J.E. (1978)



Map 24 Régimes for six rivers

After: Schwartzberg, J.E. (1978), Johnson, B.L.C. (1975, 1979)

The three major river basin systems of northern South Asia, the Indus, Ganga and Brahmaputra, have the lion's share of total surface water resources. The total flow of the three basins in an average year is about 1300 km^3 (by comparison, only one fifth that of the annual flow of the Amazon, approximately 6600 km^3). The total for the major river systems of the Peninsula is only 600 km^3 . Nearly one third of this volume flows in short rivers down the Western Ghats to the Arabian Sea. Most of the remainder flows east across the Peninsula into the Bay of Bengal. The three southern basins of the Godavari, Krishna and Kaveri (and their associated minor basins) account for about 230 km^3 .

The total average figures of surface water runoff tell only a very small part of the story of South Asian surface water resources. All South Asian rivers are highly seasonal, with a variation as great as 10 times between low and peak flow periods. The Indus, Ganga and Brahmaputra all receive significant flow from snow-melt in late spring and summer. In the eastern Himalaya this is further augmented to a small degree (< 3 per cent of total flow) by glacier melt.

River régimes

Map 24 illustrates the extent to which seasonality affects river flows across the sub-continent. Nearly all river regimes reflect the dominance of the southwest monsoon rainfall over river discharge. However the nature of the catchment areas shapes the specific characteristics of individual basins. The Indus, Ganga and Brahmaputra have somewhat longer high-flow periods than the peninsular rivers and continue to have significant flow even in the dry season. The hydrograph for the River Jhelum at Mangla (the site of one of the major Indus Waters Treaty dams) shows that average figures can conceal wide variations from year to year.

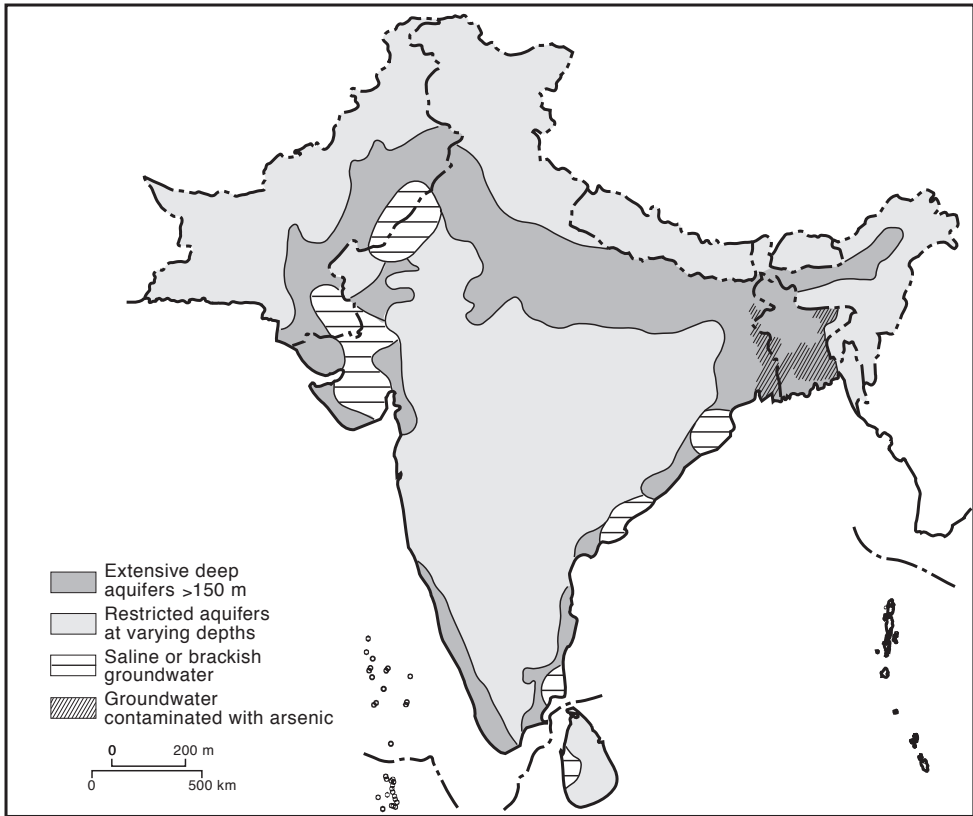
This variability is particularly pronounced with respect to peak flow, demonstrated in this case between the high flood year of 1992–93 and the low flood year of 1971–72. The graphs for the Jamuna (Brahmaputra) at Bahadurabad, where the river enters Bangladesh from India, and for the Ganga at Hardinge Bridge (also near the India-Bangladesh border) shows the great range around the mean values. Even in the season of peak flow, August–September, the flow of the Ganga can be less than 30,000 m³/sec, while in flood years it can be as high as 70,000 m³/sec. As Map 24 shows, the difference between minimum and maximum **peak** flow at Bahadurabad, though less than that of the Ganga, still ranges from 40,000 m³/sec to 70,000 m³/sec. For both rivers the dry season flow shrinks to as little as 1000 m³/sec. The Ganga experiences six months with flows less than 10,000 m³/sec, while for the Brahmaputra it is normally only a bare 3 months.

Aquifers and groundwater resources

Since the 1970s groundwater has come to play an increasingly important part in agriculture and the provision of urban water supplies in many parts of South Asia, even in those areas with high annual average rainfall (Shah T. 2007; see also Kumar and Singh 2008). In Bangladesh, for example, the six-month dry season from November through to May, until the 1980s a fallow period for agriculture, has become one of the most important agricultural seasons. In 2015 it accounted for nearly half of the total agricultural output, almost entirely made possible by the use of groundwater.

Figures for groundwater resources and use are subject to a wide margin of error and to varying underlying assumptions. In 1990 India was estimated to be using 190 km³/yr. This made it by far the largest groundwater user in the world, ahead of the USA (115 km³/yr), China (97 km³/yr), and Pakistan (60 km³/yr). Groundwater accounts for over half the agricultural water use in India and Pakistan, and India's Planning Commission recently estimated India's groundwater resources at over 230 km³/yr, showing that it is becoming an increasingly vital resource.

Groundwater resources are heavily influenced by the character of the underlying geology, in turn reflecting the differing process of formation of the Indian sub-continent (see Chapters 5 and 6). The broad picture illustrated in Map 25 follows closely the boundaries between



Map 25 Major aquifers in South Asia

the ancient, often water-impermeable rocks of the Peninsula, and the Indo-Gangetic alluvial plains. The Himalayan ranges form a third category, with isolated and patchy groundwater resources.

Just over half of India's surface area is underlain by 'hard rocks' (Indian Planning Commission 2007). In their pristine condition, these igneous and metamorphic rocks have very low water-bearing capacity. In many parts of peninsular South Asia they have been exposed to surface weathering for hundreds of millions of years. As a result, some are now covered by a mantle of weathered, water-bearing material over 100 m deep, though aquifers in such rocks are generally limited and scattered. In parts of India and Sri Lanka, which has a similar geology to that of peninsular India, the increasing use of such aquifers has exposed them to groundwater exhaustion.

In contrast to the Indian Peninsula, the alluvium of the Indo-Gangetic plains has far greater resources of water, often in deep and integrated aquifers. Even these resources are now being stretched by the intensification of groundwater use. Groundwater varies greatly in quality. Saline groundwater, which at high levels of salinity is unusable for cultivation, is common, especially in Pakistan and parts of Uttar Pradesh. Even in Bangladesh, where annual flooding still replenishes the water table, there is evidence of a large seasonal variation in the water table depth and the additional problem of arsenic contamination.

Table 2 Groundwater resources and current use in major Indian states

<i>The most groundwater-rich states</i>	<i>Net annual groundwater availability</i>	<i>Net draft</i>	<i>Balance of groundwater resource for future use</i>	<i>Level of groundwater development</i>
	BCM ¹ /yr	BCM/yr	BCM/yr	% use
Punjab	21.4	31.2	(-)9.9	145
Rajasthan	10.4	13	(-)3.9	125
Haryana	8.6	9.5	(-)1.1	109
Tamil Nadu	20.8	17.7	3.1	85
Gujarat	15.0	11.5	3.1	76
Uttar Pradesh	70.2	48.8	19.5	70
INDIA	398.7	230.4	161.9	58

¹ BCM – Billion Cubic Metres

Source: Shankar, P.S.V., Kulkarni H. and Krishnan S. (2014)

Human influence on water resources

Human influence has become a major factor in the nature of the water resource endowment of all South Asian countries. As is shown in Chapters 24 and 25, large-scale irrigation schemes have been developed in all of South Asia's major river basins. The natural river flow is therefore now significantly modified by human use. Both the volume and quality of groundwater have also been changed, sometimes radically, over the last 150 years. In particular, through large storage dams and canal distribution systems, attempts have been made both to even out the seasonal flow and to direct water to fields for irrigation. Such schemes have the side effect that unproductive water losses are often very high. These losses occur through evaporation and percolation into the water table.

These issues are discussed more fully in Chapter 24. Large dams have been developed, both to generate hydro-electricity through river schemes, in which the great majority of the water flows back into the river downstream, and for irrigation. Such schemes may also be intended to reduce peak flow discharges, thereby helping to reduce flood risk. Despite these developments across the catchment areas of South Asia, the scale and concentration of seasonal peaks in rainfall can still overwhelm such protective measures, whether on a local, regional or national scale.

Country data

The tables below present summary statistics derived from the FAO's Aquastat international water database. They attempt to provide broadly comparable data on water availability and use, alongside summary data on the country's area, population and cultivated area. They show the amount of precipitation received, averaged for the whole country with a derived total volume of precipitation received each year. Each table also includes a figure showing the dependency ratio, the country's share of water that originates outside its borders (ranging from 0 per cent for Sri Lanka and Maldives to over 90 per cent for Bangladesh). The final figures in the tables relate to the use of water for irrigation.

Afghanistan

Afghanistan's water resources are divided among four river zones.

The northern zone has 24 per cent of Afghanistan's territory. The Amu Darya and its tributaries, which flow into Turkmenistan and Uzbekistan and ultimately into the Aral Sea, represent just over half this.

The western zone (12 per cent of Afghan territory) is dominated by the Hari Rud and the Murghab (6 per cent). Both rivers flow into (and disappear in) Turkmenistan.

The southwestern basin covers 52 per cent of Afghanistan, the Helmand River flowing southwest and then north into the Sistan swamps in Iran. Under the heading of the Western Basins project this is subject to an \$83 million development project (Asian Development Fund \$75 million, Canadian International Development Agency \$8.35 million). The scheme includes canal rehabilitation of the Jui Nau, Zinda Jan and Kohsan and new construction of the Goryan Kohsan main Canal. The project also includes groundwater data collection, on-farm water management training and agriculture and livelihood services.

The eastern Kabul Basin covers the remaining 12 per cent. It is the only river system to flow into the sea, joining the Indus at Attock in Pakistan.

Afghanistan's total renewable water resources were estimated at 66 km³/yr in 2014. In 2014 approximately one third of this was withdrawn, 99 per cent for agriculture. Afghanistan faces major problems in realising its irrigation potential. Up to 5 per cent of its total irrigation water is used for cultivating opium poppies. The US Office on drugs and crime reported that in 2013 Afghanistan grew 209,000 hectares of opium poppies, up from the previous record of 193,000 ha. There is little sign of effective control (The Guardian 2014).

Table 3 Water resources of Afghanistan

Index (units+date)	Value
Area ('000 km ² ; 2012)	652
Cultivated area ('000 km ²)	79
Population (million; 2013)	31.4
Water resources (WR)	
Long-term precipitation	
Amount (mm/year)	327
Volume (km ³ /year)	213
Long-term average annual renewable water resources	
Internal renewable WVR (km ³ /year)	47
External renewable (km ³ /year)	19
Dependency	29
Total per capita (m ³ /year, 2014)	2138
Total dam capacity (km ³ /year, 2010)	2
Water withdrawal – by sector	
Agriculture (km ³ /year, 1998)	20
Municipal (km ³ /year, 2005)	0.2

Index (units+date)	Value
Industrial (km ³ /year, 2005)	0.17
Total (km ³ /year, 2000)	20
Total withdrawal per capita (m ³ , 2000)	913
Water withdrawal – by source	
Surface water withdrawal (1998)	17
Groundwater withdrawal	3
Total withdrawal (km ³ /year, 2000)	20
Withdrawal as % total ARWR (%)	31
Water-managed areas	
Equipped for full control irrigation (km ² , 2002)	32
Irrigation equipped (% cultivated area, 2002)	41
Actually irrigated (km ² , 2011)	18

Source: FAO Aquastat Country Fact Sheet Afghanistan (2014)

Bangladesh

Bangladesh has some of the richest water resources in South Asia, both in absolute and per capita terms, at nearly 8000 m³ a year. Over 90 per cent of Bangladesh's total water resources come from beyond its borders, mainly India, Nepal and China, giving it a dependency ratio of 91 per cent. Unlike Pakistan, however, the majority of whose water resources also come across its borders, Bangladesh makes little use of river water for irrigation. However, its high dependency ratio is an indicator of the extent to which upstream developments beyond Bangladesh's control can have an impact on it. Given the scale of its river water resources, a striking feature of Bangladesh's water use is that groundwater accounts for 80 per cent.

Table 4 Water resources of Bangladesh

Index (units+date)	Value
Area ('000 km ² ; 2012)	148
Cultivated area ('000 km ² , 2012)	85
Population (million; 2013)	157
Water resources (WR)	
Long-term precipitation	
Amount (mm/year)	2666
Volume (km ³ /year)	396
Long-term average WR	
Internal renewable WR (km ³ /year)	105
External renewable (km ³ /year)	1122
Dependency ratio (%)	91
Total per capita (m ³ /year)	7835

Index (units+date)	Value
Total dam capacity (km ³ /year)	6
Water withdrawal – by sector	
Agriculture (km ³ /year, 2008)	32
Municipal (km ³ /year, 2008)	4
Industrial (km ³ /year, 2008)	0.8
Total (km ³ /year, 2008)	36
Total per cap (m ³ , 2008)	232
Water withdrawal – by source	
Surface water withdrawal (km ³ , 2008)	7
Groundwater withdrawal (km ³ , 2008)	29
Total withdrawal (km ³ /year, 2008)	36
Withdrawal as % total ARWR (2008: %)	3
Water-managed areas	
Equipped for irrigation ('000 km ²)	51
Irrigation equipped (% cultivated area)	59
Actually irrigated ('000 km ²)	27

Source: FAO Aquastat Country Fact Sheet Bangladesh (2014)

Bhutan

In per capita terms Bhutan has by far the richest water resources in South Asia at over 100,000 m³. It uses less than 1 per cent of its 85 km³ and has agreements with India for the development of its hydro potential.

Table 5 Water resources of Bhutan

Index (units+date)	Value
Area ('000 km ² ; 2012)	38
Cultivated area ('000 km ²)	1
Population (million; 2013)	0.75
Water resources (WR)	
Long-term precipitation	
Amount (mm/year)	2200
Volume (km ³ /year)	85
Long-term average WR	
Internal renewable WR (km ³ /year)	78
External renewable (km ³ /year)	0
Dependency ratio (%)	0
Total per capita (m ³ /year)	103,448
Total dam capacity (km ³ /year)	n/a

Index (units+date)	Value
Water withdrawal – by sector	
Agriculture (km ³ /year, 2008)	0.3
Municipal (km ³ /year, 2008)	.02
Industrial (km ³ /year, 2008)	0
Total (km ³ /year, 2008)	0.3
Total per cap (m ³ , 2008)	455
Water withdrawal – by source	
Surface water withdrawal (2008)	0.34
Groundwater withdrawal (2008)	0
Total withdrawal (km ³ /year, 2008)	0.34
Withdrawal as % total ARVWR (2008: %)	0.43
Water-managed areas	
Equipped for irrigation ('000 km ²)	2.7
Irrigation equipped (% cultivated area)	2.7
Actually irrigated ('000 km ²)	2.7

Source: FAO Aquastat Country Fact Sheet Bhutan (2014)

India

The gross statistics of India's water resources do not adequately represent the great geographical range from one part of the country to another. In common with most of South Asia over 90 per cent of the available water resource is used for agriculture. However, while much of northeastern India has a water surplus, most of the rest of the country has a water deficit. Much of its surplus in the north comes from cross-boundary water resources, accounting for its dependency ratio of 31 per cent. There is evidence that India's two major sources of water (other than direct rainfall), surface water and groundwater irrigation, are both nearing their limits of exploitation at current levels of technology (Shah M. 2013). Growing demand from all sectors is putting increasing strain on current resources. 40 per cent of the cultivated land is already irrigated, but India is exploring ambitious water-transfer schemes (see Chapter 25).

Table 6 Water resources of India

Index (units+date)	Value
Area ('000 km ² ; 2012)	3287
Cultivated area ('000 km ²)	1690
Population (million; 2013)	1252
Water resources (WR)	
Long-term precipitation	
Amount (mm/year)	1083
Volume (km ³ /year)	3560
Long-term average WR	
Internal renewable VWR (km ³ /year)	1446
External renewable (km ³ /year)	465

Index (units+date)	Value
Dependency ratio (%)	31
Total per capita (m ³ /year, 2014)	1526
Total dam capacity (km ³ , 2005)	224
Water withdrawal – by sector (2010)	
Agriculture (km ³ /year, 2010)	688
Municipal (km ³ /year, 2010)	56
Industrial (km ³ /year, 2010)	17
Total (km ³ /year, 2010)	761
Total per cap (m ³ , 2010)	615
Water withdrawal – by source	
Surface water withdrawal (km ³ , 2010)	510
Groundwater withdrawal (km ³ , 2010)	251
Total withdrawal (km ³ /year, 2010)	648
Withdrawal as % total ARVWR (2010)	34
Water-managed areas	
Equipped for irrigation ('000 km ² , 2008)	663
Irrigation equipped (% cultivated area, 2008)	39
Actually irrigated ('000 km ² , 2008)	623

Source: FAO Aquastat Country Fact Sheet India (2014)

Maldives

Maldives have the smallest water resource per capita in South Asia. The atoll islands depend on extremely limited shallow aquifers to supplement stored rainwater and desalination of seawater.

Table 7 Water resources of Maldives

Index (units+date)	Value
Area (km ² ; 2012)	300
Cultivated area (km ² , 2012)	60
Population ('000; 2013)	345
Water resources (WR)	
Long-term precipitation	
Amount (mm/year)	1972
Volume (km ³ /year)	0.6
Long-term average WR	
Internal renewable WR (km ³ /year)	0.03
External renewable (km ³ /year)	0
Dependency ratio (%)	0
Total per capita (m ³ /year, 2014)	87
Total dam capacity (km ³ /year)	0

Index (units+date)	Value
Water withdrawal – by sector	
Agriculture (2008) (km ³ /year, 2008)	0
Municipal (km ³ /year, 2008)	0.006
Industrial (km ³ /year, 2008)	0.0003
Total (km ³ /year, 2008)	0.006
Total per cap (m ³ , 2008)	17
Water withdrawal – by source	
Surface water withdrawal (2008)	0
Groundwater withdrawal (2008)	0
Total withdrawal (km ³ /year, 2008)	0.005
Withdrawal as % total ARWR (2008: %)	16
Water-managed areas	
Equipped for irrigation ('000 km ²)	0
Irrigation equipped (% cultivated area)	0
Actually irrigated ('000 km ²)	0

Source: FAO Aquastat Country Fact Sheet Maldives 2014

Nepal

Along with Bangladesh, Nepal has the most extensive water resources in South Asia after Bhutan. Unlike Bangladesh, however, 94 per cent of Nepal's water resources are generated within the country, far exceeding internal demand. Although as elsewhere in South Asia agriculture takes over 96 per cent of the total water withdrawn, this is still under 4 per cent of the total precipitation it receives. With India as the largest downstream surface water user, there is considerable scope for co-operative development of the country's water resources, though there are significant political obstacles in the way (see Chapters 25 and 26).

Table 8 Water resources of Nepal

Index (units+date)	Value
Area ('000 km ² ; 2012)	147
Cultivated area ('000 km ²)	23
Population (million; 2013)	28
Water resources (WR)	
Long-term precipitation	
Amount (mm/year)	1500
Volume (km ³ /year)	221
Long-term average WR	
Internal renewable WR (km ³ /year)	198
External renewable (km ³ /year)	12
Dependency ratio (%)	6

Index (units+date)	Value
Total per capita (m ³ /year, 2014)	7562
Total dam capacity (km ³ , 2010)	0.09
Water withdrawal – by sector	
Agriculture (2006) (km ³ /year)	9.3
Municipal (km ³ /year)	0.15
Industrial (km ³ /year)	0.03
Total (km ³ /year)	9.5
Total per cap (m ³)	366
Water withdrawal – by source	
Surface water withdrawal (2008)	n/a
Groundwater withdrawal (2008)	n/a
Total withdrawal (2006: km ³ /year)	9.5
Withdrawal as % total ARWR (2008: %)	4.5
Water-managed areas	
Equipped for irrigation (km ² , 2002)	12
Irrigation equipped (% cultivated area)	47
Actually irrigated ('000 km ²)	n/a

Source: FAO Aquastat Country Fact Sheet Nepal 2014

Pakistan

As is suggested in Table 9, Pakistan is in a unique position with respect to water resources in South Asia. Total internal renewable water resources are estimated as 55 km³/year. However, agriculture alone draws down some 172 km³/year, with a total withdrawal of 183 km³. These figures illustrate the crucial role played by cross-border water resources for the economy of Pakistan (see Chapters 25 and 26). The 1960 Indus Waters Treaty with India continues to shape surface water sharing and use between the two countries, and agriculture of the two provinces of Punjab and Sind depend overwhelmingly on its continuing implementation. Future demand suggests the need for fundamental improvements to the management of the water economy of the country.

Table 9 Water resources of Pakistan

Index (units+date)	Value
Area ('000 km ² ; 2012)	796
Cultivated area ('000 km ²)	220
Population (million; 2013)	182
Water resources (WR)	
Long-term precipitation	
Amount (mm/year)	494
Volume (km ³ /year)	393

Index (units+date)	Value
Long-term average WR	
Internal renewable WR (km ³ /year)	55
External renewable (km ³ /year)	192
Dependency ratio (%)	78
Total per capita (m ³ /year, 2014)	1355
Total dam capacity (km ³ /year, 2010)	28
Water withdrawal – by sector	
Agriculture (km ³ /year, 2008)	172
Municipal (km ³ /year, 2008)	10
Industrial (km ³ /year, 2008)	1.4
Total (km ³ /year, 2008)	184
Total per cap (m ³ , 2008)	1024
Water withdrawal – by source	
Surface water withdrawal (2008)	122
Groundwater withdrawal (2008)	62
Total withdrawal (2008: km ³ /year)	183
Withdrawal as % total ARWR (2008: %)	74
Water-managed areas	
Equipped for irrigation ('000 km ²)	193
Irrigation equipped (% cultivated area)	91
Actually irrigated ('000 km ²)	n/a

Source: FAO Aquastat Country Fact Sheet Pakistan 2014

Sri Lanka

Pronounced differences between the annual precipitation in the north and east of the country and that in the Central Highlands and the southwest create a permanent regional imbalance in Sri Lanka's water resource budget. Thus while Sri Lanka only uses about 25 per cent of its total annual renewable water resources, large-scale water transfer schemes, notably the Mahaweli Ganga Project (1981 to the present), have been implemented to enable productive agriculture in the Dry Zone.

Table 10 Water resources of Sri Lanka

Index (units+date)	Value
Area ('000 km ² ; 2012)	66
Cultivated area ('000 km ²)	23
Population (million; 2013)	21
Water resources (WR)	
Long-term precipitation	
Amount (mm/year)	1712
Volume (km ³ /year)	112

Index (units+date)	Value
Long-term average WR	
Internal renewable WVR (km ³ /year)	53
External renewable (km ³ /year)	0
Dependency ratio (%)	0
Total per capita (m ³ /year, 2014)	2482
Total dam capacity (km ³ /year, 1996)	5.9
Water withdrawal – by sector	
Agriculture (km ³ /year, 2005)	11
Municipal (km ³ /year, 2005)	0.8
Industrial (km ³ /year, 2005)	0.8
Total (km ³ /year, 2005)	13
Total per cap (m ³ , 2005)	638
Water withdrawal – by source	
Surface water withdrawal (2005)	n/a
Groundwater withdrawal (2005)	n/a
Total withdrawal (km ³ /year, 2005)	13
Withdrawal as % total ARWVR (% , 2005)	25
Water-managed areas	
Equipped for irrigation ('000 km ² , 2006)	5.7
Irrigation equipped (% cultivated area, 2006)	
Actually irrigated ('000 km ² , 2006)	4.6

Source: FAO Aquastat Country Fact Sheet Sri Lanka 2014

Conclusion

Parts of South Asia have abundant water resources, and many regions have enough to have allowed cultivation over several millennia. However, imbalances in the regional distribution of rainfall and the availability of river water, and the limits of usable groundwater in many parts of the sub-continent, suggest the need for some radical developments in current water management if the escalating demands are to be met.

9 Natural vegetation and the challenge to biodiversity

Given that South Asian environments range from mid-latitude to tropical, from high altitude to coastal plain, and from extreme aridity to abundantly watered, it is unsurprising that the region's natural vegetation is remarkably diverse. For most areas other than deserts and high mountains the original natural vegetation was forest. However, many parts of South Asia are among the most densely populated in the world, so all the natural vegetation systems have been heavily affected by human settlement and activity, and over several thousand years of settlement the forest cover has been reduced from over 75 per cent to little over 10 per cent of the surface area. A striking feature of South Asia's vegetation is the almost total absence of savanna grassland, though there are small niches of generally high altitude grassland, as in the Western Ghats, or low altitude grassland in the *terai*, along the foothills of the Himalaya.

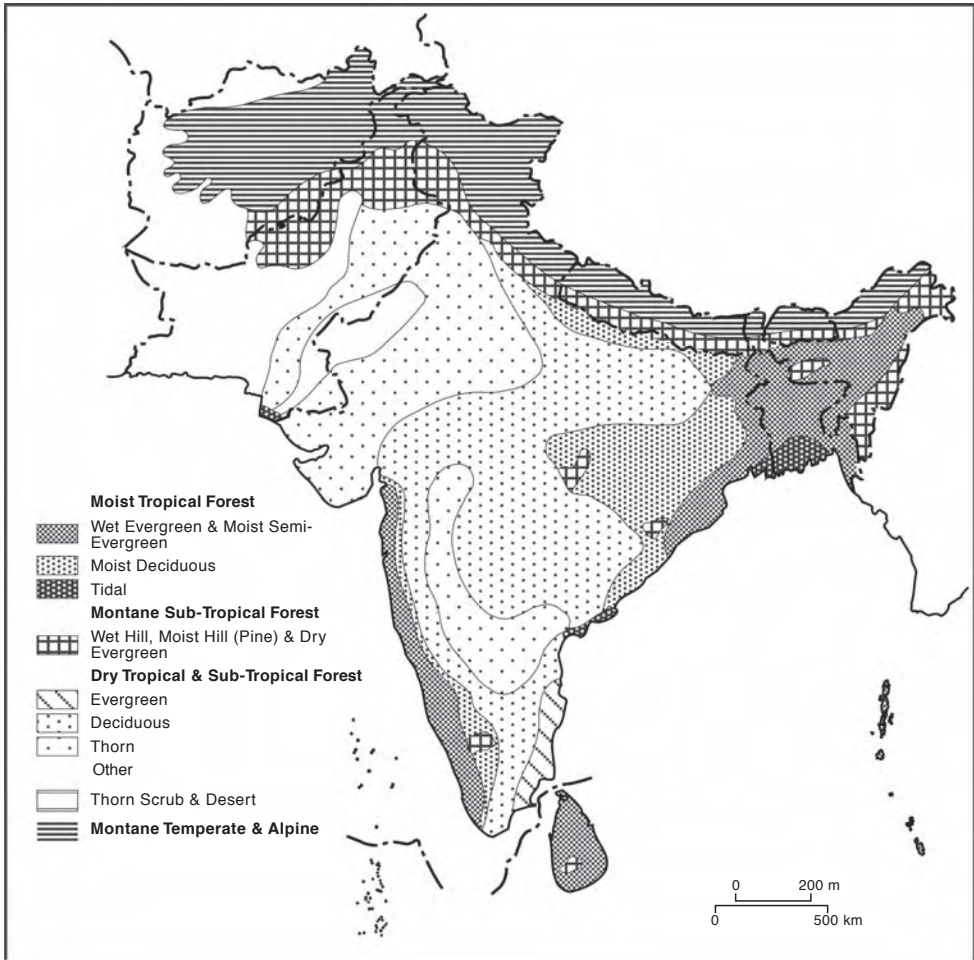
The transformative effects of human settlement in South Asia on natural ecosystems has long been recognised. Even in the nineteenth century, colonial administrators were pointing to the loss of forest to cultivation. The spread of cultivation had led to the destruction of habitat for fauna and flora, and of forest resources for tribal people. As Spate and Learmonth wrote in 1967, 'The problem of rehabilitating India's forests, which in most of the more accessible areas have been virtually ruined, is extremely serious' (Spate and Learmonth 1967). Today, despite widespread efforts to encourage re-forestation, the challenge remains great, not least because some of South Asia's most valuable mineral resources lie in remote forested (and often tribal) areas, and their extraction poses a major threat to some of the remaining areas of biodiversity.

Map 26 shows the distribution of South Asia's major natural vegetation as it would be without human settlement. In practice the plant species associated with these distributions are often only present in relict forms or are completely absent. However, the distribution shows the wide range of natural vegetation across the region.

In the absence of human settlement, the key controlling variables are rainfall and temperature. Except at higher altitude, rainfall is the more important. Vegetation across the three main high altitude belts in mainland South Asia, the Himalaya, the Western Ghats, and the Central Highlands of Sri Lanka, shows the pronounced effects of reduced temperature with increasing altitude. Even the vegetation at altitudes below 3000 metres, which has often been transformed by the cultivation of commercial crops of tea, coffee or cardamom and other spices, still show marked contrasts with altitude.

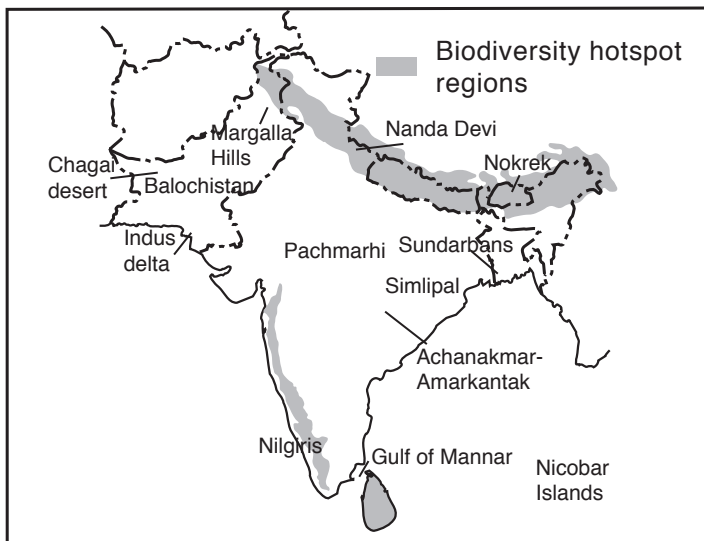
Vegetation types

Wet evergreen and semi-evergreen forest is restricted to the three main regions that have over 2000 mm of rainfall a year. The richest areas in terms of species variety are those with over



Map 26 Natural vegetation

3000 mm. Much of the Sri Lankan Highlands falls within this category, although altitude has an ameliorating effect on climate with a consequent effect on species distribution. Even the Sri Lankan 'Dry Zone' with its pronounced monsoon seasonality of wet and dry is, with the exception of the semi-arid Jaffna Peninsula, within the zone of moist tropical forest. In undisturbed conditions the forest often towers to 50 metres, with some trees reaching 75 metres. The dominant species in the northeast and north of the zone is the sal tree, *Shorea robusta*, while in peninsular India and the Western Ghats teak, *Tectona grandis*, is the most widespread. Both are hard woods. Both species, indigenous to India, spread into the drier areas of the Peninsula, but in drier conditions they become semi- or wholly deciduous during the dry season. Both species have had high economic value. Both are used in construction, sal notably for building, especially door and window frames. Teak's resilience to weathering has made it particularly desirable for outdoor uses. Their range has been greatly reduced by extraction and conversion of forest to agricultural land.



Map 27 Biodiversity 'hotspots'

Global concerns at the loss of biodiverse habitats have increasingly been matched by a widening range of literature on conservation in each of the countries of the region, including reports sponsored by governments, international agencies, and NGOs across South Asia. These reflect the growing desire to take practical action to protect wildlife and its habitat. For example, the International Union for the Conservation of Nature (IUCN), the World Wildlife Fund (WWF) and the Government of Pakistan published a Biodiversity plan for Pakistan (IUCN 2000). The Indian government has established eighteen biosphere reserves, corresponding approximately to the IUCN's Category V Protected Areas. These generally cover wider areas than a single National Park. Nine of the Indian Reserves are part of the World Network of biosphere reserves, which are based on UNESCO's Man and Biosphere (MAB) Programme. Some of the more important designated areas, ranging from the desert environments of western Pakistan, to the mangrove forests of the Sundarbans in India and Bangladesh, are shown on Map 27.

Map 27 shows the two major regions that have been identified as areas with rich biodiversity potentially at risk. In the north the Himalayan ranges in India, Pakistan and Nepal are host to a range of flora and fauna habitats. In the south protected areas include the semi-arid Pachmarhi reserve, noted for its giant and flying squirrels, to the southern slopes of the Western Ghats, where the Nilgiri Hills are home to the Nilgiri tahr and the lion-tailed macaque. Marine environments include the Gulf of Mannar, home to the Dugong, Great Nicobar reserve, with its salt water crocodiles.

The conversion of forest to arable land, and the degradation of forest in the search for fuel wood are common problems across South Asia, including Sri Lanka (Ratnayake et al 2002). The challenges of sustaining biodiversity in Bangladesh have been explored by Ali and Ahmed (in Choudhury et al 2001), while the effectiveness of biodiversity conservation strategies through the establishment of protected areas in Bangladesh have been analysed by Mukul (2007). The FAO's quarterly conservation journal for South and South East Asia, *Tigerpapers*, is a regular forum for the discussion of regional environmental concerns. However, despite the growing interest, the challenges remain daunting.

The Western Ghats, inland of India's west coast, form the second hotspot region within the zone of moist evergreen forest. Even today it is one of the most species-rich regions in

South Asia. The Nilgiri Hills in Tamil Nadu, the third and largest region of moist tropical vegetation, runs from the coastline of Odisha across most of West Bengal and Bangladesh into Assam and India's north eastern hill states. Much of this area has been completely given over to agriculture. True tropical wet evergreen rainforest can still be dense in isolated areas as in parts of Assam.

Tidal forest

The greatest concentration of tidal forests, including mangroves, is found in the coastal districts of Bangladesh and neighbouring Paschimbanga (West Bengal) – the Sundarbans, or 'beautiful forest' – though there are isolated stands of mangroves around the deltas on the Indian coastline. The total area of mangroves along the Indian coastline is just under 7000 km², 7 per cent of the world's total. Estimates of the area of the Sundarbans themselves vary widely. By a wide definition, which would include the freshwater swamps behind the mangrove coastal belt, estimates suggest an area of just over 14,000 km², with a core region of just over 4000 km².

The Sundarbans are still the world's largest and most biodiverse stand of halophytic mangroves in the world and are a World Heritage site. Probably taking their name from the *Sundari* tree, one of the most characteristic species of the freshwater swamps inland of the coastal mangrove belt, the Sundarbans are a unique – and uniquely valuable – environment. They have been managed through government agencies since the mid-nineteenth century and contain species that are still extracted, often illegally, today.

Much of the Sundarban freshwater swamp has, over centuries, been converted to settled agricultural land. Strictly speaking this area is characterised by brackish water whose salinity varies seasonally, being freshened during the monsoon when the major rivers flood and bring new deposits of silt. This area is estimated to be less than a third of that covered 200 years ago.

Dry tropical and sub-tropical vegetation

As a type this ranges from the margins of the moist evergreen through open stands of largely deciduous forest to the open scrub of the drier regions. It is probably the natural vegetation type most affected by human settlement. With a long and very arid dry season, it stretches from southern Tamil Nadu in the south to Himachal Pradesh and parts of Pakistan in the northwest. Acacias and wild date characterise the more arid regions. *Acacia catechu* (*khair* in Hindi) is an important tree for its wide range of products, including *kath*, which is sometimes added to *pan*, the betel vine leaf, areca nut and lime mix chewed as a digestif across South Asia.

Thorn scrub and desert

Human influence is evident through the very widespread introduced species *Prosopis juliflora*. Native to Mexico, this is found on drier land across much of the sub-continent, going by various local names such as *kattu karuval* or *cheemal karuval* in Tamil and *vilyati kihar* in Hindi. Introduced as a drought tolerant thorny fencing plant, it now occupies large areas of otherwise waste land on the margins of cultivable land, providing some economic use as a fuel wood. In 2012 former President of India and leading physicist Abdul Kalam urged scientists to develop the potential of the Jatophra shrub. Able to colonise dry waste land, it has been estimated that Jatophra could yield two tonnes of biodiesel per half hectare at a cost of US50 cents a litre. Kalam estimated that India could produce 60 million tonnes of biofuel from the plant every year (Jaishankar 2012).

Montane vegetation

There are two broad types of montane forest, the wet sub-tropical forests of Sri Lanka and the Western Ghats, discussed above, and the temperate Alpine forests of the Himalaya, from the Hindu Kush in Afghanistan to Bhutan, Arunachal Pradesh and Assam in eastern India.

Precipitation generally increases from west to east across the Himalayan ranges, though there are pronounced local variations. These are particularly striking in the northwest, where south-facing slopes that receive over 1500 mm of rainfall from both the Southwest Monsoon and winter westerly depressions; immediately to their north lies high altitude desert. Natural vegetation responds accordingly. The most densely forested areas in the western ranges include great stands of conifers, notably *Cedrus deodarus*, or the Deodar, and a wide range of other species. Bamboo is widely found and economically important in the east, but there are also extensive areas of grassland, as in the Shillong Plateau. The wet temperate forest to the east of 88°E, roughly from Darjiling eastwards, includes dense stands of oaks, chestnuts and laurels at between 1500 and 3000 metres. In the dry temperate forests of Kashmir, where many areas have less than 1000 mm of precipitation a year, often as snow, conifers thin out into a sparse, xerophytic and desert vegetation.

Economically important tree crops

Bamboo, of which there are many South Asian species, is widespread across the sub-continent. *Dendrocalamus strictus*, the most common species, is economically important as a highly versatile building material and can still be seen as scaffolding for modern high-rise buildings, as well as a roof support for simple huts. Fast growing and reaching full productive potential in four or five years, bamboo is being promoted for a wide range of environmental and commercial benefits. In Assam and Bangladesh bamboo is widely used for paper making, accounting for over two thirds of India's total paper production. In Bangladesh it has been claimed that nearly three quarters of the population live in bamboo houses (Alter 2008).

Palm trees

South Asia's most important commercial palm trees are the coconut, *Cocos nucifera*, the Palmyra, *Borassus flabellifer*, and the Areca palm, *Areca catechu*. Coconut palms are most common in coastal areas of India, especially in the south, and Sri Lanka. They have a wide range of economic uses; two of the products, copra (the flesh of the nut) and coir (the hairy outer layer of the nut), are important exports. The Palmyra palm is common in the south and east of India and Bangladesh. Before prohibition was introduced in Tamil Nadu the Palmyra palm was a major source of toddy – *kallu* in Tamil, an alcoholic drink created from the sap of a palm tree. Today its main use is the production of a form of brown sugar, *gur* or *jaggery*. Areca palms are the source of the areca nut, widely chewed in betel leaves as a digestif across South Asia.

Conclusion

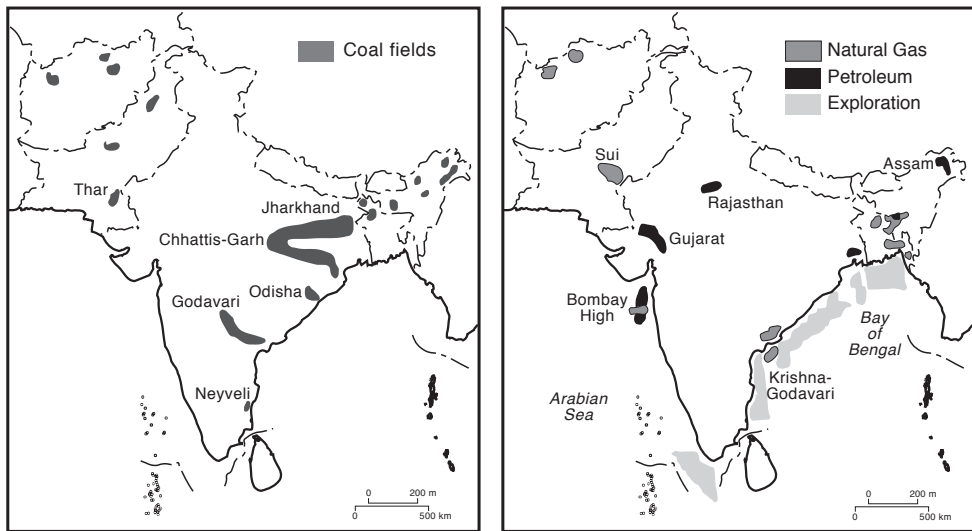
During the last fifty years there has been a sharp rise in global concern about the erosion of natural habitats. In addition to the hazards of wildlife poaching and the devastating effects of historic hunting of wild animals, which continued until very recent times in South Asia, the erosion of plant habitat by the spread of human settlement continues to pose major challenges to conservation.

10 Energy resources

Over the last thirty years every South Asian country has seen a remorseless growth in demand for energy. Fuelled both by population growth and economic development, in most of South Asia the use of a range of energy resources has expanded rapidly. The exceptions are in countries or regions, like Afghanistan or northern Sri Lanka, where conflict has interrupted development. Across South Asia all conventional sources of energy such as coal and gas are widely used, though the mix varies greatly from country to country. Hydroelectricity has been a very important source of energy across most of South Asia for decades, and India and Pakistan have had modest contributions from nuclear power. In the last decade, solar and wind have been added to the energy mix, though their total contribution to date to energy production remains under 2 per cent in India, and even less for the region as a whole. Biomass, especially wood burning and animal dung, is a very important energy source in parts of the region, notably India. According to a UNEP estimate, 'Biofuel consumption is also large for India, but the estimates vary widely. Rough estimates are around 150–250 million tonnes fuelwood, 90–100 million tonnes dungcake and 40–100 million tonnes agricultural residues (Bhattacharya and Mitra 1998). Biofuels, therefore, could be around one half of the total fuel for India. The total biofuel for the entire sub-continent could be anywhere between 300–500 million tonnes as against 300 million tonnes of fossil fuel (1990–91 period) – roughly of the same order' (United Nations Environment Programme –UNEP 2002).

Despite the continuous growth in output from the energy sector, all countries in the region are running energy supply deficits, resulting in frequent blackouts, especially at peak periods. Thus for example, in 2013–14 India's shortfall of electricity at base load was estimated at 6.7 per cent, with 6.2 per cent shortage at peak periods. These figures conceal great regional disparities, with the deficit in South India reaching 26 per cent at peak periods (Ministry of Power, Government of India 2014). In Pakistan the deficit rose above 25 per cent at peak times. All the larger countries of the region are investing heavily in new infrastructure and in exploration both on and off-shore for new energy resources.

Map 28 shows the distribution of fossil fuels - coal, gas and petroleum - across South Asia. There have been significant finds, notably of natural gas in Bangladesh, Pakistan and off-shore India. However, the overall scenario for South Asia's energy resources suggests that without either large-scale discoveries or rapid progress with developing alternative energy supplies, South Asia will be increasingly heavily dependent on energy imports over the coming decades. An indication of the growing demand for imported energy comes from the fact that India imported more than 150 million tonnes of coal in 2013, up 21 per cent from the previous year, and a figure expected to grow to over 170 million tonnes in 2014 (Das 2014).



Map 28 Fossil fuel resources

Source: Government of India, Ministry of Statistics (2014)

India, with current coal reserves of 298 billion tonnes, is thought to have 10 per cent of the world's coal. As a result of continuing exploration, estimated reserves are still rising, despite a rapid increase in coal production. Seven contiguous states are estimated to have 99 per cent of India's total reserves: Jharkhand, Odisha, Chhattisgarh, West Bengal, Andhra Pradesh, Maharashtra and Madhya Pradesh (see Map 3). In addition there are reserves of about 43 billion tonnes of brown coal (lignite), 80 per cent of which is in Tamil Nadu and the remainder in Rajasthan and Gujarat (Government of India, Ministry of Statistics and Implementation 2014).

Coal consumption in India has risen from 116 million tonnes oil equivalent in 1994 to almost 300 million tonnes oil equivalent in 2013. In 2011–12 Indian coal consumption grew by 9.9 per cent (British Petroleum 2013). Although India has large reserves of coal its reserves of high quality coking coal are far more limited. This shortage has contributed to the rapidly rising demand for imports, met largely from Indonesia, South Africa and Australia.

Meeting the rapidly rising demand for energy will present unprecedented technical and political challenges. Pakistan and India have been attempting to build a pipeline to secure imported gas and oil from Iran and Central Asia for over a decade. Such plans were opposed by the United States. However, despite US pressure and their offer to build a liquefied gas terminal, Pakistan and Iran signed a pipeline agreement in Ankara in March 2010, with completion originally scheduled for 2014. The agreement stipulated a sale to Pakistan of 21.2 m³ per day, equaling nearly 20 per cent of Pakistan's existing gas supply. Iran completed its section in 2012, but Pakistan failed to attract investor interest. Originally Pakistan faced steep contractual costs if its section of the pipeline was not completed on schedule. Following the April 2015 visit of the Chinese President to Pakistan, the Wall Street Journal reported that China was funding the project and that work had already begun. When completed, Pakistan intends to use the gas to generate 5000 MW of electricity for its grid.

Meanwhile, India's efforts to speed up its acquisition of nuclear power reactors has run into vociferous domestic political opposition from local communities and NGOs close to sites under

development (BBC 2012). Nonetheless, India currently intends to expand its nuclear generation to 9 per cent of total electricity generation by 2020, compared with the actual share in 2012 of 1 per cent (Government of India, Ministry of Statistics and Implementation 2014). While India and Pakistan have significant solar and wind potential, currently all renewables together contribute 2 per cent of total electricity generated in India. More than half of India's renewable energy is generated by wind power. The potential is concentrated in relatively few and often inaccessible areas. Current plans for realising and integrating it effectively into South Asia's energy mix do not suggest that it will make a major contribution in the next decade.

In 1991 the Pakistan Geological Survey discovered the Thar coalfield in Sindh, with deposits estimated at 185,000 million tonnes, the world's fifth largest. The World Bank funded initial exploration but withdrew from the project in 2009 on the grounds of its policy commitment to investing only in low-carbon technologies. This major project remains on hold, awaiting alternative sources of investment.

India's proven reserves of oil are 758 million tonnes, ranked roughly equal in terms of world resources with Malaysia, Norway and Oman (Index Mundi 2014). Of the other South Asian states only Pakistan and Bangladesh have any proven reserves, both on a very limited scale. None of the other South Asian countries has major petroleum resources. Pakistan is second to India, with known reserves of 0.31 billion barrels, less than the Ukraine and equivalent to the Netherlands. Bangladesh has only 0.03 billion barrels, ranked 76 in the world (US Energy Information Administration 2013).

Of India's crude oil reserves discovered so far, 44 per cent are off the west coast followed by 23 per cent in Assam. Rajasthan and Gujarat have recently been found to have onshore reserves. However, production of oil has remained fairly steady at about 35 million tonnes per annum since 2005–06; net oil imports during this period rose from 99 million tonnes to 184 million tonnes. This translates into a very large import bill.

Pakistan

Pakistan's domestic reserves of oil are located largely in Balochistan, but are a small part of domestic demand. In 2013 domestic crude oil production touched 64,000 barrels a day (approximately 8730 million tonnes of oil equivalent). Imported crude was about three times that figure.

Afghanistan

Afghanistan depends entirely on imports for its crude oil. In 2010 it imported 36,250 barrels a day.

Bangladesh

Oil accounted for only 16 per cent of Bangladesh's energy needs in 2012. In 2013 it produced 4500 barrels a day of crude, while importing 119,000 barrels a day.

Natural gas

Natural gas is a vital resource to India, Pakistan and Bangladesh. The first commercial discovery of natural gas in South Asia was made at Digboi in Assam in 1889.

Much of the production of natural gas in Bangladesh has been privatised. Chevron, which operates three fields, is the largest producer and supplied about 50 per cent of Bangladesh's natural gas in 2014. This included Bangladesh's largest natural gas field, Bibiyana, which was discovered in 1998 and came on stream in 2007. The full scale of gas reserves is unknown, but some estimates suggest that the geology implies there remain very extensive gas reserves to be discovered. Gomes (2013) has argued that both Pakistan and Bangladesh need to put renewed effort into upstream domestic exploration alongside developing a 'coherent import strategy'. She argues, for example, that Bangladesh will need to treble its installed power capacity to 20GW. It will also have to find an extra 8 trillion cubic feet of natural gas if the targeted economic growth of between 4.5 and 6 per cent p.a. is to be achieved by 2030.

India's reserves of natural gas currently stand at 1450 billion m³. 40 per cent of India's natural gas is off the west coast and nearly 30 per cent off the eastern coast. Ongoing research and exploration show significant additional reserves. Bhowmick and Misra (2011) have estimated that only 20 per cent of India's sedimentary basins have been thoroughly explored. There has been a dramatic surge in demand since 1980 in India, Pakistan and Bangladesh, all of which is used domestically. As a result of an aggressive exploration programme over the last decade India now has the largest proven natural gas resources in South Asia, though in per capita terms it is dwarfed by Pakistan and Bangladesh. At the same time, production has lagged behind demand, creating serious shortfalls in energy availability in Bangladesh and Pakistan.

Pakistan's reserves are close behind those of India, though they have been exploited since 1952, more than a decade longer.

Table 11 Natural gas reserves in South Asia 2011

Country	Gas reserves (Billion cu metres)	World rank	Nearest equivalent countries
India	1074	24	Ukraine, Oman
Pakistan	840	27	Azerbaijan, China
Bangladesh	195	46	Israel, Vietnam
Afghanistan	50	66	South Korea, Serbia
Bhutan, Nepal, Sri Lanka, Maldives	0	104	(with 103 other countries)

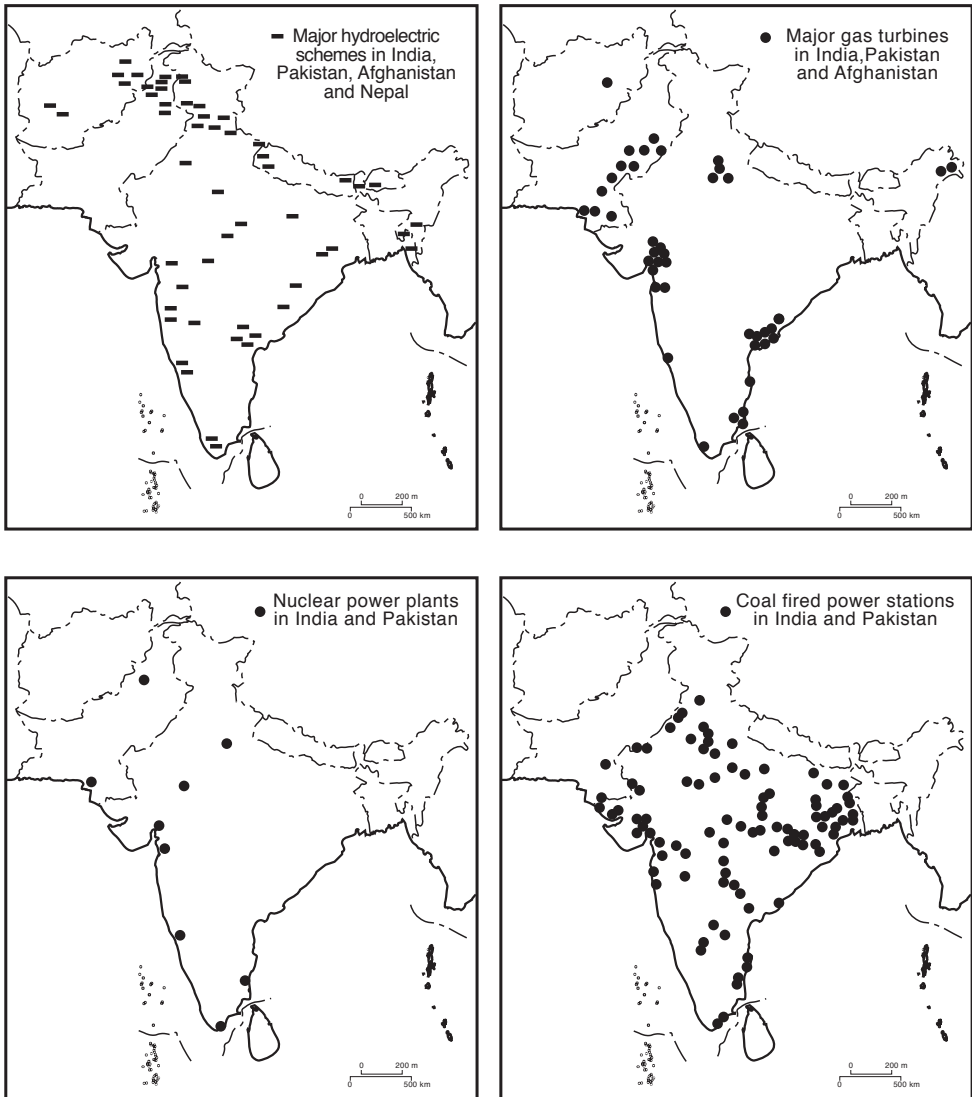
Source: Index Mundi (2014)

Table 13 sets out the trends in production of energy by source in India since 1971. All sectors have seen compound annual growth rates of over 3.85 per cent, with natural gas averaging over 9 per cent. Three quarters of India's natural gas is consumed in the power and fertilizer sectors. Despite the growth in the output of gas, it has been outstripped by demand. Imports in 2011 totalled 439 billion cubic feet. In 2011 India produced 1580 billion cubic feet of natural gas, followed by Pakistan with 1,107 billion cubic feet and Bangladesh with 683 billion cubic feet. They were ranked 13th, 17th and 22nd in the world respectively.

Electricity production

Coal, oil and gas are the major sources of power for electricity generation in South Asia. Their use continues to expand but is augmented by a variety of other sources.

By far the most important of these is hydroelectricity. India's first hydro-power plant, located near Darjiling (Darjeeling), started production in 1897. By the mid-1960s hydro-power provided over half of India's electricity. It has continued to increase, though its share of total electricity generation has fallen to under one quarter, as the other major sources of electricity generation, coal, oil, gas and nuclear, have all grown faster. Tar coal deposits were beginning to be used to generate electricity in 2011. With one of the five leading tar sands deposits in the world, Pakistan believes it has resources adequate to generate 5000 megawatts of electricity.

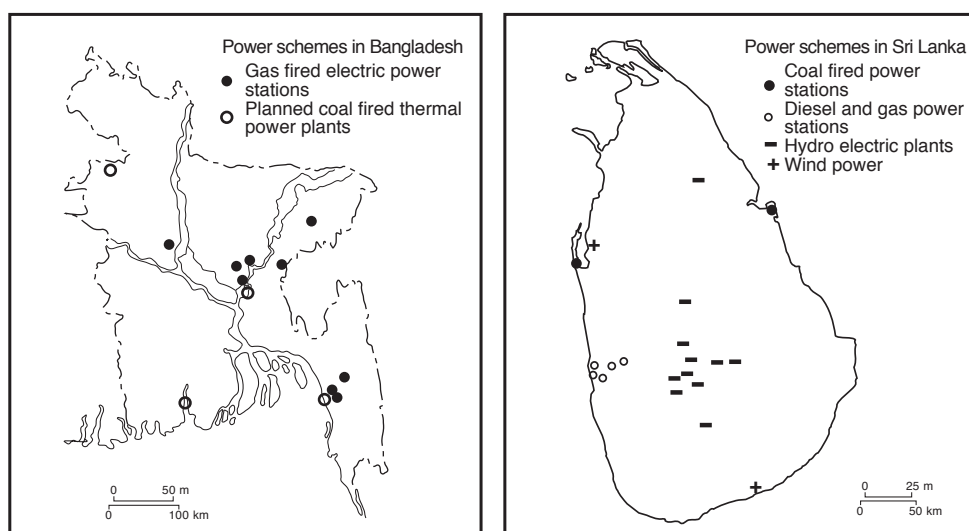


Map 29 Electricity generation by source
Source: Index Mundi (2014)

Table 12 Electricity production (GWh) in South Asia, 2010

Country	Electricity production (GWh)	World rank	Nearest equivalent countries
India	922,000	5	Russia, Canada
Pakistan	90,400	33	Vietnam, UAE
Bangladesh	39,000	55	New Zealand, Denmark
Sri Lanka	9507	90	Zambia, Uruguay
Nepal	3	124	Brunei, Papua New Guinea
Bhutan	2000	131	Malta, Uganda
Afghanistan	754	153	Aruba, Mali
Maldives	169	176	Togo, Grenada

Source: Index Mundi (2014)



Map 30 Power generation schemes in Bangladesh and Sri Lanka

Table 13 Trends in production of energy in India by primary source (in peta joules)

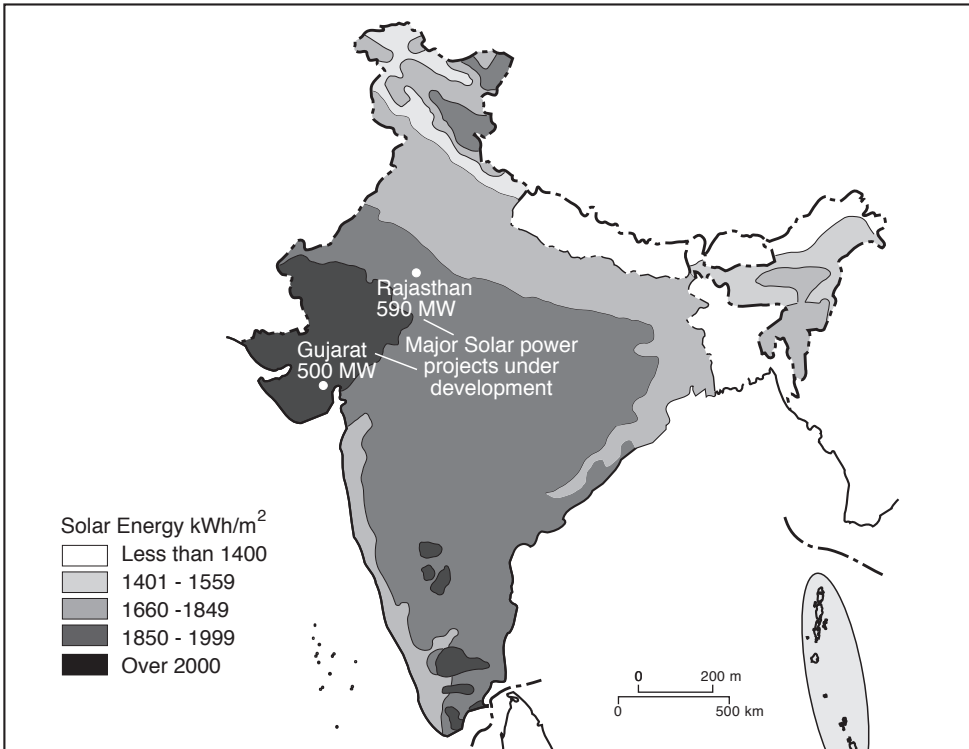
Year	Coal & lignite	Crude petroleum	Natural gas	Electricity (Hydro & Nuclear)	Total
1970-71	1598	286	56	996	2936
1980-81	2493	440	91	1784	4808
1990-91	4063	1383	693	2800	8939
2000-01	5727	1358	1135	3286	11506
2010-11	9207	1579	2012	5059	17857
2012-13	9753	1585	1567	5274	18180
CAGR	4.22	2.05	2.97	2.65	3.44
2005-6 to 2012-13					

Source: Index Mundi (2014)

Renewable and small-scale energy sources

South Asia's sub-tropical location ensures that it has significant incoming solar radiation over relatively even day lengths. At the same time the great majority of the region lies in the path of two major wind systems, the Northeast and Southwest Monsoons, which give some regions high velocity winds for significant parts of the year. India in particular has seen considerable investment going into research and development in generating electricity from solar energy, wind power, small-scale hydro schemes, co-generation bagasse and burning waste.

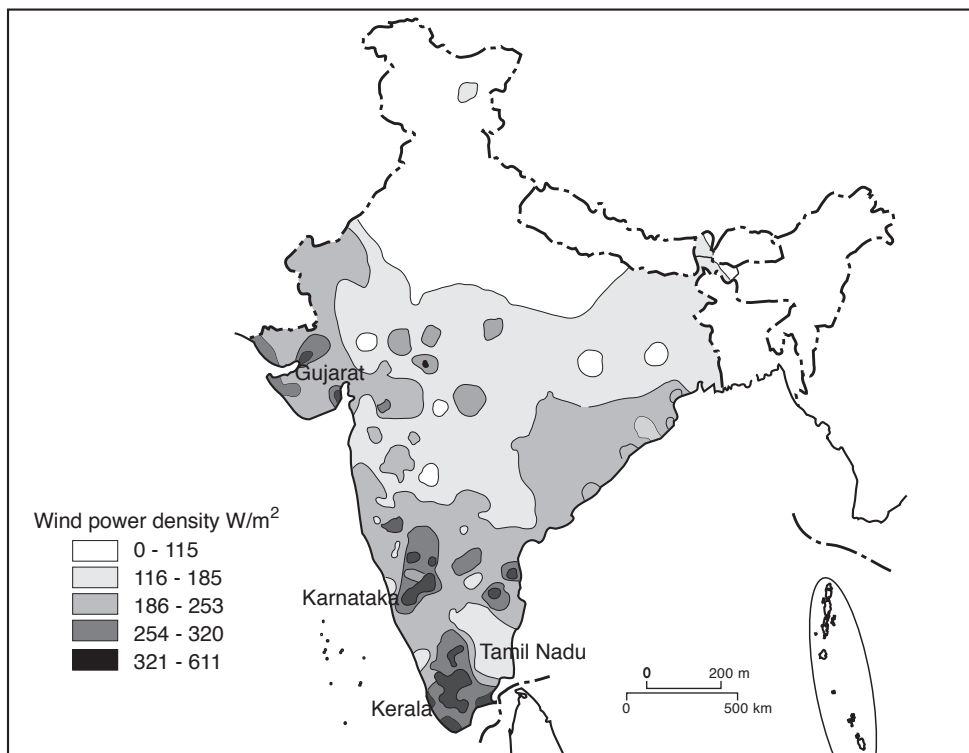
India and Sri Lanka are currently the only two countries in the region to have a measurable supply of energy from these sources. In India the total contribution of all these sources reached 2.2 per cent in 2012 and in Sri Lanka 0.25 per cent. India has now embarked on a 'solar mission'. In 2009 it announced plans to create 20 GW of solar power capacity by 2020, at an estimated cost of US\$ 19 billion. Immediately before the Copenhagen summit, in November 2009, the Indian government announced under its National Action Plan on Climate Change proposals to create 1000 MW (1GW) of solar generation capacity by 2013. This is less than 4 per cent of the hydropower capacity of China's Three Rivers scheme.



Map 31 Sustainable energy sources: solar

Source: This map has been compiled from a variety of government sources, including the Government of India's Ministry of New and Renewable Energy and the World Bank's Global Renewable Energy Mapping Programme (2014).

The area of greatest solar energy potential is in the arid north-west in the states of Rajasthan and Gujarat. This regional distribution reflects the influence of monsoon cloud cover to reduce incoming solar radiation during 4 to 5 months of the monsoon season over much of the rest of the country.



Map 32 Sustainable energy sources: wind

Source: This map has been compiled from a variety of government sources, including the Government of India's Ministry of New and Renewable Energy and the World Bank's Global Renewable Energy Mapping Programme (2014).

Despite the proposals for renewable generation of electricity, the total amounts of electricity generated by renewables (other than hydro) in South Asia are vanishingly small. Even India, the largest producer of renewable energy in the region, achieved only 2 per cent of total energy from renewables in 2012, over half from wind power.

India was fifth in the world's installed wind power generating capacity in 2012, with an installed capacity of 10,945 MW, just under 10 per cent of the world's total wind capacity. Sri Lanka has been estimated to have a potential of 20,000 MW, though to date wind power schemes are making a negligible contribution to total electricity generation across most of South Asia, and electricity generation from wind power fell far short of the theoretical wind-power capacity.

Energy supply is a critical factor in the development challenges of every country in South Asia. Economic development has been slowed by critical shortages, and poor management of existing systems has reduced levels of supply to far below the theoretical installed capacity.

Conclusion

The rapid growth in energy demand over the last two decades has led all the countries of South Asia to increase imports. Coal, oil and gas are all major energy imports, and even countries like Bangladesh, relatively rich in gas, and India, with very large coal deposits, are reaching out to the global market. Despite heightened interest in alternative energy sources, there is no sign yet of their replacing the core fossil fuels as South Asia's major energy source.

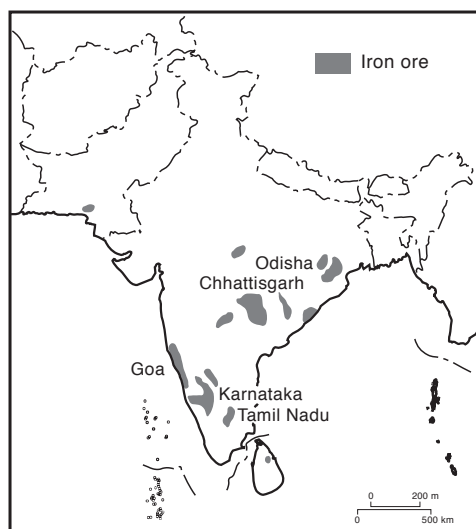
II Non-energy mineral resources

The global demand for mineral resources, coupled with rising domestic demand, is encouraging increasingly active exploration and development. Both political and environmental opposition and bureaucratic obstacles to mineral extraction contribute to what many in South Asia see as a painfully slow rate of discovery and exploitation. Non-energy mineral resources are very unevenly distributed. Bangladesh, Nepal, Bhutan and Maldives have very limited non-energy mineral resources. India, in contrast, has a variety of economically important minerals, some of which have been exploited for several decades. Sri Lanka is rich in gem stones, while Afghanistan's potential is considerable, though as yet little developed. Pakistan has extensive proven reserves of copper, gold, iron ore, limestone and salt, though their total contribution to Pakistan's GDP is only around 2 per cent.

India

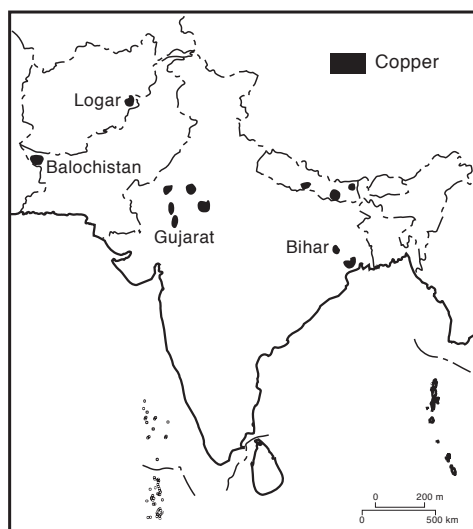
India produces as many as 97 commercial minerals. The most economically important non-energy minerals mined in India are iron ore (ranked 4th in the world in 2013 in terms of production) and bauxite (ranked 6th). However, Indian reserves amount to under 5 per cent of the world's total and are only about one third those of China. Iron ore mining in India has been wracked with scandal, many mines operating and exporting illegally without licences, notably in Karnataka and Goa. In 2011 and 2012 many mines were closed by a court order in an attempt to regularise both mining activity and revenue collection. Given that iron ore accounted for 22 per cent of India's exports in 2010, a great deal is at stake, and on April 21, 2014, the Supreme Court of India lifted the ban on mining in Goa, allowing an annual capacity of 20 million tonnes – just half the earlier excavation rate. After the Supreme Court's verdict Prime Minister Narendra Modi argued that ore mined in India should not be exported. However, in May 2015 the government cut the export duty on iron ore exports. Mining was expected to re-start in late 2015.

Other important minerals include baryte (barite in the US), chromium, limestone and manganese, all in the top ten in terms of global resources. India is in the top eight world producers of aluminium, baryte, bauxite, chromium, iron ore, kyanite, manganese ore, mica sheet, talc and zinc. Non-fuel minerals accounted for nearly 40 per cent of the total value of mineral production in 2010, which in total accounted for nearly 2 per cent of GDP.



Map 33 Iron ore resources

Source: US Geological Survey Minerals Yearbook (2012)



Map 34 Copper resources

Table 14 India's major non-energy mineral resources

Mineral	Proven reserves (mn tonnes)	Quality	Key states
Bauxite	3290	Mainly Gibbsite (relatively cheap to convert to aluminium)	Odisha, Andhra Pradesh, Maharashtra
Copper	1,34	Low 1.2% Copper content, world av. 2–3%	Rajasthan, MP, Jharkhand
Iron ore	25,249	Good. Metal content 60%, world av. 40%	Jharkhand, Chhattisgarh, Odisha, Karnataka
Lead-zinc ore	671	Good (Metal content 8–10%, world av. 5%)	Rajasthan
Manganese	379	Medium. Metal content 35%	Odisha
Chrome ore	66	Good. 40%–50%	Odisha

Source: Kuo, C. S. USGS Minerals Yearbook (2012)

Exploration

Mineral exploration remains relatively slow. This reflects the multiple administrative obstacles to obtaining licences and managing effective resource extraction and an increasingly hostile political environment with respect to mineral extraction. In some contexts, notably bauxite exploration and mining in Odisha, the strong political opposition of tribal groups, supported by both local and international environmental NGOs, has slowed the exploitation of mineral resources. The bauxite mines of the government-owned National Aluminium Company (NALCO), with a bauxite production capacity of nearly 5 million tonnes per year, were temporarily closed down by the action of Naxalite/Maoist rebels in 2009.

In 2009 the Odisha State government instructed sixty-nine illegally operated mines in the state to close and suspended nearly 500 more licences of mine operators for mining outside their permitted leases. Since the early 2000s there has been increasingly vocal opposition to the activities of mining groups and companies that have frequently been found to be operating illegally, some with severe environmental and social consequences for those who live in the area. In January 2014 the Government of India's Environment Ministry rejected a proposal from the British-owned Vedanta Resources to mine bauxite from a hill sacred to tribal communities. Its aluminium refinery at Lanjigarh, in Kalahandi District of Odisha, has also been unable to operate due to the shortage of bauxite. The State Government of Odisha called the decision 'unfortunate', and promised to find alternative supplies for Vedanta to mine (Economic Times 2014).

In September 2012 a Government inquiry into Goa's iron ore industry under the retired judge M B Shah ordered the closure of all Goa's iron ore mines until their legality had been assured. The Shah inquiry claimed that illegal operations had cost \$6 billion over a five-year period (BBC 2014). The Supreme Court closed down the mines, which were mining 40 million tonnes of ore every year, in September 2012. That also spelled the end of nearly 100,000 jobs either directly or indirectly tied to the iron ore mining industry. The Supreme Court lifted the ban on May 1, 2014, but introduced a cap of 20 million tonnes on production. With shrinking markets, the future for the industry looks uncertain.

In recent years the Indian courts have been increasingly pro-active in trying to prevent such abuses, but with high profit margins the incentives for illegal extraction remain high. In 2006 the Government of India introduced a bill to address the difficulties in the path of rapid but legal mining exploration and development. In 2009 it offered for sale a 10 per cent stake in the nationally owned National Mineral Development Corporation Ltd, a divestment concluded in 2010.

Minerals make an important contribution to India's exports, with a total value in 2009 of nearly \$24 billion. Dolomite, a double carbonate of calcium and magnesium, is an important component in industries such as the manufacture of iron and steel, fertilisers, bricks, ceramic tiles and glass. In India refractory grade dolomite is used in steel mills across the country. Cut diamonds accounted for two thirds of the total, iron ore 20 per cent, granite 4 per cent and alumina 1.5 per cent. In contrast the total value of mineral imports was \$111 billion. Of these petroleum comprised over 67 per cent, uncut diamonds nearly 15 per cent, coal 8 per cent, copper ore and concentrates over 3 per cent and natural gas 2.5 per cent. Thus over three-quarters of mineral imports were raw energy materials. The global recession has had a significant negative impact on the diamond trade, though trade in other raw materials has been much less affected.

The government continues to have a major ownership stake in many aspects of mineral exploitation, though since 1991 there has been increasingly wide participation by both Indian private companies and foreign investors. Tata (the industrial giant that opened the first iron and steel mill in India in 1908), the Birla group and a number of other companies have invested in mining and production of a range of key minerals.

Pakistan

The total value of minerals in the Pakistan economy amounted to only 2.5 per cent in 2010. Development of proven resources has often lagged behind planned growth. The most recent example is that of the world's largest gold and copper mine at Reko Diq, in the Chagai hills of Balochistan close to the Afghan border. While the main licence contract was signed by the Government of Balochistan (25 per cent), the Chilean company Antofagasta Minerals

(37.5 per cent) and Canada's Barrick Minerals (37.5 per cent), this contract and others involving Australia's Tethyan Copper Company were cancelled by the Baloch Government in 2010. There was strong local opposition to the international deal; many foresaw a resulting stripping of a major resource with too little local return.

Baryte, another important mineral, is used as a weighting material in oil and gas drilling. Production of has been between 45,000 million tonnes and 60,000 million tonnes between 2006 and 2010.

Afghanistan

Afghanistan has a wide range of valuable minerals, though many are indicated rather than proven. In addition to precious and semi-precious stones, such as emerald, lapis lazuli, ruby and garnet, copper, coal, iron ore and lead represent just part of the potential. Former President Karzai claimed in 2013 that Afghanistan's mineral resources were worth \$30 trillion, though experts put the true total at perhaps one tenth of that figure (Mehrota 2013).

Sri Lanka

Sri Lanka has long been noted for its precious and semi-precious gemstones, largely found in alluvial deposits in the Ratnapura District in the southwest of the island. In November 2013 the *Financial Times* reported that Sri Lanka was planning to increase the value of its gem exports to \$1 billion by 2016. 85 per cent of current exports are accounted for by sapphires, exporting 330,000 carats in 2012 with a value of over \$50 million. The gem stone industry is reported to employ 600,000 people (Adler 2013).

Conclusion

Non-energy minerals play a significant part in the economy of the South Asian region, but despite the importance of iron ore, copper and in Sri Lanka gemstones, South Asia's non-energy resources do not compare with some of the leading countries in the world.

Section C

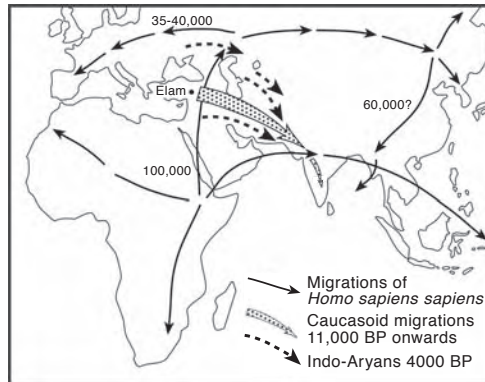
The historical background

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12 The settlement history of South Asia

The peoples of modern South Asia bear abundant evidence of the migration of modern humans, *Homo sapiens sapiens*, from their original home in Africa more than 100,000 years ago. Recent research on blood groups and genetics has confirmed the broad picture of successive waves of human settlement out of Africa. This was first hypothesised by anthropologists more than a hundred years ago, but recent genetic research, coupled with new archaeological discoveries and radiometric dating techniques continue to shed new light on the processes that have shaped the origins of settlement in South Asia. Ideological beliefs have informed the study of the origins of South Asian peoples and societies since the first European Orientalist scholars in the eighteenth and nineteenth centuries. The advent of nationalist schools of historiography in contemporary South Asia is evidence of the continuing power of political ideologies in the study of ethnic and cultural origins.

The complex patterns of movement that are now understood to have taken place show that South Asia has been both a destination and a route of passage between Africa, the East and Australasia.



Map 35 The spread of *Homo sapiens sapiens* from Africa

Some of the patterns of movement indicated in Map 35 are still controversial. Furthermore, recent blood group analysis suggests that earlier anthropological categories such as 'Caucasian' and 'Australoid' are not as clear-cut as the terms might imply. However, it is clear that the majority of South Asia's peoples have come from areas to the northwest of the sub-continent. Subsidiary movements of Mongoloid peoples, for example, entered South Asia through the Himalayan passes of the northeast, and even through South East Asia.

By 40,000 years ago human settlement had spread into East Asia and had reached Australia – though some scholars argue for a much earlier date. Genetic research published in

2009 by Raghavendra Rao of the Indian Anthropological Survey suggested a direct genetic link between tribal populations of eastern India and Australian aborigines going back 45,000 years. Some suggest that the earliest migrants followed a coastal route through South Asia and South East Asia, though evidence remains scanty (Kumar et al 2009).

There followed a series of successive migrations. The Brahuis of Balochistan are a remnant of Dravidian settlers who spread across the whole of India, probably at least 6000 years ago. In modern South Asia the Dravidian populations are largely restricted to the southern states of India. The Indo-Aryans, who followed them from the northwest about 4000 years ago, now form the overwhelming majority of the North Indian population. However, the broad categorisation of migrants who have populated modern South Asia – aboriginal tribes (known in India as *adivasis*), Dravidian and Indo-Aryan groups – fails to do justice to the enormous complexity and diversity of South Asia's society. Nor does it recognise the degree to which, despite long periods in which social custom restricted inter-marriage between major caste groups, inter-mixing has in fact taken place.

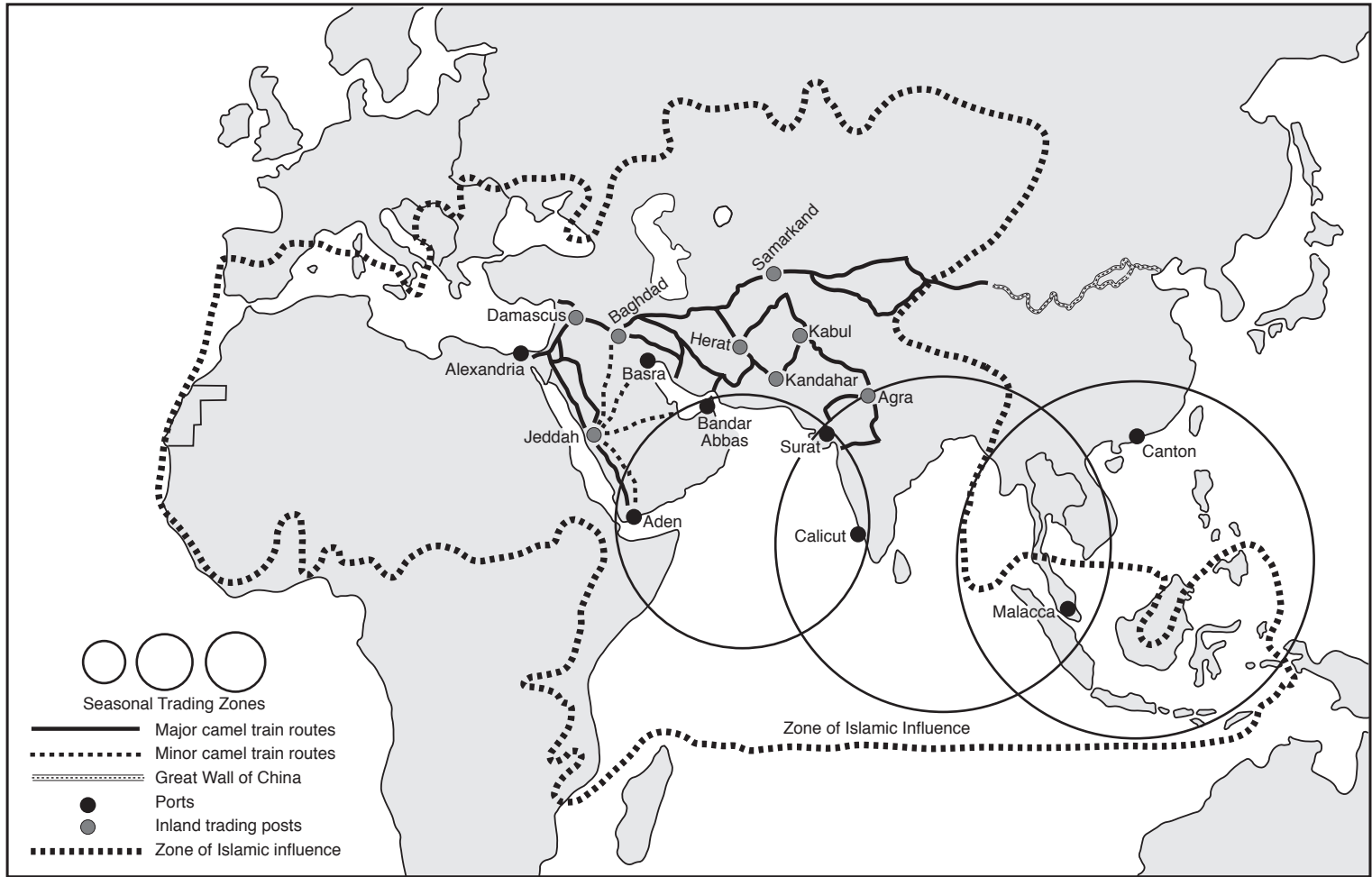
Today, there are clear genetic markers that link contemporary Indian populations with those outside the region, as between some South Indian groups and populations in Mesopotamia, for example. However, all notions of ethnic or racial purity have been ruled out by genetic research, which shows continuous inter-mixing of populations. Furthermore, in genetic terms both the Indo-Aryan and Dravidian ancestry in South Asia can be traced back over 4000 years.

There is abundant archaeological evidence of the cultural evolution that characterised South Asia from the Paleolithic to the Neolithic period and onward. The earliest cave paintings in India, at Bhimbetka in Madhya Pradesh, have paintings going back to approximately 30,000 BP, though the caves may have been occupied by *Homo erectus* ancestors over 100,000 years ago. Excavations by Jean-François and Catherine Jarrige at Mehrgarh, in modern Balochistan, have shown that by 7000 BCE, wheat and barley were being cultivated, and cattle, sheep and goats had been domesticated. A continuous sequence of houses has been excavated from that early period right up to the rise of the Indus Valley Civilisation, a complex urban culture with great cities at Moenjo Daro, Harappa and elsewhere on the Indus plains. These flourished between approximately 2500 BCE and 2000 BCE. While the many seals that have been discovered testify to the existence of writing, the script has yet to be deciphered.

The earliest decipherable script in South Asia, the Brahmi script, was long thought to date back to the rock inscriptions of the Emperor Ashoka, who reigned from 269 to 231 BCE. However, inscribed pottery shards found at Anuradhapura in northern Sri Lanka, and the Adichanallur burial urns found in modern Tamil Nadu, have pushed these dates back to the fifth and sixth century BCE, respectively. A large number of sites have revealed the indigenous evolution of South Asian cultures from Palaeolithic periods through the Iron Age.

By the time the Muslims arrived, first in the eighth century by sea on the Sindh coastline, and then from the eleventh century through the passes of Afghanistan, much of South Asia was already relatively densely populated. The Indo-Gangetic plains had long been the primary focus of both settlement and cultural development, but the coastal deltas of the east coast, from the Mahanadi in the north to the Kaveri in the south, had developed their own rich diversity of indigenously moulded cultures.

In contrast to the densely populated coastal fringes of the sub-continent, much of the interior remained relatively sparsely populated until modern times. In much of the northwest population densities were kept low by the aridity of the climate. In contrast, dense forests inhibited the spread of settled agriculture in much of central and eastern India. These remained refuges for some of the earliest hunter-gatherer tribes of the sub-continent.



Map 36 Pre-colonial trading patterns in the Indian Ocean region
 After: Chaudhuri, K. N. (1985)

When Vasco da Gama landed near Calicut (modern Kozhikode) in 1498, inaugurating the era of European colonialism, South Asia and the Indian Ocean were an integrated trading region. They had long established links to the Mediterranean and to China. As Map 36 shows, the Muslim world now stretched from West Africa to Mongolia, south to Indonesia and back to the south-eastern coast of Africa. Muslims took control of land and sea trade routes previously exploited by the pre-Muslim Arabs, and used before that by the Romans of the Mediterranean world. The camel trains took goods along the Great Silk Route from the Mediterranean coast to China. At a series of ports around the Arabian Peninsula and the Persian Gulf, such as Jiddah, Aden, Basra and Bandar Abbas and Surat and Calicut in India, the land routes from central and eastern Asia met the coastal trade routes that linked Africa and the eastern seaboard of China via the Straits of Malacca.

Muslims had spread their political control to large parts of northern South Asia after the second battle of Tarain in 1192. Until the expansion of Mughal power through the sixteenth and seventeenth centuries, however, Muslim populations remained concentrated in two regions of the sub-continent. Muslim Arab trading routes down the Indian and Sri Lankan coasts, including the islands of the Maldive chain, saw the growth of Muslim populations among the Hindu (or Buddhist in Sri Lanka) mainstream. Maldives saw a wholesale conversion to Islam in the twelfth century, but in mainland South Asia Muslims generally remained in the minority. The exceptions were in the northwest. Afghanistan and much of the Indus Valley had large Muslim populations by the end of the twelfth century in many areas forming a majority.

Under the influence first of the Delhi Sultanate and then of the Mughals, Islam moved across the North Indian Plains as far as East Bengal. There, Muslim *pirs*, or holy men, were responsible for large-scale conversions, especially of low caste Hindus. By 1707, under the Emperor Aurangzeb, Mughal power had reached its maximum geographical extent. Through this period, Mughal rulers had imported small numbers of administrators for court service, mainly from Persia. Concentrated in the towns of the Mughal Empire, particularly across the northern plains from Lahore through Delhi and Agra to Lucknow and Allahabad, by 1707 Muslims still only formed a majority of the population in the plains of the Indus and the Bengal delta. However, Muslims lived right across the sub-continent, though rarely forming more than 20 per cent of the total population. The geographical distribution of South Asia's Muslims was to have a profound effect on the post-Independence future of the sub-continent, outlined in Chapter 14.

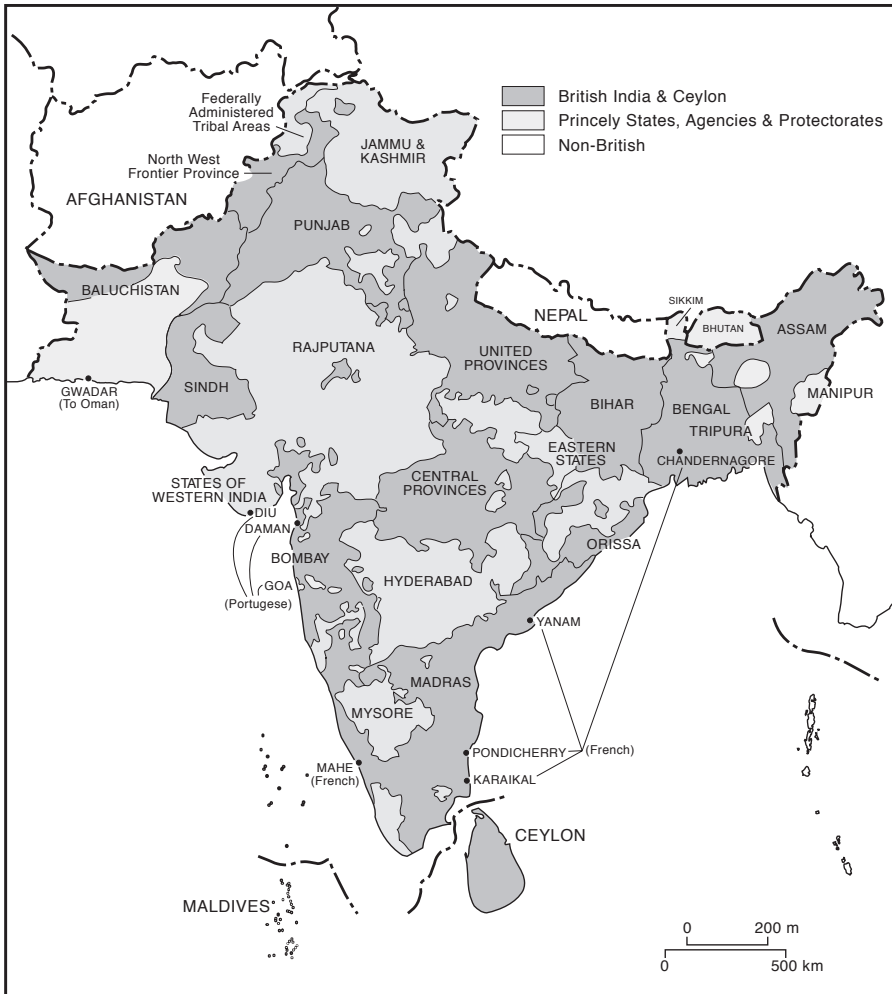
By 1707 two forces challenged and ultimately ended Mughal rule. The Hindu Mahrattas under Shivaji (1627–1680), who is still an iconic figure in Maharashtra, became a serious challenge to the Mughals in central and northern India. The British East India Company, expanding at the end of the eighteenth century from the coastal ports of Madras, Calcutta and Bombay, also threatened the Mughal monopoly on power. The disintegration of Mughal power and the formation of numerous states, often small and weak and looking for outside help in the struggle to survive, opened the doors to the rapid expansion of East India Company power at the very start of the nineteenth century. British maritime power had long replaced Portuguese and French competition, and in contrast to both their major European competitors, the British sought to extend both trade and political control to the interior. Thus began the transformation of the South Asian economy and of its political structures, laying the foundations of its contemporary geopolitical character.

Conclusion

The diverse origins of South Asia's peoples is evident, not just in the genetic markers that have been laid down through centuries of migration but also in the multilingual nature of the peoples of the sub-continent. The origins of South Asia's peoples have come to play a significant part in contemporary political debate, notably in India, a debate in which ideology and myth-making often override objective evidence. Yet despite the many unanswered scientific questions, the broad lineaments of South Asian settlement are now clear.

13 British and Princely India at Independence

The current geopolitical character of modern South Asia was forged out of its pre-Independence demography, its religious geography and the political structures left in place at the end of British colonial rule. At Independence in 1947, South Asia was one of the most densely populated



Map 37 The political divisions of India in 1947
After: Schwartzberg, J. E. (1978)

regions in the world. However, population was very unevenly spread, from the very lightly inhabited desert regions of the northwest to the extremely densely settled deltas of the east and south. The diverse demography was mapped onto political systems that had all been shaped by the ways in which British colonial rule expanded over territories that had had centuries of successive Hindu and Muslim rulers. From the late eighteenth century, the East India Company, succeeded from 1858 by the British Raj, gave a wholly new shape to South Asia's political landscape.

Geographically, the British drew a distinction between what they treated as the core of South Asia and its periphery. By 1858, when following the 1857 uprising in north India the British created the Indian Empire – the 'Raj' – the whole of mainland South Asia, bordered by the foothills of the Himalaya to the north and the Indian Ocean to the south, was under either direct British rule or the rule of Princes who had signed treaties acknowledging the suzerainty of the British Crown.

The pattern of political power to which this gave rise is represented in the snapshot of the political structure of South Asia at Independence shown in Map 37. It shows a political geography of governance that had evolved dramatically over the preceding centuries, but which had been frozen in the latter stages of British Imperial rule. Surrounding the core region of British and Princely India the British were ultimately content to leave a peripheral buffer – Afghanistan, Nepal and Tibet, and Bhutan – between their own imperial territory and that of potential or actual competitors.

The South Asian heartland

The core of mainland South Asia today comprises four independent countries: India at the centre, Pakistan to its northwest, Nepal to the north and Bangladesh in the northeast. Yet there is nothing in the pre-Independence geopolitical history of the sub-continent to suggest that such a formation of states was either inevitable or even likely. The imminence of Independence in the early 1940s raised the question of the basis on which independent statehood would be sought and achieved. The answer to that question, which emerged in 1947, would have been wholly unexpected only a decade earlier. Yet by 1947 both the British Government and the Indian National Congress (Congress for short) reluctantly accepted that those contiguous territories of British India (though not Princely India) in which Muslims predominated would be given a state of their own. This decision meant the creation of boundaries largely new to British India.

What differentiated the political territory of British India was the division, caused as much by historical accident as by direct British policy, between British India and Princely India (shaded dark and light grey respectively in Map 37). The Provinces and Presidencies of British India were interspersed with a patchwork of over 550 Princely States. These ranged in size from the Nizam of Hyderabad's territories in South India, roughly coterminous with the modern state of Telangana and approximately the size of France, to states considerably smaller than a county in the US.

Geographically, many of the Indian Princely States were not contiguous. The largest concentration of such states, Rajputana (which overlaps with much of modern Rajasthan), contained many, and were dominated by a few large, predominantly desert states, such as Jaipur, Udaipur, Jodhpur and Bikaner. Rajputana was surrounded by territories directly ruled by the British: Sindh, Punjab, United Provinces, Central Provinces and Bombay Presidency. Similarly Hyderabad was largely surrounded by Central Provinces, Madras Presidency and Bombay Presidency.

The incorporation of Indian states into British India took place by the process of expansion from each of the three ports that had been established initially as small centres, trading

under licence from local rulers, Madras (1639), Bombay (1668) and Calcutta (1690). After the Battle of Plassey in 1757, the East India Company pushed northwestwards from Calcutta up the Ganga plains towards Delhi. In the south the British feared competition from the French. Lord Wellesley's victory over Tipu Sultan and his French allies in Mysore in 1799, supported by the Nizam of Hyderabad's forces, opened the door for the future Duke of Wellington to take control of much of central India during the following decade. It also illustrated how alliances were forged on the basis of local self-interest rather than any sense of ideological or nationalist principle.

Princes who were willing to accept British control of foreign policy and to support the British presence were rewarded with a large measure of autonomy over their internal affairs. The Princely States themselves varied widely in their social, economic and political mix. Most were Hindu majority states led by Hindu Princes. However, some of the largest, including Hyderabad and Jammu and Kashmir, did not conform to type. Hyderabad had a Muslim Nawab but an overwhelmingly Hindu majority population. In contrast the people of Jammu and Kashmir, approximately three quarters of whom were Muslim, were ruled over by a Hindu Maharajah.

At Independence the answers to two questions dictated the ultimate patterns of governance of an independent South Asia: On what geographical basis would British India be divided between the two newly created states of India and Pakistan? And what options would be available to, and taken up by, the Princely States?

Mohammad Ali Jinnah hoped that the division of British India would ensure that all Muslim majority Provinces would be given to Pakistan. This would have given Pakistan the whole of Punjab and Bengal, including both Delhi and Calcutta. He anticipated that Assam, the Muslim-majority Princely State of Jammu and Kashmir, and Muslim-led (though Muslim-minority) Hyderabad would follow suit. He also nearly succeeded in persuading the Maharajah of Jodhpur to accede to Pakistan. Had all of these expectations been met, Pakistan and India would have had approximately equal resources and populations.

In fact the new boundaries between India and Pakistan were created at a district rather than a Provincial level. This resulted in the division of Punjab in the northwest and Bengal in the northeast into two, greatly reducing the area under Pakistani rule. Pakistan itself was divided between its eastern and western wings, separated by nearly 1000 miles of Indian territory. The results of Partition caused wounds that have continued to fester in the South Asian body politic ever since.

The South Asian periphery

From the late nineteenth century the continental periphery of British India – the mountainous region of the Hindu Kush and the Himalayan ranges – had been left by the British as a buffer zone between British India and potential competitors. The most notable of these were the Russian Empire and China to the north.

Afghanistan, Nepal and Tibet, the Princely states of Sikkim and Bhutan and the Crown Colony of Sri Lanka all had much in common with the core of the South Asian mainland. Yet all the Himalayan states were ultimately left outside direct British control, while small Princely States such as Bhutan and Sikkim received British protection in exchange for a measure of autonomy over domestic policy.

Further east, Britain extended its control over Burma in stages after three Anglo-Burmese wars. In 1824 the Arakan and Tenasserim were annexed from Burmese territory following the first Anglo-Burmese War and added to the territory of British Indian administration. Lower Burma was added after the Second Anglo-Burmese War of 1852, and Upper Burma was added

as a result of the Third War in 1885. In 1886 Burma was made a province of British India and was governed as part of British India until 1937, when the British began to administer it independently of British India. It finally achieved its Independence after the Second World War and its occupation by the Imperial Japanese army on January 4, 1948, and since that time has been regarded as a part of the South East Asian region rather than part of South Asia.

To the south, in 1795 the British took control of coastal Ceylon from the Dutch, who had evicted the Portuguese in the early decades of the seventeenth century. Ceylon was made a British Crown Colony in 1815, and two years later the British defeated the last King of Kandy to take control of the island, establishing European control over the whole island for the first time.

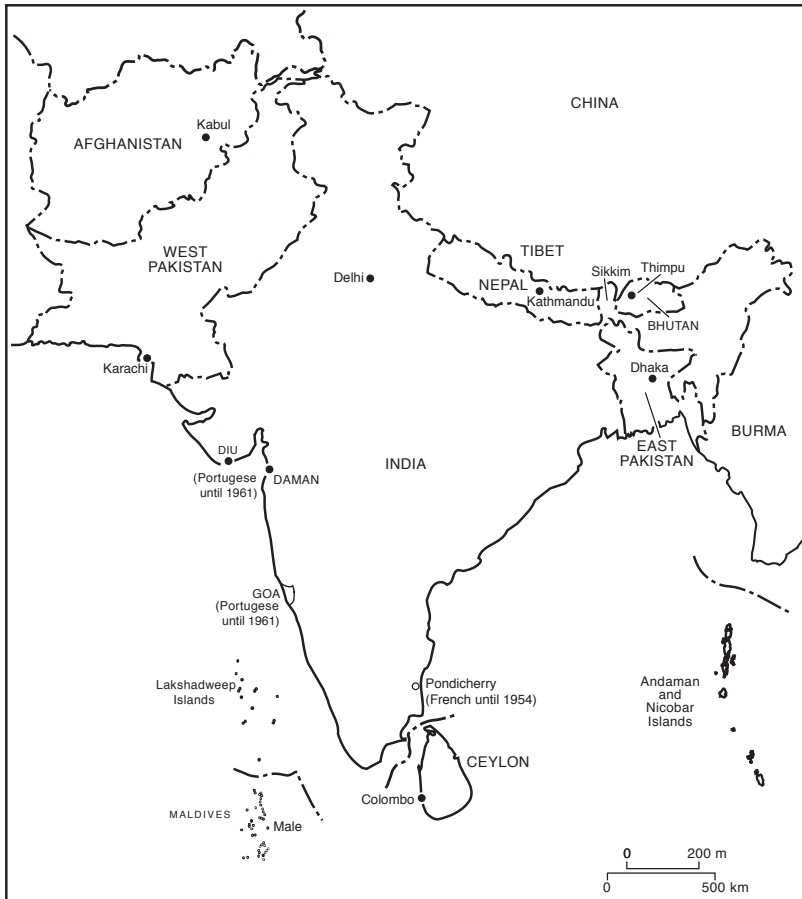
Outlying islands such as the Andaman and Nicobar Islands and the Laccadive Islands (re-named the Lakshadweep Islands after Indian Independence), were administered directly as part of British India. An exception was Maldives, which had enjoyed largely uninterrupted independence for over five centuries, with the exception of very brief periods of Portuguese and Dutch rule. The growing strategic importance of the Indian Ocean as a zone of British influence led the British to make the islands a British Protectorate from 1887 until 1965.

Conclusion

The territorial structures of British colonial power, which themselves were the result of a piecemeal incorporation of pre-existing indigenous states in the eighteenth and nineteenth centuries, had a profound impact on post-colonial South Asia. The states that currently make up South Asia owe their modern territorial form to two factors. On the one hand, most of the external boundaries of South Asia with its neighbours were settled by treaty between the British and the regional powers of the nineteenth century: Persia, Russia and China. On the other hand, the internal borders of the South Asian states were largely the result of the 1947 Independence settlement, some of whose ambiguities remain a source of contention today.

I4 Partition and the newly independent states of South Asia

The boundaries of the South Asian region have been fluid in the past and remain subject to dispute. However, the core identity of modern South Asia as a geopolitical region is clear, even while its internal dynamics have undergone great stresses and far-reaching changes since the dissolution of the British Indian Empire in 1947, when India and Pakistan became independent and 1948 when Ceylon followed suit.



Map 38 The post-Independence states of South Asia, 1947–48
After: Schwartzberg, J. E. (1978)

The Partition of British India

The territorial character of each of the South Asian states has followed its own trajectory since the British relinquished their hold on their Empire in 1947–48. The peripheral states of contemporary South Asia – Afghanistan, Nepal and Bhutan and the two island states of Sri Lanka and Maldives – retained the territories with which they had long been identified. Their boundaries had been defined either by their coastlines or by territorial treaties and agreements between themselves and the imperial powers of Britain and Russia. Some of these stretched back over more than a century.

In 1947–48 the largest area of uncertainty with respect to the external boundaries of the South Asian countries lay on the borders of what had been British India and Nepal with China. Over the fifty years before Indian Independence a series of boundary agreements had been reached between Britain and Tibet and pre-Revolutionary China (see Chapter 23). Stretching from the northern reaches of Jammu and Kashmir to the eastern borderlands of Assam, agreements made between their predecessor governments in China and Tibet and the British were not recognised by the government of the People's Republic of China. In the 1950s it became clear that there were wide differences of view between the PRC government and India over where the boundary through the Himalaya ran. In the west China built a highway through the Aksai Chin, well inside India's territory as defined by Treaty at the start of the twentieth century. In deserted mountainous terrain over 7000 metres high, India did not discover that the road was in use until 1957, when its completion was announced in the Chinese press. At the same time the Chinese claimed territory in the eastern sector that lay well within what India believed to be its own territory. The India-China border remains actively disputed to this day.

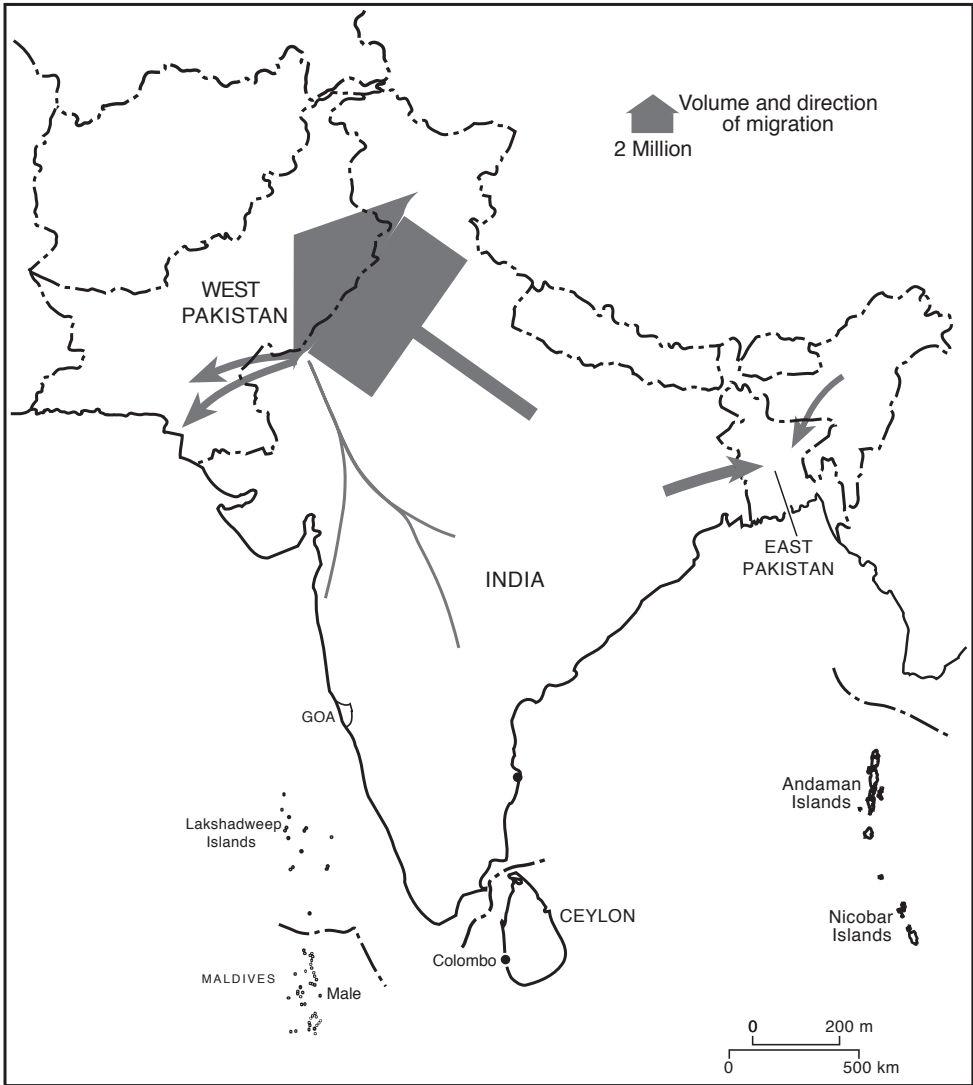
Despite the ongoing significance of these border uncertainties, by far the most important geopolitical result of the Independence process was the ultimate shape of the two states that emerged from Partition, India and Pakistan. The demands of the Muslim League for a homeland for India's Muslims were always incompatible with the wish of the Indian National Congress that Britain should leave India as a single, undivided and sovereign nation. The Two Nation theory, on which Muslim League claims were predicated, held that India's Muslims and Hindus represented two distinct nations, which in an era of self-determination and identity politics gave Muslims a fundamental right to a separate state of their own. The Indian National Congress viewed India's multi-faith, multi-linguistic and multi-cultural fabric as incompatible with anything other than a secular polity in which none of India's distinctive groups would have exclusive or privileged political rights.

For the Muslim League, given the scatter of Muslim populations across India, the challenge was to define a territory that could legitimately be called a Muslim homeland. Sir Cyril Radcliffe, a British judge, was appointed by the government to define the Partition boundaries. Using Census of India data, his solution was to draw on a map a line separating those districts with a Muslim majority and which were contiguous with each other. In principle these were to be awarded to Pakistan. Districts with a non-Muslim majority were to be awarded to India. The choice of the district as the territorial unit of allocation, rather than the much larger province, had crucial effects. While the provinces of both the Punjab and Bengal had Muslim majorities, the eastern districts of Punjab and the western districts of Bengal had non-Muslim majorities. The choice of the district as the geographical unit of allocation significantly reduced the area that was ultimately awarded to Pakistan.

At Muhammad Ali Jinnah's insistence, India's Princes would be given the right to accede to either Pakistan or India (though not to become independent themselves). Jawaharlal Nehru's preferred option was for accession to be decided by a plebiscite of the peoples of each state. In the end, the decision to leave the choice to the Princes was to have perverse effects and produced the opposite result from that for which Jinnah had hoped. In Jammu and Kashmir, after two months of prevarication, the Hindu Maharajah Hari Singh, facing imminent overthrow by

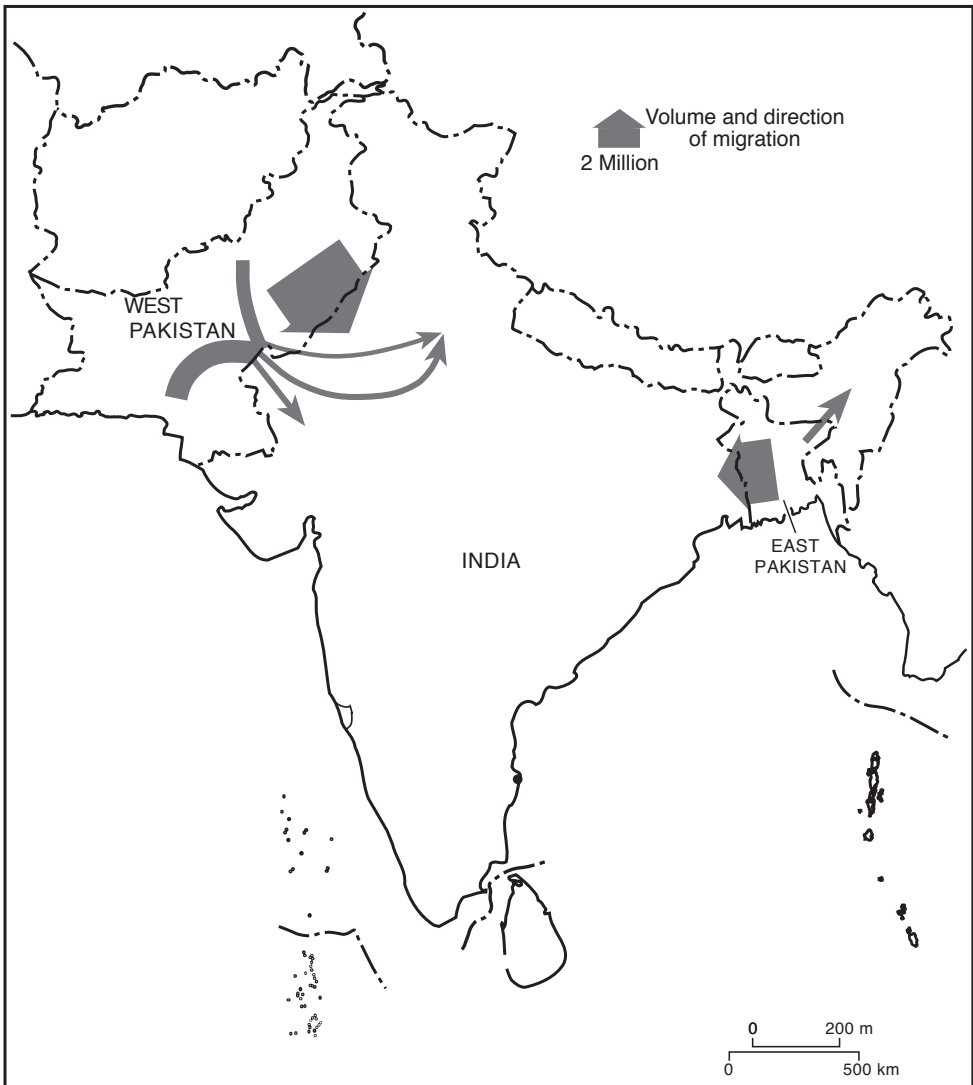
rebellious tribal militia from the northwest frontier, pleaded for Indian military help and acceded to India. In the south, the Nizam of Hyderabad also failed to accede to Pakistan, and having toyed with Independence in 1949 he was removed from power by what the Indian Government termed a ‘police action’. Jinnah’s attempts to persuade the Maharajah of Jodhpur to accede to Pakistan also failed, leaving Jinnah with what he was to call a ‘moth-eaten Pakistan’. To add insult to injury, the small Muslim-ruled Princely State of Junagadh, with 95 per cent of its population Hindu and no contiguous border with Pakistan, was forced to withdraw the Nawab’s accession to Pakistan and submit to an Indian-imposed referendum. This overwhelmingly favoured accession to India.

Partition: The aftermath



Map 39 Refugee migration from India to Pakistan, 1947–48
 Data source: Schwartzberg, J. E. (1978)

The immediate effects of Partition were traumatic. More than 14 million people fled. Approximately equal numbers of Muslims moved to Pakistan, predominantly West Pakistan, as Hindus and Sikhs fled in the other direction. Over 1 million people were massacred. The great majority of the movement took place over relatively short distances across the border (Map 39 and Map 40). Muslims moved from the major cities where they had often been a very significant presence, like the old Mughal capitals of Delhi and Agra. They also moved from smaller industrial towns like Ludhiana and the cities of the central plains of the United Provinces, Allahabad, Kanpur and Lucknow, from which much of the support for the creation of Pakistan had originated. Most of the migrants moved into the cities of Pakistani Punjab and Sindh, notably the port city of Karachi. There they often retained their migrant identity and acquired the Urdu term



Map 40 Refugee migration from Pakistan to India, 1947–48
Data source: Schwartzberg, J. E. (1978)

muhajirs, literally ‘migrant’. Almost entirely Urdu speaking, unlike their new neighbours, they have retained a distinct identity in the cities of the south, especially Karachi.

There was also large-scale movement of Hindus from East Pakistan to what became West Bengal, though many Hindus remained behind, contributing up to 15 per cent of the post-1947 population of East Pakistan. Calcutta experienced horrendous riots in 1946 – the ‘Great Calcutta Killing’ – in which estimates of those who died range from 5,000 to 10,000. Yet, partly as a result of Gandhi’s 1947 initiative, Calcutta had quietened again by 1947, and few Muslims fled from Calcutta itself to the newly created East Pakistan.

Hindus and Sikhs moved from West Pakistan into the Indian Punjab, settling in special colonies and in homes in the cities vacated by Muslim emigrants.

The geopolitical consequences of Partition

The immediate effect of Partition was to create two new states out of the jigsaw of pre-Partition British India and Princely India. Their boundaries with each other bore no relation to any previous historic boundaries. They separated peoples on the primary basis of their nominal religious affiliation. However, the division left 15 per cent of East Pakistan’s population Hindu and 12 per cent of India’s population Muslim. The apparent unity of Pakistan’s Muslim identity proved a fragile basis for sustaining the development of integrated national identity. Fundamental cultural differences distinguished East Pakistan, which was 99 per cent Bengali speaking and had its own history of Islam, from West Pakistan, where Panjabi, Sindhi and Pashto were the major languages.

One thousand four hundred kilometres of Indian territory separated West and East Pakistan. The differences in linguistic and cultural history, the dominance of West Pakistanis in the armed forces and the civil service and the markedly different levels of economic development between the western and eastern wings fostered a sense of grievance in East Pakistan against the western wing. This was increased by the sense that East Pakistan’s major contribution to Pakistan’s foreign exchange through jute exports was being used to fund development projects in West Pakistan. All these issues were to present a major challenge, exacerbating the sense in East Pakistan of being an exploited periphery of the western wing. Jinnah’s hopes of forging a united, secular Muslim state died with him, just over a year after Independence. Even then, his attempt to make Urdu the national language of Pakistan, where it was the mother tongue of less than 5 per cent of the total population, had provoked language riots in East Pakistan. The deep-seated distrust the decision had fostered was ultimately to prove fatal to Pakistan’s unity when Bangladesh seceded to become an independent country in 1971.

The problems posed by the new boundaries themselves have still not been fully resolved (see Chapter 23). At the time, the most discussed feature of the partition of the Punjab, and the most feared in Pakistan, was the division of the catchment area of the Indus and its tributaries. In Pakistani eyes, Indian control of the upper reaches of these crucially important rivers threatened the security of the irrigation water supplies, on which the overwhelming majority of Pakistani agriculture, especially in Punjab and Sindh, depended. From 1960 the sharing of waters has taken place under the aegis of the Indus Waters Treaty, one of the few examples of long-term cooperation between India and Pakistan (see Chapter 25).

The form in which the countries of the sub-continent ultimately gained their independence (Map 38) has had broader geopolitical consequences. After 1947 India was geographically central to its region. All member states of the South Asian Association for Regional Cooperation (SAARC), with the exception of recent entrant Afghanistan, have a common land or sea border with India. At the same time none have borders with each other, except Pakistan and Afghanistan.

In 1947 India was also by far the largest of the South Asian countries in terms of both area and population. With its peninsula centrally placed in the Indian Ocean, while sharing over 1800 kilometres of its northern border with China, India had a unique stake in both wider continental and maritime interests.

To its neighbours, India's size and position have often given it the appearance of regional dominance, a position at once feared and resented. The Indian perspective has been different. Facing the huge and complex task of welding its own socially, ethnically and linguistically diverse communities into an integrated nation state has been a constant concern. Fears of secession, whether on religious or linguistic grounds, have run close to the surface through much of the period since Independence, exacerbated by challenges to the legitimacy of the central government from many different parts of the country. The sense of being surrounded by potentially or actually hostile neighbours is therefore commonly seen in India less as an opportunity to control its region than as a threat to its own cohesion.

Conclusion

The secession of East Pakistan to form Bangladesh marked the last major modification to the Partition settlement, giving its current shape to the contemporary geopolitical structure of South Asia. Pakistan continues to dispute the legitimacy of the current position of Jammu and Kashmir. Local disagreements over border questions remain to be finally resolved. Nonetheless, the fundamental territorial form of the political geography of the sub-continent has been without successful internal challenge since 1971.

15 Independent South Asia

Contrasting experiences of governance

Governance in post-Independence South Asia reflects the scale, cultural diversity, resource base and historical trajectory of each country. In the post-Colonial world of far-ranging social, political and economic change, it is scarcely surprising that the forms of governance in South Asia should have diverged widely. When India and Pakistan entered this new post-Colonial world they themselves experienced great internal upheaval. Internationally, after the Second World War the world was fracturing along the lines of the Cold War, polarising global politics. The South Asian countries were directly affected by the transformation of global politics in ways in which none could ignore.

It was against this background that at Independence India, Pakistan and Sri Lanka all committed themselves to:

- constitutional government based on democratic institutions;
- the rule of law and the independence of the judiciary;
- protecting the rights of all their citizens;
- creating new institutions through which these goals could be reached.

In 1947 Afghanistan, Nepal and Bhutan, at arm's length from British rule, were all monarchies, and Maldives, a sultanate, was a British Protectorate from 1887 until 1965.

In 1947 modern democratic forms of government were largely new to South Asia. Gandhi made much of the ancient Indian tradition of self-governing village republics as the basis on which India should build its own democracy, but in 1947 these ancient practices were largely moribund. Through the first half of the twentieth century the British had gradually introduced a degree of autonomy and a range of democratic institutions into the governance of India and Ceylon.

The practice of the last 65 years has shown the great diversity of constitutional and non-constitutional responses to the challenges faced by each of the new states. There have been some remarkable achievements, as well as notable failures. In 2015, all the countries of South Asia have some form of democratic government, operating under a variety of civil constitutions. All have formally independent judiciaries and a separation of the military from government. Some – India, Bangladesh, Pakistan and Nepal – have some form of unicameral or bicameral parliamentary democracy. Others – Afghanistan and Maldives – have presidential systems, while Sri Lanka has a form of combined presidency and parliamentary rule. Bhutan is a constitutional monarchy that has introduced an increasing measure of representative democracy. All currently have universal adult suffrage, mainly using the Westminster first past the post (FPTP) electoral system for elections to national parliaments or assemblies, some in combination with forms of proportional representation. Yet there have been major challenges to democracy in all the countries of the sub-continent. Since 1947 no country has had uninterrupted democratic rule at

a national level, and all the countries of the region have repeatedly either modified or replaced their constitutions over the years since they became independent states and continue to do so.

Violent and non-democratic acts have often played a crucial role in shaping their contemporary political life. Most South Asian countries have experienced coups and counter-coups, and political assassinations have been common. Pakistan and Bangladesh have had repeated military coups and extended periods of military government. In Pakistan the most recent of these, the government of President Musharraf, ended only in August 2008, with a return to an elected government. That Parliament was the first to serve a full term and to be followed by a democratically elected successor, which took office after the May 2013 elections.

Bangladesh's latest military coup was in 2007, but the country has been under democratic rule since the landslide victory of Sheikh Hasina's Awami League in 2008. The elections held in January 2014 were again won by the Awami League, though the BNP and some other opposition parties boycotted them.

Afghanistan had nearly a decade of occupation by the Soviet Union in the 1980s, followed by a bitter Civil War and the advent of a Taliban government. Afghanistan's use as a base for Al Qaeda led to the post 9/11/2001 war, from which only by 2015 had NATO active engagement ended. At the end of President Karzai's term in office, the 2014 Presidential elections marked a major staging post for Afghanistan's democratic institutions. In 2015, after the withdrawal of NATO combat troops, Afghanistan continues to face enormous political, economic and security challenges.

In the last twenty years Nepal and Sri Lanka have suffered long periods of civil war. A Maoist insurgency in Nepal lasted from 1996 to 2006. In addition to its war with the Tamil Tigers of northern Sri Lanka, Sri Lanka faced two brutal uprisings by the Marxist JVP in the 1970s and 1980s. India, in addition to the nearly two year period of Mrs Gandhi's emergency government from June 25th 1975 to March 21st 77, has responded to repeated secessionist demands and militant campaigns in different parts of the country by suspending key constitutional rights and making heavy use of its military power in Jammu and Kashmir and the northeast. Governments have also used Governor's Rule in states where state-level government has been deemed by the central government to have broken down.

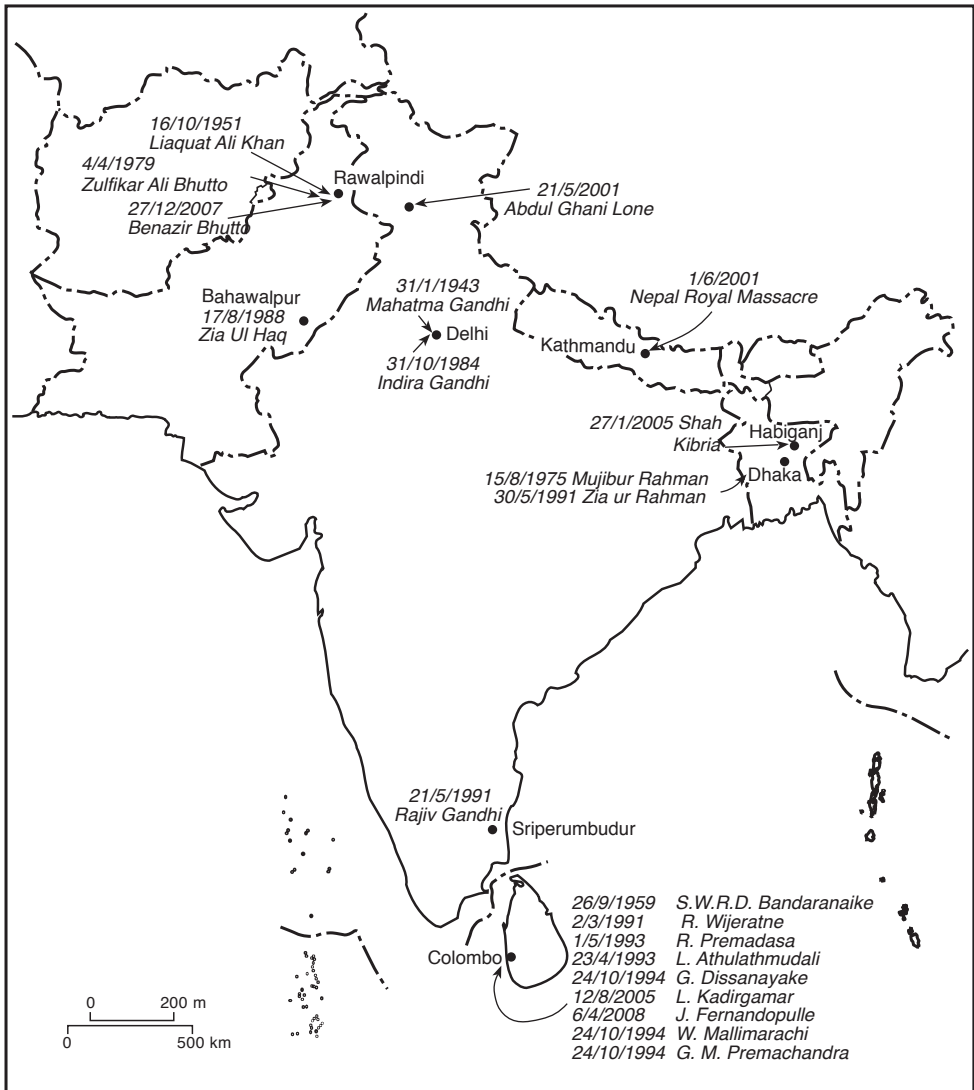
The fragility of constitutional rule in most South Asian countries is illustrated by the extent and frequency of political violence since Independence. Insurgency and secessionist movements have been commonplace. Only Bhutan has not experienced repeated political assassination or coups and attempted coups as a routinely used tool of politics.

Violence has been an endemic feature of political life in many parts of South Asia since Independence. Fully democratic government is still seriously challenged by regional and sectarian violence. India, with arguably the most stable and constitutionally secure democratic governance since Independence, has suffered the assassination of some of its most famous political leaders. Mohandas Karamchand Gandhi, given the soubriquet 'Mahatma', or 'great soul', by India's Nobel Laureate poet Rabindranath Tagore, was widely referred to in India as the father of the nation, but was shot in January 1948 by a Hindu nationalist, Nathuram Godse, who believed Gandhi had betrayed the Hindus of the sub-continent.

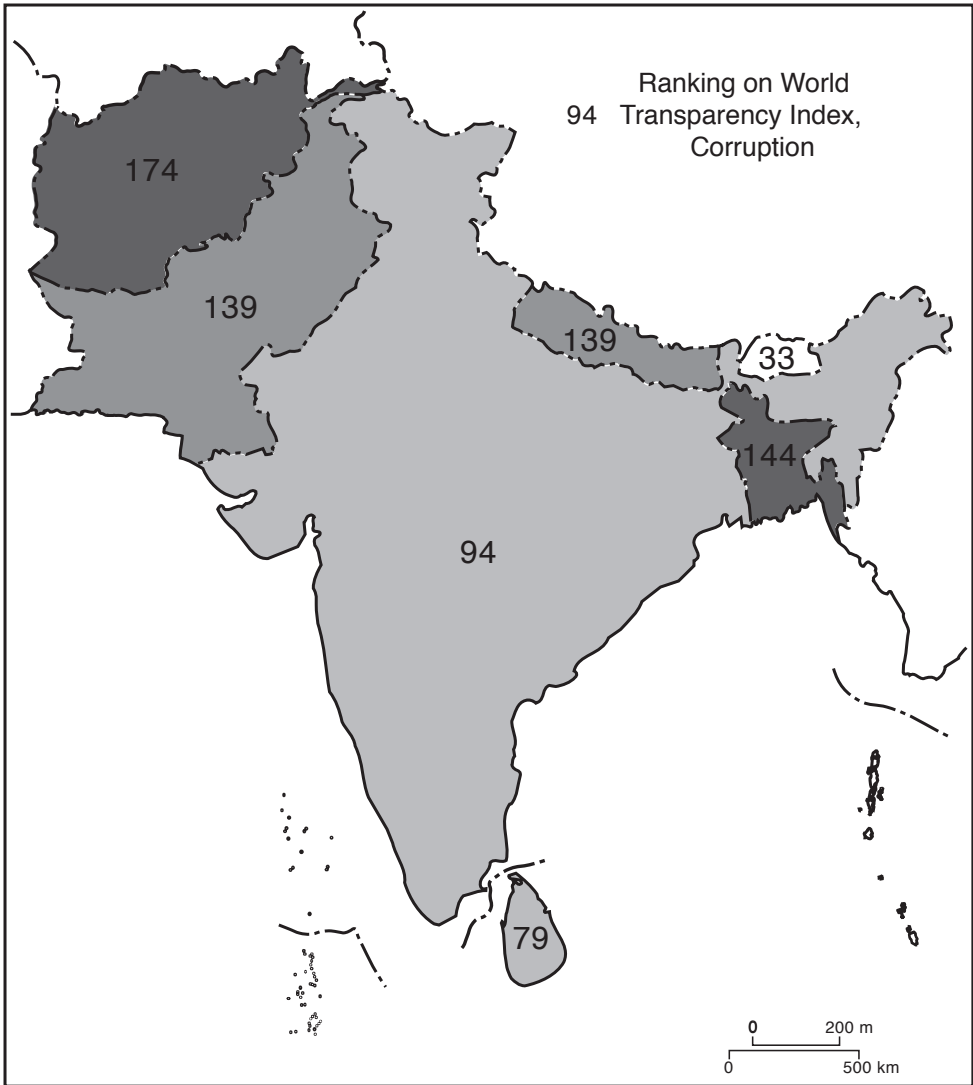
Every country in South Asia, other than Bhutan and Maldives, has seen one or more of its heads of government or heads of state assassinated. In India, Prime Minister Mrs. Indira Gandhi was in office when she was shot by her Sikh bodyguards on October 31, 1984. Her son, Rajiv Gandhi, was killed by a Sri Lankan Tamil suicide bomber in May 1991, after leaving office and while campaigning during a general election. Numerous less well known Indian political figures have also been assassinated.

The countries surrounding India have all seen political murders and assassinations of their leaders. Bangladesh's first president, Mujibur Rahman, was killed in 1975. After coups and counter-coups, President Ziaur Rahman was also assassinated in May 1981, and in 2004 there was a failed attempt on the life of Sheikh Hasina, Mujibur Rahman's daughter and the current Prime Minister of Bangladesh. Periods of democracy have been interspersed with military rule.

Pakistan has had extended and repeated periods of military rule. The creation of Bangladesh in 1971, the result of the Pakistani Civil War, was in part a revolt against the military government of General Yahya Khan. Afghanistan, Sri Lanka and Nepal have all experienced recent, long-running and devastating civil wars, in some cases accompanied by coups, sponsored from within or outside the country. Maldives has had coups in 1988 and 2012.



Map 41a Political assassinations in South Asia



Map 41b Corruption in South Asia: ranking on World Transparency Index

Map 41a identifies the assassinations of major political figures in South Asia since Independence. It is by no means a complete list, and political assassinations have not been restricted to the élite. Pakistan's first – and longest-serving – Prime Minister, Liaquat Ali Khan, was shot by an Afghan nationalist assassin in 1951, exacerbating the leadership gap caused by the death to cancer of Mohammad Ali Jinnah three years before. Zulfikar Ali Bhutto, Pakistan's ninth Prime Minister and first head of government after the secession of Bangladesh, a key figure in the adoption of the 1973 Constitution, was hanged in Rawalpindi jail on 24th April, 1979, following a military coup. His death followed a trial that many in Pakistan regarded as rigged by the self-declared president and former army chief, Zia ul Haq. Zia ul Haq himself was killed less than a decade later when his plane was sabotaged, having just taken off from the Pakistan Air Force base at Bahawalpur.

His was not the last high-profile assassination in Pakistan. Benazir Bhutto, Zulfikar Ali Bhutto's daughter and twice Prime Minister in the 1990s, was killed at a campaign rally in 2007.

One of the striking results of the history of political assassination in South Asia has been the rise to prominence of family dynasties. A number of women who have become presidents or Prime Ministers have done so in the wake of their husbands' or fathers' violent deaths in addition to those in the Gandhi and Bhutto families. The world's first woman Prime Minister, Sirimavo Rattwate Dias Bandaranaike, became Sri Lanka's Prime Minister a short period after the assassination of her husband, S W R D Bandaranaike, in 1959. Her family has remained politically influential, most recently through her daughter Chandrika Kumaratunga, who was president until 2005. Sheikh Hasina, daughter of the assassinated first President of Bangladesh, Mujibur Rahman, has led the Awami League since 1981. First elected Prime Minister in 1996, she won a landslide victory in the 2008 elections and returned to power again in the 2014 elections. For more than twenty years her chief opponent has been Begum Khaleda Zia, widow of the assassinated Ziaur Rahman. She has led the Bangladesh National Party (BNP) since 1991, when she became only the second woman in the Muslim world, after Benazir Bhutto, to lead a democratic country. In Pakistan, Benazir Bhutto and Asif Ali Zardari's son, Bilawal Bhutto Zardari, continued the family's political leadership role while he was still a student at Oxford in December 2007. He became chairman of the Peoples Party five years before he was old enough to contest a National Assembly seat (BBC 2007).

Corruption (Map 41.b)

Corruption is widely perceived to be endemic and deep-rooted in nearly all the polities of the region, provoking periodic demands for reform, but to date with little long-term effect. According to a Transparency International (TI) report in 2002 'corruption is seriously undermining development objectives in South Asian countries by hindering economic growth, reducing efficiency, acting as a disincentive to potential investors and, above all, by diverting critical resources meant for poverty alleviation' (Transparency International 2002). All the evidence suggests that across South Asia, with the exception of Bhutan, the problem of corruption in public life is severe and, if anything, deepened in the decade since the 2002 report.

Table 15 Transparency International corruption index 2013, South Asia

Country	Rank	Score
Afghanistan	175	8
Bangladesh	136	27
Bhutan	31	63
India	94	36
Maldives	na	na
Nepal	116	31
Pakistan	127	28
Sri Lanka	91	37

Rank: The lower the rank the less corrupt. **Score:** Perceived level of public corruption, from 0 ('highly corrupt') to 100 ('very clean')

Source: Transparency International (2014a)

In terms of public perception, the police and judiciary are the two most corruption-prone sectors, with tax and land administration close behind. Access to public services, critical for a high proportion of the population, especially the poor, is a fundamental need, often denied or substantially affected by corrupt practice across the region. However, low-level and small-scale corruption, pervasive though it is, has been more than matched by spectacularly large-scale plundering of the public purse since 2002. One of the most notable examples in India was the public sale of the 2G telecommunications licences scam through which it has been claimed that the public exchequer lost nearly \$30 billion through the corrupt practices of politicians, bureaucrats and corporations. The public widely sees politicians and political life across all South Asian countries as corrupt. In their 2014 report on corruption in South Asia TI argues that poor accountability, lack of effective protection for whistle blowers and widespread political interference in the work of anti-corruption agencies and the judiciary ‘makes them ineffective in keeping a check on government’ (Transparency International 2014b, p. 3). It is a problem that runs from central governments through provincial or state level governments to the local level.

Evidence from across South Asia attests to the universal challenge that corruption poses to good governance in the region. In recent elections corruption has often been a high-profile issue. It was highlighted in Narendra Modi’s campaign in the Indian elections of May 2010 and again in Sri Lanka’s presidential election in 2015. However, living up to promises made by incoming governments continues to be a significant challenge. One dimension of this challenge is the extent of criminal engagement with the political class. Criminal gangs exercise extensive political power. In the 2014 Indian elections the independent Indian think tank Association for Democratic Reforms published research showing that over a fifth of candidates for the Lok Sabha elections in May 2014 had criminal charges filed against them. Many of the charges related to sexual violence. In November 2014 it published further research showing that 31 per cent of the ministers in the government elected in 2010 had criminal charges against them including 38 per cent of the newly inducted ministers (Association for Democratic Reforms 2014).

In Afghanistan, there remain powerful ties between politicians and the drug trade. TI put the cost of corruption to the Pakistani exchequer of the PPP-led government of 2008–2013 at \$94 billion. In its 2014 report on the National Integrity system TI Pakistan observed that while there were multiple mechanisms for preventing corruption implementation remained very weak (Transparency International Pakistan 2014). Bangladesh, which ranked 136 of the 177 countries surveyed in 2013, has its own wide-ranging set of governance concerns.

Its 2013 report on Sri Lanka stated that ‘the rule of law in Sri Lanka has been eroded and politicians, their sons and henchmen flout the law with impunity’ (Transparency International 2013). The President has ‘absolute immunity’ under Article 35 of the 1978 Constitution and can intervene in any judicial case in favour of anyone he chooses. The Civil War, which ended in 2010, was accompanied by appalling abuses of human rights. The UN Commissioner for Human Rights reported on February 13, 2013, that the rule of law, ‘the administration of justice and the right to freedom of opinion and expression’ were still seriously compromised (Transparency International 2013). Corruption and nepotism were widely seen as behind President Rajapakse’s defeat in his attempt to win a third presidential term in 2015, and President Sirisena has made reducing corruption one of his top priorities.

Given their internal diversity and the contrasts between them – geographically, culturally and economically, as well as in terms of their differing geopolitical relations with each other and with external neighbours – it is no surprise that forms of governance in South Asia should have continued to evolve throughout the period beginning in 1947. The constitutional and political position remains fluid and dynamic today. All of the South Asian countries have struggled to

seek constitutional structures that would allow diversity within an overall framework of state-led political unity and stability.

Language and the state

To some degree all South Asian states faced a common set of problems in trying to develop appropriate forms of governance that would achieve their broad and self-proclaimed democratic objectives, while meeting the practical realities of domestic politics. Linguistic uniformity in South Asian countries is the exception rather than the rule. When they gained Independence, India, Pakistan and Sri Lanka, for example, all had deep-seated – though regionally contrasted – linguistic and cultural identities. Soon after Independence, all three proposed similar strategies of adopting a single language as the national or official language: Hindi for India, Urdu for Pakistan and Sinhala for Sri Lanka, though the political context of each was very different. Only in Sri Lanka, where S W R D Banadaranaiké introduced the ‘Sinhala Only Act’ in 1956, was the language proposed as the national language the mother tongue of the majority (70 per cent). The Sri Lankan government’s move was interpreted, however, as an explicit attempt to reduce the power of the Sri Lankan Tamils. In 1948, Sinhalese fears of Tamil (and Hindu) influence had already led the newly independent government of Sri Lanka not to give citizenship to the Tamil tea estate workers, the so-called ‘Indian Tamils’. The Sri Lankan Tamil response to the Sinhala Only Act was to press first for safeguards, then for autonomy and finally for Independence, a demand totally unacceptable to the Sinhalese. Even though the Sinhala Only Act was repealed in 1959, this demand ran through to the end of the civil war.

In Pakistan, Jinnah nominated Urdu to be the national language for a reason almost diametrically the opposite of the choice of Sinhala in 1950s Ceylon. Spoken as the mother tongue by under 5 per cent of the population, Jinnah hoped that its nomination, as the language of élite Indian Muslim culture, would calm the fears that would have been raised had any of Pakistan’s major mother-tongue languages been chosen. India’s difficulty was that while Hindi was spoken by 40 per cent as a mother tongue, and accepted by many others as a legitimate choice, the large and educated Tamil minority in the South also felt that it threatened them with exclusion.

All three countries discovered that the single-language policy produced powerful opposition. In Pakistan the policy fed the East Pakistani demand for a separate state. In Sri Lanka it contributed to the Civil War that dominated Sri Lanka’s political life for over thirty years up to 2009. In India it gave fuel to a campaign for the secession of Tamil Nadu but met with the kind of compromise with which India has learned to defuse many of its crises.

Religion in state governance

Each of the South Asian countries has produced a different constitutional response to the role of religion in the state. In its 1950 Constitution, India adopted what has been widely described as a secular model for its state governance. The freedom of religious belief is enshrined in the Constitution. Furthermore, each major faith in India has the Constitutional right to maintain its own personal law governing marriage, divorce, inheritance, adoption and maintenance. This, however, is held by some to be in conflict with one of the Directive Principles of the Indian Constitution, which says that it should be an objective of the state to move towards a uniform civil code.

In contemporary India the adoption of a uniform civil code of personal law has become a highly polarised political argument. On the one hand, the Congress Party and a number of its

allies oppose its application. They see the imposition of a uniform civil code of law as infringing the rights of communities to maintain their own identity. On the other hand, the BJP has long been in favour, arguing that a uniform civil code would make every individual equal before the law. Critics of that view, however, see it simply as a direct means of attacking the rights of minorities and of enforcing a personal law that would reflect only the interests of the majority, the Hindu, community. During the 2014 elections this argument was seen as one of the touchstones of the debate as to what secularism means in modern India.

Of the other South Asian countries only Bangladesh and Nepal have adopted a secular constitution. Secularism was one of four founding principles in Bangladesh's first constitution, adopted in 1972. The others were 'nationalism, democracy, and socialism'. Despite subsequent modification, the Bangladesh High Court ruled on October 4, 2010, that following a decision of the Supreme Court Bangladesh had been confirmed once more as a secular state (BD News 24, 2010). Nepal had a very different trajectory to its current secular status. Having been the only country in the world to be described as a 'Hindu Kingdom' (though it did not proclaim Hinduism to be the state religion), after the abolition of the monarchy the Nepali Provisional Constitution of January 15, 2007, declared Nepal to be a secular state. Freedom of religion was to be guaranteed, though conversion from one faith to another was banned.

Article 9 of Sri Lanka's 1978 Constitution states that 'The Republic of Sri Lanka shall give to Buddhism the foremost place and accordingly it shall be the duty of the State to protect and foster the Buddha Sasana, while assuring to all religions the rights granted by Articles 10 and 14(1)'. Thus, while the Sri Lankan Constitution guarantees the right to practice different faiths, it explicitly gives state protection – and active support – only to Buddhism.

Bhutan has been a constitutional monarchy since its first formal constitution was adopted on July 18, 2008. The constitution is based on Buddhist philosophy and emphasizes its Buddhist culture. However, it was also strongly influenced by the desire to protect human rights, in ways influenced by the new Constitution of the republic of South Africa.

The other three South Asian states – Pakistan, Afghanistan and Maldives – all proclaim Islam as the religion of the state. In Afghanistan, the 2005 Constitution describes Islam as 'sacred', and while adherents of other faiths are free to practise their faith, apostasy from Islam is punishable by death.

South Asian governance in outline

Afghanistan

Official name: The Islamic Republic of Afghanistan **Official language(s):** *Pashto, Dari*
National anthem: Milli Surud **Flag:** *Description* Vertical tricolour of black, red and green with the National Emblem in the centre.

The 2014 elections in Afghanistan were the first ever elections to result in a peaceful transfer of power in the country. They resulted in a power-sharing agreement between the two main candidates, in which the President would have overall executive authority. A Chief Executive Officer would also be appointed to look after day to day administration, under the President's ultimate authority (BBC 2014).

With short intermissions since the overthrow of the Daoud regime in 1978, Afghanistan has been either at war (when occupied by the Soviet Union between December 1979 and February 1989) or suffering civil war. Before the overthrow of King Mohammed Zahir Shah in 1973 Afghanistan had been ruled by a succession of dynasties, the most notable of which was that of

Ahmed Shah Durrani (1722–72), the ‘father of the nation’. The monarchy went through a series of reforms before the 1975 coup led by Mohammed Daoud Khan, who established a republic under his own presidency. Throughout this period regional and tribal chiefs played a vital role in the governance of the country until the Soviet occupation. The overthrow of the Soviet occupation was achieved by a loose coalition of autonomous tribal groups. These groups received extensive external military aid from neighbouring Pakistan, the Middle East and the United States. Pakistan itself became home to up to five million Afghan refugees in encampments along the Afghan border.

The ending of the Soviet occupation marked the beginning of a period of intense civil war, as different regional and tribal factions tried to attain central power. This period culminated in the formation of a Taliban government, which ruled from September 1996 until December 2001. The Taliban, essentially the creation of and heavily backed by Pakistan’s Directorate for Inter-Services Intelligence, the ISI, introduced the harshest forms of Sharia law and gave a home to Al Qaeda and to Osama bin Laden from which they could launch attacks on targets around the world. Al Qaeda’s 9/11/2001 attack on the World Trade Center in New York resulted in the US-led war to defeat the Taliban, and the installation of a new reformist government. The Taliban government’s sectarian rule had made it feared and deeply unpopular in much of Afghanistan. It was formally overthrown within three months of the 9/11 attack, but thirteen years of continuous military efforts and massive flows of international aid later, the Taliban was still able to pose a significant threat to the peaceful governance of Afghanistan.

Out of the chaos of that period Afghanistan is still struggling to establish a stable form of governance. Through much of its history assassination has been an ever-present threat, with an attempt on the life of presidential candidate Abdullah Abdullah on June 6, 2014, being just the latest. Suicide bombing has become a regular feature of Afghan and Pakistani political life. Those assassinated in Afghanistan over the last decade include MPs, provincial governors, police chiefs and lawyers, as well as high-profile women in public affairs. Assassination was part of a wider and systematic use of extreme violence, including genocidal massacres, in which the UN documented several thousand deaths. The peaceful transfer of power to the ultimate victor in the presidential elections of 2014, Ashraf Ghani, was achieved through a unique power-sharing arrangements with his defeated rival, Abdullah Abdullah, who together face the challenge of achieving security, development and political stability in the 2015 reality of an Afghanistan unprotected by NATO combat troops.

Bangladesh

Official name English: *The People’s Republic of Bangladesh*; Bengali: *Gonoprojatontri Bangladesh* **Official language(s)**: Bengali / Bangla **National anthem**: *Amar Sonar Bangla* (‘Our golden Bengal’) **Flag**: *Description* A red disc on a green field.

Born out of a bloody civil war in 1971, Bangladesh achieved its independence as a sovereign, democratic republic on December 15, 1971, and adopted its first constitution in 1972. After the assassination of Mujibur Rahman in 1975 it experienced a succession of coups, counter-coups and military governments. The last of these, headed by President Ershad, handed over power to a fully democratically elected government in 1991. Since then power has alternated between the two major parties – the Awami League (AL), now under the leadership of Sheikh Hasina, and the Bangladesh National Party (BNP), currently under the leadership of Begum Khaleda, widow of the assassinated former President, Ziaur Rahman.

Since its adoption the constitution has been modified several times. The original constitution stated that four principles underlay the Bangladeshi state:

- nationalism
- socialism – social justice and egalitarianism
- democracy
- secularism, upholding the freedom of religion

Ziaur Rahman struck out the fourth principle, secularism, during his martial law regime of 1975–77. A 1975 amendment replaced the parliamentary system with a presidential system of government, and the courts lost their independence and significant powers of responsibility for human rights. Under the Eighth amendment in 1988 Islam was made the state religion. In 1991, at the end of the former military leader President Ershad's rule, the Parliamentary system was restored. In 2010 the Supreme Court ruled that as Parliament had no constitutional power to appoint a military government, a military government had no power to change the constitution, and therefore the principle of secularism was reinstated.

Today Bangladesh has a unitary government, with an elected national assembly (the *Jatiyo Sangshad*) of 350 members, 50 of which are reserved for women. Parliament is elected for a five-year term. The President, whose role as Head of State is largely ceremonial, is elected by the parliament, also to serve a five-year term. Bangladesh is sub-divided for administrative purposes into divisions, districts and sub-districts. Apart from the village unions, which have elected bodies, the larger administrative divisions are run by civil servants.

Elections The run-up to the 2014 elections was marked by extensive violence, a general strike call and boycotts by the opposition parties. The Bangladesh National Party did not contest, and the Awami League came back into power.

Bhutan

Official name *Druk-Yul (The Land of the Thunder Dragon)* English: *The Kingdom of Bhutan*
Official language(s): Dzongkha **National anthem**: *DrukSendhen* **Flag**: *Description* Divided diagonally, the upper (inner) triangle being yellow, the lower (outer) triangle being orange. A large black and white dragon in the centre faces outwards.

By signing the Treaty of Punakha with the British in 1910, Bhutan had brought decades of skirmishing, with first the Mughals and then the British, to an end. The Treaty acknowledged British authority over foreign policy but otherwise ensured continuing autonomy over internal affairs. In 1949 Bhutan and the newly independent government of India concluded a similar agreement, ensuring an ongoing special constitutional arrangement with India. This was modified by the 2007 Treaty, and Bhutan now manages its own foreign affairs, including these sensitive to India. The most significant of these is the border relationship with China, discussed in Chapter 23 and 24.

Bhutan made the transition from a monarchy to a Unitary Parliamentary Constitutional Monarchy in 2007. The government introduced political parties, which have to be registered with the Election Commission, into the Lower House of the newly created bi-cameral legislature. The second elections for both houses were held in 2013. In these, the Druk Phuensum Tshogpa party took forty-five of the forty-seven seats in the Lower House, the remaining two going to the People's Democratic Party. The elected parliament has all legislative powers and a normal term of five years, while the twenty-five member national council, comprising twenty directly elected members and five members nominated by the King, also serves five years.

Bhutan is divided into four zones or Dsongdeys, and into twenty administrative districts, *Dzonkhags*. The only remaining monarchy in South Asia, Bhutan has seen an increasing delegation of powers to the National Assembly and the Council of Ministers. The Prime Ministerial position rotates each year between the five ministers who received most votes in the National Assembly elections to the Council of Ministers. Bhutan adopted its current constitution on July 18, 2008. It affirmed its status as a democratic constitutional monarchy. Its preamble states:

'We, the people of Bhutan:

Blessed by the Triple Gem, the protection of our guardian deities, the wisdom of our leaders, the everlasting fortunes of the Pelden Drukpa and the guidance of His Majesty the Druk Gyalpo Jigme Khesar Namgyel Wangchuck;

SOLEMNLY *pledging ourselves to strengthen the sovereignty of Bhutan, to secure the blessings of liberty, to ensure justice and tranquillity and to enhance the unity, happiness and well-being of the people for all time;*

DO HEREBY *ordain and adopt this Constitution for the Kingdom of Bhutan on the Fifteenth Day of the Fifth Month of the Male Earth Rat Year corresponding to the Eighteenth Day of July, Two Thousand and Eight'.*

(Bhutanaudit, 2008)

The Supreme Court is made the guardian of the constitution, with a separation of the powers of the Executive, Legislature and Judiciary. The King – the Druk Gyalpo – is head of state. Among other powers, the monarch has the power to appoint the chief justice, chief election commissioner, Chairperson of the Anti-corruption Commission, the Heads of the Defence Forces and the Governor of the Central Bank. The Constitution declares Buddhism to be the spiritual heritage of Bhutan, but also makes the Monarch protector of all religions in the country.

India

Official name English: *Republic of India* Hindi: *Bharat Ganarajya* **National anthem:** *Jana Gana Mana* **Official language(s):** Hindi, English. There are also 26 'recognised regional languages'. **Flag:** *Description* Horizontal tricolour ('*Tiranga*'), saffron at the top, white in the centre and green below. In the centre of the flag is a navy blue wheel, representing Ashoka's wheel of the law, with 24 spokes. By law the flag is to be made of *khadi*, or home-spun cloth.

India declared itself a Federal Parliamentary Constitutional Republic on January 26, 1950. The Head of State is the President, indirectly elected by the electoral college. The parliament comprises a bicameral Parliamentary legislature: the Lok Sabha (the Council of the People), and the Rajya Sabha (the Council of States). There is a unitary, three-tier independent judiciary. In 2014, after the separation of Telangana from Andhra Pradesh, it had twenty-nine states and seven Union Territories.

The government is formed by the party with the largest number of seats and which is able to command a majority in the Lok Sabha. Elections to the Lok Sabha must be held at least once in five years, though the Parliament may be dissolved sooner. The multi-party Lok Sabha is directly elected under universal suffrage with the voting age of 18, by the First Past the Post system. It has 523 members, plus two reserved seats for Anglo-Indians.

Together the Lok Sabha and Rajya Sabha have the fundamental law-making powers. All but 12 members of the Rajya Sabha are elected by an electoral college. The electoral college

comprises the elected members of the State Legislative Assemblies (MLAs), using proportional representation through the Single Transferable Vote. Members of the Rajya Sabha are elected to serve for six years. One third of the members retire every two years. Twelve members are nominated by the president for the contribution they have made to Indian life and culture. As of October 2014 the Congress and its allies in the United Progressive Alliance had 89 seats in the Rajya Sabha and the BJP 57, with the balance of 77 seats made up of regional and other parties. In the Lok Sabha elections of 2014 the electorate numbered 814.5 million, with about 23 million aged 18 or 19. The turnout was the highest ever recorded in India at 66.4 per cent.

The Judiciary

Substantial powers lie with the Judiciary. The Supreme Court, headed by the Chief Justice of India, can both initiate legislation and serve as a court of appeal over High Court judgements. It may also rule in disputes between states and cancel state level legislation that contravenes the Constitution.

The states of India

The 1950 constitution provided for the creation of State Assemblies. The Princely States and the Presidencies inherited from the British period were re-organised in the 1950s. Initially, Jawaharlal Nehru, India's first Prime Minister, had been opposed to re-forming the administrative units on a linguistic basis, fearing the potential for encouraging secessionist tendencies. An indication of the importance of managing successfully India's linguistic diversity is given by the fact that today there are twenty-two Recognised Regional Languages in the Eighth schedule of the Constitution, plus four added under the 92nd Constitutional amendment in 2003.

After lengthy and sometimes bitter disagreements the government finally accepted that the administrative and political logic for linguistic states was overwhelming. The first 'new' linguistic state, Andhra State, was created from the Telugu speaking districts of Madras Presidency in 1953, after the campaigner Potti Sreeramulu fasted to death. A major re-organisation of India's states followed in 1956, and many were based on the dominant language spoken in their territory. These included Tamil Nadu, Kerala and Karnataka in the South (with the languages of Tamil, Malayalam and Kannada respectively), while Andhra State was merged with the former territories of Hyderabad to form Andhra Pradesh. Orissa (now Odisha – language Odishi) and West Bengal (now Paschimbanga, language Bengali) in the east, and Maharashtra (language Marathi) and Gujarat (language Gujarati) in the west were created during the same reform. The division of Bombay and Gujarat and of Punjab and Haryana both proved problematic and were not accomplished until the 1960s. The merger of Andhra Pradesh with the Nizam of Hyderabad's former territories was never uncontested, and on June 14, 2014, Telangana, comprising the ten northwestern districts of the former state of Andhra Pradesh, became the twenty-ninth state of the Indian Union.

The creation of Telangana was just the latest in a series of state sub-divisions that have taken place since the 1960s, not always on a linguistic basis. Three new states were created in November 2000. Chhattisgarh was formed from the southeastern districts of Madhya Pradesh. Its Chhattisgarhi language is closely related to Hindi. The Himalayan state of Uttarakhand (known initially as Uttaranchal), was carved out of the Himalayan foothills of Uttar Pradesh. It is unique in having Hindi and Sanskrit as its official languages. Jharkhand, formed from the southern districts of Bihar on November 15, 2000, has Hindi as its state language, though a wide variety of tribal languages is spoken by its tribal majority population.

The northeast of India has had a distinctive administrative and political history. The modern state of Arunachal Pradesh was made a Union Territory on January 21, 1972. Arunachal is one of the most linguistically diverse regions of India, with perhaps fifty languages, spoken by the largely Tibeto-Burman groups who form the overwhelming majority of the population. It is still claimed by China as its own. The People's Republic of China argues that it should be regarded as a disputed territory, awaiting resolution.

In 2014 there were 29 States and the National Capital Territory of New Delhi. In addition there were six Union Territories, each under the charge of an Administrator appointed by the President. Part IX of the Constitution divides legislative powers between the Union list (99 items), the State list (61 items) and the Concurrent list (52 items), with overall power strongly weighted towards the centre. The Union list includes defence, foreign affairs and major items of economic policy, and all State and Concurrent list powers are subservient to the power of the Central Government.

The principle of devolution of powers is enshrined in the Indian Constitution. Mahatma Gandhi argued that the village should be the basic unit of governance for India, using the term 'gram Swaraj' village self-government. From 1958 the Indian Government introduced a three-tier system of local government: the gram, or village (in practice often more than one village); the *tehsil*, *taluka*; and the *zilla*, or *district*. The system has been modified several times and has not been uniform across the country. A 1992 Act gave a major impetus to the importance of Gram Panchayats, devolving a series of development powers to this lowest level of government. Powers include those over public works, education, agriculture, information technology and social welfare.

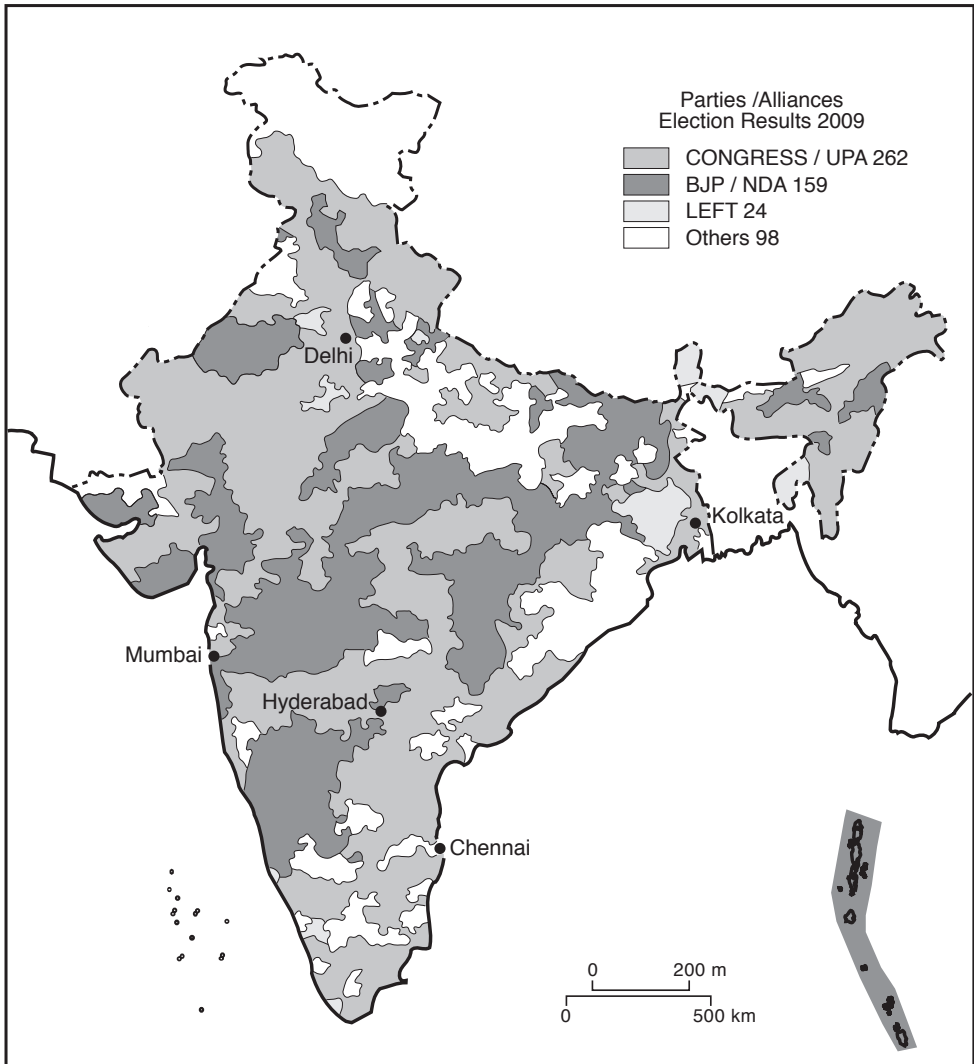
Challenges to democracy in India

India has faced a series of challenges to democratic governance. External pressures have been caused by the wars with China (1962) and Pakistan (1947–48, 1965, 1971 and 1998). Although the India-China War was widely regarded as a humiliation for India and seriously weakened Jawaharlal Nehru's government in the last two years of his life, the wars with Pakistan proved rallying points for India's democratic governance.

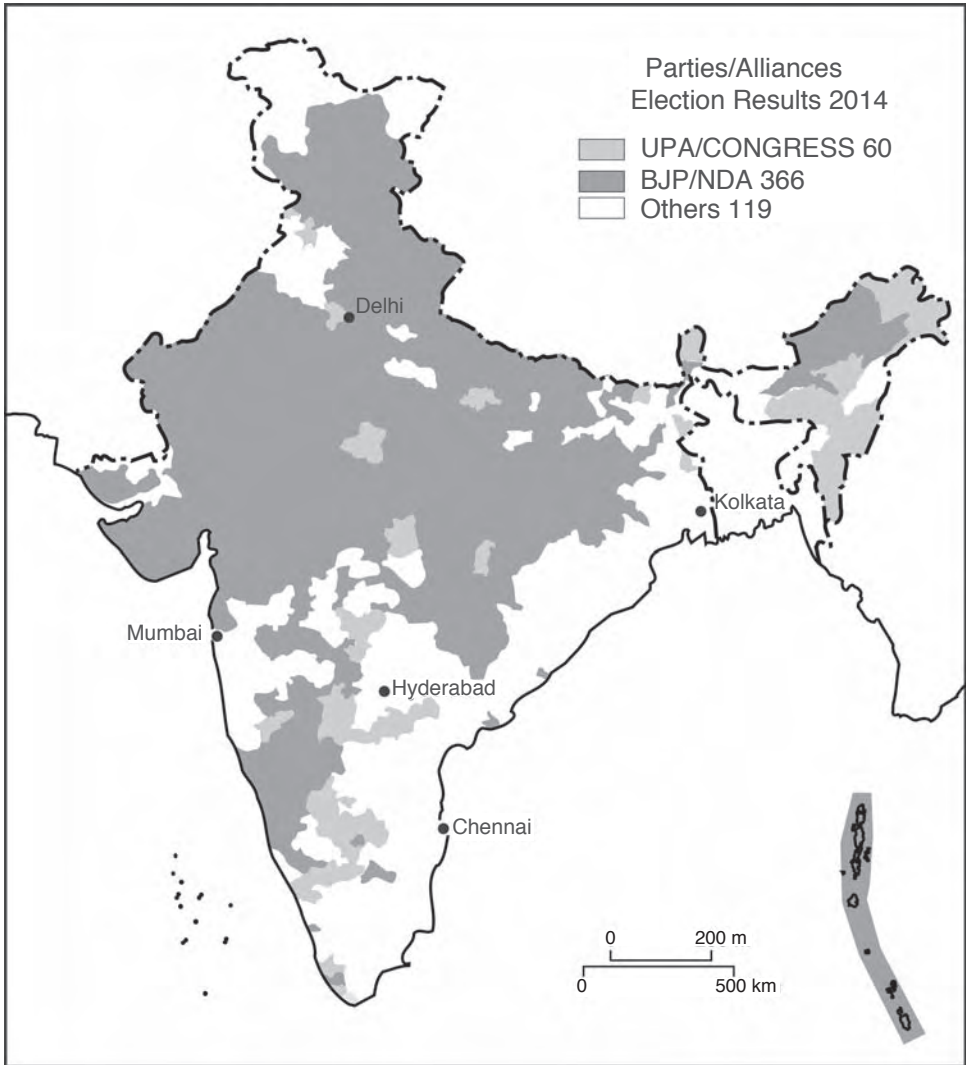
On the domestic front, the years of independence have seen a series of political challenges to democratic governance. These include secessionist claims in Jammu and Kashmir and the northeast, and ongoing militancy and terrorist activity, discussed in Chapter 30. The sole interruption to India's democracy at the national level, however, was the twenty-one month period of Mrs Gandhi's emergency beginning in June 1975. It was triggered by an Allahabad High Court judgement in which Mrs Gandhi was found guilty of the misuse of Government machinery during the 1971 election campaign four years previously. De-barred from parliament for six years by the High Court's ruling, and threatened by widespread public demonstrations, Mrs. Gandhi declared a State of National Emergency and assumed autocratic powers. During this period the freedom of the press was severely curtailed, and many outspoken critics of the government were imprisoned. Mrs Gandhi ended the emergency by calling a fresh General Election, which the Congress Party lost to the newly formed Janata Party, a wide-ranging coalition of ideologically varied parties who agreed to sink their differences in their effort to defeat Mrs Gandhi's Congress. On numerous occasions constitutional State-level governments have been suspended by the central government and replaced for varying periods by central rule from New Delhi. The most recent example was the seven-week imposition of Governor's rule in Jammu and Kashmir in mid-January 2015, following the state elections that gave no one party a large enough block of seats to form a government.

The Indian Emergency demonstrated the constitutional powers given both to state level High Courts and to the Supreme Court of India. As a result of the 1971 election Mrs. Gandhi had a large enough majority to amend the Constitution. However, the Supreme Court ruled that such powers did not extend to changing the basic structure of the Constitution. India's courts, with the Supreme Court, or Apex Court as it is widely referred to, at their head have an independence that is still fiercely maintained. Electoral politics in India, resumed in 1977, has continued ever since.

Lok Sabha elections since Mrs. Gandhi's sweeping victory in 1971 have sometimes resulted in large-scale shifts in party representation. However the 2014 elections were the first to give a single party a mandate to rule on its own since Rajiv Gandhi's Congress victory in 1984. The results of the Indian Lok Sabha elections in 2009 and 2014 illustrate the scale of electoral change that took place.



Map 42 India's Lok Sabha election, 2009



Map 43 India's Lok Sabha election, 2014

In 2009 the Congress and its allies captured seats in much of northwest, central and southern India. The BJP-led alliance had a much more restricted geographical scope. In 2014 the BJP and its allies captured almost the whole of northern India and seats as far south as southern Karnataka – in total 282 seats, compared with 116 in 2009. Its alliance in total won 336 seats. The Congress was restricted to seats in isolated pockets scattered from Kerala in the far south to Uttar Pradesh in the north and some seats in the northeast – a total of 44 compared with 206 in 2009. The Congress-led United Progressive Alliance won only 60 seats in 2014 (262 in 2009). Almost the whole of the eastern seaboard fell to regional parties, who in the past have joined the governing group but who in the current Lok Sabha make up a major part of the opposition. The First Past the Post electoral system amplifies the scale of change. In 2014 the BJP won 52 per cent of the seats in the Lok Sabha with 31 per cent of the vote, while the Congress, with just over 19 per cent of the vote, won 8 per cent of the seats.

Maldives

Official name English: *Republic of the Maldives* Dhivehi: *Dhivehi Raajjeyge Jumhooriyya*

Official language(s): Maldivian/Dhivehi **Official religion**: Islam **National anthem**: *Gaumii salaam* **Flag: Description** Red ground with central green rectangle bearing a vertical white crescent.

The Sultanate of the Maldives, having been a British Protectorate from 1887, became a unitary presidential democratic republic when it gained Independence from the United Kingdom in 1965. Since then the atoll island state has adopted twelve constitutions, of which the latest, adopted by a special *majlis* in 2008, enshrined the principle of multi-party democracy and an independent judiciary. Under this constitution the powers of parliament were increased at the expense of those of the President. Maldives' Constitution is unique in South Asia in banning any religious practice other than Islam.

Politics in Maldives, while generally conducted peacefully, has also experienced the use of force to attempt to achieve political change. In 1988 an expatriate Maldivian, Abdullah Luthufi, with approximately 80 mercenaries from Sri Lankan Tamil secessionist groups, attempted a coup. This was put down by an Indian naval force in Operation Sandhya.

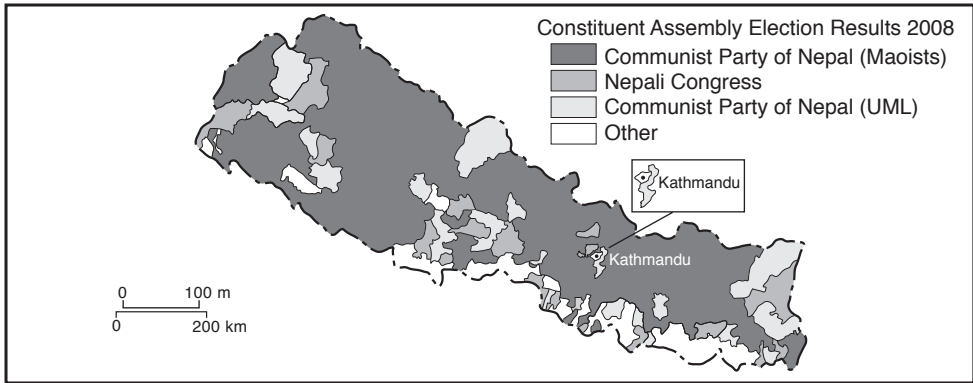
Nepal

Official name English: *Federal Democratic Republic of Nepal* Nepali: *Sanghiya Loktantrik Ganatantra Nepal*

Official language(s): Nepali **Official religion**: Under the monarchy Nepal was officially a Hindu state; it is now officially a secular state. **National anthem**: *Sayaun Thunga Phulka* **Flag: Description**: The world's only non-quadrilateral flag, it comprises two blue-bordered red pennons. On the upper is a symbol of the crescent moon, below a symbol of the sun, both white.

After the turmoil of over a decade of civil war and the overthrow of the 250 year-old Shah dynasty, the monarchy was replaced when Nepal was declared a Federal Republic following elections to a Constituent Assembly in May 2008. The Constituent Assembly, which ratified the changed Constitution, had been elected at the end of a bitter Civil War in 2005. The Maoist insurgents who had forced the change found themselves sharing power in the new Assembly, but key decisions were repeatedly blocked and the government proved wholly ineffective. Elections in November 2013 resulted in a new 601-seat Constituent Assembly, whose first task was to draft a new constitution by the end of 2014. While the Nepali Congress (196 seats) and the Communist Party of Nepal (175 seats) both increased their share, the Maoists won only 80 of the seats, compared with 220 seats in 2008. The elections were fought on the basis of 240 First Past the Post seats, the remainder under a form of Proportional Representation.

This was followed by an extended period of political deadlock, brought to a close with further constituent assembly elections on November 19, 2013. These resulted in the formation of a new government led by the Nepali Congress, with a significant drop in support for the Communist Party of Nepal and the Unified Communist Party of Nepal (Maoist), particularly the latter. Using a combination of First Past the Post and Proportional systems, the Nepali Congress secured 196 of the 601 assembly seats (Map 44). Map 44 shows the extent to which at the end of the Civil War the Maoists had spread their support across Nepal, though much of the southern border region of the *terai*, and Kathmandu itself, remained under Nepali Congress control. In February 2014 the Communist Party of Nepal agreed to back the Nepali Congress leader, Sushil Koirala, for the Prime Ministership.



Map 44 Nepal's Parliamentary election, 2008

Nepal is divided into five development regions, the eastern and central regions (in which the capital, Kathmandu, is located), and the western, mid-western and far western regions. There are 14 further administrative zones and 75 districts.

Political violence in Nepal

The most dramatic act of political violence in Nepal's history was the massacre of most of the Royal Family on June 1, 2001. Prince Dhipendra shot nine members of the Royal Family, including King Birendra and Queen Aiswarya, before committing suicide. King Birendra's place as King was taken by Prince Gyanendra. Despite the drama of the royal shooting, of greater consequence for Nepal and for its long-term governance was the Maoist insurgency, launched in February 1996 and ended with a Peace Accord in November 2006. The insurgency and ten year civil war came to dominate and ultimately change the politics of Nepal, with an estimated 17,500 people killed. Ultimately the agenda of the Maoists focused on replacing the monarchy with a democratic parliament. Under the terms of the Peace Accord this aim was achieved, and King Gyanendra abdicated, though he continued to live in Kathmandu.

Pakistan

Official name English: *The Islamic Republic of Pakistan* Urdu: *Islami Jumhuriyah-yi Pakistan*
Official language(s): English, Urdu **Official religion**: Islam **National anthem**: *Quami Taranah*
 (Note: Ayub Khan removed the Islamic tag from the country's official name in 1958, though it was rapidly restored). **Flag**: *Description* A dark green field on a vertical white stripe at the hoist, surmounted by a white crescent moon and star.

Before Independence little thought was given to the political structures of a united Pakistan. The British Government of India Act 1936 provided the provisional constitutional basis at Independence but had not anticipated that India would be divided and that there would be an Independent Pakistan. After 1947 a succession of challenges frustrated attempts to adopt a permanent and universally accepted Constitution. Pakistan has alternated between a Prime Ministerial and Presidential form of government, currently having reverted to the former. Under the terms of the 1973 Constitution Pakistan is a Federal State. It comprised four provinces, Punjab, Sindh, Balochistan and Khyber-Pakhtunkhwa, with an additional four federal territories, the federally administered Tribal Areas, Islamabad Capital Region, Azad Kashmir and Gilgit-Baltistan. Each province has its own powers and provincial governments.

Pakistan's constitution

After the secession of East Pakistan in 1971 and the disastrous war with India in which nearly 100,000 Pakistani soldiers were taken prisoner of war, the military government of General Yahya Khan was replaced by a civilian government, under the leadership of President Zulfikar Ali Bhutto and his Pakistan Peoples Party. In 1972 Bhutto convened a Constitutional Committee, in collaboration with the opposition parties, which presented a new Constitution. The 1973 Constitution re-empowered the Prime Minister and returned the role of President to that of non-executive Head of State.

Under the terms of the constitution the President, who must be a Muslim and at least 45 years old, is the Head of State and is elected to office for a term of five years by the members of the Majlis e Shoora (Parliament) of both Upper House (Senate) and Lower House (National Assembly).

The National Assembly is elected by universal suffrage with a minimum voting age of 18. Sixty of the 342 seats in the National Assembly are reserved for women and ten are reserved for non-Muslims. Elections for general seats are held in single member constituencies, the winner declared by a simple majority (First Past the Post). The reserved seats for women are elected with each Province as the constituency. Seats for non-Muslims are elected with the whole of Pakistan as the constituency.

Following an amendment to the Constitution in 2010, the Senate of 104 members is elected by members of the Provincial Assemblies (14 for each Province), 8 from the Federally Administered Tribal Areas (FATA), 2 from the Federal Capital. The Provincial Assemblies also elect four women each to the Senate, four 'technocrats' and one non-Muslim. Elections to the Senate are by proportional representation using the Single Transferable Vote.

Challenges to democratic governance

Muhammad Ali Jinnah's objective had been to create a secular, democratic form of government, with equality of all faiths and the expectation that Pakistan would have a sizeable minority non-Muslim population. The emigration of non-Muslims, notably Sikhs and Hindus, from Pakistan in 1947, particularly from West Pakistan, gave Pakistan the appearance of a society unified by its religious identity. In the eyes of many Pakistanis it was the Islamic faith, rather than a much more loosely defined Islamic culture, which was the essential basis of Pakistan's existence as a state.

Jinnah, Pakistan's first Governor-General (though not Prime Minister) thought it inconceivable that Pakistan should not have its own national language, but the challenge proved both socially and geographically divisive. Although Urdu was considered the language of cultured South Asian Islam by many Pakistani nationalists, its choice as a national language faced two fundamental difficulties. Urdu, while respected as a language of the cultured and educated in West Pakistan, was spoken as a mother tongue by less than 5 per cent of the total Pakistani population. Furthermore, Bengali, spoken by over 95 per cent of the population of East Pakistan, had a rich cultural tradition. Bengali speakers represented more than 50 per cent of Pakistan's population, but it would have been inconceivable in West Pakistan to have Bengali as Pakistan's national language. Rivalries between the two main linguistic groups in West Pakistan, Panjabis and Sindhis, meant that neither language was deemed suitable as a national language. Other regional languages in West Pakistan were spoken by far too few to command respect as a national language.

The prospects of Pakistan establishing a secure democratic basis and set of institutions rapidly met seemingly insurmountable obstacles. Without a long-standing and broad nationalist base, or a deep-rooted history like India's Congress Party, Pakistan was less well-prepared to

cope with its internal divisions. In West Pakistan these came partly from long-standing competition between the interests of the Punjab, with over 60 per cent of Pakistan's population and the lion's share of its agricultural resources, and Sindh, dependent on the lower Indus River, with its own culture, language and history, and partly from a fear of Punjabi dominance. Right up until the last minute the North West Frontier Province (after 2010 known as Khyber-Pakhtunkhwa) had seriously contemplated acceding to India. Balochistan had a tribal society that sat uncomfortably in the new configuration. On top of these difficulties was what proved to be the insurmountable challenge of integrating East Pakistan into a united Pakistan. Their separation by 800 miles of Indian territory was just one of a series of problems that proved insuperable. The framing of a Constitution, the integration of the flood of immigrants from India into the cities of Pakistan, the question of a national language – all posed severe challenges. Jinnah himself had unwittingly exacerbated the language issue when, speaking to a huge crowd on his only visit to East Pakistan just before he died, he had proclaimed that Urdu should be the sole national language, a decision that gratified the Urdu speaking refugees from India but few others. It provoked fury in the Bengali speaking province.

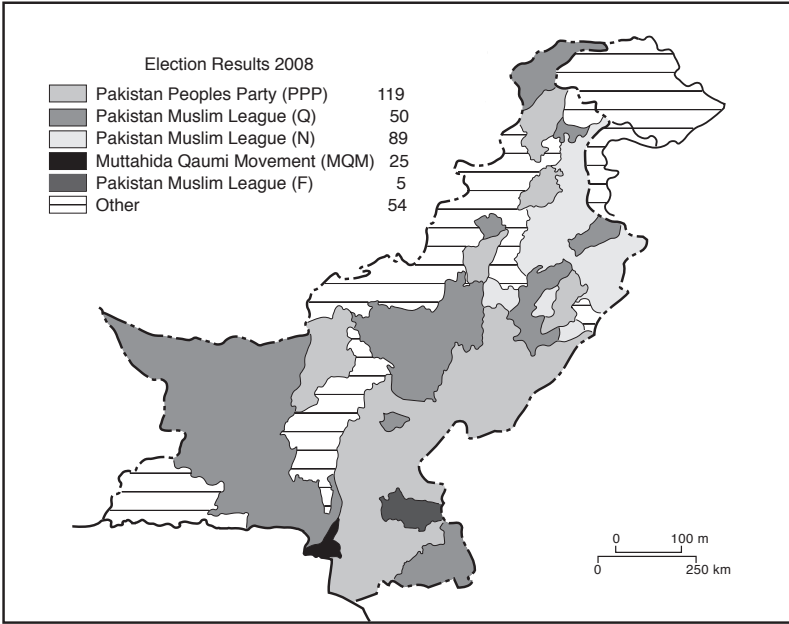
Pakistan's brief period of euphoria following Independence in 1947 was dealt a series of body blows. Mohammad Ali Jinnah himself died within thirteen months of Independence, due to a combination of tuberculosis and lung cancer, at the age of 71. This was followed by Pakistan's failure to defeat India in its struggle for Jammu and Kashmir, which ended in January 1949 in a stalemate that has repeatedly been a *casus belli* between Pakistan and India that continues to this day.

Jinnah's death was followed by a series of power struggles as Pakistan's widely different regional interest groups struggled for supremacy. Prime Minister Liaquat Ali Khan reversed Jinnah's objective of giving Pakistan a secular constitution and laid the foundations for Pakistan to become an Islamic republic. His assassination in 1951 left Pakistan's nascent government enfeebled further. The first Constitution, agreed in 1956, was abrogated by President Iskander Mirza when he staged a coup in 1958. He in turn was deposed by General Ayub Khan, who declared himself President and introduced his Constitution in 1962. A key element of Ayub's Constitution was the introduction of what he termed 'Basic Democracies'. On the grounds that illiterate people had insufficient knowledge and awareness to participate fully in democracy, universal suffrage was restricted to the election of local self-governing bodies.

Ayub's failed attempt to wrest Jammu and Kashmir from India by armed intervention in 1965 led to growing disillusionment with the role of the military in government, and the ultimate secession of Bangladesh, with the capture of over 90,000 Pakistani soldiers in East Pakistan by the Indian Army, led to a return to democratic government and the framing of the 1973 Constitution. While successive military rulers (General Zia ul Haq from 1978–88, and Pervez Musharraf from 2001–2008) turned their backs on the 1973 Constitution, democratic parties have used it as the basis for reconstituting democracy in Pakistan, and it is under a constant process of amendment.

Elections in Pakistan

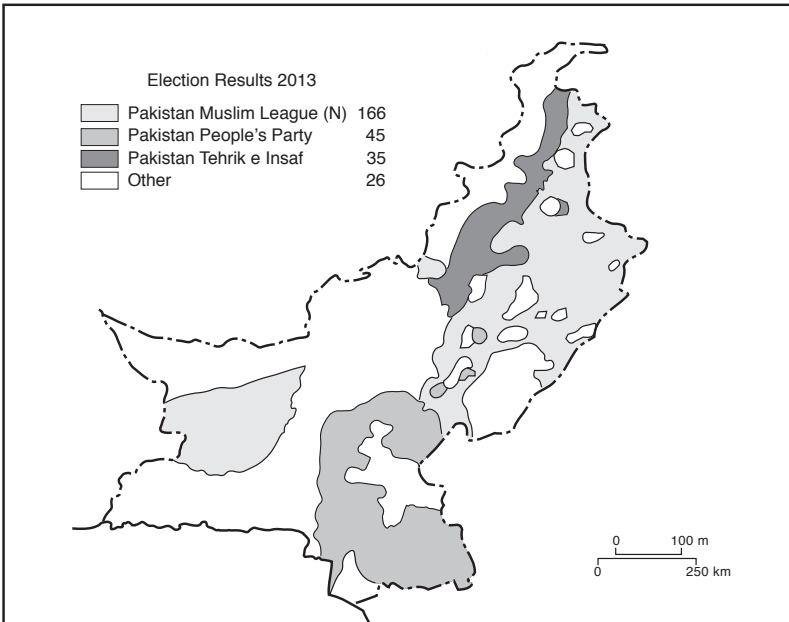
The 2008 elections in Pakistan were dominated by the decision of then-President Musharraf to return Pakistan to fully democratic elections. He also allowed the exiled leaders of the Pakistan People's Party, Benazir Bhutto, and the Pakistan Muslim League, Nawaz Sharif, back to contest them. Personally it proved a costly miscalculation, as his MQM Party lost heavily in the vote. The campaign also cost Benazir Bhutto her life, as she was assassinated at a campaign rally just before



Map 45 Pakistan's National Assembly election, 2008

the vote. The elections also brought to the fore the new party of Imran Khan, the Pakistan Tehrik e Insaf, though it was not until 2013 that he was to make a significant mark.

The 2013 elections marked the first time that Pakistan had experienced the successful transfer of power from one democratically elected government to a successor. It resulted in the Pakistan



Map 46 Pakistan's National Assembly election, 2013

Muslim League of Nawaz Sharif winning 166 of the 342 seats, an increase of 77 on the 2008 election. In contrast, the Pakistan People's Party of Asif Ali Zardari lost 74 of the seats it had held in 2008, returning with only 45 seats. The new party to make an impact was Pakistan Tehrik e Insaf (PTI, Pakistan Movement for Justice), under the leadership of former cricketer Imran Khan. Second in the popular vote with 17.9 per cent, the PTI won 35 seats. Map 46 shows how the PPP had lost support across the whole of Pakistan except in Bhutto's home province of Sind. It also shows the impact of the Tehrik e Insaf. As in all previous Pakistani elections, the explicitly religious and fundamentalism Muslim parties gained very limited support.

Sri Lanka

Official name English: *Democratic Socialist Republic of Sri Lanka* Sinhala: *Sri Lamkava* **Official languages:** *Sinhala and Tamil* **Flag:** *Description:* The Lion Flag *Description* Dark red rectangular panel with yellow border. A yellow lion holds a sword in its right forepaw, and at the corners of the red field are four *bo* (*Ficus religiosa*) leaves. On the hoist side of the lion are two vertical stripes, green and orange, surrounded by a yellow border.

According to its 1978 Constitution, Sri Lanka is a Unitary Semi-Presidential Parliamentary democratic Socialist Republic. Sri Lanka traces its modern democracy back to 1931, when under the terms of the Donoughmore Commission Report the British introduced elections based on universal suffrage to a state council, which was to have full powers over domestic affairs. After Independence in 1948 Sri Lanka became a democratic republic with a unitary system of government and a combined Prime Ministerial/Presidential system.

The Executive branch of government is headed by the President, who is also commander in chief of the armed forces. The President is directly elected every six years. He appoints a Cabinet from the elected members of the Parliament. The President cannot be legally challenged on any basis while in office. The Eighteenth Amendment to the Constitution removed the two-term restriction on the President. However, President Rajapakse's defeat in the January 2015 election may well see this amendment overturned, as it has been strongly attacked by newly elected President Sirisena.

The unicameral Parliament has 225 members, 196 elected from constituencies and 29 by Proportional Representation. The Prime Minister serves as the President's Deputy.

The Judiciary has the Supreme Court at its head, as well as a Court of Appeal and a High Court. Subsidiary courts deal with less important matters.

Following the April 2004 election, Sri Lanka's then-President, Chandrika Kumaratunga, appointed Mahinda Rajapakse as Prime Minister in the United People's Front Alliance government. Under the then-prevailing terms of the Constitution, Mrs. Kumaratunge gave up the Presidency at the end of her second term in 2005, and Mahinda Rajapakse won the following Presidential election. Over the course of the next four years the Civil War continued to take a heavy toll. In 2009, the Sri Lankan Army made a concerted attack on the Liberation Tigers of Tamil Eelam (LTTE, or Tigers), finally defeating them in 2009.

In the wake of this military success President Rajapakse called fresh elections. With greatly increased popularity among Sinhalese voters, the UPFA was returned with a record majority, winning 4.8 million of the 8 million votes cast and 144 of the 225 seats. The turnout was 61 per cent. While outside observers were highly critical of the Sri Lankan Army final push, the government bitterly resisted any attempts to have an independent enquiry. In March 2014, however, the United Nations Human Rights Council voted (by 23 to 12 with 12 abstentions) to open an



Map 47 Sri Lanka's Parliamentary election, 2012

international investigation into possible war crimes by both the Sri Lankan Government and the Tamil Tiger rebels. Pakistan opposed the resolution, and India abstained. The UN Human Rights Council has expressed concern over 'a continued deterioration of human rights in Sri Lanka'. These are claimed to include abductions, torture and extra-judicial killings. The Presidential elections in January 2015 saw him defeated by a former colleague in the UPFA, the Health Minister Maithripala Sirisena. One of his first acts was to declare himself a one-term President and then to target the abuses of power he claimed had marked the last period of President Rajapaksa. Early indications suggested a rapprochement with India would be high on the new President's agenda.

Conclusion

There have been remarkable political achievements in South Asia since Independence, yet every country in the region faces major challenges in improving the quality of its governance. Repeated challenges to the rule of law, abuses of human rights, and the exercise of arbitrary power continue to erode trust in democratic procedures in many parts of the region. Despite this, the repeated commitment to the electoral process and the maintenance of a largely independent judiciary, coupled with an increasingly vocal electorate, suggest that there will be continuing pressure for effective reform.

16 South Asia

The Cold War era

The dismantling of Empire heralded by the Independence of India, Pakistan and Ceylon from British rule coincided with a radical re-ordering of world geopolitics. Through the period from 1947 until the end of the Cold War in 1991, the countries of South Asia were forced to come to terms with developing their own foreign policies in a world that had frozen in a wholly new configuration. The superpowers of the US-led West on the one hand and the Soviet bloc on the other saw their interests as operating on a global scale, albeit in ways that were strategically highly differentiated.

That differentiation had its roots in the geopolitics of the colonial era. In his 1904 paper, *Geography as the Pivot of History*, the British geographer Sir Halford Mackinder argued that regional geopolitical interests characteristic of the era of European expansion had been superseded by a new global geography of world power (Mackinder 1904). At the start of the twentieth century this resolved into a conflict between control of the resource-rich, easily traversed, continental 'heartland', and the countries from Western Europe along the oceanic rim. Mackinder defined the heartland as the core or 'pivot' region of central Eurasia, and under his 1904 definition it stretched from Eastern Europe to the Urals and beyond. While at the start of the twentieth century the railways gave rapid access across the heartland, in the maritime rim power was exercised through control of the sea-lanes. In his seminal paper, Mackinder argued that control of the territory, resources and accessibility of the heartland was the key to global economic and political control.

In Mackinder's view the expansion of European colonial power had given the maritime rim of Eurasia a new strategic importance. From 1498, when Vasco da Gama first made landfall in South India, South Asia had been drawn inexorably into the globalising world of European interests. Up to 1858 the East India Company was the vehicle for the rising dominance of British interests, though the Portuguese, French, Dutch and Danes all had varying degrees of contact with India by the sea routes, often through parallel companies. To the north the expansion of the Russian Empire from the fifteenth century up to the Russian Revolution in 1917 had increasingly cast a new shadow over the sub-continent. In the form of the 'Great Game' this was to play a prominent part in British thinking in India at the end of the nineteenth century.

The Bolshevik Revolution of 1917 brought a new ideological dimension to the struggle for global power and the control of the heartland envisioned by Mackinder. It was this struggle, coloured by the ideological contest between the 'Communist' and the 'Free' worlds that engaged the Harvard Professor Nicholas Spykman in his *Geography of the Peace* (Spykman 1943). This book was to shape a generation of US thinking on what became known as the policy of containment, associated with the post-War president, Harry S. Truman.

Spykman 'turned Mackinder on his head'. He argued that after the Second World War the key to global power would lie in control of the maritime 'rimland' of Europe and Asia. This

control was aimed at preventing the Soviet power, which then controlled the heartland, from breaking out and becoming the dominant world superpower in the way in which Mackinder's analysis had suggested. Roosevelt, Churchill and Stalin gave the key outlines of this new world concrete form at the Yalta Conference in 1945. At Yalta the western focus was on the future shape of Europe and where the line would fall between countries under Soviet control and those outside it. However, its implications were to be felt across Asia as well. Mao Zedong's proclamation of the People's Republic of China on October 1, 1949, and the capture of Tibet, Yunnan and Xinjiang the following year extended the Communist world to the heart of Asia. The initial alliance between the PRC and the USSR cemented the impression of a bipolar world. However, within a decade the PRC made clear that it would pursue a path independent of, and sometimes hostile to, the Soviet Union.

Before the Cold War crystallised the division between the Communist and non-Communist worlds, Jawaharlal Nehru had recognised the profound implications of a bipolar world for a newly independent India. Speaking to the nation in a radio broadcast in September 1946, almost a year before Independence, Nehru said: 'We propose, as far as possible, to keep away from the power politics of groups, aligned against one another, which have led to past world wars and which may lead again to disasters on an even vaster scale'. Nehru's espousal of what was to become known as 'Non-alignment' was often portrayed as based on moral principle. However, in the eyes of Indian strategists it was also based on an assessment of India's strategic interest.

In contrast to India, Pakistan in the early 1950s had no fears of strategic engagement with the Western powers. Pakistan's key foreign policy goal from Independence until well into the twenty-first century was to protect Pakistan against the possibility of Indian dominance in South Asia. This fear encouraged successive Pakistan governments to participate actively in the bipolar geopolitics of the Cold War and repeatedly to join in US-led alliances. Serious tensions have dogged the relationship. Pakistan always hoped for more – and more active – support from the United States in its wars with India in 1965 and 1971. The Soviet occupation of Afghanistan on December 1, 1979, gave then-President Zia ul Haq the opportunity to demand a major increase in the supply of US military hardware, overwhelmingly deployed on the Indian front. Despite widespread domestic opposition, President Musharraf equally felt he had no alternative but to back the Bush Administration's post 9/11 'War on Terror'. This support has continued, despite its heavy costs, to the present. Although Pakistan joined the Non-Aligned Movement (NAM) in 1979, this was to prevent India's gaining an advantage in any international forum that could have a bearing on Pakistan's security.

The division at the heart of South Asia was to have a profound effect on the geopolitical roles of the South Asian countries during the first forty years of Independence. From the mid-1950s China came to play an increasing role in South Asia's strategic thinking. Pakistan sought active diplomatic engagement with China, seeing it as a crucial strategic partner in its struggle with India. In the 1960s Sri Lanka and Nepal also saw ties with China as bolstering their capacity to face pressure from India, while for India itself China has loomed like a shadow over its strategic objectives.

From the end of the Second World War the global geostrategic interests of the United States and its allies found new expression. With the Soviet Union occupying all and more of Mackinder's heartland, the US felt the need to build protectionist alliances of the 'Free World' in the maritime ring surrounding the Soviet Union. This led to an attempt to create a cordon of strategically placed countries around the Communist-controlled mainland of Eurasia.

The internal dynamic of the 'Communist world' was more complex than early Cold War strategists had imagined. Somewhat equivocal, yet of vital strategic significance throughout the



Map 48 South Asia and the Cold War: military pacts

post-War years, has been the position of China. Locked into a close relationship with the USSR until 1958, China increasingly refused to accept a secondary role in global geopolitics. From 1972 when it signalled a new relationship with the US through the entente led by President Nixon and Henry Kissinger, China determined to pursue its interests independently of the Soviet Union. While becoming a global power, China had strong South Asian interests. In 1962 it had invaded north eastern India across the boundaries inherited from agreements between Britain and pre-Communist governments in Tibet and China. Having defeated the Indian forces the Chinese withdrew behind the old border; however, in the fifty years since no border agreement has been reached.

South Asia in a world of strategic alliances

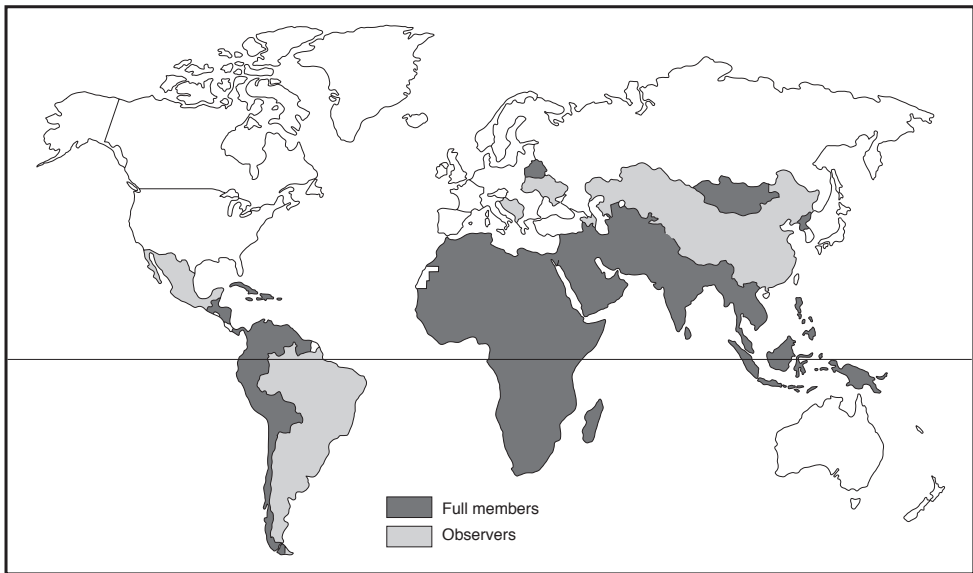
The division of the world into Cold War blocs crystallised at exactly the time that India and Pakistan won their independence. It forced hard choices onto the new nation states of South Asia. Following the Truman Doctrine and the strategic analysis of Eisenhower's Defense Secretary George Kennan, its strategic purpose was to secure the whole of the perimeter of the land and sea borders of the Soviet Union against possible expansion. The North Atlantic Treaty Organisation (NATO), stretching from Norway in the north to Turkey in the south-east, was the first of three strategic alliances formed by the US and its allies. To complete the encirclement of the communist bloc (in the 1950s China and the Soviet Union were still close allies) the United States urged countries of the central and southeast Asian rim to join either SEATO (The South East Asia Treaty Organisation, 1954, also known as the Manila Pact) or CENTO (The Central Treaty Organisation, established 1955, also known as the Baghdad Pact). The driving force behind the Pacts is indicated in part by their membership. Despite its name, the only Southeast Asian member states of SEATO were Thailand and the Philippines. Pakistan joined both SEATO and CENTO, on the basis that East Pakistan gave it interests in Southeast Asia while West Pakistan's interests were congruent with those of CENTO.

While neither CENTO nor SEATO survived to the end of the Cold War, the polarisation characterising the period was refracted through South Asian geopolitics right up until 1991. The war between India and Pakistan over the former Princely State of Jammu and Kashmir was ended by the ceasefire of January 1, 1949. The division of the Princely State along the Ceasefire Line was the result. From this point Pakistan and India saw each other as major security threats. Each saw the Cold War in a wholly differing way. For Pakistan, alliances with its Muslim neighbours to the west and with the US as a global power seemed to offer the best chance of security against what it feared were Indian ambitions. It joined CENTO and SEATO and cultivated an active partnership with the US. However, the perceptions of the roles of CENTO and SEATO differed fundamentally between the signatories. The West saw them exclusively as protective alliances against the risk of Communist expansion. Pakistan hoped that the members of the organisations would come to Pakistan's assistance in any conflict, including with India.

Pakistan's failed use of force to try and achieve the secession of Jammu and Kashmir in 1965 received no support from its CENTO partners. This failure encouraged Pakistan to strengthen its ties with the People's Republic of China (PRC). In 1971 it played a significant role in Kissinger's and Nixon's first contacts with the PRC. However, while the US gave diplomatic support to Pakistan to try and prevent the secession of Bangladesh in 1971, this never amounted to the provision of military hardware.

The Non-Aligned Movement (NAM)

While India too cultivated friendship with the Muslim nations of West Asia, it resisted joining western-led alliances. Under Nehru's leadership, India's initial response was to seek leadership among newly de-colonised states for peaceful international cooperation in global affairs. The Hindi slogan 'Hindi-Chini bhai bhai' – Indians and Chinese are brothers – epitomised India's idealistic ambitions in a newly free world. The formation of SEATO and CENTO, neither of which India wanted to join, were seen as a potential threat to India's security, while the wider polarisation was opposed as a threat to global peace. The term 'non-aligned' was first used by India's Foreign Secretary Krishna Menon in 1953 at the UN. Nehru and China's Premier Chou en Lai set out the five principles that were to guide their approach to India-China relations in the Panchsheel Treaty (signed on April 29, 1954). The Panchsheel, or five principles (Sanskrit, literally for 'five stones') were: 1. Mutual respect for territorial integrity and sovereignty; 2. Mutual non-aggression; 3. Mutual non-interference in each other's internal affairs; 4. Equality and mutual benefit; 5. Peaceful coexistence. These were to be accepted as the basis for the first *Conference of the Heads of Government of Non-Aligned countries* held in September 1961 in Belgrade.



Map 49 Members of the Non-Aligned Movement, 2015 (NAM)

Development of the Non-Aligned Movement remained a core principle of India's foreign policy up to the end of the Cold War in 1989–91.

Long after that date some Indian strategists were reluctant to accept that its relevance had been fundamentally changed by the new global geopolitical realities prevailing from the collapse of the Soviet Union. The map of current membership of NAM and the list of recent chairpersons illustrate the very wide range of countries, each with widely differing strategic interests, the NAM represents. Every South Asian country is a full member. During the Cold War the early leadership of the NAM – and its chairpersons – came from the key founding members: Yugoslavia, Egypt and India, with Ghana, Zambia and Algeria quickly followed by Sri Lanka and Cuba. After the Cold War the membership has steadily widened, and recent chairpersons include Nelson Mandela of South Africa, Mahathir Mohammad of Malaysia and Mahmoud Ahmadinejad of Iran.

Conclusion

From the perspective of 2015, the strategic landscape of the Cold War is almost unimaginable. Yet global geopolitical perceptions continue to impinge on regional and local priorities. As is shown in Chapter 30, the defence and security preoccupations of the South Asian countries are still struggling to adjust to new realities.

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Section D

Key issues in modern South Asia

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17 Population issues

Density and growth

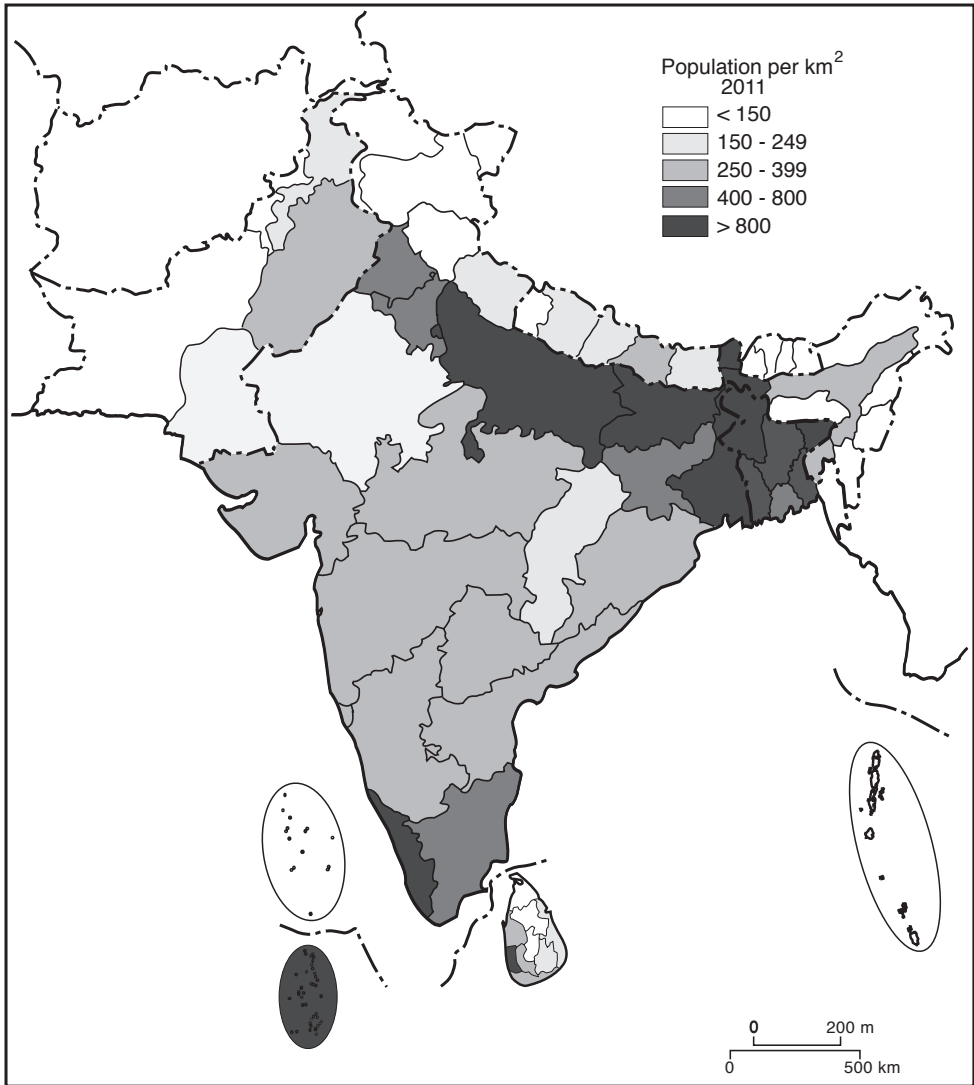
Every country, region and district of South Asia continues to experience population growth. While population no longer holds centre stage in the security or development agendas of South Asian countries, it still poses major challenges.

The population of South Asia has grown continuously since 1921, when it recovered from the world-wide influenza epidemic of 1918–19, which is estimated to have caused the death of 5 per cent of the population (Billings 1997). Throughout the twentieth century there were wide differences in growth rates between different regions of South Asia. In the last 40 years the rapid growth of urban population has added a new dimension to regional contrasts in population growth. The contrasts within India are as marked as those between India and its regional neighbours. While Pakistan and Afghanistan had the highest average growth rates in South Asia over the last two decades, parts of North India have had equally high growth rates. In contrast, many districts of India's South and East are well advanced on the path of the demographic transition towards low growth and a stable population. The difference in growth rates is strongly associated with the widening gap between regions with relatively rapid social and economic development and those that still have high levels of poverty and deprivation.

Population density

Today, with a density of 1034/km², Bangladesh and some of the districts of West Bengal have three times the population density of the Netherlands or Belgium. At the other extreme, the deserts of Afghanistan, Pakistan and the arid districts of northwestern India have densities as low as 1/km². Between these extremes there are great local variations.

Contemporary population densities reflect four major factors. First is the historic legacy of population densities that are the result of adjustments over millennia to the suitability of the land to sustain intensive agriculture. This suitability has reflected agriculture's essential need for water and land that is not too densely forested or disease-infected to be cleared and settled. Different types of agriculture have, in the pre-modern period, supported widely differing population densities. Millets, common in the drier regions of South Asia, are drought resistant but low productivity crops, with a relatively low labour demand. At the other extreme, rice yields are highest where there is plentiful water and labour. The most productive rice growing areas in South Asia can grow at least two, and sometimes three, crops a year. Even in the modern period, when mechanisation is playing an increasing role, the labour demand of rice cultivation remains high. As agriculture evolved, highest population densities were closely correlated with high precipitation and intensive rice cultivation.



Map 50 Population density in South Asia, 2011

Source: Derived from National Census Organisations for South Asia.

Some forms of traditional agriculture have made heavy use of irrigation. Large-scale irrigation works were developed more than 2000 years ago in Sri Lanka and parts of India. Well irrigation was also common in places with shallow aquifers. Pre-modern irrigation augmented already high demand for labour. In areas like the dry northeast of Sri Lanka the breakdown of those irrigation systems in the thirteenth and fourteenth centuries ACE led to significant de-population and a slow evolution of the population density pattern to favour the Wet Zone of the island's southwest. The high density of Sri Lanka's Wet Zone is replicated in the equally high densities in Kerala, where a double rainfall peak and the lack of a totally dry season have enabled very high densities to be sustained.

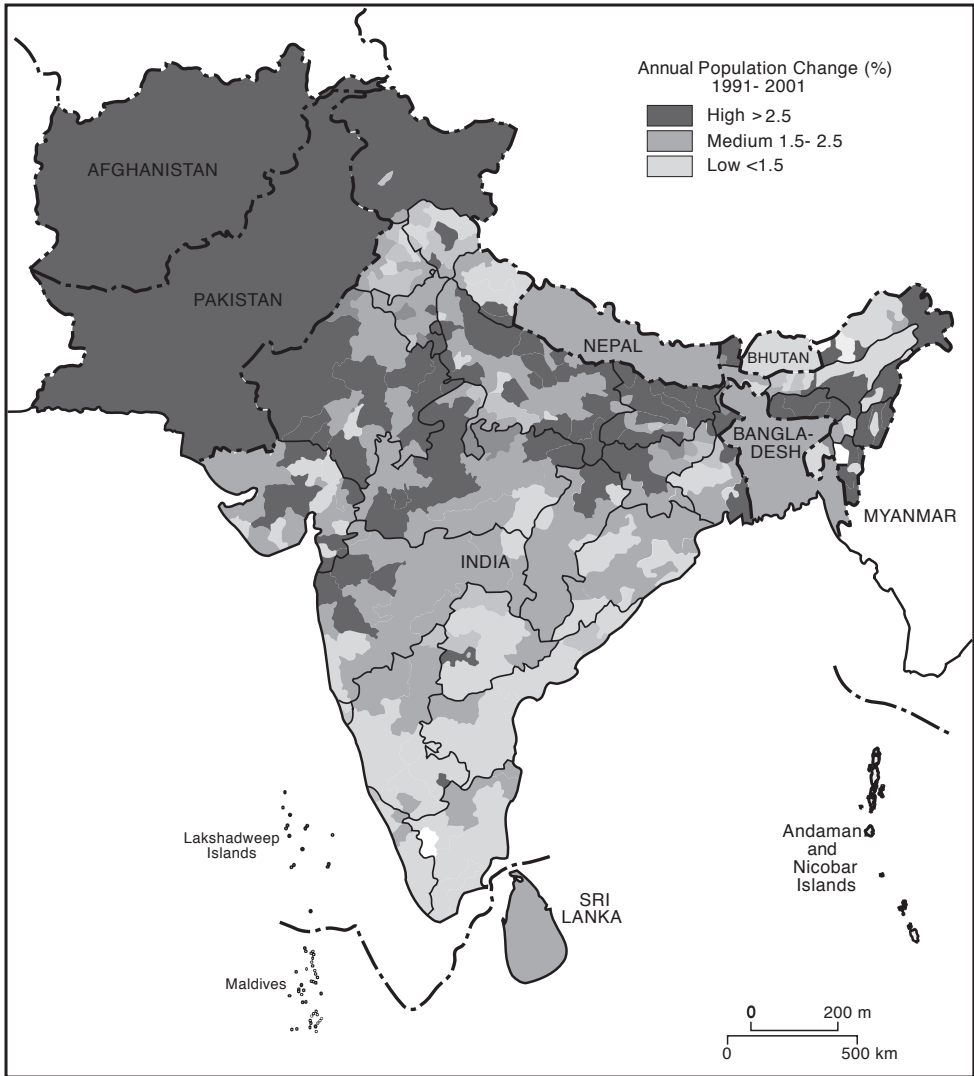
Modern large-scale irrigation works began in the mid-nineteenth century in northern India and what is now Pakistan and in the deltas of southern India. The high densities of Pakistan and northwestern India in the twenty-first century depend on modern, intensive, large-scale irrigation. In recent decades, canal-sourced river water has been augmented by groundwater, especially in the plains of the Indus and Ganga.

While high rainfall generally enabled the development of high population densities, it also favoured the growth of forests. In the pre-modern period, dense forests often acted as barriers to movement and settlement. They were also frequently the home of disease, notably malaria. The northeast of peninsular India and the states of the Himalayan margins had much lower population densities than neighbouring districts because of these constraints. Many retained a high proportion of tribal peoples who were adapted to forest life and were more disease-resistant than settlers from the plains. Forest-dwelling tribal peoples lived at far lower densities than the settled agriculturalists on the plains. They survived on a combination of low-intensity shifting cultivation, hunting and gathering. The combination of dense forests and high malaria incidence is reflected in the lower population density of Chhattisgarh compared to that of its immediate neighbours. The near-eradication of malaria in the Terai region of Nepal from the late 1940s was followed by a dramatic increase in population, as migrants flooded in to the sparsely populated land.

The most recent influence on changing patterns of population density is urbanisation (see Chapter 19). The pace of urbanisation in South Asia has been widely described as slow, especially in comparison both with Europe during its industrial revolution and with other parts of Asia. However, even though the proportion of South Asia's population classified as urban remains below 40 per cent, and in some countries below 30 per cent, the absolute numbers living in cities have increased dramatically in all of the countries of the region. The largest cities have grown disproportionately quickly. South Asia has some of the world's largest cities – Mumbai, Kolkata and Delhi all having over 16 million, Karachi and Dhaka both approaching 15 million.

The establishment of the colonial ports of Madras (now Chennai), Bombay (Mumbai) and Calcutta (Kolkata) by the East India Company in the seventeenth and eighteenth centuries sowed the seeds for a re-shaping of population densities. These coastal port cities drew people away from the earlier cores of highest population density inland. Today they have become the major metropolitan centres for their regions, though other cities like Bengaluru (Bangalore) and Hyderabad in the south are also showing dynamic growth. As the centres of the burgeoning transport infrastructure of a rapidly modernising road, rail and air network, metropolitan cities' growth and dominance can be anticipated to continue. It is only in the last two decades that Delhi has capitalised on its position as India's capital and overtaken the colonial ports.

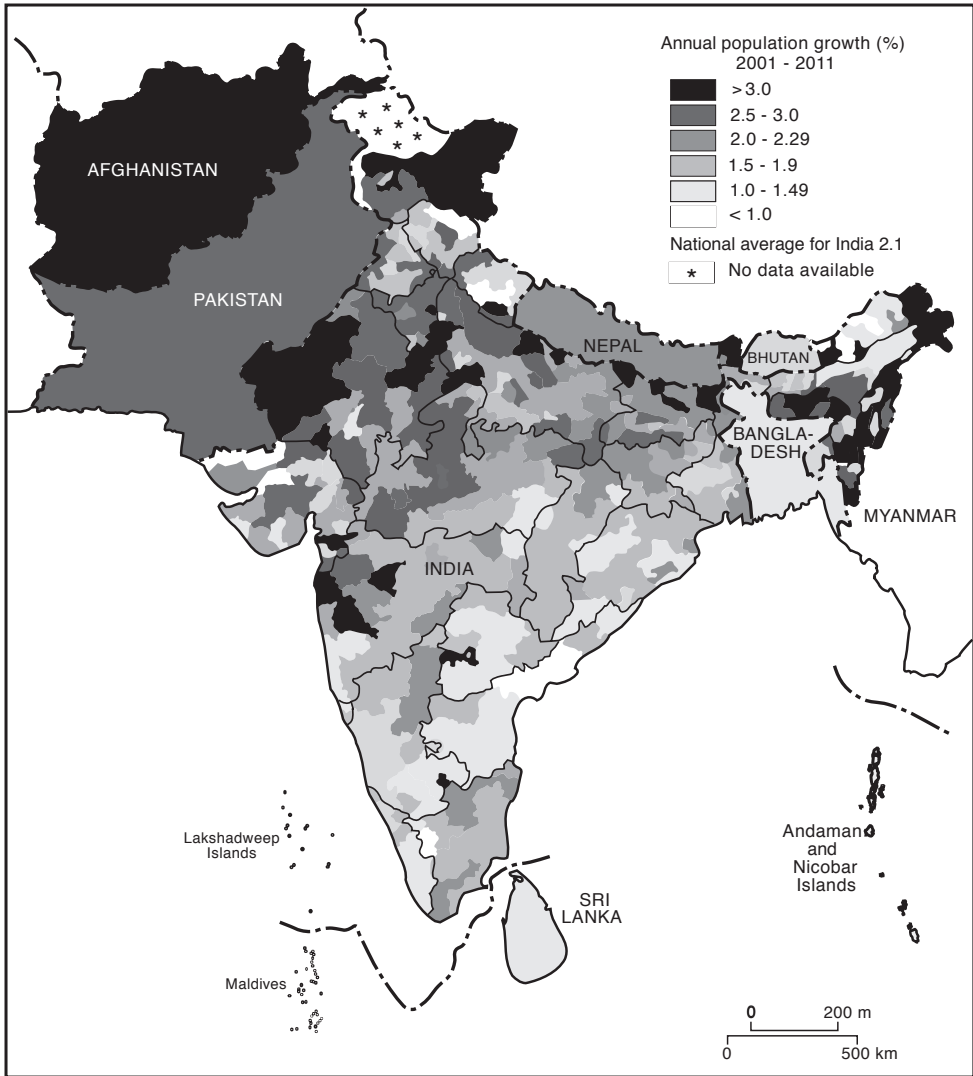
With the exception of Pakistan, all of India's neighbours have a single dominant city that has taken the lead in urban growth. The most recent to see a surge in growth is Kabul (3.2 million, Afghanistan), but Dhaka (15 million, Bangladesh), Kathmandu (2.5 million, Nepal), Colombo (750,000 for the city, 5 million for the metropolitan region, Sri Lanka), Male (103,000, Maldives) and Thimpu (80,000, Bhutan) are all easily the largest cities in their respective countries. In Pakistan, Islamabad was created as a new capital to side-step the competition between Karachi and Lahore, the capitals of the provinces of Sindh and Punjab respectively, but Karachi, with an estimated 23 million people, remains overwhelmingly the largest. When their immediate regions are taken into account, South Asia's 'primate' cities are increasingly dominant in the political, economic and social life of their regions and countries.



Map 51 Annual population growth rates in South Asia, 1991–2001

2011 was the Census year for all South Asian states except Afghanistan and Bhutan, which held censuses in 2010. As Maps 51 and 52 demonstrate, the headline figures for national population growth in South Asia between 1991 and 2011 conceal wide regional disparities. Broadly speaking, the areas where population growth rates have remained above 2.5 per cent per annum lie in a belt from Afghanistan and Pakistan across many districts of northwestern and northern India, to parts of India's northeast. In contrast, Uttarakhand, Punjab and parts of Himachal Pradesh in India's north, most of the four southern states, and large parts of Odisha and Paschimanga (West Bengal) have rates of increase below 1.5 per cent. Here the demographic transition has really begun to show itself, with many districts recording increases in the last decade of below 0.5 per cent per annum.

As is shown in Chapter 18, high rates of natural increase are the result of a more rapid decline in death rates than birth rates, not of historically high birth rates. Nonetheless, there has been a wide discrepancy in the take up of contraception in some parts of South Asia, though



Map 52 Annual population growth rates in South Asia, 2001–2011

not all. There has been little official support for contraception programmes ('family planning') in Pakistan and Afghanistan. Both countries have relatively low rates of female literacy, and across South Asia there is a strong correlation between high female literacy and contraceptive take-up. In contrast, Bangladesh has pursued one of the most vigorous contraception programmes in South Asia, with considerable success, as has Sri Lanka. The Indian government has promoted contraception for more than 50 years, but with varying degrees of commitment in different states and consequent wide differences between states in population growth rates.

Predicted population growth in the twenty-first century

The published figures for South Asian populations vary widely, depending partly on the assumptions made about the reliability of national censuses and assumptions about the rates of growth

between censuses. The UN demographic forecasts suggest that if present trends continue, there will be significant contrasts in population growth across the region to the end of the century. By 2050, when there is relatively strong agreement around the median figures, the population of South Asia as a whole is expected to rise from its 2014 figure of approximately 1.6 billion to between 2 and 2.7 billion. The share of different countries in the total population will have shifted slightly. Taking the median estimate, India's share of the total South Asian population is expected to remain at approximately 74 per cent. That of Pakistan will have risen slightly, from 10.8 per cent to 11.7 per cent, while that of Bangladesh will have fallen from 9.3 per cent to 8.7 per cent.

Beyond 2050 forecasts vary widely according to the assumptions made. The median estimates predict a fall in the total population, possibly to a level below that of the present population. However, the highest estimates show strong continuing growth to the end of the century. The low or declining growth forecasts build in a steady but significant increase in death rates in the second half of the century as the average age of the population rises.

Table 16 Predicted population growth in the twenty-first century

Country	Population			
	Total 2013 (millions) ⁱ	% South Asia	2050 (millions)	2100 (millions)
Afghanistan	32	2.0	70 – 80	75 – 160
Bangladesh	150	9.3	160 – 230	90 – 280
Bhutan	0.8	0.05	0.8 – 1.1	0.4 – 1.3
India	1200	74.6	1500 – 2000	900 – 2600
Maldives	0.3	0.02	0.35 – 0.45	0.18 – 0.55
Nepal	30	1.9	40 – 55	28 – 75
Pakistan	194	10.8	240 – 310	150 – 420
Sri Lanka	21	1.3	20 – 27	11 – 33
South Asia Total	1628		2031 – 2704	1255 – 3570

ⁱThe 2011 Census of Bangladesh was widely believed to be an under-counting of 8 – 10 million. The 2011 census of Pakistan has still not published its official results. The preliminary results suggest a total population in the order of 194–197 million.

Source: Data rounded from UN Department of Economic and Social Affairs/ Population Division World Population prospects: the 2010 revision, Volume II: Demographic Division http://esa.un.org/unpd/wpp/country-profiles/country-profiles_1.htm Accessed 2 May 2013

A key element of projected population change is in the historic and expected patterns of urban growth and urbanisation, discussed in Chapter 19. Other factors are economic growth rates and international migration.

Table 16 sets out the estimates made by the Population Division of the UN for national population growth rates from 1950–55 to 2060–65 (Sathar 2001). The first thirty years of Independence saw growth rates rise everywhere except Afghanistan and Sri Lanka. In Afghanistan, the Soviet occupation between December 1979 and February 1989 led to an outflow of more than 3 million refugees, mainly into Pakistan. This was responsible for the negative growth rate recorded in 1980–85, of 2.3 per cent. Some of Afghanistan's subsequent pattern of continuing growth reflects the return of many of those migrant families. Bangladesh has also had a significant recorded outflow of migrants in the last thirty years. In 1980–85 the UN calculated that 936,000 had emigrated. By 2005–10 this had risen to 2,908,000, a net migration rate of 4 per cent. The UN predicts emigration

rates from Bangladesh to fall steadily, though still to be over 300,000 for the five years 2060–65. In Sri Lanka, a drop in birth rates that began in the early 1980s contributed to the decline in annual growth rates. In the rest of South Asia annual growth rates in 1980–85 were between 2.3 per cent (India) and 3.4 per cent (Pakistan).

From that point rates have fallen everywhere, other than Afghanistan, which remains a special case. In 2005–10 the growth rates ranged from 1.0 per cent (Sri Lanka) to 1.9 per cent (Nepal and Bhutan). The relatively low annual growth rate of 1.1 per cent in Bangladesh is in part the result of high levels of emigration, largely to India, though accurate figures for this are impossible to obtain.

Table 17 Annual population growth rates

Country	1950–55 (%)	1980–85 (%)	2005–10 (%)	2020–25 (% predicted)	2060–65 (% predicted)
Afghanistan	1.6	-2.3	2.6	2.4	1.1
Bangladesh	2.7	2.7	1.1	0.9	-0.3
Bhutan	3.2	2.6	1.9	0.9	-0.3
India	1.8	2.3	1.4	1.0	0
Maldives	1.6	3.5	1.4	0.9	-0.4
Nepal	1.7	2.4	1.9	1.4	0.1
Pakistan	1.8	3.4	1.8	1.4	0.1
Sri Lanka	1.7	1.4	1.0	0.4	-0.3
South Asia Total	2.01	2.00	1.64	1.16	0.00

Source: UN Department of Economic and Social Affairs/ Population Division World Population prospects: the 2010 revision, Volume II: Demographic Division. Figures from other sources vary significantly.

Evidence of the combined effects of economic development, urbanisation and literacy on overall population growth rates is indicated by the contrasts between economically advanced states and those classified as ‘Empowered Action Group’ (EAG) states in India. The EAG States are Rajasthan, Uttar Pradesh, Uttarakhand, Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh and Odisha. These are the poorer regions of India and have been classified as needing special development efforts. Rural population growth rates across India as a whole for the 1951–61 decade rose from 20.64 to 24.86 per cent, with rates of growth in the EAG states somewhat lower than those in the developed states. The Census of India 2011 shows that in 2001–11 the rural growth rate in EAG states was still 18.72 per cent, while in the non-EAG States the rural growth rate for the decade had fallen to 5.75 per cent. These figures demonstrate the slow-down of population growth that results from the complex combination of factors that make up economic and social development.

Conclusion

Population growth remains a key issue for all the contemporary states of South Asia. Coupled with urbanisation, discussed in Chapter 19, it is a major driver of social, political and environmental change across the countries of the region. The youthful demographic profile of all the South Asian countries offers many developmental opportunities, if the challenges of improving health and education can be met.

I8 Fertility and mortality

Fertility, mortality and migration: these elements of ‘population dynamics’ ultimately control the population size of a region. Of these, the balance of fertility and mortality has been far and away the major influence on population size in South Asia. The demographic history of the region in the last century has been dominated by a slow reduction in birth rates and overall fertility, preceded by a steeper decline in death rates. The overall result has been a growth in population across the sub-continent, albeit at differing rates.

Migration has had a significant effect at a local or regional level and over relatively short time periods. Political upheavals, such as Partition in 1947, the Soviet occupation of Afghanistan in the decade following 1979 or the Pakistan Civil War, which led to the secession of Bangladesh in 1971, have caused millions to move. Such movement has in some cases been temporary. The UNHCR estimates that by 2013, more than 5.7 million Afghan refugees had voluntarily repatriated over the previous decade, though in 2013 there are still perhaps 2.7 million Afghan refugees living outside Afghanistan, with a further 427,000 internally displaced (UNHCR 2014). Natural disasters like the 2005 tsunami have led to large-scale, generally short-term movement. Despite the sometimes daunting scale of population movements, and

Table 18 Crude birth rates and total fertility in South Asia, 1950–2065

Country	Crude birth rate	Total fertility	Crude birth rate	Total fertility	Predicted crude birth rate	Predicted total fertility
	1950–55		2005–2010		2060–65	
Afghanistan	52.9	7.7	42.3	5.97	18.5	2.35
Bangladesh	48.3	6.36	21.5	2.38	9.3	1.68
Bhutan	47.9	6.67	21.5	2.61	9.2	1.68
India	43.3	5.9	23.1	2.73	11.1	1.8
Maldives	43.2	6.03	17.2	1.9	7.5	1.71
Nepal	42.9	6.1	25.6	2.95	10.8	1.72
Pakistan	42	6.6	28.1	3.65	11.7	1.77
Sri Lanka	37.4	5.8	19.0	2.36	10.7	1.85
South Asia	44.74	6.4	24.79	3.07	11.1	1.82

¹Crude birth rate: Births per 1000 population (written in the text as ‰)

²Total fertility: Children born per woman

Source: UN Department of Economic and Social Affairs/ Population Division World Population Prospects: The 2010 Revision, Volume II: Demographic Division

their political and social consequences, changes in the demography of South Asia since the end of the nineteenth century have very largely been the result of internal changes in the balance of births and deaths.

During the decade after Independence in 1947, only Sri Lanka had begun to experience the demographic transition to the low birth rates and low death rates typical of modern industrialised societies (Tables 18 and 19). All of the other countries of South Asia still had the high birth rates and high death rates typical of pre-modern societies. With their economies primarily dependent on agriculture, industrialisation had made few inroads, and education and public health were at pre-industrial levels. In the early 1950s, it is estimated that the mean crude birth rate for South Asia as a whole was nearly 45‰. Even then, the average concealed a range from 37.4‰ for Sri Lanka to 52.9‰ for Afghanistan.

The apparent precision of the above figures needs to be treated with caution. Despite the regular censuses held in many parts of South Asia since the late nineteenth century, demographic data even in 2015 is often rudimentary and patchy. The development of the Sample Registration System in India (SRS), and parallel schemes in other countries, has made a major contribution to the analysis of contemporary demographic trends, but there remain significant margins of error in many of the published demographic data in South Asia. India's Sample Registration System is the longest-standing and most sophisticated of the demographic registration systems in South Asia,

‘initiated ... in 1964–65 on a pilot basis and on full scale from 1969–70. The SRS since then has been providing data on a regular basis’

(Census of India 2013)

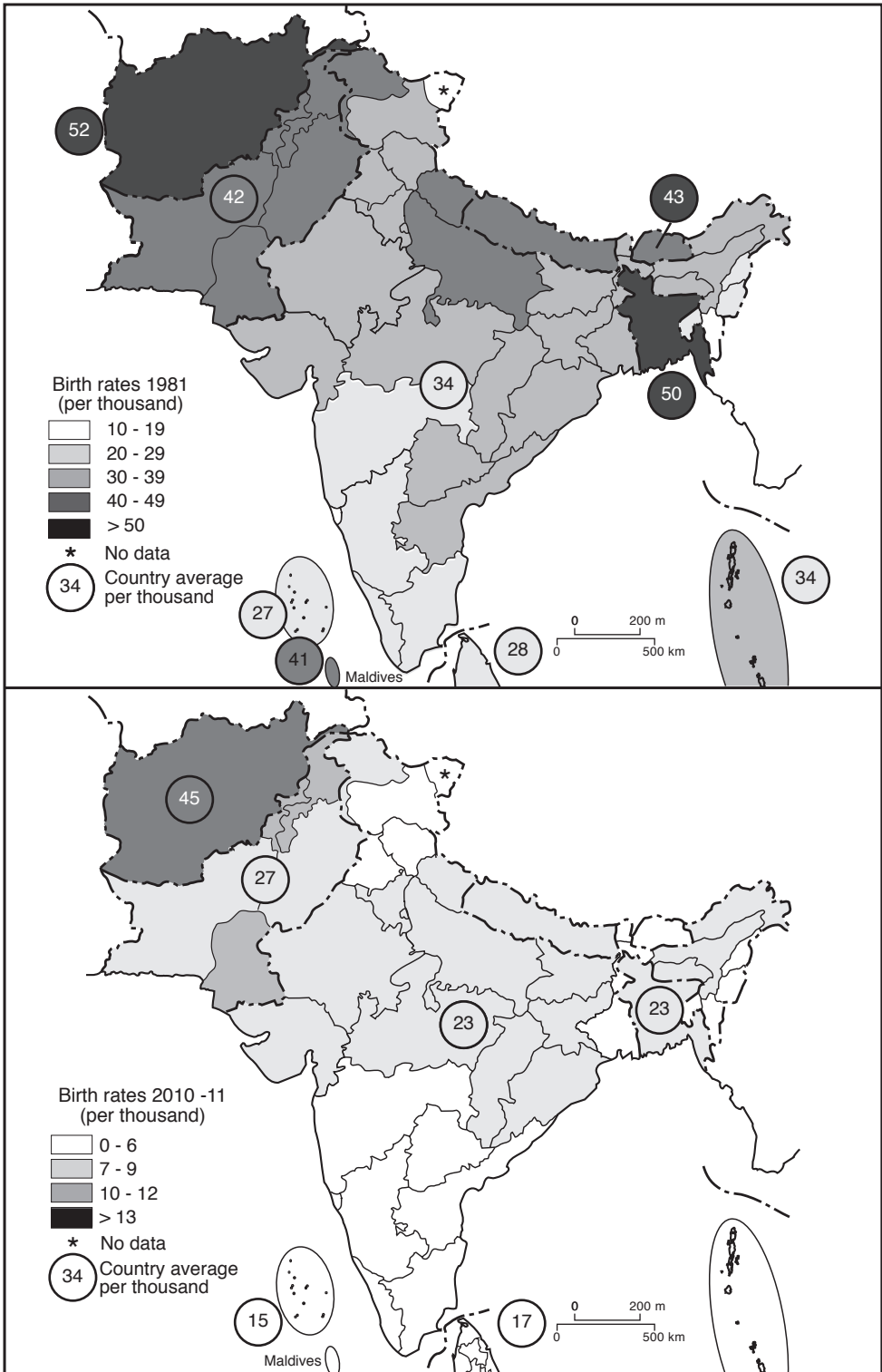
Estimates of current crude birth rates show that on average, across South Asia, the crude birth rate has nearly halved to less than 25‰. All the countries of South Asia have experienced a significant decline. Afghanistan, which is still estimated to have a crude birth rate of over 42‰, has shown the slowest decline, Maldives the most rapid. Maldives currently also has the lowest birth rate, 17.2‰. These data illustrate the very considerable regional variations brought out in Map 53. India, for example, has many districts, especially in the south, with even lower crude birth rates than those in Maldives. The UN Population Division estimates that by 2060, the crude birth rate for South Asia as a whole will have fallen to 11.1‰, less than half the current levels.

This pattern belies the common impression that South Asia's high population growth rates are simply the result of high birth rates. In fact, they are typical of countries going through the demographic transition, where death rates initially fall faster than birth rates, leading to a large percentage growth in total population.

Population growth, religious identity and urbanisation

There is little if any correlation at the national scale between religious identity and changes in birth rates. In some parts of India Muslims have higher birth rates than non-Muslims. However, many Muslims come from poorer sections of society and have low literacy, especially female literacy. Furthermore, Afghanistan and Pakistan, overwhelmingly Muslim, are at the top of the South Asian table of population growth and still have higher crude birth rates than other countries in the region. However, Maldives and Bangladesh, also overwhelmingly Muslim, have the lowest birth rates. This suggests that in South Asia, as elsewhere, religion is a far less important control on population growth than social deprivation and poverty.

Although correlations between crude birth rates and religious affiliation are, at best, tenuous, in most states of India and across South Asia, there is a clear difference between the birth rates



Map 53 Crude birth rates, 1981 and 2010-11

of urban and rural populations. According to the Indian SRS, the urban crude birth rates are significantly lower than rural crude birth rates in every state except Kerala. In Kerala the two rates are identical, and in Goa and Manipur urban birth rates are higher than rural birth rates. Although the difference elsewhere may be less than 2‰ (Andhra Pradesh, Maharashtra, Punjab and Tamil Nadu), in a number of states urban birth rates are between 5 and 10‰ lower than rural birth rates. These include Rajasthan, Uttar Pradesh, Bihar and Assam in the north and northeast; and Madhya Pradesh, Chhattisgarh, Jharkhand and Paschimbaranga (West Bengal) in a band from west to east across the centre. As shown below, death rates also tend to be higher in rural than in urban areas, so that overall the difference in total growth rates between urban and rural areas is slight.

Total fertility

Crude birth rates are commonly used because of their relative simplicity, though they only tell a small part of the story of population change. Another key indicator is total fertility, that is, the number of children born per woman in the population. As Table 18 shows, this too has been falling steadily across South Asia since Independence. For South Asia as a whole it has more than halved, from 6.4‰ to 3.01‰. The rate has varied from country to country, and for large countries such as India, Pakistan and Bangladesh, there are significant differences between regions and/or urban and rural areas. At a national level, the greatest fall in total fertility between 1950–55 and 2005–10 was in Maldives, a drop from just over 6 births per woman to fewer than 2. Bangladesh and Sri Lanka have also seen sharp falls during this period. The countries that have shown the slowest rates of fall are Afghanistan (7.7 to 5.97) and Pakistan (6.6 to 3.65).

Mortality rates

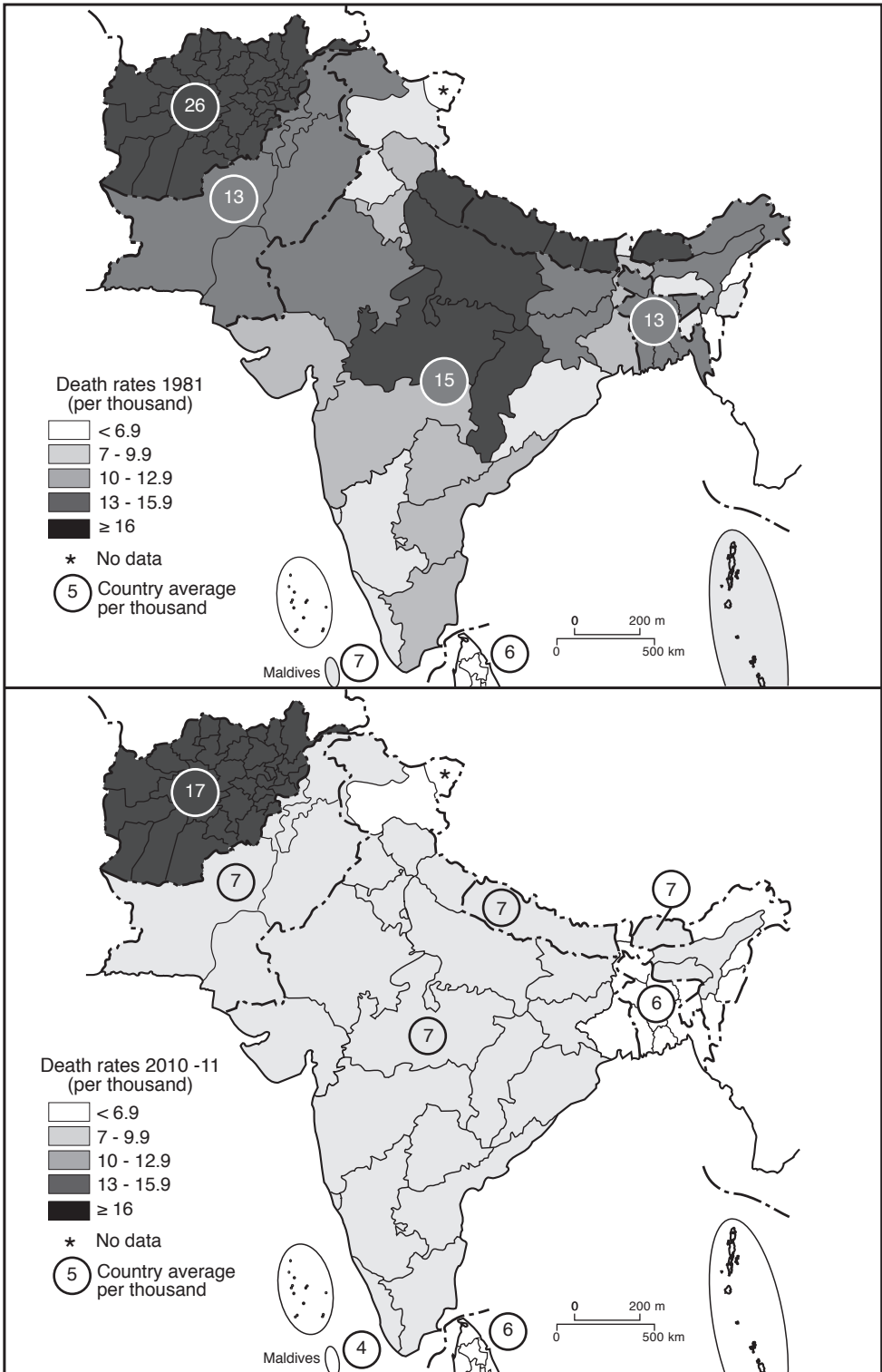
Two indicators, crude death rates and infant mortality rates, have also shown very significant reductions since the early 1950s. In line with the model of the demographic transition, the decline in these mortality indicators has been even faster than the decline in birth rates. Across

Table 19 Crude death rates and infant mortality, 1950–2065

Country	Crude	Infant	Crude	Infant	Predicted	Predicted
	death rate	mortality rate	death rate	mortality rate	crude death rate	infant mortality rate
	1950–55		2005–2010		2060–65	
Afghanistan	36.9	275	15.1	125	7.7	51
Bangladesh	20.9	165	6.3	49	11.8	13
Bhutan	27.1	185	7.2	44	12.2	14
India	25.5	165	8.3	53	11.1	22
Maldives	27.7	233	3.7	10	11.8	4
Nepal	25.4	211	6.2	39	9.1	9
Pakistan	23.8	177	7.7	66	10.2	35
Sri Lanka	19.8	104	6.5	12	12.3	6
South Asia	25.89	189.38	7.63	49.75	10.78	19.25

¹Crude death rate: Deaths per thousand (‰) people. Infant mortality rate: Deaths ‰ live births

Source UN Department of Economic and Social Affairs/ Population Division World Population prospects: the 2010 revision, Volume II: Demographic Division



Map 54 Crude death rates, 1981 and 2010-11

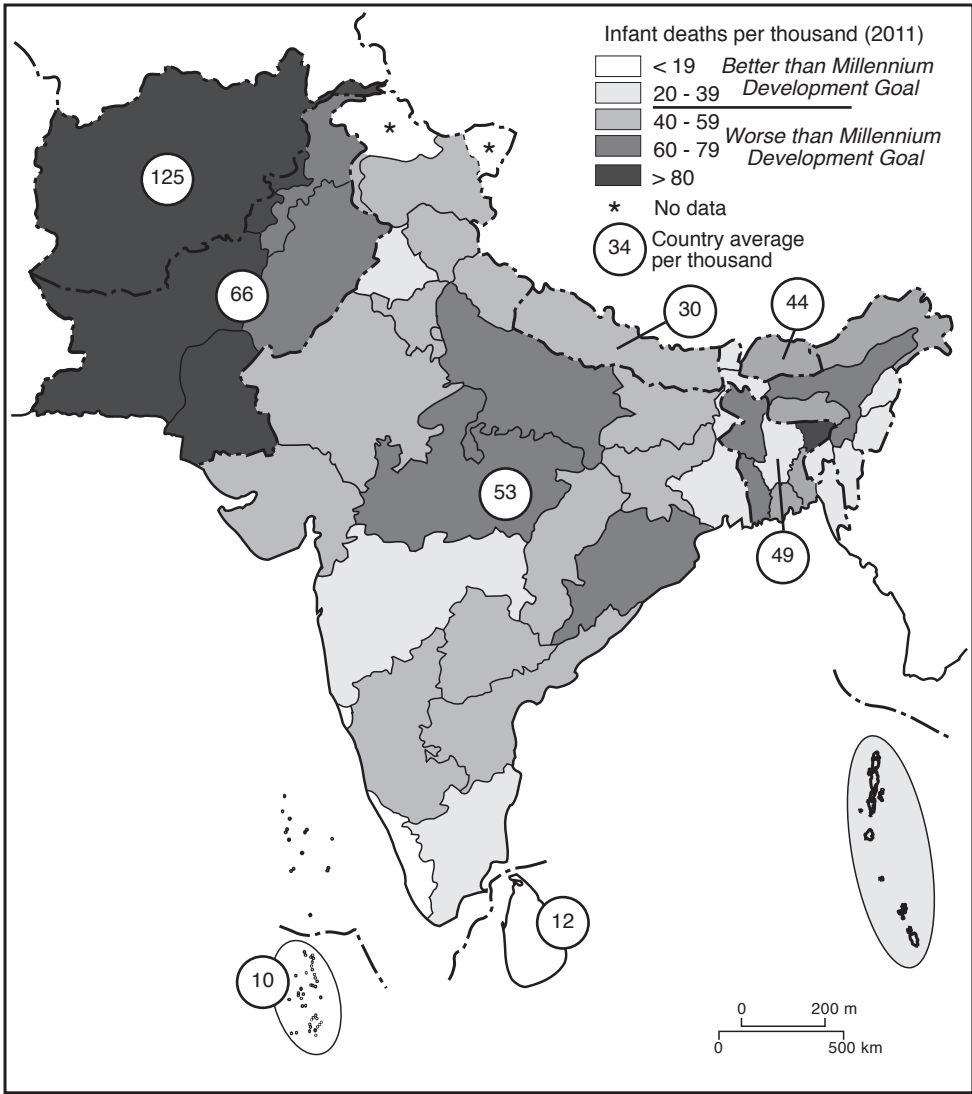
South Asia as a whole, the crude death rate in 2005–10 was just over a quarter that of the period 1950–55. The decline in the national averages of infant mortality rates was similar, from 189‰ to less than 50‰ live births. For all countries other than Afghanistan and Pakistan, the fall in both indicators was greater. Most striking is the decline in the crude death rate in Maldives, from nearly 28‰ to only 3.7‰. Nepal, Bangladesh and Sri Lanka were all below 7‰. India's crude death rate remained above 8‰ in most of the country.

Infant mortality

Infant mortality is commonly defined as the number of deaths of children under the age of one in a given year, per 1000 live births in the same year. In comparison with most of the developed world, the infant mortality rates for South Asia remain very high. As Map 55 shows, current infant mortality rates in most of South Asia are significantly higher than the targets set in the Millennium Development Goals. High levels of infant mortality commonly result from high levels of malnutrition, poor hygiene in the environments of the place of birth and the residence for the early months of life, high prevalence of disease and poor water quality. These are often exacerbated by inadequate or wholly absent medical facilities for mother and child. In many areas of South Asia such conditions remain widely prevalent, even in countries such as India, which has experienced high levels of economic growth over the last two decades. A Save the Children report (May 2013), quoting India's Sample Registration Survey 2011, said that over one third of the world's malnourished children live in India. India accounts for 29 per cent of all the world's 'first-day deaths', i.e., 390,000 a year. Madhya Pradesh, Uttar Pradesh and Odisha are particularly severely affected. South Asian countries have among the poorest records on child and mothers' health. Pakistan, India and Afghanistan (in descending order) are in the bottom five in the South Asian ranking. In contrast, Nepal and Bangladesh have made particularly striking progress over the last twenty years, reducing infant mortality by 47 per cent and 49 per cent, respectively.

India's rates of infant mortality showed great variations around its national average of 53‰ live births. The eight most backward states, termed by the Indian Government as the 'Economically Empowered Action Group States', have the highest neonatal (< 28 days old) mortality rates in the country. Neonatal mortality has been estimated to constitute about 60 per cent of total infant mortality in India. Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand and Uttar Pradesh all have neonatal mortality rates between 60‰ and 79‰, well above the national average. One study has suggested that making full antenatal care available to all pregnant women, giving assistance at delivery and good postnatal care would have a major impact on the high rates of neonatal mortality (Arokiaswamy and Gautam, 2008).

The gap between targets and achievements highlights the ongoing challenges in lowering mortality rates, stimulating development that reaches the poorest in the most backward regions. Achieving peace and stability in those parts of South Asia where high crude death and infant mortality rates continue to go hand in hand remains vital.



Map 55 Infant mortality in South Asian Provinces and States, 2010–11

Sex selective abortion

The ready availability of gender-determination and abortion technology across Asia over the last two decades has already had a measurable effect on the gender balance of under ten year olds. The trend has been pronounced in some relatively developed states, such as Punjab and Haryana in India, and among better-off social groups. According to the Census of India, by 2011 the ratio of males to females had increased from 104 in 1981 to over 109 in 2011. The states of Punjab had already recorded a ratio of 126 by 2001, and the trend of what then-Indian Prime Minister, Manmohan Singh called a ‘national shame’ has continued. Sex-selective abortion is illegal in India, yet there is widespread evidence that the law is ignored.

Life expectancy

Life expectancy across South Asia rose from 42 years in 1961 to over 65 years in 2010 (Index Mundi 2013). Male life expectancy rose from 44 to 64 years in the period, while female life expectancy was slightly ahead, rising from 43 to 67 years. There was a wide range in life expectancy across the region. Life expectancy in Afghanistan was still only 49 years in 2011, compared with Maldives, where life expectancy had reached 79 years. Sri Lanka was close behind, with a life expectancy of 75 years, while all the other South Asian countries registered figures in the sixties: Bangladesh and Nepal 69 years, Bhutan 66 years, India and Pakistan 65 years. These life expectancy figures reflect a bundle of social, economic and medical factors. There are direct correlations among life expectancy and nutrition, education and health care. In Afghanistan the very short life expectancy has been exacerbated by ongoing civil wars and by the slow pace of social and economic modernisation.

Conclusion

All of the South Asian countries can point to significant progress on the path to greatly reduced infant mortality and a general pattern of low fertility and low mortality. Nonetheless, the social, political and economic challenges in the way of reaching a stable population with low mortality and low fertility remain immense.

19 Urbanisation

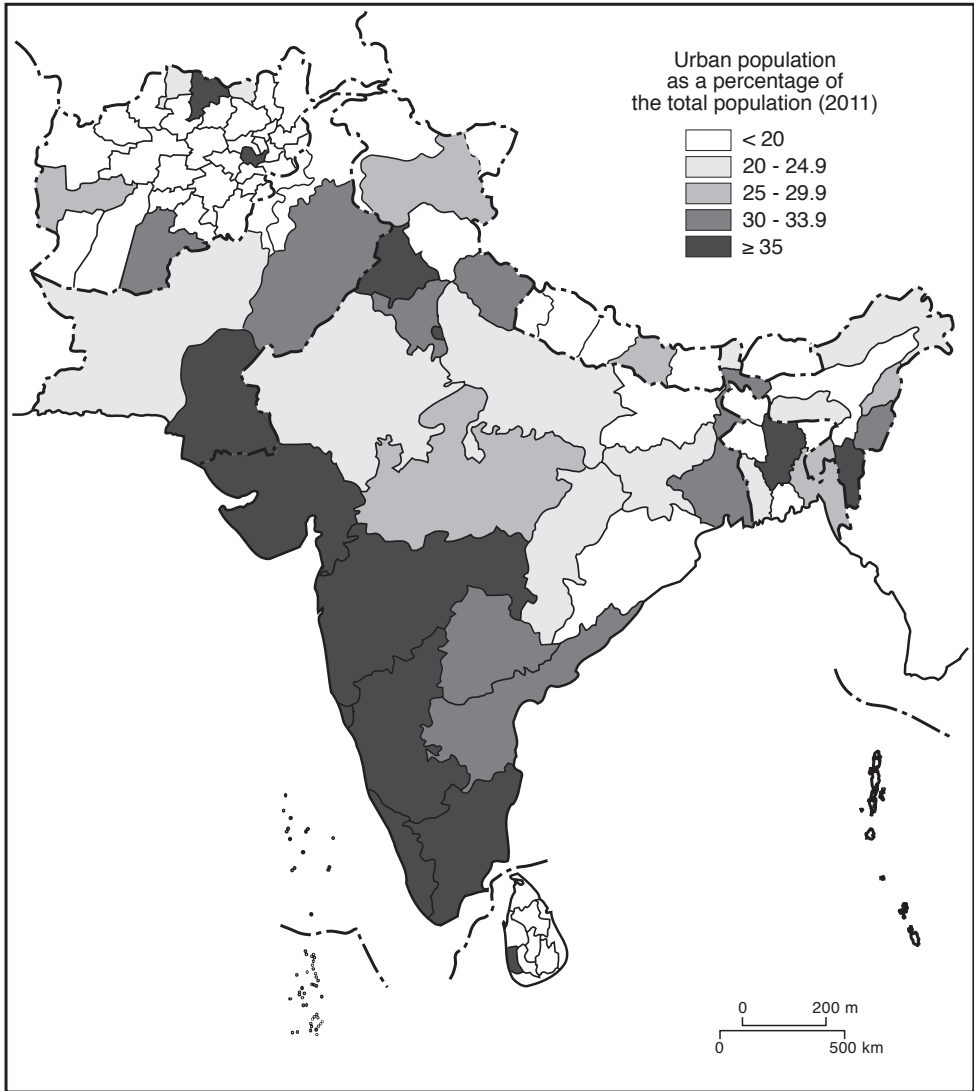
Since they gained Independence, all of the South Asian countries have seen a transformation of urban life. This transformation has been most visible in the growth of their cities. In 1951 India, for example, had an urban population of just over 62 million, 17 per cent of its total population. The largest city in South Asia, then Calcutta (now Kolkata), had a population of 4.6 million. By 2011, Mumbai had grown to become India's largest city, with a population of its metropolitan agglomeration standing at 18.4 million. Delhi had reached over 16 million, Kolkata 14 million and Chennai and Bengaluru both over 8 million (Census of India 2013). India has not been alone in experiencing the rapid growth of mega-cities. In Pakistan, Karachi has become South Asia's – and by some reckonings, the world's – largest city, with over 21 million people in its metropolitan area. Dhaka, the capital of Bangladesh, has also witnessed explosive growth to reach its current estimated population of 15 million.

While such figures suggest a dramatic transformation of the urban landscape, change has not been restricted to population growth. In 2015 cities in South Asia have come to dominate the economic, political and social landscape of all South Asian countries. They have become the centres of all advanced education, the hubs of political life and the main drivers of economic growth. With the exception of raw material extraction industries, manufacturing and services are very largely city-based, laying the economic foundations for the rise of a broad-based middle class. In some cases the cities have also been the centres of ethnic and religious conflict and criminal turf wars, and urbanisation is far more than simply a matter of demographic change.

The larger South Asian economies – India, Pakistan and Bangladesh – are all experiencing a sea change in the economic role of their major cities. A McKinsey Global Institute analysis of Indian urbanisation in 2010 predicted that by 2030 urban centres would provide nearly 70 per cent of the country's Gross Domestic Product – and perhaps 80 per cent of the tax revenues (Sankhe et al 2010). The rapid development of urban national transport networks over the last two decades has enhanced the advantages of central locations for many economic activities. Some of the biggest cities are not only improving their connectivity in terms of the global airline business, but are also becoming increasingly important hubs for all forms of communication – radio, TV and newspapers, mobile phone networks and the Internet are all urban focused. Despite the headline news created by the terror campaigns of the Taliban, the results of the 2013 Pakistan elections suggest that the overwhelming majority of Pakistanis are looking for improved development, better education and more opportunity for the rising class of educated young people. Such demands are particularly strong in the urban areas, though few parts of the region are exempt from the new thirst for opportunity.

Given the scale of the impact of South Asian cities across the region, the rates both of urban growth (the growth in the number of people living in cities) and of urbanisation (the growth in the proportion of the population living in cities) have been slower than in many comparable countries in Asia and beyond. Countries in East Asia – China, the Republic of Korea, Malaysia

and Indonesia, for example – have seen far faster rates of urbanisation than any of the South Asian countries. Thus in 1991 Indonesia had 31 per cent of its population classed as urban, when India's urbanisation was 25 per cent. Yet by 2011 the proportion of Indonesia's population living in cities had reached 44 per cent, against 31 per cent in India.



Map 56 The urban population of South Asia, 2011

Levels of urbanisation across India are far from uniform. Map 56 captures the broad regional patterns of urban development across South Asia. Large tracts still have less than 20 per cent of their population urbanised. In India a series of states with less than 25 per cent urbanised runs from west to east across the country. From Rajasthan in the west with less than 25 per cent in cities, it runs through Uttar Pradesh (22 per cent) in north central India to Bihar (11 per cent) to its east. Odisha to the southeast has 17 per cent urbanised and Assam to the northeast 14 per cent. In contrast, the southern and western states are more highly urbanised; Tamil Nadu and Kerala

in the far south (48 per cent), Karnataka (39 per cent) and Maharashtra (45 per cent) and Gujarat (43 per cent) in the west all have over 35 per cent of their populations now living in cities. Punjab, in the northwest (36 per cent urban in 2011), has urbanised on the back of a rapid transformation of its agricultural sector into a small-scale industrialising hub, while the small northeastern hill state of Mizoram (52 per cent) is the only state in India with more than half of its population in towns and cities. In Pakistan and Bangladesh only Sindh and Dhaka respectively have more than 35 per cent of their populations urbanised.

There is ongoing academic debate about the polarising effects on income distribution of both the programme of economic liberalisation in South Asia and the growth of urbanisation. There has been a widening in income disparities, both between the richer and poorer social groups within society as a whole and within urban society in particular, and also between urban and rural areas (Ahluwalia 2000, 2002; Chandrasekhar and Ghosh 2004; Deaton 2005; Deaton and Dreze 2002; Pal and Ghosh 2007). There are sharp disparities within urban areas between the upwardly mobile, educated and relatively prosperous minority and the still very large proportion of urban dwellers living in extreme poverty. These include both the large numbers of recent migrants and those born to extremely poor families in the cities themselves.

Slums in South Asia

Map 57 shows the remarkably high proportion of South Asia's urban dwellers who live in what are loosely called 'slums'. In most of the large South Asian cities such 'informal' or 'squatter' settlements have local names – *jhuggies* in Delhi, *chawls* in Mumbai, *cheris* in Chennai, *bustees* in Kolkata, *katchi abadis* in Karachi, and so on. The Census of India (2011) stated that:

A slum, for the purpose of Census of India, has been defined as a residential area where dwellings are unfit for human habitation by reasons of dilapidation, overcrowding, faulty arrangements and design of such buildings, narrowness or faulty arrangement of street, lack of ventilation, light, or sanitation facilities or any combination of these factors which are detrimental to the safety and health.

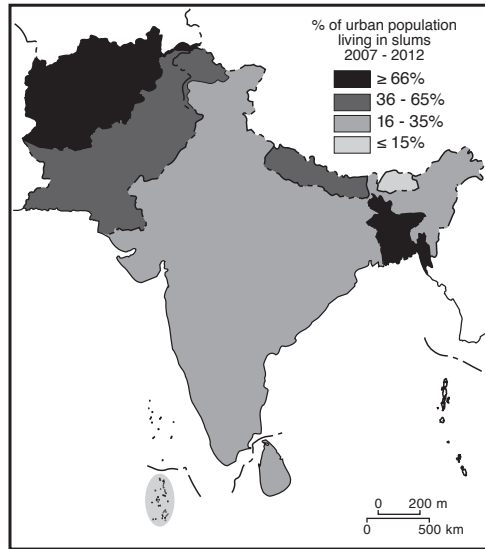
(Census of India 2011; Chandramouli 2011)

The statistics for India are striking. Over 2500 of India's 4000 towns reported the presence of slums. In total, there were over 37,000 notified slums across the country. 17 per cent of the country's total urban households were slum households. In Andhra Pradesh, which had the highest proportion of urban households, slum households accounted for over 35 per cent. Chhattisgarh, Madhya Pradesh, Odisha and West Bengal, all in the top five slum reporting states, had over 20 per cent. At the other end of the scale, Kerala had only 1.5 per cent of urban households as slum-dwelling, and the four other states at the bottom of the scale, Assam, Jharkhand, Gujarat and the Union Territory of Chandigarh, all had under 10 per cent.

Figures for the major metropolitan cities in India are daunting. In the capital, Delhi, nearly 15 per cent of households are slums. The figures rise steadily in Chennai (29 per cent), Kolkata (30 per cent) and Greater Mumbai (41 per cent). But it is not just a problem of the largest cities. Ten of the cities with a population of at least a million have over 30 per cent in slum households. Over half of slum dwellings have no more than one room, and 5 per cent have no exclusive room. Nearly 20 per cent of slum households have no drainage connection, and a further 44 per cent only have open drains. Yet the slums have also seen significant developments. In 2011 nearly three quarters of slum households had a tap water connection, and two thirds had

drinking water from a treated source – a higher proportion than non-slum households. Nearly 64 per cent of slum households now had a mobile telephone, 40 per cent had a bicycle and over 20 per cent had a motor scooter ('two-wheeler').

This slum situation is far from unique to India. A survey in 2013 suggested that there were over 4000 slums housing over 3.5 million people in Dhaka (BDNews24 2013). In both Nepal and Afghanistan estimates suggest that over 90 per cent of the urban population live in slums. The precise nature of the challenges faced varies according to the local environment. In Kabul, very cold winters leave slum dwellers, who have wholly inadequate protection, exposed to bitter conditions.



Map 57 The proportion of the urban population living in slums
Source: The World Bank (2012)

The prospects of urban development

Infrastructure

The major cities of South Asia are facing multiple issues of survival. The provision of protected and safe drinking water remains a far-off target for tens of millions. National and regional governments are putting large-scale resources into improving both total supplies and the quality of water. The draw-down of groundwater in Dhaka and Karachi, for example, is threatening to be wholly unsustainable.

Transport systems

All the 'metro' cities of South Asia pose major infrastructural challenges. Public transport provision is hugely overstretched. Some of the largest cities – Delhi, Kolkata and Chennai in India, for example – have developing metro networks. However, many people are dependent either on an inadequate bus service, auto-rickshaws (three-wheelers), or personal transport – cars, two-wheelers and bicycles. Overcrowding is almost universal, and air pollution remains a major problem despite efforts taken by some governments to curb the use of the most polluting engines.

Underlying these issues, the last decade has seen a surging demand for private cars. World Bank (2013) data shows that South Asia remains one of the least motorised major world regions (World Bank 2013). Per thousand of population the figures are shown in Table 20. Given the very large populations of all the major South Asian countries, the absolute numbers of cars in the bigger cities is transforming the urban transport system. Traffic jams are commonplace, and modern traffic management systems have yet to be fully developed.

Table 20 Motorised vehicles per 1000 population in South Asia

<i>Country</i>	<i>Motorised vehicles per 1000 population, 2009–2013</i>
Afghanistan	29
Bangladesh	3 (2009)
Bhutan	70
India	18 (2009)
Maldives	12 (2009)
Nepal	7
Pakistan	20
Sri Lanka	48 (2009)

Source: World Bank (2013)

The figures may be compared with those for the US (786), or Germany (588). Comparators in the developing world include China (69), and South Africa (165).

While the rates of motor vehicle ownership remain very low across South Asia, ownership in urban areas, especially of private cars, has been increasing rapidly. India has seen the most rapid growth in the sale of all motorised vehicles. By 2012–13 total motorised vehicle sales had reached approximately 20 million. Of these 2.7 million were cars, 0.8 million commercial vehicles and nearly 14 million two-wheelers (Society of Indian Automobile Manufacturers 2013).

Rapid transit

One of the most potent symbols of urban change is the current expansion of Mass Rapid Transport systems. Kolkata opened the first such system in South Asia in 1984, although it was based on an already dated technology. Chennai opened the first stages of its MRT system in 2002, and Delhi Metrorail also began operating in 2002. In 2014 the Delhi Metro covered 190 km. The earliest lines were on Indian Broad Gauge, but subsequent lines, including the Airport Express, have been on Standard Gauge because of the lower cost of imported rolling stock. In 2013 the Delhi Metro carried nearly 2.5 million passengers a day, or over 700 million a year. By 2020 India plans to have opened metro systems in eleven additional cities.

India is the only South Asian country to have a modern urban rapid transit rail system. A new Metro system has been approved for Dhaka, and a contract for the first line signed with the Japan International Corporation. In November 2013 the Government of Bangladesh also signed an agreement with the Delhi Metro Rail Corporation to provide a range of support for the Dhaka metro project, though the major tie up is with Japanese assistance. After several postponements, work is planned to start in 2016–17.

Pakistan has explored rapid mass transit systems for Karachi, Lahore and Peshawar. A rapid transit rail system proposal for Lahore was abandoned in 2013 in favour of an improved bus system. Plans were announced for a new MRTS in Karachi in 2013, to be built with Japanese collaboration, but in 2014 there was no finalised schedule. Peshawar is also planning a single line, 18 km metro sky train, to be in operation by 2016.

Conclusion

The patterns of urbanisation in South Asia often bemuse the outside observer. The extremes of poverty and wealth so closely juxtaposed would not have surprised a visitor from early nineteenth century Britain or Western Europe, nor would the often overwhelming problems of sanitation and public health or the lack of protected water supplies. Yet in the century of industrialising Europe's most rapid growth, the proportion of the population living in towns and cities in the most rapidly industrialising country, Britain, grew from 20 per cent to over 80 per cent. In India over the last hundred years, the proportion of the population living in cities remains stubbornly below 35 per cent. At the same time, the dynamic cities of South Asia are the centres of a social and economic transformation that looks set to gather pace.

20 Health and morbidity

Since the early 1990s, alongside its rapid economic development in many areas, South Asia has experienced major reductions in crude death rates. However, the improvement in the provision of health care and the eradication of a variety of life-threatening diseases are still strategic priorities in every country of the region. A number of diseases remain prevalent, including malaria, tuberculosis, HIV/AIDS, cholera and other water-borne diseases. Child and maternal health is seriously compromised by the lack of clean water, poor access to health care and inadequate diets in many parts of South Asia. There are wide regional disparities in major health indicators, and although the over-crowded and under-resourced slums across the region pose major health hazards, remote rural areas are often even more seriously disadvantaged in terms of basic health needs. Effective management of water resources, from storage to the provision of protected clean water supplies and efficient drainage, hold the key to achieving a significant reduction in many of the diseases that continue to take millions of lives across South Asia.

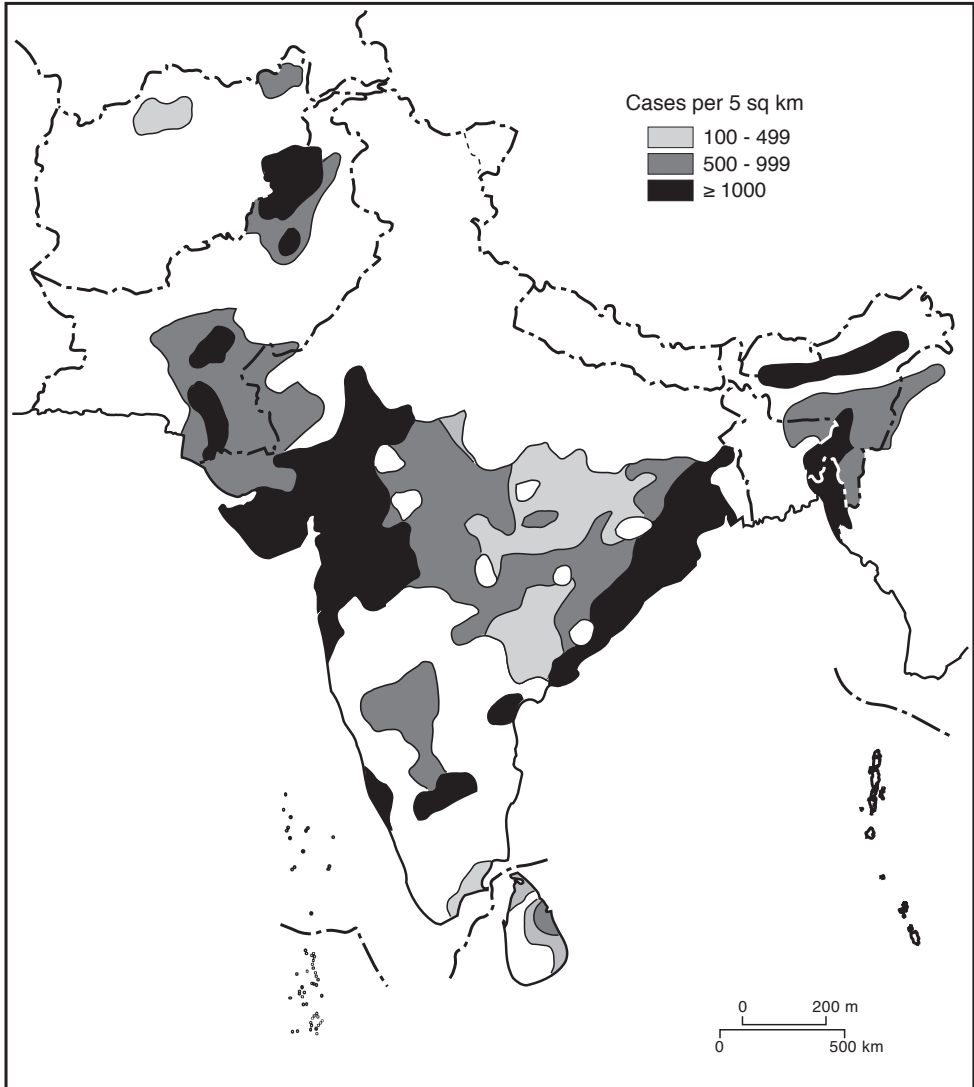
Malaria

It has been estimated that 36 per cent of the world's population is exposed to the risk of contracting malaria. Together with measles and water-borne diseases, such as cholera and dysentery, it contributes perhaps 85 per cent of the world's infectious disease burden. According to the World Health Organisation there were 198 million cases of malaria worldwide in 2013, of which up to 20 per cent were in South Asia. Of the five types of malaria, *Plasmodium falciparum* and *Plasmodium vivax* accounted for the overwhelming majority of clinical cases of malaria (Oxford Malaria Project 2015). Both are protozoal parasites, carried by female *Anopheles* mosquitoes.

According to Snow et al (2005), the incidence of malaria outside Africa is much higher than previously estimated (i.e., nearly 119 million cases out of global estimates of 515 million). However, as Hay and Snow (2006) have argued, 'national malaria reporting continues to be fanciful'. For many years *P. falciparum* has been regarded as the greatest problem and has been described as the only strain responsible for malaria-related deaths. This is now believed to be incorrect, with growing evidence that *P. vivax* is also a killer. In addition, South and South East Asia have half of the world's total incidence of *P. vivax*, which is estimated at between 71 and 80 million. The majority of these cases are probably in India. There are however, severe problems in estimating current incidence of malaria (Hay et al 2007).

Malaria has many ramifications in terms of public health, other than simply raising death rates. In addition to premature mortality, it has long been recognised that malaria has seriously debilitating social, economic and psychological effects. In 1935 it was estimated that in India alone

100 million people had contracted malaria, of whom one million died. In 1947 there were an estimated 75 million cases (22 per cent of the 334 million population). In addition to premature death, long-term psychological disorders are translated directly into a reduction of the productivity of the labour force and an increased burden on families, as well as on personal, community and state resources.



Map 58 The clinical burden of *P. falciparum*, 2007

After: Hay, S. et al (2010)

The geographical distribution of *P. falciparum* and *P. vivax* in South Asia reflects a number of factors. The highest incidence of both is across central India, with a subsidiary concentration in the northeast, and a further area on the borders of Pakistan and Afghanistan. Some of these

Table 21 The incidence of *P. falciparum* malaria in South Asia, 2007

Country	<i>P.falciparum</i> clinical cases ('000s)	% of total cases in South Asia
Afghanistan	719	0.62%
Bangladesh	9375	8.12%
Bhutan	165	0.14%
India	101,527	87.98%
Maldives	0	0.00%
Nepal	16	0.01%
Pakistan	3264	2.83%
Sri Lanka	335	0.29%
South Asia	115,401	

Note: These figures are based on modelled data with a wide range of variance at the 95 per cent level. They represent the most credible estimates currently available. Note that the minimum credible number of *P. falciparum* in India is 31 million, while the maximum could be as high as 187 million (Hay et al 2007).

remaining concentrations are in tribal areas, often currently or recently forested, where the conditions for stable malaria remain. Chhattisgarh alone has nearly 25 per cent of India's *P. falciparum* cases. Similarly, the distribution in Bangladesh is largely restricted to the forested hill tracts of the southeast bordering India.

Tuberculosis

A World Health Organisation special report on tuberculosis (2014) reported that nine million incidents of tuberculosis were reported globally in 2013. Nearly one and a half million people died, of whom 360,000 were among HIV positive. The scale of the social and economic burden is indicated by the number of children orphaned by the disease, estimated at 9.7 million. India alone accounted for 24 per cent of the people who developed TB (Floyd et al 2014).

Table 22 Tuberculosis 'high burden countries' (WHO) in South Asia - incidence in 2011 (best estimates)

Country	Mortality absolute/rates per 100,000	Prevalence ¹ absolute/rates per 100,000	Incidence ² absolute/ rates per 100,000
Afghanistan	13,000/39	110,000/351	61,000/189
Bangladesh	68,000/45	620,000/411	340,000/225
India	300,000/24	3,100,000/249	2,200,000/181
Pakistan	59,000/33	620,000/350	410,000/231

Source: Floyd, K. et al (2014) WHO Estimated burden of disease caused by TB

1. Prevalence: Either the number of people found to have a given condition, or expressed as a proportion of the total population.

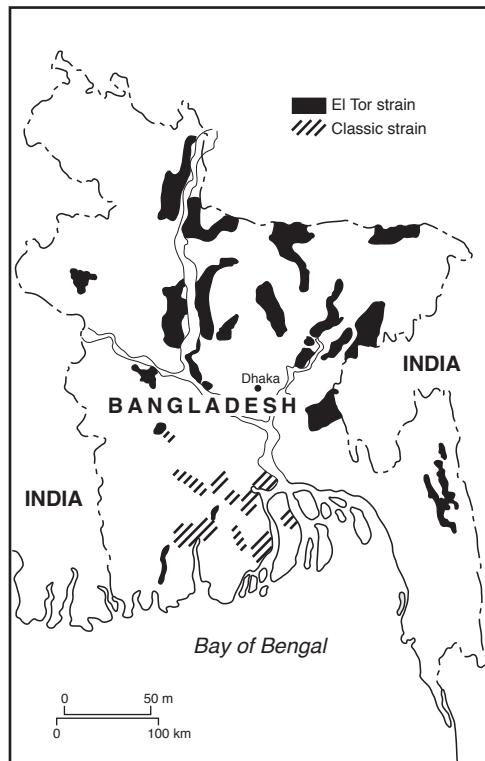
2. The incidence rate is the number of new cases or the number of new cases per population in a given time period.

India and China together are estimated to account for 40 per cent of the world's tuberculosis cases. The global Millennium Development Goals (MDG) target of beginning to reverse the expansion of tuberculosis by 2015 has already been reached. However, the scale of the problem remains very great. Afghanistan, India, Pakistan and Bangladesh are all classified by the WHO as 'High Burden Countries'. It remains very difficult to obtain a full picture of the continuing extent of the problem. It was only in 2012 that India declared tuberculosis to be a notifiable disease, and all doctors, clinics and caregivers treating a tuberculosis patient now have to report every case. Thus, the best estimates quoted in Table 22 have a significant margin of error.

Cholera

According to the WHO, cholera spread from its original home 'reservoir' in the delta of the Ganga during the nineteenth century. In the period since there have been a series of global pandemics, the most recent of which started in 1961 in South Asia and reached the Americas in 1991. It is now endemic in many countries.

The major difficulty in assessing the prevalence of cholera in South Asia is that cholera cases are not notified. The Bulletin of the WHO reported in 2010, on the basis of a study of a wide range of published research, that actual figures of cholera incidence in India from 1997–2006 were at least six times those reported by the Government of India to the WHO. The WHO itself does not publish estimates for the prevalence of cholera, and reliable statistics are notable for their absence. Nonetheless, evidence suggests that prevalence remains high.



Map 59 Cholera outbreaks in Bangladesh during the flood events of 1988–89

Thus while no cholera cases have been reported in Bangladesh during the last decade, estimates suggest that there may be over one million cases a year.

The 2010 World Health Organisation Report said that cholera affects areas outside the traditional Gangetic and Brahmaputra deltaic regions of India. The main factors in the spread of cholera, as for other diseases spread by faecal contamination of water, are the lack of drinking water, poor water purification and poor hygiene. These difficulties are made worse in times of floods (Kanungo et al 2010). The seasonality of heavy rains during South Asia's monsoons contributes directly to the concentration of cholera outbreaks during these periods.

HIV and AIDS

The Indian government first took official notice of an HIV/AIDS risk in 1987, establishing a National Aids Control Programme. There has been continuing dispute within India as to the extent of AIDS in the country. That debate takes place, as in most of South Asia, in a context of reticence over public debate about sex and a deep taboo on homosexuality. Article 377 of the Indian Penal Code outlaws sexual acts between people of the same gender. In 2013 the Supreme Court overturned a ruling of the Delhi High Court that such a provision was unconstitutional, stating that it was the responsibility of Parliament to change the law, not the courts. Homosexual acts are outlawed across South Asia, though attitudes in practice vary widely. Homosexuality is widely tolerated in Sri Lanka, for example, and even where there is great hostility to practising homosexuality, as in Pakistan and Bangladesh, there are lesbian and gay communities.

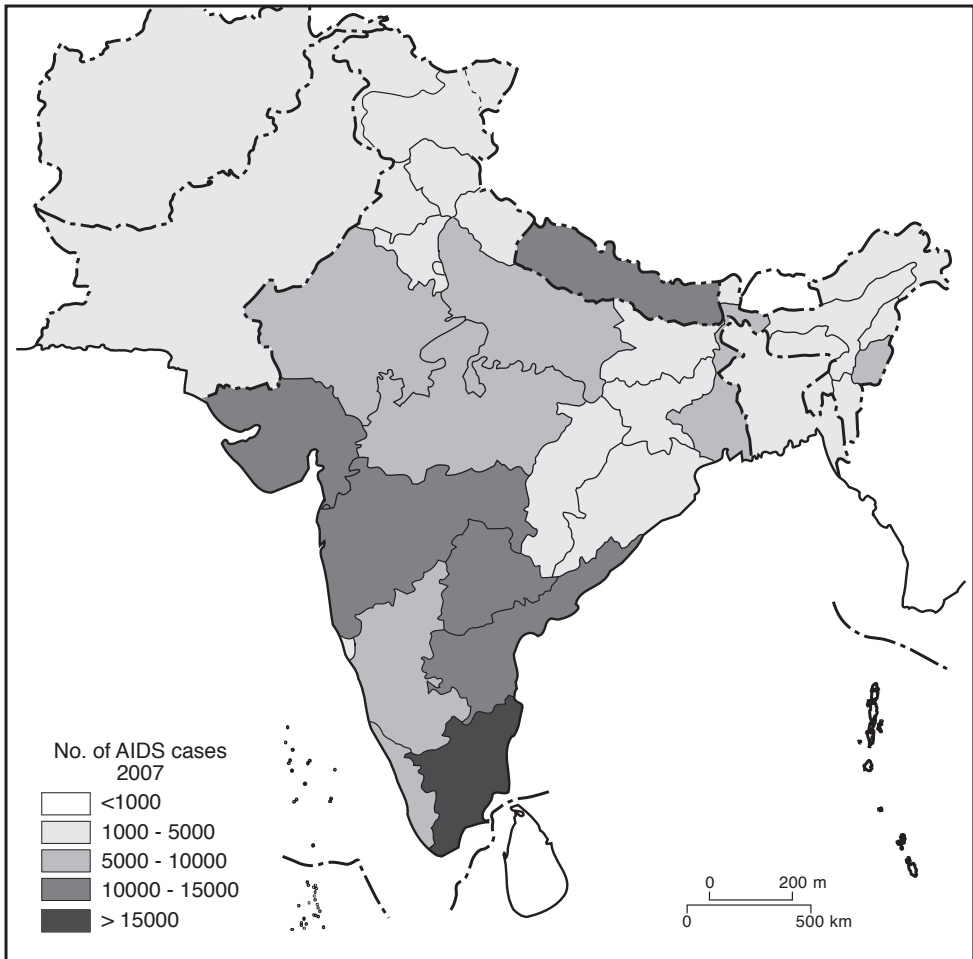
Attitudes to homosexuality are just part of the background to the understanding of HIV/AIDS in the sub-continent. The UN estimates that India is home to the largest absolute number of people with AIDS outside Africa, but in terms of rates per thousand of the adult population, rates overall in South Asia are low.

Table 23 HIV prevalence in South Asia

<i>Country</i>	<i>HIV Prevalence</i>
Afghanistan	<0.5%
Bangladesh	0.1%
Bhutan	<0.5%
India	0.2 – 0.5%
Maldives	<0.1%
Nepal	0.3%
Pakistan	<0.1%
Sri Lanka	<0.1%

Source: Rodrigo, C. and Rajapakse, S. (2009)

There is some recent evidence (2012) that adult HIV rates in India are declining, from a prevalence of 0.36 per cent in 2006 to 0.31 per cent in 2009.



Map 60 Incidence of AIDS, 2007

A nationally representative survey in India, based on over one million homes, suggested that HIV accounted for between 59,000 and 140,000 deaths among all people between the ages of 15 and 59 years (Jha et al 2010). The authors argue that their results suggest a total infected adult population of between 1.4–1.6 million, 40 per cent lower than the estimate for 2006. There remains a significant margin of error in the data, though not enough to invalidate the trend.

Conclusion

South Asia remains home to some of the world's major life-threatening diseases. The toll of malaria, cholera, tuberculosis and HIV/AIDS goes well beyond those directly affected, with major costs for families, the wider community and for governments. While the enumeration and documentation of all these diseases is often poor, their impact is still clearly evident. They continue to demand a totally focused response from governments if further progress is to be made towards their eradication.

21 Literacy in South Asia

After more than sixty years of government-supported efforts to spread education, with literacy as its most basic component, there are still no major regions that can claim 100 per cent literacy. Within the larger countries there are great regional disparities. There are also major contrasts between rural and urban areas and most strikingly between male and female literacy. Enormous challenges remain to be overcome if universal literacy is to be achieved across the whole of South Asia.

The statistical data on literacy in South Asia present only a partial picture of the true position, and they need to be treated with caution. Definitions of literacy vary widely. Furthermore, the testing of literacy across South Asia is not uniformly reliable. Many of the figures are no more than best estimates, and there are significant disparities between data collected from different sources. International comparisons can only be used to give a rough approximation of relative measures of literacy.

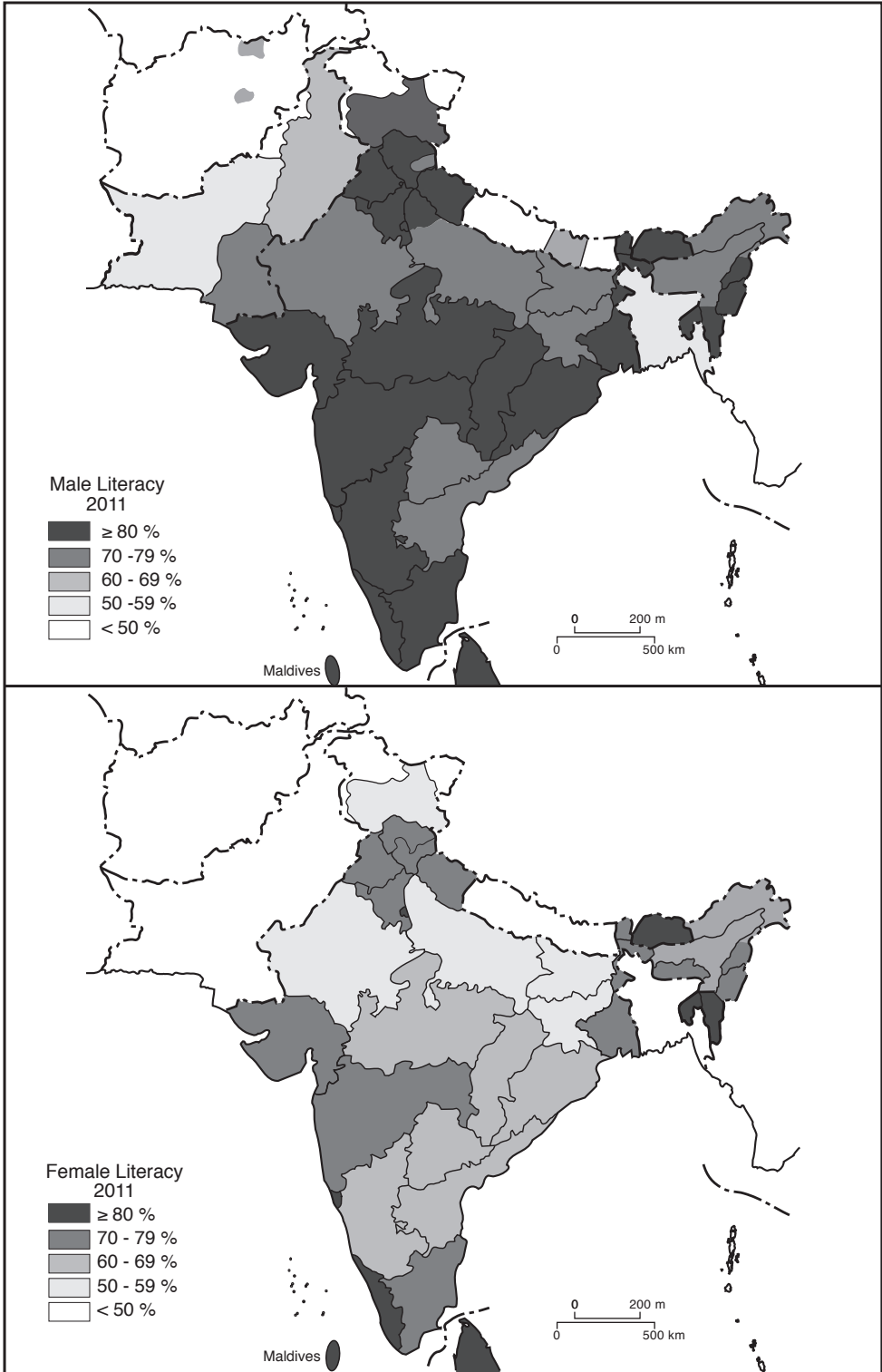
Table 24 Adult literacy rates in South Asia, 2011

Country	Urban (%)	Rural (%)	Male (%)	Female (%)	Total (%)
Afghanistan	26	9	39	13	28
Bangladesh	68	55	61	51	55
Bhutan	na	na	80	68	74
India	85	69	90	79	82
Maldives	98	95	93	95	94
Nepal	60	na	73	48	59
Pakistan	74	48	69	45	57
Sri Lanka	93	92	95	91	93
South Asia	72	53	75	61	68

Source: World Bank (2014)

Despite the continuing low levels of literacy in many parts of South Asia, the proportion of people with basic literacy has steadily increased. In India alone, for example, the 2011 Census enumerated 779 million literates: 493 million males and 285 million females. These figures compared with a total of 106 million literates in 1961 (68 million males and only 37 million females).

This nearly eightfold growth is a testament to the efforts that have been made to spread education. However, these have been hampered by persistent poverty, political upheaval, high rates of population growth and, in many areas, political inertia. Furthermore, significant gender inequality remains a characteristic of many aspects of social institutions in South Asia. Beyond a narrow élite, gender inequality in education is also widespread (see Map 61) and is particularly



Map 61 Male and female literacy in South Asia, 2011

evident in low levels of rural literacy in many parts of the sub-continent. There are only small areas of South Asia in which over 80 per cent of the rural population is literate.

The result is uneven progress towards meeting the Millennium Development Goals. The second MDG target is to 'Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling' (UN 2008). Map 61 reveals that many parts of South Asia are far from reaching 80 per cent literacy, even for males. Nationally, only Bhutan, Sri Lanka and Maldives have reached this level.

India

The Census of India 2011 showed that fewer than half of the states and union territories of India had achieved over 80 per cent male literacy. Of the full states (as distinct from the union territories), only three groups had reached this level: Himalayan states of the north, Himachal Pradesh, Uttarakhand and Sikkim; northeastern hill states, Nagaland, Manipur, Mizoram and Tripura; and the western and southern states, Maharashtra, Goa, Kerala and Tamil Nadu.

Of these, only Mizoram, Tripura and Kerala had reached 80 per cent female literacy by 2011.

Table 25 Adult literacy rates in India, 2011

	Total	Male %	Female %		Total	Male %	Female %
Jammu & Kashmir	68	82	66	West Bengal	77	83	71
Himachal Pradesh	84	91	77	Jharkhand	68	79	56
Punjab	77	82	71	Orissa	73	82	64
Chandigarh*	86	91	81	Chhattisgarh	71	82	61
Uttarakhand	80	88	71	Madhya Pradesh	71	81	60
Haryana	77	85	67	Gujarat	79	87	71
NCT of Delhi*	86	91	81	Daman & Diu*	87	92	80
Rajasthan	67	81	53	Dadra & Nagar Haveli*	78	87	66
Uttar Pradesh	70	79	59	Maharashtra	83	90	75
Bihar	64	73	53	Andhra Pradesh	68	76	60
Sikkim	82	87	76	Karnataka	76	83	68
Arunachal Pradesh	67	74	60	Goa	87	93	82
Nagaland	80	83	77	Lakshadweep*	93	98	88
Manipur	80	83	77	Kerala	94	96	92
Mizoram	92	94	89	Tamil Nadu	80	87	74
Tripura	88	92	83	Puducherry*	87	92	81
Meghalaya	76	77	74	Andaman and Nicobar islands*	86	91	82
Assam	73	79	67	India Total	74	82	66

Source: Census of India (2011)

* Union Territories

On the positive side, the gender gap has been narrowing steadily for over fifty years, in both urban and rural areas. In 1961, nearly 71 per cent of urban males were classified as literate, compared with less than 44 per cent of urban females, leaving an urban gender gap of over 27 per cent. Decade by decade this has fallen, to a gap of just under 10 per cent in 2011. The narrowing of the gender gap in the rural literacy rates began much later – after 1981 – and to date has continued more slowly. In 1961 only 11 per cent of rural females in India were classified as literate, a figure that had climbed to 59 per cent by 2011. The gender gap had thus fallen from over 26 per cent in 1961 to under 20 per cent in 2011. The regional discrepancies were, however, still pronounced. The widest gender gap among rural populations was in Rajasthan, with a difference between male and female rates of over 28 per cent. At the opposite end of the spectrum, Kerala had a rural gender gap of only just over 2 per cent, with literacy of both male and female rural populations being over 90 per cent.

Pakistan

Pakistan has seen an increase in the number of literates, but a slower rise in the proportion of the population literate and a slower narrowing of the gender gap than India. Pakistan started from a significantly lower literacy base. Since 1972, immediately after the break-up of Pakistan and the secession of its eastern wing, there has been a steady increase in the proportion of the population classified as literate. In 1972 Sindh, which then had the highest levels of literacy overall in Pakistan, claimed 32 per cent of its population literate. Punjab had just over 20 per cent, Khyber-Pakhtunkhwa 16 per cent and Balochistan only just over 10 per cent of its total population literate. By 2009 literacy in Balochistan had reached 45 per cent, in Khyber-Pakhtunkhwa 50 per cent, and in Punjab and Sindh 59 per cent.

At 24 per cent, the urban-rural gap in literacy in Pakistan is still striking. And, while by 2011–12, the gender gap had narrowed to under 20 per cent in Punjab and under 15 per cent in urban areas, in Sindh it was still 26 per cent, in Khyber-Pakhtunkhwa nearly 38 per cent and in Balochistan almost 40 per cent.

Table 26 Literacy in Pakistan's provinces, 2011

<i>Province/Area</i>	<i>Total</i>	<i>Male % literacy</i>	<i>Female % literacy</i>
Pakistan	57.7	69.5	45.2
Rural	49.2	63.6	34.2
Urban	73.2	80.2	65.5
Punjab	59.6	69.1	49.8
Rural	52.5	64	40.7
Urban	73.5	78.9	67.8
Sindh	58.2	70.2	44.3
Rural	41	58.2	20.3
Urban	74.9	82.2	66.8
Khyber-Pakhtunkhwa	50.9	70.1	32.3
Rural	48.4	68.3	29.1
Urban	62.7	77.8	47.4
Balochistan	51.5	69.2	29.3
Rural	45.7	64.2	22.5
Urban	69.6	85	50.6

Source: Pakistan Economic Survey (2011)

The lowest rural/urban gap is in Khyber-Pakhtunkhwa at 14.3 per cent, followed by Punjab at 21 per cent, Balochistan at 24 per cent, and Sindh at 34 per cent.

Afghanistan

In 2012 UNICEF reported that there were 12 million children, including 2.4 million girls, in primary and secondary education. This compared with the period when the Taliban Government was in power in 2002, when education for girls was banned, and there were only 1 million children in full time education. Despite the progress, UNICEF identifies a series of outstanding challenges. Afghanistan's continuing conflict and powerful opposition to the education of girls remain major hindrances to full participation in education. Its 2012 report states: 'A general shortage of teachers and acute need for female instructors, coupled with too few physical structures, makes attendance difficult – particularly in rural areas. 60 per cent of the 4.2 million out-of-school children are girls, and there are no female students enrolled in grades 10–12 in 200 out of 412 urban and rural districts throughout the country'.

Bangladesh

In 2009 the Government of Bangladesh committed itself to a major expansion in its provision for universal education. These include extending primary schooling from five to eight grades, and achieving a 1:30 teacher to pupil ratio by 2018, and other measures to enhance technical and university education. Bangladesh achieved gender equality in primary school enrolment in 2009, with nearly 94 per cent enrolment. There has been a seven-fold increase in girls' secondary school enrolment since 1980, with a total of 57 per cent in 2008. Tertiary education has grown from a base of only 26,000 students in university education in 1970 to nearly 400,000 in 2011–12. However, against its target of achieving universal adult literacy in 2015, over 40 million adults remained illiterate.

Nepal

A mountainous terrain that makes communication exceptionally difficult, social and cultural norms that continue to discriminate against educational opportunity for girls, and extreme poverty are continuing obstacles to improving literacy rates beyond the Kathmandu Valley. These problems were exacerbated by the political upheavals that marked the last decade from the start of the Civil War in 1996 and the continuing political uncertainty that was a hallmark of Nepali life in the first decade and a half of the twenty-first century.

The World Bank's Nepal Living Standards Survey 2011 claimed a 59 per cent adult literacy rate (73 per cent for males and 48 per cent for females). It also reported that 40 per cent of women in Nepal aged 15 and above had no education (14 per cent for males), a further 16 per cent had completed primary education (20 per cent for males), and only 8 per cent of females had more than secondary education (15 per cent for males).

Bhutan

Adult literacy in Bhutan has grown steadily over the last two decades and was estimated at 74 per cent overall in 2010, with an 80 per cent rate for males and 68 per cent for females. Bhutan is placing emphasis on its Non-Formal Education (NFE) programme in order to improve adult literacy. The number of NFE centres increased from 5 in 1992 to 953 in 2012, with a current

enrolment of about 13,500 a year. It now also claims 100 per cent enrolment of primary school age groups. The basis for this claim is not entirely clear. In its report on progress towards achieving the SAARC Development Goals (2011), Bhutan's Royal Happiness Commission [sic] says 'Bhutan achieved universal primary enrolment ratio in 2007 with 106 per cent. In 2010, gross primary enrolment ratio further rose to 117 per cent. In terms of Net Primary Enrolment Ratio, Bhutan progressed well from 62 per cent in 2000 to 93.7 per cent in 2010' (Gross National Happiness Commission, Bhutan 2011). The report does not explain the basis of gross and net enrolment calculations.

Sri Lanka

In comparison with other South Asian countries, Sri Lanka has long had high levels of socio-economic development, including literacy. Despite a quarter of a century of civil war, education levels have only been surpassed in Maldives. Furthermore, levels of literacy are uniformly close to 90 per cent in all provinces, the lowest level being 87 per cent in Eastern Province, while the highest, over 96 per cent in Western Province, with Colombo at its heart. In most provinces the gap between male and female literacy is close to the national average of 3 per cent. The gap between male and female literacy is widest in Central (6.6 per cent), Eastern (6.5 per cent), Uva (5.9 per cent) and Sabaragamuwa (5.4 per cent) Provinces.

Maldives

Maldives has the highest literacy rate in South Asia, a position it has enjoyed for over a decade. Rapid rates of development and of the growth of Male, the capital, and heavy dependence on the global tourist industry and wider international trade have given high incentives to making rapid strides in literacy. Maldives is also the only South Asian country in which female literacy rates exceed male rates.

Conclusion

Improving literacy has a key role in wider development objectives. Despite significant progress in achieving basic literacy and in widening the access to higher education, in most parts of the region the continuing levels of illiteracy and the poor quality of much of higher education leave enormous challenges to be tackled. Gender inequality remains deeply rooted, especially in Pakistan and Afghanistan and in some Indian states, contributing to wider economic and social inequalities.

22 South Asia's external borders

The legacies of an Imperial past

The Himalaya are the finest natural combination of boundary and barrier that exists in the world. It stands alone. For the greater part of its length only the Himalayan eagle can trace it. It lies amidst the eternal silence of vast snowfields and icebound peaks.... Could you stand on one of the lower and outer ranges in Kashmir, or in Garhwal, or Nepal, or at Darjeeling, and watch on some clear day the white outline of the distant snowy range, you would realise then that never was there such a God-given boundary set to such a vast impressive and stupendous frontier.

(Holdich T. 1916)

Except as myths to inspire the troops, there are no natural frontiers. All political frontiers are unnatural, the result of policy, compromise and temporary power relationships... no frontier, real or idealised, can be considered immutable.

(Wilkinson J.C. 1975)

External borders

As Sir Thomas Holdich's observation suggests, those who drew up South Asia's boundaries were constantly looking out for physical features that would offer natural divides. Holdich was a military surveyor in India from 1865–1900. In charge of the Survey of India Frontier Field Force, 1879, and the Superintendent of Frontier Surveys from 1892–98, he served extensively on the Afghanistan and northern Indian borders. At the least, he believed, appropriate physical features could reinforce the effectiveness of boundaries that were drawn. Of such features, the Himalaya offers the most striking example. However, the history of boundary-making in South Asia exemplifies Wilkinson's fundamental point that, even where a mountain range of the magnitude of the Himalaya would appear to offer a 'natural frontier', in the end all boundaries are political. As such, they have both political causes and political consequences.

South Asia's external boundaries – with Iran to the west, the Central Asian Republics to the northwest, China to the north, and Burma to the east – have all been inherited, almost intact, from their delimitation during the late nineteenth and early twentieth centuries. In his remarkable *Historical Atlas of South Asia* (1978), Schwartzberg observed that with the annexation of the Punjab in 1846, the conquest of India by the British had, for all intents and purposes, been completed. Over the next seventy years or so, there followed a period of intense interest in defining, delimiting and demarcating the external boundaries of British India and its immediate neighbours. Wherever possible, this was to be achieved on the basis of the most advanced available field surveys, laying the basis for international treaties with the relevant powers. The process stimulated the development of theoretical aspects of frontiers and boundaries, as well as the drawing of boundaries in highly varied territories on the ground.

There is a difference between 'defining' and 'delimiting' boundaries on the one hand and 'demarcating' on the other. The former are the processes of marking on a map the line of boundaries that may then be agreed and signed off for the purposes of treaties, as an agreed line separating two states. 'Demarcating' is the marking of such a line by a physical presence on the ground. In the nineteenth and early twentieth centuries this was usually at most the erection of cairns or border posts every few hundred metres. In the last thirty years some of South Asia's most contentious boundaries have been demarcated with fencing. The term 'frontier' has the distinct technical meaning of a 'zone on either side of a boundary'. However, the two terms are often used interchangeably.

In terms of South Asian interests, the relevant colonial powers at the end of the nineteenth and the beginning of the twentieth centuries were Britain, Russia and France. These powers had been expanding and intensifying their interests in Asia throughout the nineteenth century. On the margins of the core territories controlled by these imperial European countries – and this is, correctly, to regard Russia at this period as a European power – were regional powers. By far the most significant was China, which at the end of the nineteenth century had reached its maximum territorial extent, incorporating Tibet and some territory on both the northeastern and northwestern margins of India. However, the power of the Qing (Manchu) Dynasty at this critical period was in terminal decline, and marginal territories, including Tibet, were temporarily quasi-independent at crucial moments in the boundary defining process.

While neither Persia and Afghanistan to the west nor Thailand to the east was in a position to threaten British interests, they were all important to Britain's long-term security in the region. These countries fought, generally successfully, to retain their independence from imperial rulers. At the same time, they were often in competition with each other or their neighbours in their own border regions. This competition often generated political instability and uncertainty, both for them and for the imperial powers. Territorial disputes between Afghanistan and Persia in the settled districts of Sistan, on the Persian-Afghan border, for example, were problems not just for the Shah of Persia or the Amir of Afghanistan, but for the British too. On the eastern margins of South Asia, frequent wars between Burma and Thailand also posed challenges for the British and the French, with almost permanent instability in the whole border region of Burma.

By the beginning of the nineteenth century, such uncertainty came to be seen as problematic. Britain, Russia and France sought to regularise the South Asian borders along which they had potential or actual contact. Through the period of South Asia's most intensive boundary settlement, the Qing Dynasty, which had controlled China for over two centuries, had been brought to its knees by a combination of external force and internal corruption. After the Meiji Restoration in Japan (1865), the Japanese had sought to extend and secure their strategic interests. The first fruit of the new Japanese drive to 'modernisation' was the successful attempt to prise Korea from Chinese suzerainty in 1876. Having kept itself closed to all foreign powers during the nineteenth century, Korea was forced by the Japan-Korea Treaty of that year to open itself to Japanese trade and political interests.

For the Qing Dynasty these extensions of Japanese power were a serious affront and weakened an already crumbling state. The First Sino-Japanese War of 1894–95 further hastened the collapse of the Dynasty. By the early 1890s, almost at the point of its collapse, Qing rule was probably at its greatest territorial extent. In the southwest, it included, by Chinese accounts, the Aksai Chin, the easternmost borderlands of Kashmir, and the eastern Pamirs, where it came into direct contact with Russia. In the southeast, Qing China claimed to have held the easternmost borderland of Bhutan and the territory that today forms the Indian state of Arunachal Pradesh. In between, Tibet had been taken under Qing control in the eighteenth century. However, by 1912

Chinese control of all these territories was fragile to the point of being non-existent, and the Qing Dynasty finally collapsed. In 1913, Tibet declared itself Independent, a status it retained until 1951. At the start of the nineteenth century, the British Government in India was more concerned about Russian expansion and the possibility that a power vacuum in Tibet would play to Russia's advantage than about the extent of Chinese power, which seemed to be on the wane. Britain sought to formalise treaties that would give final, and internationally accepted, shape to the whole of British India's territories.

In the north and northwest, the British feared Russian expansion southwards. As the Russian Empire consolidated the territorial expansion that had brought much of northern Eurasia under its control, it probed its southern borders. The British construed this probing as an intention to reach the 'warm water ports' of the Indian Ocean and potentially to threaten Britain's hold on India. In the latter part of the nineteenth century, notably after the series of failed British attempts to bring Afghanistan directly under its control, Britain had sought to make Afghanistan a buffer zone between British and Russian interests. However, a century earlier Britain had competed with France for territory and influence, both in India itself and along the land route from Europe to India. On this route, Persia occupied a strategic position between the Middle East and South Asia, which gave it an interest in South Asian border negotiations.

To the east, from the latter part of the eighteenth century, a spread of French control from Indo-China threatened British interests, both on the landmass of South East Asia, notably on the Malay Peninsula and the Straits of Malacca. Francis Light, an East India Company sea captain, had recognised this strategic significance with the establishment in 1786 of a fortified trading post on Penang, at the head of the Malacca Straits. For European trade and political control, the Straits, which today are the vital corridor of trade between the Indian Ocean and the China Seas, were the 'key to the East'. In the face of a potential French territorial expansion, the British sought an accord in which Thailand would be guaranteed its continued independence. This independence was under pressure from the French in the east and from Burma in the west. The British aimed to guarantee stability by securing Thailand's independence and preventing any further westwards march of French power in South East Asia. These objectives were achieved in 1886 after the Third Burma War, and Burma was fully incorporated into British India.

Maps 62 and 63 bear witness to the influence of all these factors in the definition of South Asia's external boundaries, many of which remain in place today. Nearly all of the modern boundaries are the result of treaty agreements drawn up between the British and neighbouring powers. The treaties varied in their legal status at the time, and in the degree to which they have been accepted by the successor South Asian, and neighbouring, states as legitimate. The origins and character of these borders is discussed briefly below, working clockwise from the borders of Pakistan and Iran in the west to those of India and Burma in the east.

The borders of northwestern South Asia

South Asia's northwestern borders were settled in a spate of imperial diplomatic activity that stretched through the second half of the nineteenth century. Russian-British competition was at its height, and the British were determined to establish a decided and secure frontier beyond Afghanistan, which they ultimately came to accept would be best left as a quasi-independent buffer zone.

Wherever possible, the external boundaries of South Asia were aligned to follow major natural features. Thus, through much of the Himalaya, for example, the border follows the high ridge-line that divides major drainage basins. In short sections it took account of pre-existing

civil boundaries or land or tribal rights that crossed the natural watersheds. However, in the highest ranges it was often impossible to survey accurately the precise alignment of the watershed. The result is that, even today, maps of some sections of the Himalayan boundary differ by tens of kilometres as to the true location of the border.

In some cases, as with much of the northern boundary of Afghanistan, the border followed the course of a river (in northern Afghanistan's case, the Amu Darya). Where none of these options was available, boundaries were established according to astronomical bearings between fixed points. This was true of sections of the southern border between Persia and Afghanistan. The westernmost section of the Durand Line (1893), which runs today between Afghanistan and Pakistan, is based on the same principle. The presence of large, settled, populations generally made an astronomical approach inapplicable, as existing rights and realities on the ground had to be taken into account. Very rarely did local interests and use conform to the straight-line distance between two points.

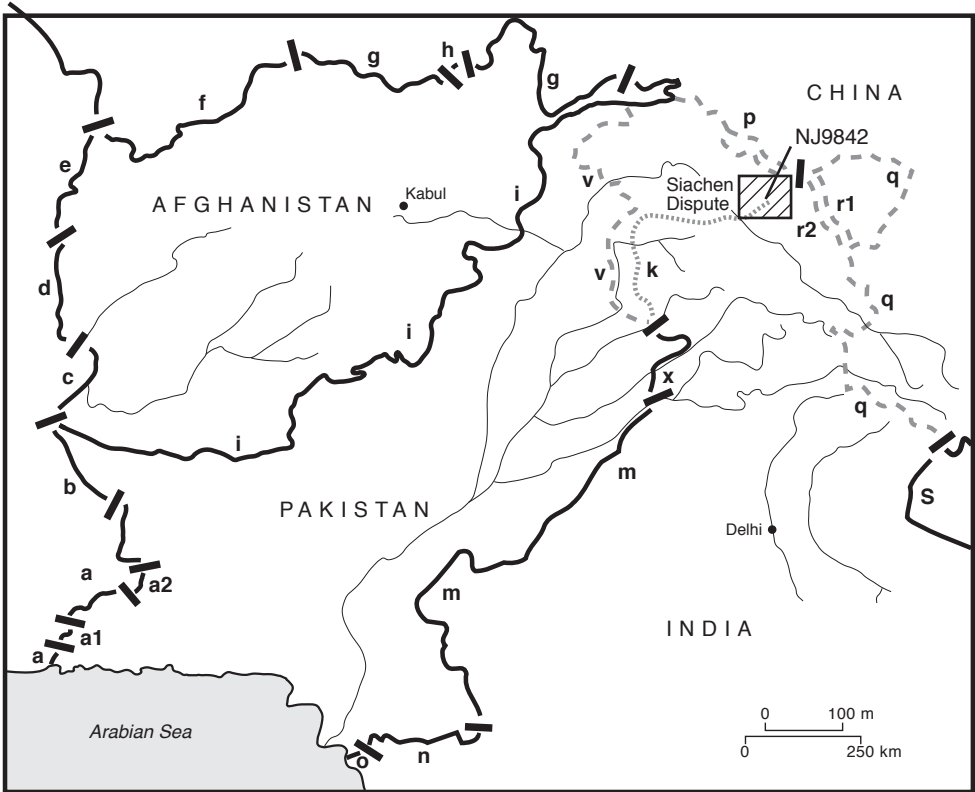
Pakistan-Iran

As Prescott (1975) has pointed out, the modern boundaries between Iran on the one hand, and Afghanistan and Pakistan on the other, are entirely the result of 'four arbitrations by foreign military officers'. These were carried out between 1871 and 1935. In 1871 General Sir Frederic Goldsmid was asked to arbitrate in disputes between the Khan of Kalat, now in Pakistan, and the Persian Shah. Subsequently, in the early twentieth century, British officers were invited to arbitrate sections of the border between Persia and Afghanistan, where disputes arose on the ground in regions that were, or had been, densely populated and where water resources were critical to settlement. In 1935 the Afghans and Persians sought the arbitration of the Turkish Government, with whom both were on good terms, to settle the central section of that border.

The earliest attempt at border settlement between British India and Persia, now the border of Pakistan and Iran, was the Anglo-Persian Accord of 1871 (Prescott 1975). The border goes north from the Makran coastal range to the Afghan border, at the western end of the Chagai Hills, the site of Pakistan's 1998 nuclear tests. The line runs through the sparsely populated and harsh desert landscapes of bare rock, stones and sand, in which delimitation seemed relatively simple in theory. However, in practice, demarcation was often difficult. The 1871 Accord was followed by the Anglo-Persian Accords of 1874 and 1896. These delimited the border, although large sections remained un-demarcated. These were only demarcated between 1958 and 1960 through agreements between Iran and Pakistan.

Afghanistan-Iran

The 837 kilometre boundary between Afghanistan and Iran was settled in three stages, between 1872 and 1935 (Prescott 1975). The westernmost borders of Afghanistan were delimited largely by British military surveyors. In the late nineteenth and early twentieth centuries, the British had been invited to define the boundary by the Persian and Afghan governments (Mojtahed-Zadah 2007). In the southern section, General Goldsmid, the British boundary arbitration officer, had aligned the Iran-Afghanistan boundary with the main branch of the Helmand River. The Persians claimed that, because most of the fertile and irrigated portion of the delta was in the Persian province of Sistan, a settlement needed to take proper account of the greater traditional Persian demand for water. General Goldsmid's line was accepted by the Persian and Afghan governments but failed to meet many of the social, political and ecological realities on the



International borders: ——— **Disputed borders** - - - -

Pakistan - Iran
a and **b** 1871-1896 Anglo-Persian accords
a1 and **a2** Pakistan-Iran accords 1958 -60

Afghanistan - Iran
c 1903-1905 McMahon
d 1935 Turkish settlement
e 1888-1891 MacLean

Afghanistan - Turkmenistan
f 1885-1888 Anglo-Russian

Afghanistan - Uzbekistan - Tajikistan
g 1873 Anglo-Russian
h 1926

Afghanistan - Pakistan
i 1893-1896 The Durand Line

Pakistan - India
v 1947 Disputed border of Jammu and Kashmir
k 1949-1974 Ceasefire Line/ Line of Control
x 1947 Radcliffe award
m 1949 Borders of Bahawalpur and Khairpur (formerly Princely States)
n 1968 Tribunal award
o 1948 - alignment still contested along Sir Creek

India / Pakistan - China
p 1963 Kashmir-China agreement. Contested by India
q 1880-1913 Anglo-Tibet agreements. Never ratified by China, claimed by India
r1 and **r2** 1958 Aksai Chin occupied and claimed by China

India - Nepal
S 1815 Anglo-Nepali Treaty of Segauli

NJ9842 Grid reference of terminus of the Ceasefire Line/Line of Control (LoC)

Map 62 The borders of north western South Asia

ground. Between 1903 and 1905, the settlement was reviewed by Colonel McMahon, who, with a team of 1500 soldiers, laid out the still-current McMahon award. Colonel McMahon initially acknowledged that before the settlement the Persians had drawn off two thirds of the water in the river, and that a just settlement must guarantee a fair proportion to Persia. The award recognised the crucial importance of cross-border water needs and included the provision of water-sharing arrangements on either side of the new border (Prescott 1975). It also demarcated the boundary on the ground with large pillars.

To the north of Sistan the next 400 km was not delimited and demarcated until the 1934–35 arbitration, carried out at the request of the Persian and Afghan governments by a Turkish mission under General Fahreiddin Altaï. Further north still, in the region of Hastadan, the border ran through desert that had been cultivated extensively by means of *karez* (or *qanat*) irrigation. This is a system of deep wells, linked by underground channels, that transport water tens, and sometimes hundreds, of kilometres for use on land that would otherwise be too dry for cultivation. It is typical of parts of Persia and borderland Afghanistan/Pakistan. In many places this system had long fallen into disuse. The boundary was drawn up by Major-General C. S. MacLean, on the basis of an intensive survey into ground conditions, water resources and patterns of settlement. Persia and Afghanistan both claimed the whole Hastadan Valley. As Prescott argued, MacLean's solution, accepted in 1890, was a compromise along the line shown in Map 62, which remains as the border today.

The northern boundary: from Iran to Nepal

The final delimitation of Afghanistan's northern boundary was the product of the 'Great Game' – the competition for power and influence between Russia and Britain at the end of the nineteenth century. Britain wanted to keep a wide neutral territory between Russian and British possessions. Hence, it wanted the northern boundary of Afghanistan to be as far north as possible. In contrast, while Russia accepted that Afghanistan was in Britain's sphere of interest, it wanted to maximise its own territorial hold as far south as could be achieved. The resulting compromises were agreed upon between 1873 and 1926. Broadly speaking, the eastern section follows the course of the Amu Darya from the high Pamirs to Kwaja Salar, and from there westwards to the Hari Rud River, where it meets the Persian border.

The main uncertainty lay in the far eastern limits of the border. Here, China, Russia and British India met in the high Pamir ranges of the Himalaya. Sparsely populated, with its highest mountains inaccessible, much of the region had not been under the formalised control of any regional power, though China had pushed up to the Wakhijir Pass when it annexed eastern Turkestan in 1877. Russia accepted that the Wakhan Corridor should be assigned to Afghanistan, in order to prevent the British and the Russians having a direct border of contact.

This still left the borders in the high, eastern Pamirs, undelimited. The British feared the possibility of Russian expansion into that region if it were left without agreed borders, and sought to gain Chinese agreement on a common border position at the very eastern end of the Wakhan Corridor. The Chinese government never responded to the proposal put forward by the British Ambassador in Peking in 1899. In 1900, Sir Thomas Holdich, the British officer responsible for finalising this section of India's boundary, drew a 40-mile border along the Wakhijir Pass, closing the gap between Afghanistan and China. This line was closely followed when Afghanistan and China ratified this border in 1963. From that point, the northernmost in British India, the British proposed an extension of the border, line 'p' on Map 62, to the Chinese government in Beijing. Probably because the Qing government was facing imminent collapse, the Chinese

neither accepted nor rejected the proposal. The failure to achieve a defined border between modern-day India and China continues to reverberate to the present day.

The last section of the boundary shown on Map 62 is the westernmost end of Nepal's boundary with India. The short section of north-south running boundary was agreed in the Treaty of Segauli, signed between the East India Company and the Raja of Nepal, in 1815. However, its precise demarcation is a source of current dispute between the Indian and Nepali governments, largely because the course of the River Kali as it emerges from the Himalaya is heavily braided, and the main stream is subject to periodic changes in location.

The borders of the North and Northeast of South Asia

The borders of the North and Northeast are of far more recent origin than those of the Northwest. The majority of them are with China. From Pakistan's border with China, discussed above, China's border runs eastwards, shared first with India, then Nepal, India again and then Bhutan before it reaches the tri-junction of China, India and Burma, at South Asia's northeasternmost point. From there, South Asia's borders – first India, then Bangladesh – are shared with Burma alone.

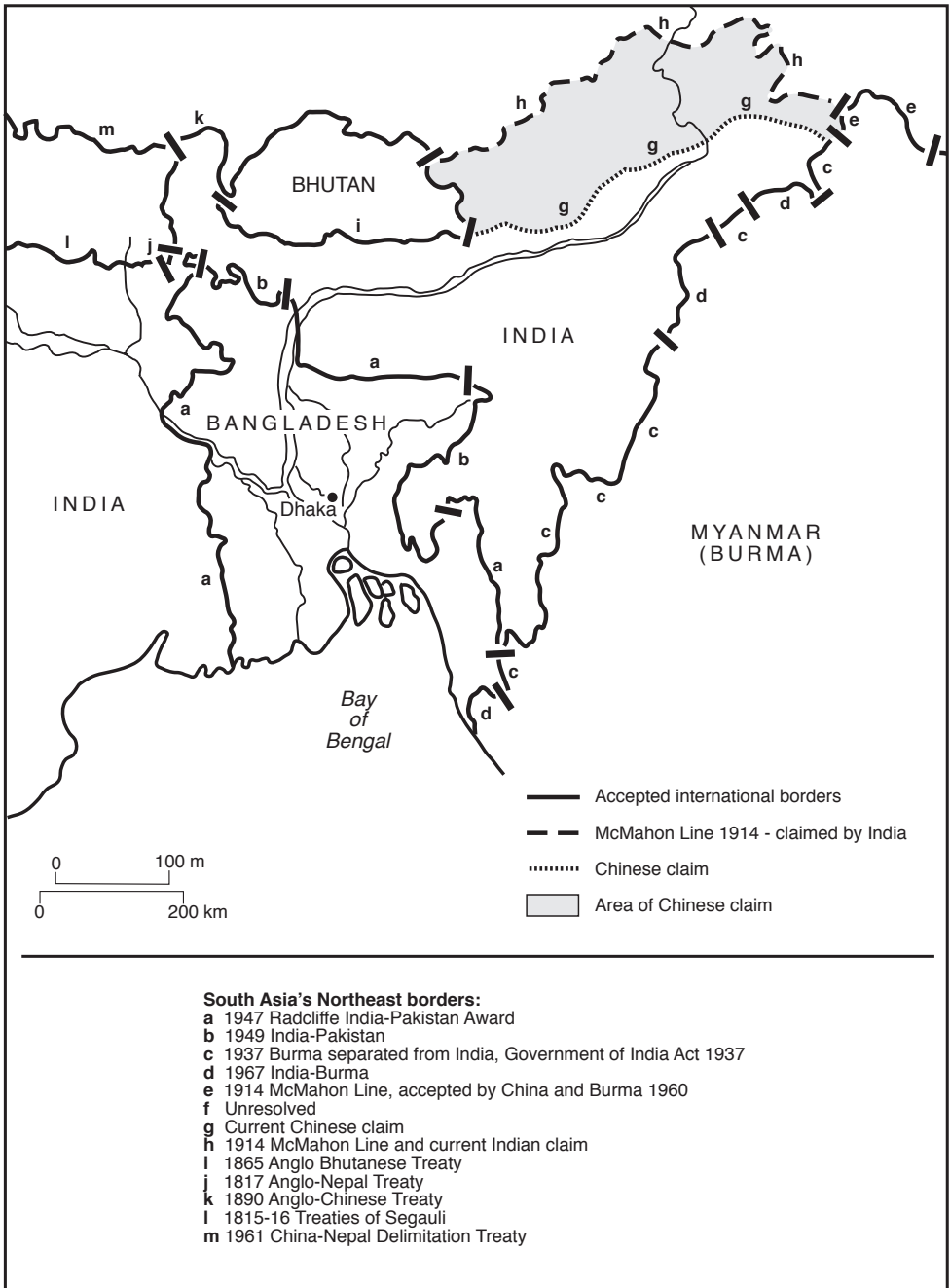
In contrast with many of the borders of the northwest, where treaties from the Colonial period were broadly accepted as the legitimate borders of the successor states, the treaty agreements that decided the Chinese borders with South Asia were never accepted as legitimate by the People's Republic of China (PRC) after 1949. India's definition of the common border is based on the view that orders agreed on by the predecessor Colonial powers have the status of legitimate boundaries for the successor states. India has held to the view that boundaries agreed upon between the British and the Tibetan governments at Simla in 1912 were signed by legitimate authorities in place at the time and should therefore stand. The PRC disputes both the legitimacy of the Treaties and the position of the borders the Treaties proposed, in both the eastern and the western sectors.

In the main, the PRC regards only those sections of the border negotiated since 1949 as legitimate. Apart from the treaty between China and Pakistan in Kashmir, referred to above, this only applies to the 1961 China-Nepal Delimitation Treaty. This broadly follows the line of the highest watershed in the world. China has explicitly rejected the colonial definition of India's northern boundary, both in Kashmir and in the northeast. India's creation of the state of Arunachal Pradesh in February 1987 and the inclusion of Tawang in India, which has been accepted by the Dalai Lama as being wholly within India, has been consistently repudiated by China.

Prescott (1975) has pointed out that there is irony in the positions adopted by both China and India on their respective border claims. India has agreed with Nepal about a border along the southern edge of the Terai, along the foot of the Himalayan ranges, while demanding a border with China along the high watershed ridge of the Himalaya. China, in contrast, has agreed upon a border with Nepal largely along the watershed of the Himalaya, while in northeastern India's it claims a border that is almost an extension of India's border with Nepal, along the plains margins of the Himalaya. The current disputes along this border are discussed in Chapter 23.

Sikkim and Bhutan

The Sikkimese border with China, the oldest treaty-based Himalayan border still extant, was agreed to under the Anglo-Chinese Treaty of 1890. Following the watershed of the Tista River, it has survived the incorporation of Sikkim into India in 1975. Although the Chinese government



Map 63 The borders of north and north eastern South Asia

still describes the treaty as an 'unequal treaty', as Prescott (1975) points out, it is an extension of the China-Nepal boundary agreed upon in 1961, and there has been no sign of any move to re-position it. In contrast, Bhutan's nearly 300-mile border with China has been, and remains, under dispute. The Bhutanese government claims four areas under dispute, totalling about 250 square kilometres. In 1998 China and Bhutan signed a bilateral agreement to resolve the border disagreements peacefully, but the issues remain unresolved by formal treaty.

South Asia's borders with Burma

As Map 63 shows, the great majority of India's border with Burma, and the short section of Bangladesh-Burma border, were created when Burma was separated from British India in 1937, under the Government of India Act (1935). Over 1600 km in length, the border runs through the Arakan Mountain ranges from the Himalaya to the Bay of Bengal. Its line was confirmed by the Indo-Burma Treaty of 1967, though demarcation, and in particular fencing the border, has caused local disputes, where long-standing social and trade links were threatened with disruption by the erection of a fence.

The Partition of British India between India and Pakistan in 1947 meant that the southernmost section of the India-Burma border, established by the India Act of 1935, became the border between East Pakistan and Burma, when Burma itself gained Independence in 1948. The line follows the Naf Estuary, whose shape and mid-line fluctuate. In 1965 East Pakistan and Burma agreed on a fixed line, with shared rights on the navigable waterway. This agreement was adopted by Bangladesh when it seceded from Pakistan in 1971.

The main challenges to Burma's western border with India and Bangladesh have been a result less of the border position than of political challenges on either side of it. Much of the border runs through settled tribal territories. Development programmes like the Kaptai Dam, in the Chittagong Hill Tracts of what was then East Pakistan, led to widespread displacement of tribal peoples. The movement of Chakma and other refugees from Bangladesh to India has been mirrored by the repeated attacks in Burma on the Muslim Rohingya community. Their repeated attempts to flee Burma into Bangladesh have met with forcible repatriation. The fencing of the borders has been designed to limit both refugee movement and politically motivated infiltration, but the issues remain alive and unresolved.

Conclusion

With a total length of over 10,400 km, South Asia's external borders are key features of the region's geopolitical landscape, well over a hundred years since many of them were first put in place. Nearly half their length remains contested, disputes that often reflect the politics of the nations that border them, rather than of the borders themselves. There is no sign of immediate resolution to the challenges they pose.

23 New borders and unresolved disputes

The post-colonial legacy

The Independence of India and Pakistan in 1947 was accompanied by the drawing of wholly new national boundaries within mainland South Asia. These were developed alongside treaty-based external boundaries. Such treaties, outlined in Chapter 22, which had been negotiated by the British with neighbouring rulers, delimited the extent of the territory controlled directly by the British. The boundaries defining this territory became the external boundaries of the new South Asia.

Most South Asian boundaries, whether with countries outside South Asia or with each other, have at least some sections that are either not permanently agreed upon, or are in active dispute. The areas of dispute are focused mainly in sections where shared resources are divided by the political boundary, or where longstanding patterns of local trade have been disrupted by the imposition of a hard political boundary. Only the atoll-island state of Maldives is completely free of boundary disputes. Even the island state of Sri Lanka has a dispute with India over the ownership of Kachchatheevu, a small uninhabited island in the Palk Straits between Tamil Nadu and Sri Lanka. The island was formally transferred to Sri Lanka by Mrs. Gandhi's government in 1974, though it had long been used by fishermen from Tamil Nadu. The government of Tamil Nadu has been demanding its return since 2001. The South Asian boundaries drawn in the nineteenth and early twentieth centuries have been supplemented by those drawn at the end of Empire, in 1947/48, and on the final Independence of Bangladesh in 1971. Together they continue to provide the basic territorial framework of the modern South Asian states.

Afghanistan and Iran

Afghanistan and Iran share two major trans-boundary river systems. In the south the Helmand (Hirmand) crosses from Kandahar Province into Iranian Sistan. Here the river provides both essential water for intensive agriculture in what is otherwise a desert region, and a great expanse of wetland marshes, which are an important wildlife habitat. Historically, the whole region has come under the jurisdiction of both Afghanistan and Persia. The nineteenth century settlement between British India and the Persian Shah (see chapter 22) has not resolved tensions relating to the border. In part these revolve around the issue of water management and use. During the Taliban insurgency they have also reflected Afghanistan's fears of Iranian support for the Taliban, mirrored in Iran's deeply rooted objections to the US presence in its neighbourhood. Concerns over water reflect Afghanistan's growing use of the Helmand, both for hydroelectricity and irrigation (Weier 2002). The same is true of the northern river, the Harirod. The completion of the Salma Dam, in the upper reaches of the Harirod, has been delayed many times since its inception in 1976. Providing 42 MW of electricity and an extra 40,000 hectares of irrigated land, the project is seen by Iran as threatening water supplies on its side of the border. The Indian government committed itself to completing the project, but seven Taliban suicide bombings on the dam in 2014 continued to slow progress.

Pakistan and Afghanistan

The 'Durand Line' forms the current 2640 km long boundary between modern Pakistan and Afghanistan. Pakistan has argued since 1947 that the international law of *Uti possidetis* ('as you possess') applies to the boundary. In international law this gives states the right to hold on to territory that was under the control of the power to which they were the successors. Pakistan's view has been that the Durand Line, as the border between British India and Afghanistan, has the status in international law to be recognised as the legitimate boundary of the inheritor states after Independence.

Afghanistan has never accepted the boundary settlement, arguing that the one page agreement signed in 1893 by Sir Mortimer Durand and the Amir of Afghanistan, was an agreement on the delimitation of spheres of influence, not of a political border. Between 1894 and 1896, the 1893 agreement was followed through by the demarcation of the first 1300 km of the line. This cut through Pashtun tribal areas, which for generations had been the homeland of Pashtun peoples. The remainder of the line was demarcated by separate agreements up until the final section, the Khyber Pass, which was settled by the Treaty of November 22, 1921, and a minor adjustment at Arandu in 1933–34.

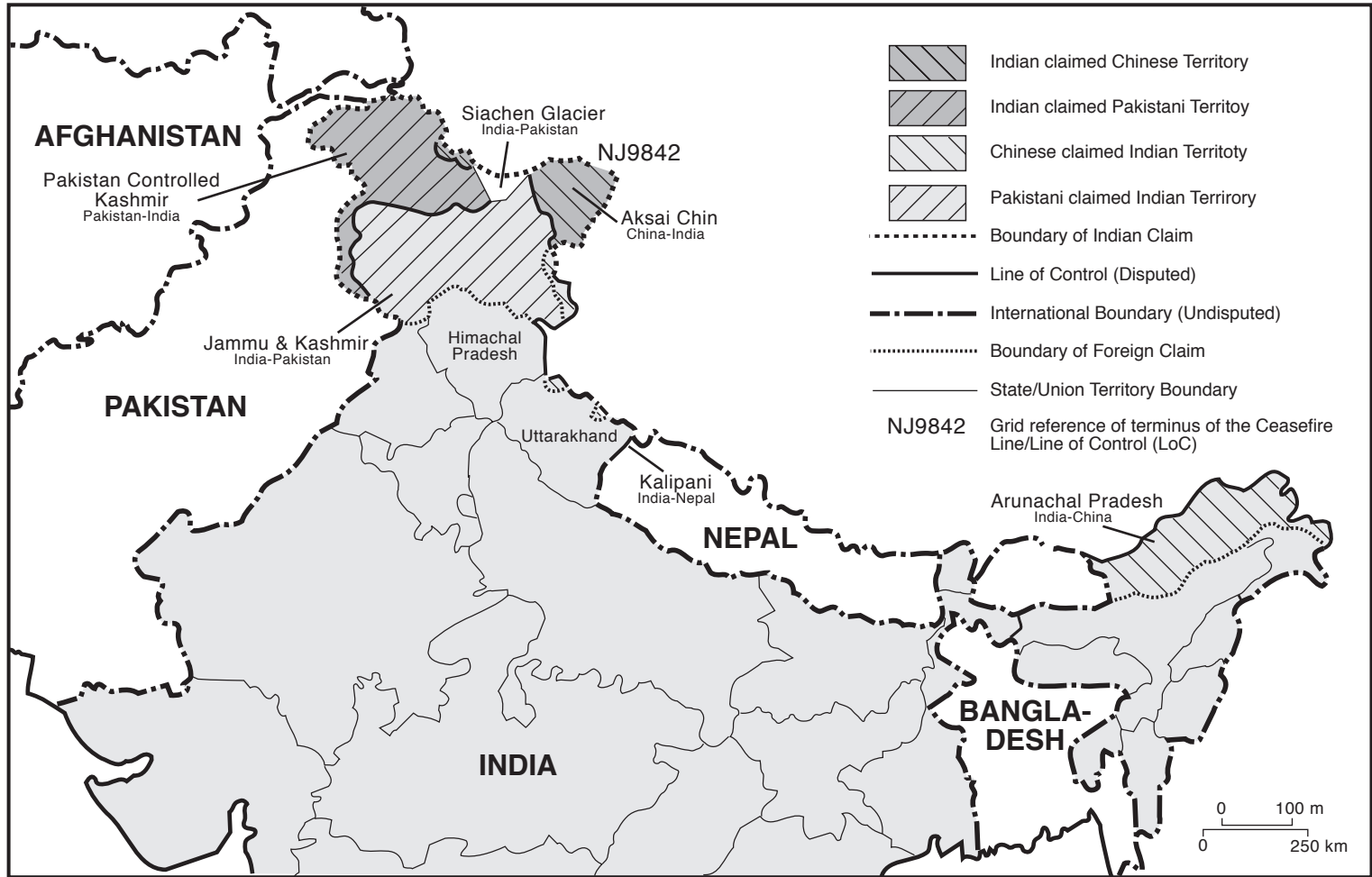
Since 1947 Afghan governments have periodically pressed irredentist claims to the Northwest Frontier of Pakistan, while within the region itself there has been an undercurrent of campaigning for the creation of a wholly separate state, Pakhtunistan (or Pashtunistan), a claim opposed by both Afghanistan and Pakistan. The ongoing conflict with the Taliban in Pakistan's Northwest Frontier region (Khyber-Pakhtunkhwa) and in eastern Afghanistan continues to keep the border question high on the regional political agenda.

Afghanistan and China

Afghanistan's border with China is a mere 76 km, situated at the easternmost end of the Wakhan corridor. Designed at the end of the nineteenth century to separate territory directly under the control of Russia from that under British authority, it had been in dispute until the treaty settlement between the PRC and Afghanistan signed on November 22, 1963. There are no current disputes.

India, Pakistan and China

In 1947–48 the indecisive war between India and Pakistan over the future of Jammu and Kashmir left the former Princely State divided by a Ceasefire Line in which the northern and westernmost parts of the state were under Pakistani control while the remainder was in India. This gave Pakistan a direct border with China in the northernmost regions of Kashmir. Pakistan claimed just under 7770 km² in the high Karakoram ranges, including the Shaksam Valley. This region was almost entirely uninhabited and was never under the effective control of the Pakistan government. Pakistan became concerned in 1959 that Chinese maps put the valley in China. China and Pakistan opened border negotiations on October 13, 1962, a week before China attacked Indian positions in both the western and eastern sectors of the India-China border. The Sino-Pakistan Agreement, signed on March 2, 1963, gave Pakistan approximately one-quarter to China's three-quarters of the disputed 7250 km² in total. The agreement continues to be rejected by India, which claims that Pakistan had no *locus standi* to negotiate a border in Jammu and Kashmir with China.



Map 64 Border disputes in the Himalaya

The India–China border is the longest in South Asia. It has also been the most contentious. The war of 1962 was fought in both the Aksai Chin in the west and the McMahon Line in the east. Despite protestations of the need to finalise the border peacefully from both China and India, China continues to make claims on territory that India regards as its own in both the western and eastern sectors.

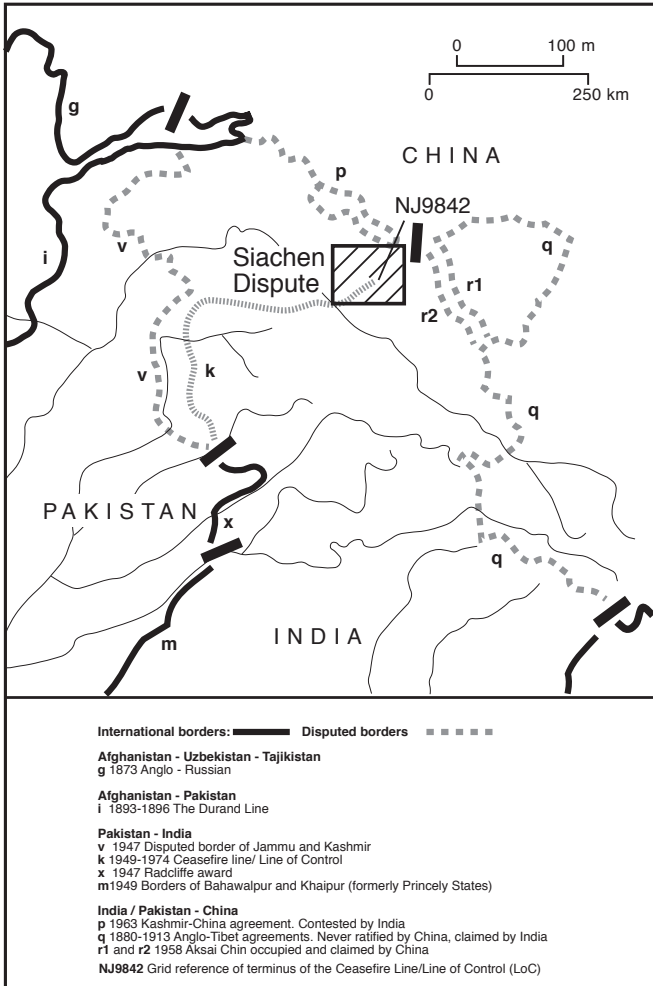
The original basis of the Indian and Chinese claims lies in their countries' respective imperial histories and in the even earlier expansion of Sikh power in Kashmir in the 1830s, when the Aksai Chin was first claimed by an Indian power. The current Line of Actual Control between India and China represents a set of compromises arising from the 1962 India–China War, with which neither claims to be content. The Line of Actual Control is the term coined by Chinese Prime Minister Zhou Enlai in a letter to Indian Prime Minister Nehru in 1959. Describing the 4057 km long-disputed border, the term has stuck. It runs from Ladakh to Uttarakhand in the west and from Sikkim to Arunachal Pradesh in the east.

The origins of the border in the far northwest of South Asia pre-date British control of the region. The Sikh Empire, which ruled the Punjab in the first half of the nineteenth century, incorporated Ladakh in 1834 and by 1841 had invaded western Tibet. The Sikhs ultimately agreed on a border with the Chinese that ran from the Karakoram Pass to the Pangong Lake. However, though the Aksai Chin was claimed by the Sikhs, the borders of the claim were undefined. In 1865 the British surveyor W. H. Johnson proposed a border between British India and China/Tibet that included the whole of the Aksai Chin and extended up to north of the Karakoram Pass. This proposal was widely criticised as unrealistic and was never agreed upon, even by the British government, though the fear of Russian expansion into Tibet subsequently caused them briefly to revert to the claim. The Chinese themselves have always repudiated it.

In 1899 the British proposed a line that put most of the Aksai Chin into China (the McCartney–MacDonald Line). It followed the watershed through the Karakoram between the Indus River Basin (put wholly in Kashmir) and the Tarim Basin (wholly in China). The prime British concern through this period remained the fear of Russian expansion, and it was hoped that the Chinese would be an effective barrier in any Russian expansion towards Tibet. The collapse of the Qing Dynasty and lapse of Chinese power in Tibet in the early years of the twentieth century re-awakened these fears, and the British periodically re-asserted their claims to the northernmost line. However, they never demarcated it or established any effective control on the ground. Although never formally accepted by the Chinese, the McCartney–MacDonald Line follows closely the Line of Actual Control today.

Since Independence, India's territorial claims have been based on the belief that the crest line of the Himalaya was the line intended by the British to separate Chinese territory from British India. In practice this argument has faced some major difficulties. In the western sector, for example, the great majority of the Aksai Chin, which India claims, lies in the Tarim Basin on the Tibetan side of the watershed. In the eastern sector there have been major problems establishing precisely where the watershed is. Indian maps of the McMahon Line, for example, showed the boundary well south of the crest line of the Himalaya, and after Independence India re-drew the line to conform with what they argued was the principle. In fact, the McMahon Line, agreed to at the 1913–14 Simla Conference among the British, the Tibetans and the Chinese, was never ratified by the Chinese and was subsequently formally repudiated.

Despite periodic incidents on the Line of Actual Control in the five years leading up to 2013, in April 2013 Chinese Premier Li Keqiang and then-Indian Prime Minister Manmohan Singh committed themselves to resolving outstanding border issues in the interests of a stable and lasting peace. This agreement remained to be tested by the BJP government in May 2015.



Key		
m	1949	Borders of former Princely States of Bahawalpur and Khaipur
x	1947	Radcliffe Award
v	1947	Border of former Princely State of Jammu and Kashmir
k	1948-72	Ceasefire Line / Line of Control
i		Durand Line Pakistan/Afghanistan
g	1873	Anglo-Russian Treaty
p	1963	Pakistan-PRC Kashmir agreement. Contested by India.
q		Anglo-Tibet agreements. Never ratified by China, claimed by India.
r1	1958	Aksai Chin claimed by PRC
r2	1958	Occupied by PRC

Map 65 India-China border disputes in Kashmir

India and Pakistan

The border between India and Pakistan runs 4023 km from the Rann of Kutch in the south to the Karakoram Pass in the north. This border between India and Pakistan was laid out in the 1947 Radcliffe Award (see Chapter 14 - the full original award related to West Pakistan and East Pakistan, but in 1971 East Pakistan seceded from Pakistan to form Bangladesh). For most of its length the border followed the pre-existing district boundaries of British India, under the Radcliffe plan to be divided according to the religious affiliation of the majority of their population. The new border had only a minimal relationship with any natural features. In the north it cut through the catchment areas of the Indus and its tributaries. In the south there was an indeterminate boundary through the desert marshes of the Rann of Kutch.

The chief modification to this majoritarian principle was caused by the position of the Princely States. Irrespective of the religious affiliation of the majority of their peoples, the Indian Princes were given the right to accede to either India or Pakistan. The national boundaries were drawn to incorporate the existing boundaries of the Princely States. In the border region of India and West Pakistan, most Princely States from Punjab southwards acceded to Pakistan or India along expected religious lines. The Muslim-majority and Muslim-ruled states of Sindh, Khairpur and Bahawalpur joined Pakistan, while the numerous Hindu-majority and Hindu-ruled states of Rajputana and Bikaner joined India. The boundaries of these states, established in British India, have been followed by the new international border between India and Pakistan and have been free of dispute. The chief exception was Junagadh, the Muslim-ruled but overwhelmingly Hindu-populated princely state encircled by what is now Gujarat. When the Muslim ruler decided to opt for Pakistan, the Indian government deposed him and enforced a plebiscite, which overwhelmingly voted for the state to join India. It has not been the focus of subsequent dispute.

To the north of the former Princely State of Bahawalpur the boundary runs for 340 km across the irrigated plains of the Punjab. Here the major eastern tributaries of the Indus traverse the Indian plains before crossing into Pakistani Punjab. At Independence the Indian and Pakistani submissions to the Radcliffe Commission differed widely, and Radcliffe's decision met with fierce, and long continued, opposition, especially from Pakistan. However, the position of that boundary today is no longer a cause of dispute. Pakistan's chief strategic fear, that of the loss of control of the headwaters of the rivers on which the irrigation system of Pakistani Punjab depends, was addressed by the 1960 Indus Waters Treaty, which is still in force. Also in 1960, the governments of India and Pakistan reached agreement on the four outstanding sections of the Punjab border over which there had been disputes (Prescott 1975).

Jammu and Kashmir

Contemporary border disputes between India and Pakistan are focused at the northern and southern ends of the boundary. By far the most serious is the dispute over Jammu and Kashmir. For the history of the boundary, see Chapter 22.

As a Princely State, the boundaries of Jammu and Kashmir were not subject to the Radcliffe Commission's consideration. The accession of the Hindu Maharaja to India on October 26, 1947, the result of incursions into Jammu and Kashmir by tribal fighters from the northwest, led to an immediate outbreak of hostilities between India and Pakistan. They were ended by the ceasefire of January 1, 1949, and the demarcation of a UN-monitored Ceasefire Line, which divided the former Princely State. Approximately two-thirds was kept by India and one-third by Pakistan. Because of the extreme altitude and difficulty of the terrain beyond this point, the Ceasefire Line terminated at Grid Reference, NJ9842.

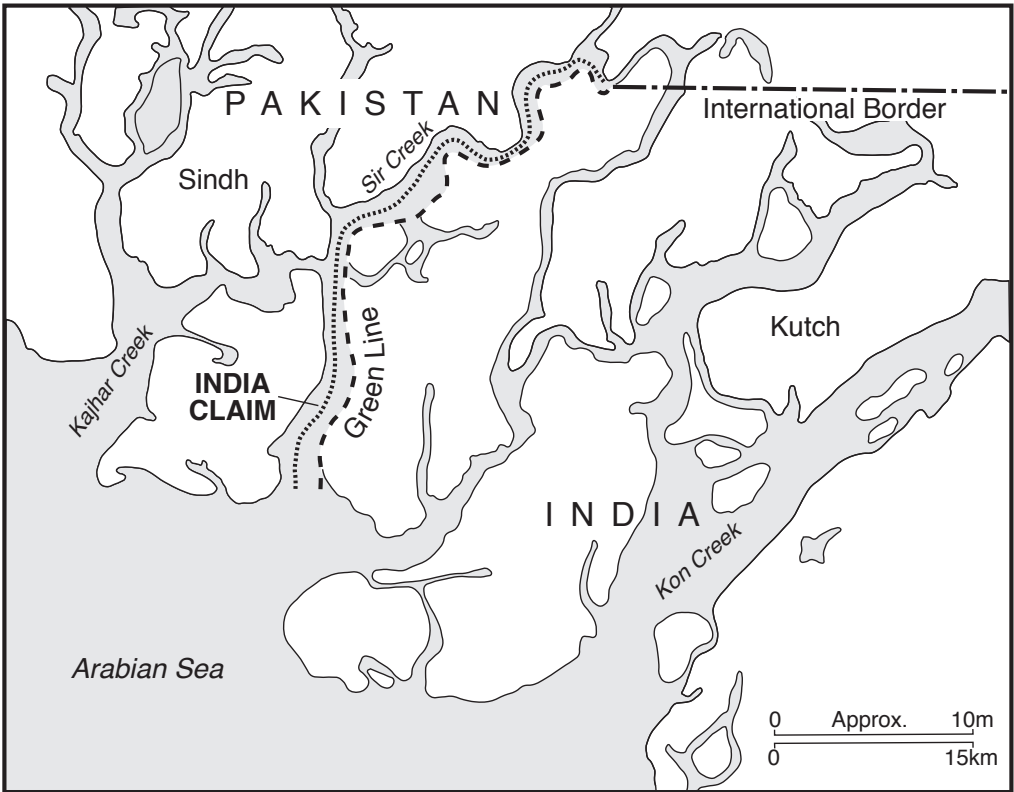
The 1972 Simla Agreement accepted this grid reference and was confirmed as the terminus of the Ceasefire Line, now re-named the Line of Control. This was signed following the defeat of the Pakistani Army in East Pakistan and the secession of Bangladesh. For most of its length it has now been demarcated, fenced and intensively mined. However, the Simla Accord did not resolve the final section of the line in the Siachen Glacier region of the high Karakoram from grid reference NJ9842. From this point since 1984 India and Pakistan have disputed the direction the line takes to the Chinese border. India argues for an extension almost due north, while Pakistan claims that it runs east. India and Pakistan fought continuously over the disputed triangle of this heavily glaciated terrain, at over 6000 m altitude, until a ceasefire was agreed to in 2003. Despite repeated talk of the cost in lives, material and environmental damage, and what is widely described in both India and Pakistan as the absurdity of the conflict, in 2015 there was still no sign of an agreement.

The wider dispute over the future of Jammu and Kashmir also shows no sign of resolution. In 2003 India and Pakistan renewed their talks. These have resulted in a modest increase in cross-border contact and a significant reduction in Pakistani sponsored infiltration into Indian-held Kashmir. An Ipsos-Mori opinion survey, published by Chatham House in 2010, found that there was no clear majority for any of the solutions that have been proposed. More than a quarter of the population was content to see the Line of Control converted into the international border as things currently stand. A further 58 per cent of those interviewed said that they would accept the current Line of Control as the international border if movement across for both people and/or trade were wholly liberalised (Bradnock 2010). The results of the State Assembly elections in Jammu and Kashmir in December 2014 confirmed the deep divide in opinions over the political future of Kashmir. The elections saw a four-way split. The BJP, standing on a platform of full integration with India, the abandonment of Jammu and Kashmir's special status and taking a tough line with Pakistan, won its seats, largely from the Indian National Congress, in the southern districts of Jammu. Although the BJP, with 26 per cent, won the largest share of the total vote, the People's Democratic Party (PDP) won two more seats, all concentrated in the core region of Kashmiri identity, the Vale of Srinagar. The National Conference, which had formed the government, was pushed to the more marginal areas of the state, while the Congress retained its hold on Ladakh. Irreconcilable policy differences between the major parties made the formation of a governing coalition in the state impossible within the first month of the elections, and as a result the central government imposed a seven-week period of Governor's rule in January 2015.

The southern India-Pakistan border: Sir Creek

In the south, the India-Pakistan land border reaches the Arabian Sea through the Rann of Kutch. The exact position of this border was heavily disputed between 1948 and 1968. In June 1965, at the end of the India-Pakistan war, a three man tribunal of jurists from Sweden (the chair), Iran (nominated by Pakistan) and Yugoslavia (nominated by India), was invited to resolve the demarcation of the boundary. They reported in 1968. The majority of the award has been accepted. However, the precise position of the boundary in Sir Creek continues to be disputed.

The roots of this dispute go back to the attempt by the British to delimit the boundary between then British-held Sindh and the Princely-held State of Kutch. On September 20, 1913, the essence of the difficulty was described by the government of Bombay in a letter to the Secretary of the Government of India (paragraphs 9 and 10 of the Bombay Government Letter no 5543, September 20, 1913), to the Secretary of the Government of India, Foreign Department. As Prescott notes (1975, 291), this was the basis of the Resolution 1192 of the Governments of India and Bombay on February 24, 1914. The letter explained that the difficulty lay with placing a line along the boundary of the Sir Creek, which is tidal and had historically changed its course. The letter proposed that rather than follow the eastern edge of the Creek (which remains Pakistan's position),



Map 66 Sir Creek Dispute - the Green Line

it should follow the high-tide *thalweg*, or main navigable channel (which is currently India's position). In May 2013 India was reported to be building floating marker buoys in the centre of the *thalweg* to claim this as the border, though no agreement with Pakistan had yet been reached.

India and Bangladesh

The land borders

At Independence in 1947 there were wide differences in eastern India between the boundary demands of the Indian National Congress and those of the Muslim League. The Muslim League sought to maximise its territory beyond the core Muslim majority districts so as to include key economic regions. These included the city of Kolkata and a number of Muslim-majority districts in what became West Bengal. The Muslim League also claimed the districts of Goalpara, Garo Hills, Lushai Hills and Cachar in Assam. In contrast, the Congress, who opposed Partition in its entirety, wanted to reduce Pakistan to the barest possible number of Muslim-majority districts. The Congress claimed much of Khulna, a non-Muslim majority district in 1947, and the whole of the tribal Chittagong Hill Tracts in the far east.

The problem of enclaves ('chitmahals')

The rulers of the Princely States of Tripura and Cooch Behar were given the freedom to choose which of the newly independent states they wished to join. However, the territories of Cooch Behar

The land borders shared by India and Bangladesh, over 3900 km long, have posed particular problems for India. Until the 1980s they were un-demarcated on the ground, indicated solely by marker posts. Both at Independence in 1947 and during Bangladesh's struggle for independence in 1971 millions of people crossed into India. Estimates suggest that 10 million crossed into India in 1971 alone. While many of these refugees returned, an indeterminate number have crossed into India since. In order to prevent a continuing large-scale migration from Bangladesh to India, Rajiv Gandhi committed India to building a 3 metre high electrified fence the length of the border. By 2014 over three-quarters of this had been completed.

The Maritime boundaries of India, Bangladesh and Myanmar

Map 68 illustrates the extent of the disputes over maritime waters between Bangladesh and its two maritime neighbours, Myanmar to the east and India to the west. Disputes over the definition of these maritime boundaries first arose in the early 1970s, soon after Bangladesh achieved its Independence.

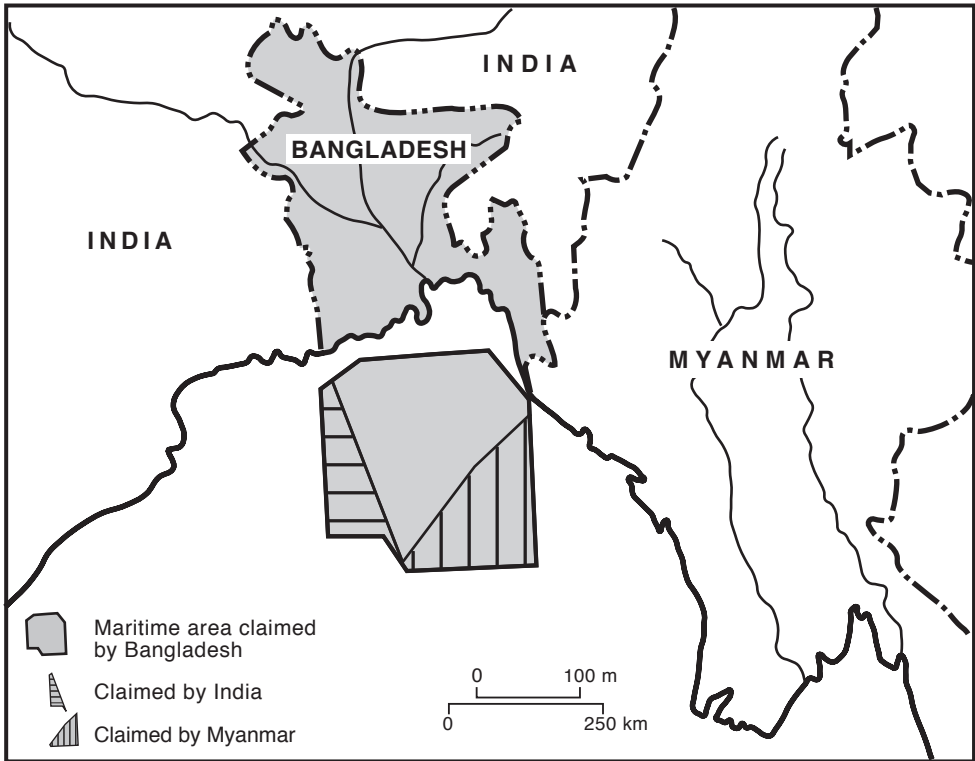
The dispute between Bangladesh and Myanmar was based on Bangladesh's claim that it was entitled to a 19 km territorial sea around its southernmost land, St. Martin's Island.

The Bangladesh-Myanmar maritime waters dispute was settled by arbitration, after repeated failures to find a bi-lateral agreement (Panday 2012). Covering about 110,000 km² in the Bay of Bengal, an area two thirds that of Bangladesh itself, the International Tribunal for the Law of the Sea gave its verdict in Bangladesh's favour on March 14, 2012. Bangladesh will now have exclusive rights to the resources of the maritime region, by far the most important of which are the anticipated natural gas resources under the sea bed. In 2014 India and Bangladesh also settled their maritime border claims.

India's dispute with Bangladesh over their maritime border went back to 1971, when, following Cyclone Bhola on November 12, 1970, a new island appeared, named New Moore Island by India and South Talpatti Island by Bangladesh, just over 3 km south of the mouth of the Haribhanga River in the Ganga/Padma estuary. Under the terms of the Radcliffe Award at Partition in 1947, and in line with international maritime law, the boundary between India and East Pakistan was to follow the deepest channel of the Haribhanga (also Hariabhanga) River, one of the many distributaries of the River Ganges. Although the line of the deepest channel had never been established, the appearance of a new island changed the potential boundary of both the territorial waters and the Exclusive Economic Zones of the two countries. India claimed that the deepest channel of the estuary ran to the east of New Moore Island, while Bangladesh claimed that it was to the west.

Each counter-claimed exclusive maritime rights to the area shown in Map 68. The already-proven gas reserves under the continental shelf were a major factor in the dispute, but fishing rights were also important. A further complication was the use by the Indian and Bangladeshi governments of different defining criteria of the base line from which their respective coasts were drawn. Under the UN Convention on the Law of the Sea (UNCLOS), the 19 km limit of territorial waters can be based on either the lowest low tide position along the coast, or, in the case of unstable and shifting coastlines, an average baseline following the 10 metre depth offshore. In the UNCLOS Article 7, a straight baseline is defined as applicable method where *'the presence of a delta and other natural conditions the coastline is highly unstable, and the appropriate points may be selected along the furthest seaward extent of the low-water line, and, notwithstanding subsequent regression of the low-water line'*.

India chose the former of the two definitions, Bangladesh the latter. The two governments agreed to go to arbitration by the Permanent Court of Arbitration on October 8, 2009. The Court



Map 68 Disputed maritime borders of Bangladesh and their resolution, 2012–14

issued its verdict, finding in Bangladesh's favour on July 7, 2014, a verdict both governments pledged to accept. For a good discussion of this maritime dispute, see Tanaka (2011).

Sri Lanka and India

The maritime boundary between India and Sri Lanka runs through the 30–50 km wide Palk Straits. Disputes over ownership of the uninhabited island of Kachchateevu (Kachchativu), an almost barren limestone island approximately one and a half kilometres long by 1 kilometre wide, can be traced back to the East India Company period in the eighteenth century. The island's only structure is an early twentieth century Roman Catholic shrine to St. Antony, visited by pilgrims for an annual festival. In an agreement made between Mrs. Gandhi and Mrs. Sirimavo Bandaranaike in 1974, then Prime Ministers of India and Sri Lanka, respectively, Mrs. Gandhi acknowledged Sri Lanka's title to the island. However, this agreement was never ratified, and Sri Lanka's ownership is still disputed in India.

Conclusion

South Asian external and internal borders, both land and maritime, continue to be the focus of active dispute. Some of the disagreements are of only minor significance. Others, including the India-China border and the India-Pakistan border, have continuing and major costs for all the parties involved and the potential to erupt into serious conflict.

24 South Asia's water resources

Reaching the limits?

Water is a critical resource for the future of all the South Asian countries. In conjunction with land, it is the resource that shapes and sets limits to many of the opportunities for future growth. Such growth in agricultural output is essential to meet basic food demands. In the 1960s and early 1970s, at the start of the intensification process often referred to as 'the Green Revolution', there was still a commonly held view that South Asia had ample scope for extending its agricultural area, as official census data suggested there were large areas classified as 'culturable waste'. By the 1970s, as Farmer (1974) demonstrated, the extensive margins of agriculture had in fact been reached in many parts of South Asia, in some cases – India, Bangladesh and Pakistan – even earlier.

With no cultivable waste, a continuing growth in population and the increasing demands for non-food agricultural crops like cotton, the required growth in production could only be met by increasing the intensity of agricultural output for every hectare of land. To date this has been achieved by the wider use of improved seeds and intensive use of chemical fertilisers. These in turn have depended on increasing the total volume of water made available to agriculture. As this becomes more and more difficult, the next major challenge is to improve the efficiency of water management and use at a time when municipal, industrial and personal demand for clean water are increasing sharply.

A note on water data in South Asia

Data on water resources in South Asia have significant margins of error. Over decades, different national organisations have relied on a variety of data collection sources for their own national level statistics. These vary from country to country, and their internal consistency is often in question. Some types of water resource use are better recorded than others. Large dams and their command areas are usually accurately surveyed and these records maintained. However, changes in water and land use, especially the use of groundwater, are notoriously poorly recorded. A recent survey in India comparing ground-truthed satellite data with official land use records showed that small-scale and tube-well irrigation was almost entirely omitted from Indian data for large parts of the country. International data publication agencies, such as the FAO's Aquastat, make great efforts to produce data that is accurate and comparable from region to region and country to country.

The FAO's Aquastat international water database provides broadly comparable data on water availability and use, alongside summary data on the country's area, population and cultivated area. It shows the amount of precipitation received, averaged for the whole country, and a derived total of the volume of precipitation received each year. Each table also includes a figure showing the dependency ratio, the country's share of water that originates outside its borders (ranging from 0 per cent for Sri Lanka and Maldives to over 90 per cent for Bangladesh). Unless otherwise indicated, the water data in the next two chapters comes from Aquastat. However, there are still significant inconsistencies. All data in this field should be regarded as provisional and subject to significant margins of error.

As was shown in Chapter 8, South Asia's most important water source is precipitation. This comes mainly in the form of rainfall, the great majority in the monsoon months of June through October. There are important regional variations, such as the October-December wet season experienced in India's far southeast and in northeastern Sri Lanka. In the Himalaya, above 3500 metres, and westwards into Afghanistan, much of the precipitation comes in the form of snow. At even higher altitudes, generally above 5500 metres, this may gradually be converted into glacier ice. In most of the Himalaya glacier melt itself contributes less than 3 per cent to river flow. In contrast, annual snowmelt is a significant source of summer water supplies for local catchment areas and for the dry season flow of some larger rivers.

Precipitation is important for three reasons. First, many parts of South Asia still lie beyond the reach of irrigation and depend wholly on seasonal rainfall. While in Pakistan only 10 per cent of the net sown area is rainfed, in India (60 per cent) and Sri Lanka (67 per cent), for example, rainfed agriculture covers nearly two-thirds of the net sown area. Variations in seasonal rainfall have an immediate impact on agriculture in all of the rainfed regions.

Second, rivers gain most of their flow from rainfall, with an important contribution from snow in the mountains, and from groundwater, especially in the dry season. In some areas rivers are important as sources of fish and where navigable as routes for the local movement of goods. They also offer the opportunity for storing and diverting water. Small-scale barrages and storage schemes have been used in South Asia for millennia, testified to by the large shallow reservoirs, known as tanks, in Tamil Nadu, other parts of peninsular India and northern Sri Lanka, where some are more than 2000 years old. However, large-scale diversion barrages and canal systems were introduced in the mid-nineteenth century. Wherever the topography permits, large storage dams have played a major role from the start of the twentieth century to the present. Such dams have been built to generate hydro-electricity, to provide water for irrigation or for a combination of both. Some have also been claimed to provide protection against flooding. They continue to be built.

Third, precipitation is the major source of recharge for aquifers. These have been important locally throughout history, especially for meeting drinking water needs. However, since the 1950s the spread of diesel and electric pumping has enabled groundwater to become a major contributor to increased agricultural productivity in South Asia. It made a large contribution to the Green Revolution of the 1970s, and continues to be vital to increased output in many parts of the region.

The total annual average volume of precipitation in South Asia between 2008 and 2012 was estimated at nearly 7700 km³ (FAO Aquastat 2014). 46 per cent of this total fell in India, the overwhelming majority of it as rain. As was shown in Chapter 9, the regional variability in rainfall across the sub-continent, its seasonal range, and the contrasts in total precipitation from year to year, mean that national figures of average precipitation are only a partial clue as to the overall significance of precipitation for meeting water demand.

The driest parts of South Asia – Afghanistan, Pakistan, and the deserts of Rajasthan – have average annual rainfall totals of below 500 mm. At the opposite extreme, Bangladesh and Bhutan receive more than 2200 mm. Bangladesh and Pakistan each receive approximately the same gross volume of precipitation, just under 400 km³, though Pakistan has five and a half times the area of Bangladesh. Bhutan, less than one tenth the size of Afghanistan, has almost half as much rainfall (101 km³ against 212 km³). Underlying the broad regional patterns, there are major variations in rainfall down to the most local scale. Parts of northwestern Bangladesh, for example, are relatively dry, even during the monsoon, and can experience extended drought. In Nepal, the north/south/east or west facing aspect of individual valley slopes produces significant contrasts in rain and snowfall. In predominantly arid Pakistan, a narrow corridor running eastwards from the Khyber Pass is on the path of rain-bearing (and, in the mountains, snow-bearing) winter depressions, transforming the agricultural potential of the districts in their path.

At the southern tip of India a distance of 80 kilometres separates the very wet, monsoon-facing slopes of Kerala's Western Ghats from Tamil Nadu's semi-arid sandy coast.

Table 27 Area, population and water resources

	<i>Afghanistan</i>	<i>Bangladesh</i>	<i>Bhutan</i>	<i>India</i>	<i>Maldives</i>	<i>Nepal</i>	<i>Pakistan</i>	<i>Sri Lanka</i>
Area ('000km²)	652	144	38	3287	0.3	147	796	65
Net cultivated area ('000km²)	79	86	1	1420	.07	24	223	21
Total cultivated area ('000km²)	80	150	1	1990	0.1	25	226	26
Population (Mn)	31	147	0.75	1207	0.3	31	180	21
Precipitation km³	213	384	84	3560	0.6	221	393	112
Precipitation per person (m.litres/pp)	6	2.6	138	2.9	1.9	7.1	2.2	5.4
Renewable water resources⁽¹⁾ (RWR) km³	65	1227	78	1911	0.03	210	247	53
External RWR km³	10	1122	0	465	0	12	192	0
Total RWR per capita m³/year	2126	8345	104,000	1582	96	6778	1371	2488
Total dam capacity km³	3.7	6.7 ⁽²⁾	n/a	224	0	0.09	27.8	5.9

1. Renewable water resources are defined by the FAO as: 'the total amount of a country's water resources (internal and external), both surface water and groundwater, which is generated through the hydrological cycle. The amount is computed on a yearly basis'. (Natural Resources Management and Environment Department, FAO). External resources are waters, either river or groundwater, that originate outside the country's borders. The concept of actual renewable resources takes into account both internal and external resources, i.e., those resources that come from upstream, either as river flow or in aquifers (FAO Aquastat 2014).

2. The Kaptai dam is the only large-scale dam in Bangladesh. Until late 2014 Aquastat's published figure for the capacity of dams in Bangladesh was 20.3 km³, which now appears as the figure in a number of other sources. However, this is an error. Aquastat have corrected their database to show it as 6.7 km³.

Table 27 summarises key data on water availability for each of the South Asian countries. It shows the very wide range of water resources and compares the raw data with data on land area, cultivable area and population. The proportion of the net area cultivated in each of the countries is a direct reflection of water availability within them. This is graphically illustrated by the ratio of net cultivated to total cultivated area. The total cultivated area in Afghanistan and Pakistan is approximately the same as the net cultivated area, indicating the very limited contribution of double and triple cropping. It also indicates the importance of irrigation for the main crop. In

contrast, India and Bangladesh have extensive areas of double, and in some areas triple, cropping, though in India in particular these are often under-reported. Thus while in Bangladesh the main wet season crop (known as *aman*) is watered largely by rain and flood water, in the two other seasons, *aus* and *boro*, irrigation is normally essential. Irrigation in both India and Bangladesh has sometimes been used to increase double cropping and to improve productivity within the already cultivated areas. Increased quantity and reliability of the water supply have encouraged a movement away from food crops towards cash crop production.

India (1911 km³) and Bangladesh (1227 km³) have by far the largest total gross Renewable Water Resources (RWR) in the region. Maldives (0.03 km³), Afghanistan (65 km³), Sri Lanka (53 km³) and Bhutan ((78 km³) have the lowest gross RWR, with Pakistan and Nepal in between (approximately 230 km³).

The relevance of these absolute figures is put in sharper perspective by other data shown in Table 27: the volume of water resources that originate outside the country, water availability per capita and total storage capacity in dams. Dams may store water exclusively for either irrigation or power generation or a combination of both. They have also been built to even out the seasonal flow and inhibit flooding downstream. In South Asia, as elsewhere in the world, large dams have been very politically contentious, especially among environmental groups.

Sri Lanka and Maldives (the two island states) and Bhutan (whose boundary with China follows the crest-line of the Himalaya) have no external water resources. For Pakistan (192 km³, mainly from India, the remainder from Afghanistan and China), external resources are critically important and play an important part in the geopolitics of cross-border relations. Bangladesh's external water resources (1122 km³, entirely across the Indian border) represent over 90 per cent of its total. India (465 km³, largely from Nepal and China), also has an important stake – 25 per cent of the total – in its external water resources. The implications of these cross-border resource movements are discussed in Chapter 25.

The uses of water

Table 28 shows the dominance of agriculture as the main user of water in all the countries of South Asia. In Afghanistan, Bhutan and Nepal agriculture accounts for almost 100 per cent of withdrawn water. In Bangladesh it is just under 90 per cent, in India 90 per cent, in Pakistan 93 per cent and in Sri Lanka 85 per cent. In the major economies of South Asia the scale of industrial use is rising, and as city populations grow municipal demands are also increasing.

Table 28 Water withdrawal by sector and source

		Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
B	Agricultural	23	32	0.3	688	–	9.3	172	11
Y	(km ³)(% of total)	(99)	(89)	(99)	(90)		(98)	(93)	(85)
S	Municipal (km ³)	0.2	3.6	–	56	–	0.15	9.4	0.8
E	Industrial (km ³)	0.2	0.8	–	17	–	0.03	1.4	0.8
C	Total withdrawn	938	244	450	630	19	335	1020	639
T	per capita (m ³)								
O									
R									
	Total water withdrawal (km³)	23	36	0.3	761	–	9.5	184	13

(Continued)

		<i>Afghanistan</i>	<i>Bangladesh</i>	<i>Bhutan</i>	<i>India</i>	<i>Maldives</i>	<i>Nepal</i>	<i>Pakistan</i>	<i>Sri Lanka</i>
B Y S O U R C E	Surface water withdrawal (km ³)	n/a	8	0.3	510	–	9.3	122	n/a
	Groundwater withdrawal (km ³)	n/a	29	–	251	–	–	62	n/a
	Total freshwater withdrawn as % of ARWR ¹	36	3	0.4	40	16	4.5	74	25

¹ ARWR Actual Renewable Water Resource

Surface water withdrawal

The use of surface water (largely from rivers) is particularly important in India (510 km³) and Pakistan (122 km³). The figures for surface water and groundwater often contain an element of overlap. In some parts of South Asia the groundwater, while not tapped directly, contributes to river flow and in some cases is wholly responsible for low season river flow. It is striking how small the proportion of surface water flowing through Bangladesh is withdrawn for use (8 km³ out of more than 1000 km³). Nearly all of its surface water flows directly out to sea. The figures for surface water flows make for an interesting comparison with flows elsewhere in the world. At one extreme, the Amazon carries nearly twice as much as the total surface flow of rivers in India, approximately 8000 km³ every year. The flows of the Rhine, the Loire and the Rhone are only 5 km³ each.

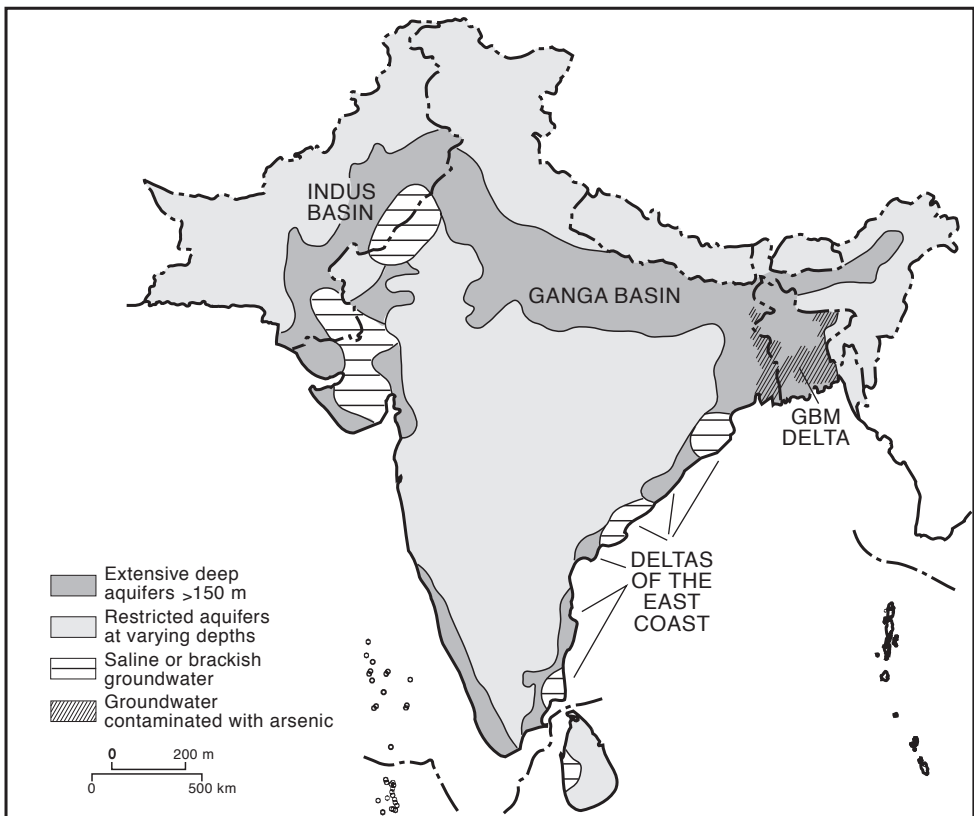
Table 29 Area irrigated in South Asia

		<i>Afghanistan</i>	<i>Bangladesh</i>	<i>Bhutan</i>	<i>India</i>	<i>Maldives</i>	<i>Nepal</i>	<i>Pakistan</i>	<i>Sri Lanka</i>
I R R I G A T I O N	Total area irrigated (km ²)	31,990	50,500	320	663,340	0	11,680	192,700	5700
	Surface irrigation (km ²)	n/a	50,500	276	619,380	0	11,340	192,700	5700
	Sprinkler irrigation (km ²)	n/a	-	-	14,460	0	0	0	0
	Localised irrigation (km ²)	n/a	-	-	5780	0	0	0	0
	Irrigable as % of cultivated area	41	59	28	39	0	47	93	29

Irrigation is by far the most important water use across the sub-continent. The overwhelming majority is by surface irrigation, water being released from channels directly onto the fields in a form of controlled flooding. Only in India has a significant start been made on introducing more efficient sprinkler irrigation.

The challenge of groundwater

Globally, it has been estimated that groundwater represents 30 per cent of the world's total fresh water. Today it is a critical resource in South Asia (Shah T. 2007). Its use goes back centuries. In the pre-modern period, each region of South Asia had its own forms of well irrigation. Some were bull-ock-power driven systems such as the *Persian Wheel*, common across northern India and Pakistan, or the *kavalai* system of southeastern India, especially Tamil Nadu. Others used gravity to channel underground water, such as the *karez* of Afghanistan and Pakistan, and their neighbour Iran. Since the early 1960s, the spread of diesel and electric pumps has transformed the exploitation of aquifers across South Asia. They have become a crucial resource in regions far beyond those in which they were historically significant. Today, India, Pakistan, Bangladesh and North China have been estimated to use approximately 400 km³ of groundwater, over half the world's total. India is the largest single user. The analysis of satellite data suggests that the official government figures may be a considerable underestimate. In addition to its direct use, groundwater makes a significant contribution to river flow, especially during the dry season, sustaining rivers that would otherwise run dry.



Map 69 Water resources: South Asian aquifers

Groundwater storage varies widely according to the combination of geological and hydrological conditions. As Map 69 shows, the most significant aquifers are in the alluvial plains of the Indus and the Ganga, and some of the narrow coastal deltas of peninsular India. In places groundwater is heavily saline, making it unusable either for human consumption or agriculture. Since the early 1980s, the increasing use of groundwater in the Bengal delta has led to the oxygenation of the upper levels of the water table, contributing to the serious problem of arsenic contamination in Bangladesh and Paschimanga (West Bengal). This issue is discussed in Chapter 27.

Country summaries

Afghanistan

Afghanistan's water resources are divided among five river basins.

1. The northern basin (24 per cent of the total) The source and upper reaches of the Amu Darya are in Afghanistan, totalling only 6 per cent of the river's complete basin. The Amu Darya flows into Turkmenistan and Uzbekistan and ultimately into the Aral Sea. Its catchment represents 14 per cent of Afghanistan's total basin area, the inland draining northern rivers contribute a further 10 per cent of Afghanistan's total basin area.

2 and 3. The western basins The two basins of the Hari Rud and Murghab rivers have 12 per cent of Afghanistan's total basin area, shared equally between them. They rise in north central Afghanistan, and while the Murghab flows into Turkmenistan, the Hari Rud shares its basin with Iran and Turkmenistan. Afghanistan has 37 per cent of the total area of these two basins and 37 per cent of the flow. However, the population of the two basins is less evenly divided. Afghanistan has 855,000 of the Murghab's total population of 1.25 million. The population of the Hari Rud basin is divided between Iran, with 3.4 million, Afghanistan (1.3 million) and Turkmenistan (168,000). Note: some writers treat these two rivers as sharing one basin (King and Sturtewagen 2010).

4. The southwestern basin (52 per cent of Afghanistan's area, 11 per cent of the total flow.) The River Helmand (flowing southwest into Iran) is subject to an \$83 million development project (Asian Development Fund \$75 million, Canadian International Development Agency \$8.35 million) under the heading of the Western Basins project. The scheme includes canal rehabilitation of the Jui Nau, Zinda Jan and Kohsan and new construction of the Goryan Kohsan main canal. The project also includes groundwater data collection, on-farm water management training and agriculture and livelihood services. The Helmand flows into Iran and is an essential source of water for the wetlands of Sistan.

5. The eastern basin (12 per cent) The Kabul River and its tributary the Kunar (which rises in Pakistan) is the only Afghan river to flow into the sea, joining the Indus at Attock in Pakistan. Apart from providing essential water supplies for Kabul's estimated three million people, the river is an important source of hydroelectricity and irrigation. The use of the shared waters is contested with Pakistan, and the IUCN has urged the two governments to work towards a treaty based on the model of the Indus Waters Treaty (IUCN 2010).

Bangladesh

Despite its seasonal abundance of rainfall and surface water, the availability and effective management of water resources are just as critical for Bangladesh's sustainable development as for

the other countries of South Asia. This has become increasingly true since Independence in 1971. Between 1970 and 2012 Bangladesh's population grew from 66 million to approximately 155 million, a two and a half fold increase. This growth has imposed direct demands on agricultural output. (In comparison, during the same period Russia's population grew from 120 million to 144 million: World Bank 2014.) As a result, demands on water have grown, the chief use being irrigation during the four-month dry season.

Growing demand for food has been mapped onto a highly complex agricultural system. Brammer (2000, p. 58) pointed out that 'eight main kinds of crop rotation can be recognised in Bangladesh'. These are related to variables such as normal levels of flooding, the water-retentive character of soils and the time of onset of the pre-monsoon rains. Perennial and semi-perennial crops such as fruit trees, betel vine and ginger are an integral part of the system of which the cereals rice and, in the dry season, wheat, are the key components.

Statistics of area and production are recorded for three major cropping seasons, *Aus* (pre- and early monsoon), *aman* (monsoon) and *boro* (winter monsoon or dry season). In 1971–72, 65 per cent of the total surface area was classified as cultivable (9.3 million ha), and 8.5 million ha were actually cultivated. Double and triple cropping increased the total cultivated area to just over 13 million ha, a cropping intensity of 156 per cent. By 2005 (the latest official figures available) although the net area sown had fallen slightly, the cropping intensity had risen to 177 per cent.

This growth in total cultivated area had largely been achieved by increasing the irrigated area during the *boro* season, from just over 1 million ha in 1979–80 to over 3.6 million ha in 2005. *aman* season irrigation had also increased, but from the much lower base of 130,000 ha in 1979 to 340,000 ha in 2005 (Government of Bangladesh, Ministry of Agriculture 2007). The very small importance of irrigation in the *aman* season is because in most of the country the monsoon season has abundant rainfall and floodwater, making irrigation redundant – the opposite of the situation in the *boro* season. The overall importance of the predominantly un-irrigated *aman* season is given by the total area under rice, which has fluctuated around 5,500,000 ha, compared with the total area under *boro* rice in 2005 of over 1,000,000 ha. On top of the growth in area under irrigated rice, Bangladesh has seen a growth in irrigated wheat and maize from just over 100,000 ha in 1979 to over 1 million ha in 2005 – again, *boro* season crops.

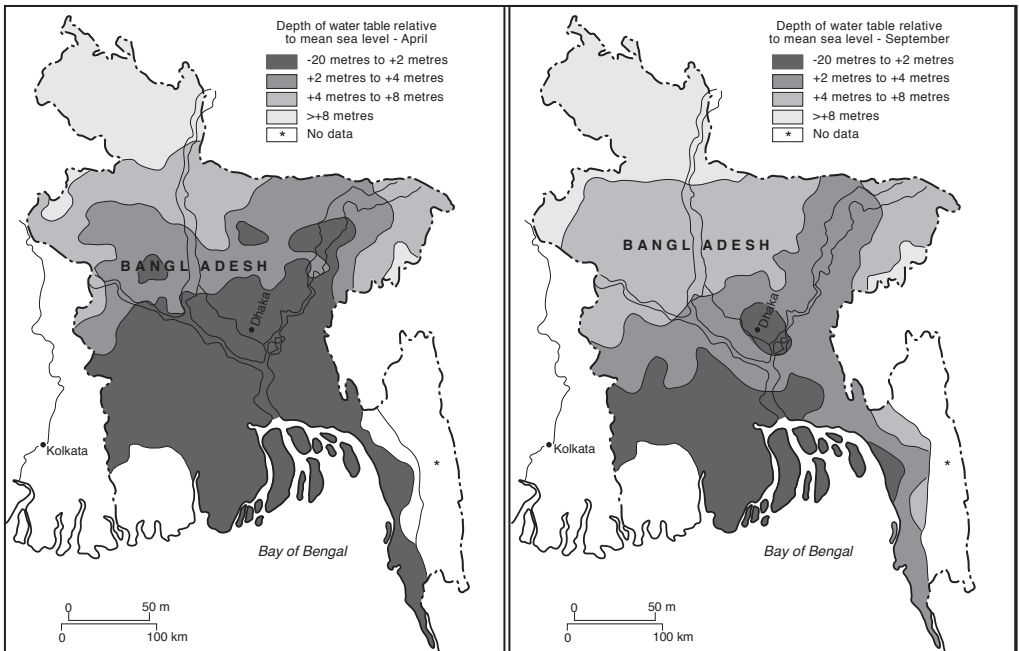
Map 70 shows the wide regional variations in the proportion of agricultural land irrigated across Bangladesh. The most intensively irrigated land lies in a belt across the centre of the country, with figures ranging above 50 per cent. Over 5 million ha is equipped for irrigation. The growth of area irrigated, notably by tube wells, has been very rapid. In 1979 the total irrigated area was a meagre 1,500,000 ha. Of this, 600,000 ha was irrigated by low lift pumps operating close to the banks of rivers, and a further 500,800 ha was irrigated by traditional wells. Deep tube wells irrigated only 100,800 ha and shallow tube wells a further 55,000 ha. By 2004–5 the total irrigated area had risen to over 5,000,000 ha. Of this total, deep tube wells accounted for 700,160 ha and shallow tube wells a further 3,000,270 ha.

The spread of tube well irrigation has had a significant effect on the depth of the water table, notably in the dry season. Map 71 shows the contrast between the levels at the end of the dry season in April, Map 71(a), when water tables are at their lowest, and those in September, at the end of the monsoon, Map 71(b), when water tables are at their highest (Shamsudduha et al 2009). The depth of the water table is shown as metres above sea level.

In April, at the end of the dry season, and the period of greatest extraction of groundwater, the water table across most of the southern districts of Bangladesh is between 20 metres below mean sea level and one metre above. In parts of the southwest, and around Dhaka, it remains as low as 20 metres below sea level through much of the year. In April the area in which the water table is no

more than 2 metres above sea level stretches up the Ganga and Brahmaputra rivers and northwards from Dhaka almost up to the border with India in the foothills of the Shillong Plateau. The monsoon rainfall and flooding replenishes the water table over much, though not all, of Bangladesh. At the end of the monsoon, only the coastal districts have a water table less than 4 metres above sea level, and in much of the central belt water tables have recovered to between 8 and 15 metres above sea level.

Despite the dominance of seasonal variability in the pattern of water table depth and the annual seasonal replenishment, Shamsudduha, Chandler et al (2009) have shown that between 1985 and 2005 there was a long-term decline in groundwater levels in areas of intensive abstraction for irrigation or for urban use. This was most striking in and around Dhaka, where the drop in water table depth has been more than 1 metre a year. In the dry areas of the northwest, the west and the southwest, the decline has been much less, at between 0.1 and 0.5 metres a year. In some areas, such as the Upper Barind Tract in northwestern Bangladesh, capped by impermeable clays, replenishment rates may be below sustainable levels (Shamsudduha, Chandler et al 2009; Shamsudduha, Taylor et al 2011).



Map 71 Seasonal groundwater depth in Bangladesh
After: Shamsudduha, M., Chandler, T.E. et al (2009)

Bhutan

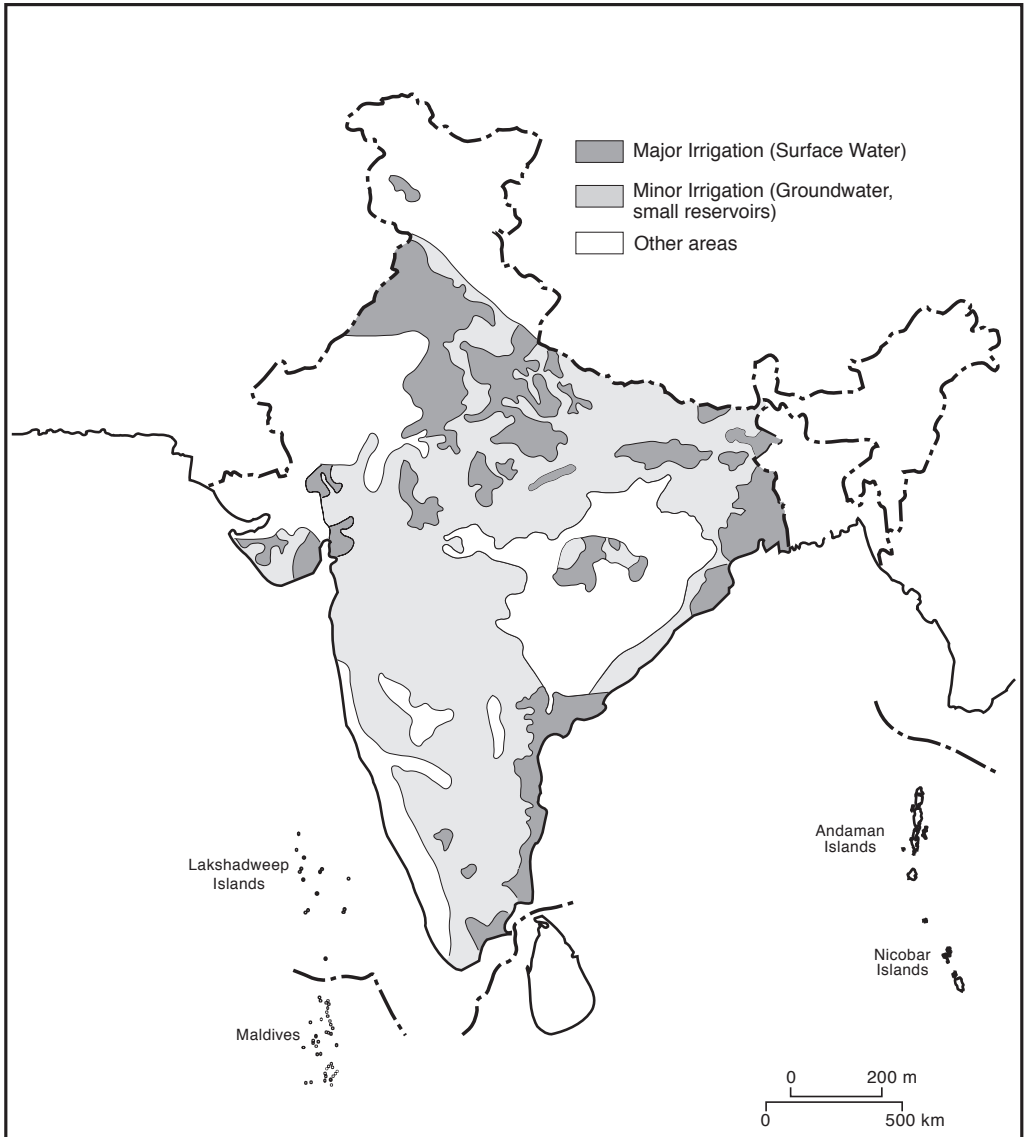
Bhutan currently makes negligible use of groundwater.

India

In 1990, India was estimated to be using $190 \text{ km}^3/\text{year}$, making it by far the largest groundwater user in the world, ahead of the US ($115 \text{ km}^3/\text{yr}$), China ($97 \text{ km}^3/\text{yr}$) and Pakistan ($60 \text{ km}^3/\text{yr}$).

In 2014 groundwater accounted for over half the agricultural water use in India and Pakistan. In 2014 India's Planning Commission estimated India's groundwater resources at over 230 km³/yr. The statistics for India's groundwater resources and use are subject to a wide margin of error and to varying underlying assumptions (Thenkabail et al 2009).

The regional distribution of groundwater resources, shown in Map 69 and Table 30, is very uneven. Apart from the extensive aquifers of the Indo-Gangetic Plains, and the deeply weathered peninsular rocks of Tamil Nadu, groundwater is usually very limited. Uttar Pradesh alone, India's most populous and fourth-largest state, accounts for over 18 per cent of the estimated



Map 72 Irrigation in India

groundwater available and over 20 per cent of extraction. Together, the states of the northwest account for 57 per cent of the groundwater extraction, and it is estimated that Punjab, Rajasthan and Haryana are extracting more than the rate of replenishment. For India as a whole it has been calculated that 58 per cent of total groundwater resources are currently in use.

Table 30 Indian groundwater resources and use

<i>The most groundwater-rich States</i>	<i>Net annual groundwater Availability</i>	<i>Net extraction</i>	<i>Balance of groundwater resource for future use</i>	<i>Level of groundwater development</i>
	km ³ /yr	km ³ /yr	km ³ /yr	% use
Punjab	21.4	31.2	(-9.9)	145
Rajasthan	10.4	13	(-3.9)	125
Haryana	8.6	9.5	(-1.1)	109
Tamil Nadu	20.8	17.7	3.1	85
Gujarat	15.0	11.5	3.1	76
Uttar Pradesh	70.2	48.8	19.5	70
INDIA	398.7	230.4	161.9	58

Source: Indian Planning Commission http://planningcommission.nic.in/plans/mta/11th_mta/chapterwise/chap21_water.pdf p. 439

Some of the states that are shown in Table 30 – Punjab, Haryana, Tamil Nadu and Gujarat – are those that have been at the forefront of increases in agricultural productivity, a boom enabled largely by the increase in water use in general and groundwater extraction in particular. As the table shows, in Punjab, Haryana and Rajasthan, rates of extraction currently exceed rates of replenishment.

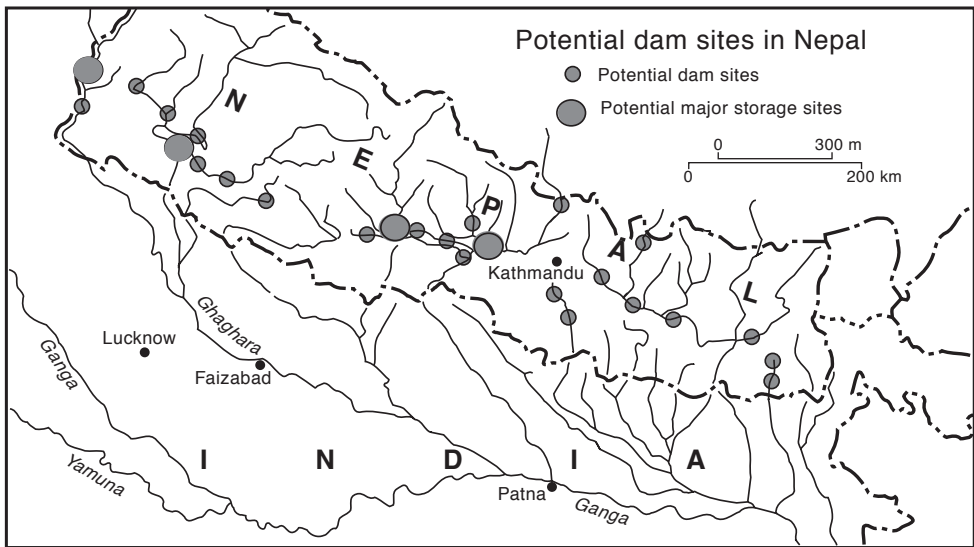
Maldives

The islands of the twenty-six Maldivian atolls, with a total land area of 300 km², receive on average just under 2000 mm rainfall a year, giving a total of 0.6 km³/yr. Some of this is captured in storage tanks, but the remainder of Maldives' requirements have to be met entirely from shallow aquifers in the coral. Agriculture, which is entirely dependent on rainfall, plays a minor part in the economy. Maldives are a good example of Allan's concept of virtual water, the country being very largely dependent on imported food – and hence of the water needed to produce it (Allan 1993). Sea water intrusion and pollution are putting a severe strain on fresh water resources. All tourism needs (approximately 500,000 tourists visit each year) are met from desalinated water, as are an increasing proportion of the needs of Male, the capital.

Nepal

From its precipitation of 221 km³/year Nepal produces 198 km³/year renewable water resources. The 20 km³ of groundwater sustains dry season river flow rather than being used directly for irrigation. External water resources, 12 km³/year, are made up of the small percentage of Nepal's

upper catchments that lie in China. Almost the full total of Nepal's surface waters, 210 km³/year cross the border into India. The five major river basins gather water from nearly 6000 rivers. In the far west the Mahakali River, forming the western boundary with India, has a total flow of 15 km³/year, of which about 3.4 km³/year originates in Nepal. In succession eastwards are the Karnali (50 km³/year), Gandaki (51 km³/year) and Kosi (47 km³/year). In addition there is a group classified by the FAO as the southern river basins, with a total of 65 km³/year flowing into India. Map 73 shows some estimates of potential dam sites in Nepal, but in addition to being very costly it is impossible to envisage adequate demand without sharing both the costs and benefits with India. To date this has proved an insufficiently attractive option to Nepali governments to overcome domestic objections.



Map 73 Potential large-scale dam sites in Nepal

Although Nepal is estimated to have significant groundwater potential, especially in the *terai* region bordering India, development has been relatively slow, despite recent attempts by the government to use groundwater as a key means of increasing agricultural production.

Pakistan

Of Pakistan's three major river basins, the Indus, the Karan in western Balochistan, and the arid Makran coast, the Indus system is both the largest, covering approximately 65 per cent of Pakistan and in terms of water resources by far the most important. However, over half the total catchment area of the Indus' 1.1 million km² lies outside Pakistan, shared by China (the headwaters), India and Afghanistan. The mean annual inflow into Pakistan's Indus system is approximately 265 km³. The crucial significance of these flows to Pakistan's whole economy is a result of the incorporation of much of the river and its tributaries into a managed system, known as the Indus Basin Irrigation System (IBIS). The left bank tributaries of the Indus, divided into the western rivers (Chenab and Jhelum) and the eastern rivers (Ravi, Beas and Sutlej) were allocated to Pakistan and India respectively by the Indus Waters Treaty of 1960.

Under the treaty India had the right to develop the eastern rivers for both hydro-electricity and irrigation, while these rights on the western rivers and the River Indus itself were given to Pakistan. Under the treaty India was to be allowed to develop hydro-electric generation on the western rivers as long as they did not extract water. The FAO quotes the total flow of the western rivers of the Indus from India into Pakistan as being just over 232 km³. Of this, over 180 km³ cross from China into India; the remainder is added by snow melt and precipitation in India itself.

Under the Indus Treaty Pakistan has constructed two large dams, the Mangla on the Jhelum (since 2005, raised to 10.5 km³) and the Tarbela on the Indus (11.96 km³). High rates of siltation in these dams are leading to an urgent need for more live storage to be created.

Pakistan's groundwater is largely confined to the plains of the Indus in Punjab and Sind and is an extension of the Gangetic aquifer of northern India. Groundwater withdrawal in Pakistan accounts for just over 33 per cent of total water withdrawal, almost entirely within the Indus basin. The water is raised by diesel (87 per cent) and electric (13 per cent) pumps, of which in total there are over 1 million in use. There are significant problems of saline aquifers, exacerbated by generations of inadequate management that has allowed water-logging and salinisation of irrigated land to be a perennial problem (see Chapter 27).

Sri Lanka

Despite the relative abundance of its monsoon rainfall, effective management of water has played an essential part in Sri Lanka's agriculture for over 2000 years. This has been necessitated by both the seasonality and the varied regional distribution of rainfall. The Central Highlands not only create the radial pattern of the island's drainage, but in addition to having their own small-scale regional climate, mark out a profoundly important divide between the Wet Zone (approximately the southwestern quarter of the island) and the Dry Zone (the remainder).

Total rainfall in the Wet Zone is typically over 2500 mm a year, while in the Dry Zone it is under 1500 mm a year. Much of the north and east of the island (the major part of the Dry Zone), which itself is topographically and climatically very varied, experiences a long dry season. Only the Wet Zone has rain throughout the year, with two maxima. The two main rainy seasons are the Southwest Monsoon, from May to September, and the Northeast Monsoon, from November to February. These are interspersed with the inter-monsoon rains, first in March-April and second in October-November. The main cropping seasons, the *Yala* (April to September) and *Maha* (September to March), correspond broadly to the monsoon pattern. While the Wet Zone has enough water throughout the year to support at least double cropping, agriculture in the remainder of the island requires irrigation, especially in the *Yala* season. Total annual runoff has been estimated at between 42 and 49 km³/year. Its uneven distribution means that many areas suffer significant water shortages. The Victoria Dam, completed in 1985, is the highest large dam in Sri Lanka, with a capacity of 0.73 km³, part of a chain of multi-purpose reservoirs designed to bring power and irrigation to the agricultural settlement lands of the Mahaweli Ganga project in Sri Lanka's eastern region. Total dam capacity in Sri Lanka was estimated at just under 6 km³ in 1996.

Groundwater resources in the largely crystalline rocks are limited to the shallow, weathered surface rocks. The most important water-bearing rocks are the permeable limestones of the Jaffna Peninsula in the north, though there is a series of less important aquifers, including the coastal alluvial deposits. The FAO estimates total usable groundwater resources of 7 km³, most of which returns to river flow, sustaining dry season surface water resources.

Conclusion

Water resources in South Asia are under immense pressure. With a growing population and increasing urban and industrial demand, every country in the region needs to maximise the efficiency of its water use. In many areas, such efficiency will demand greatly increased inter-regional cooperation, but the political will to achieve this has yet to be demonstrated, either in cooperation between the South Asian countries, or, in some cases, within them.

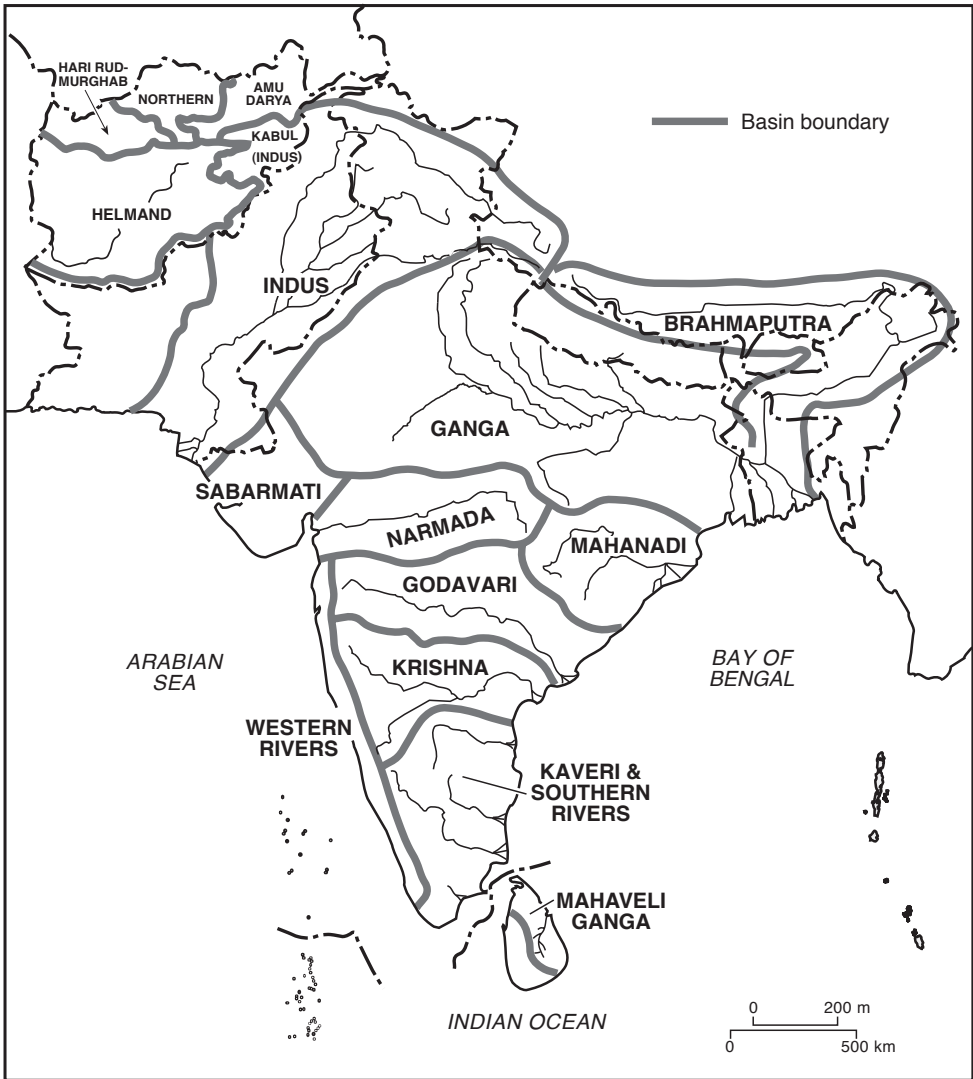
25 The geopolitics of cross-boundary water resource use

Cross-border water resources are of major strategic concern to all the mainland countries of South Asia. The ways in which cross-border rivers and groundwater play a part in the security interests of the individual countries reflect a variety of factors. The proportion of domestic water resources used in the country itself and the dependence on external resources are two. Some see opportunities for cooperation in the vital importance of shared water resources. However, a Chatham House Report on water in South Asia, analysing some 500 interviews with water professionals across South Asia, observed that ‘Discussion about water in South Asia is vociferous, antagonistic, and increasingly associated with national security’ (Price 2014). The political context is thus as important as the distribution of cross-border water flows themselves for the future effective use of cross-boundary water resources.

These elements are evident in Map 74. The three international rivers that cross national boundaries are particularly important. For example, the upstream catchment of the Indus basin, at high altitude and sparsely populated, lies largely in India, though there is also an important section in China. The downstream section – intensively irrigated low-lying plains, densely populated, and where the great majority of the water demand is located – is in Pakistan. Similarly, the upper Brahmaputra basin is in the very sparsely populated southwest of China, while the lower basin is in densely populated and heavily water-using India and Bangladesh. Both India and Bangladesh have a major stake in the Brahmaputra, even though Bangladesh currently uses little of the river’s water directly.

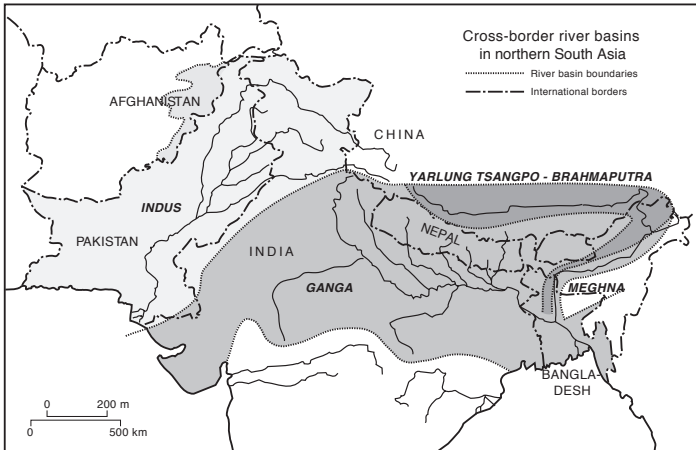
It is not just national borders that are of significance. None of the major Indian river basins lies exclusively within one state, and in Pakistan all the provinces have some stake in waters of the Indus Basin. As a result, water is also often a key issue in intra-national water disputes, notably in India and Pakistan. It has also been important in Sri Lanka, where the Mahaveli Ganga scheme, which stimulated not only agricultural intensification but large-scale population movements, raised inter-regional and communal tensions between the Sinhalese and Tamil communities.

The figures of cross-border water flow demonstrate why water is such an important element in the geopolitics of the region. The total volume of water crossing from India into Pakistan in the northwestern Himalaya has been estimated at 181 km³ (FAO Aquastat 2013). From Nepal the flow into India is 210 km³ and from Bhutan 95 km³. The Brahmaputra carries 165 km³ of water from China into India, but by the time the river reaches the border of Bangladesh, having passed through Assam, it has been massively augmented by local precipitation and flow from summer snowmelt. It carries just under 600 km³ a year from India into Bangladesh. The Ganga transports a further 344 km³ from India to Bangladesh. All of the flows are highly seasonal.



Map 74 Major river basins and international borders in South Asia

The size of these water transfers does not translate directly into economic or geopolitical significance. To date, for example, Pakistan's economy is wholly dependent on the cross-border flow of the Indus and its tributaries. In contrast, as yet Bangladesh makes virtually no use of the waters of the Brahmaputra that flow into it from India, although the contribution of the Brahmaputra to Bangladesh's flood system is a vital element of the dynamics of the whole delta, including its sedimentation. Indeed, the sediment in Bangladesh's cross-border rivers has been and remains responsible for the continuous evolution of the delta region. Its continuing supply ensures that, despite river-bank erosion and a rising sea level, Bangladesh's total surface area continues to grow (Brammer 2014).

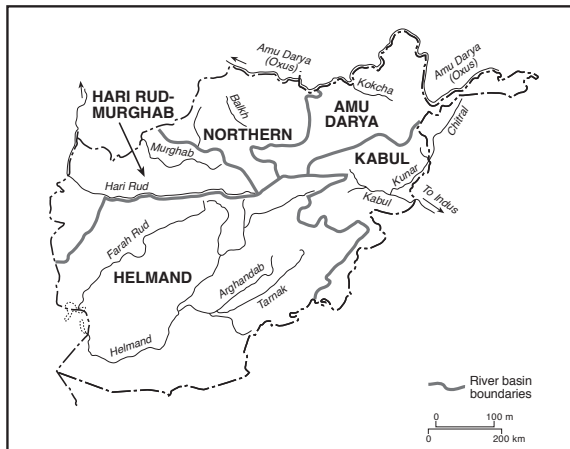


Map 75 Cross-boundary river basins in northern South Asia

International water sharing

Afghanistan and its neighbours

In 2010 Afghanistan had the lowest storage water capacity per capita of any state in the region, other than Maldives (Ahmed 2010). The headwaters of Afghanistan’s rivers flow from its central highlands into each of its neighbouring states from its five basins (FAO Aquastat 2013). All five basins are international watercourses as defined in the 1997 UN Convention on the Law of Non-navigational Uses of International Watercourses (UN 1997).



Map 76 The river basins of Afghanistan

The Kunar, a major tributary of the Khyber River, has its source and a large part of its course in Chitral District of northern Pakistan before crossing into Afghanistan and joining the Kabul River at Jalalabad. The combined river then crosses the Pakistan border and joins the Indus at

Attock. The flow of the Kunar-Kabul fluctuates widely, both seasonally and from year to year. In common with the rest of Afghanistan, which receives over 80 per cent of its precipitation in the form of snow, it depends heavily on annual snowmelt, which in turn depends on both winter depressions and summer monsoon precipitation. The maximum flow since the late 1930s has ranged from 12 km³ to 37 km³. Upstream water withdrawal has contributed to a long-term decline in the annual discharge into the Indus, though there remains wide annual variation.

Afghanistan's need for water and power have grown dramatically in the last two decades. Urban needs in the Khyber basin focus on Kabul, with a population of about 3.5 million in 2014. The rapid growth of both urban and rural demands led successive governments to plan for a series of schemes to dam the rivers for drinking water, irrigation and power (Ahmed 2010). However, Pakistan and Afghanistan currently have no water treaty, and given the growing demand for water in both countries, there is an urgent need for agreement between the two countries on long-term water development plans. This is a highly sensitive political challenge. The Pakistan newspaper *Dawn* suggested in 2011 that the construction of storage capacity of 5.8 km³ on the Kabul River would give Afghanistan 25 per cent more storage than currently exists in the Mangla Reservoir on the River Jhelum, which serves Pakistan. On August 26, 2013, Pakistan and Afghanistan signed an agreement to develop a 1500 MW power project on the Kunar River. This is being seen as the first major step towards developing a Kabul River Basin Management Commission. The World Bank has encouraged Afghanistan and Pakistan to use the Indus Waters Treaty between India and Pakistan as a model for the development of vital shared water resources (Kiani 2013). In 2014 such a development remained under discussion.

The Kabul River is Afghanistan's strategically most significant river in the east. In the southwest it is the Helmand (Hilmand), which, having risen less than 80 km west of Kabul and run southwest across the breadth of southern Afghanistan, crosses the border into the Iranian part of Sistan. The Helmand is the only Afghan River basin subject to an international treaty, Iran and Afghanistan's 1977 Helmand River Treaty. However, to date it has had little effect (Vick 2013). There is heavy demand on the Helmand, whose waters ultimately keep alive the distinctive marshland economy of the Sistan region of Iran as well as providing irrigation for southwestern Afghanistan.

Pakistan and India

Partition in 1947 divided a portion of the Indus River drainage basin between Pakistan and India. With the exception of the Kunar/Khyber, the headwaters of every major river in the basin, from the Indus in the north and west, southeastwards to the Beas, rose in or flowed through India to Pakistan. The imposition of what was quickly to become a hotly contested national boundary posed both immediate and long-term strategic questions for the two new states. In the short-term, Pakistan inherited the largest share of the area irrigated by the tributaries of the Indus, notably in what became Pakistani Punjab. However, many of the controlling head-works of the barrages that diverted water for irrigation onto the intensively cultivated fields of West Punjab lay in India.

The Indus Waters Treaty was ratified by the governments of India and Pakistan in 1960. The World Bank played a key role, financing the multiple large-scale projects that were an integral part of the Treaty. The Treaty provided for the division of rights to the waters of the basin between India and Pakistan, accompanied by investment in the infrastructure to build essential storage dams and a major reconstruction of the canal systems. The water of the eastern tributaries of the Indus, the Beas, the Sutlej and the Ravi, were allocated to India. The western



Map 77 Shared river systems - India and Pakistan
 After: Johnson B.L.C. 1979

... rivers, the Chenab and the Jhelum, and the Indus itself, were allocated to Pakistan. The transfer of rights had to be accompanied by major changes to the canal infrastructure.

In 1947 the intensively irrigated plains of Punjab had depended on water controlled by irrigation head-works on the three rivers that were to be allocated to India. For Pakistan, the replacement of this water thus became a priority under the treaty. Equally, India had no means of using the three rivers to which it now had the rights and that before Independence had flowed into Pakistan. Thus the treaty allowed for large dams to be built on the upper reaches of these rivers in order to engineer both a massive diversion of existing water supply and the creation of new storage capacity, thereby increasing the irrigated area in both India and Pakistan (Map 77). Such dams included the Bhakra and Nangal Dams on the River Sutlej in Bilaspur District, India,

(often referred to as the Bhakra-Nangal Dam) and the Mangla and Tarbela Dams on the Jhelum and Indus Rivers respectively in Pakistan. An integral part of the treaty was the generation of electric power from the large dams.

The Indus Waters Treaty has remained in force ever since it was signed in 1960, despite the dispute over the status of Jammu and Kashmir, the wars of 1965, 1971 and 1999 and the militant campaign in Jammu and Kashmir, which remains unresolved and flared again in late 2014. Under the treaty, the three dams mentioned above and numerous other major works have been completed. The Tarbela Dam alone had an electricity generation capacity of nearly 3500 MW and accounts for the generation of 16 per cent of Pakistan's electricity (Asianics Agro-Development International 2000). In 2014 construction of an additional capacity of 1400 MW, the Tarbela Extension Project, was underway.

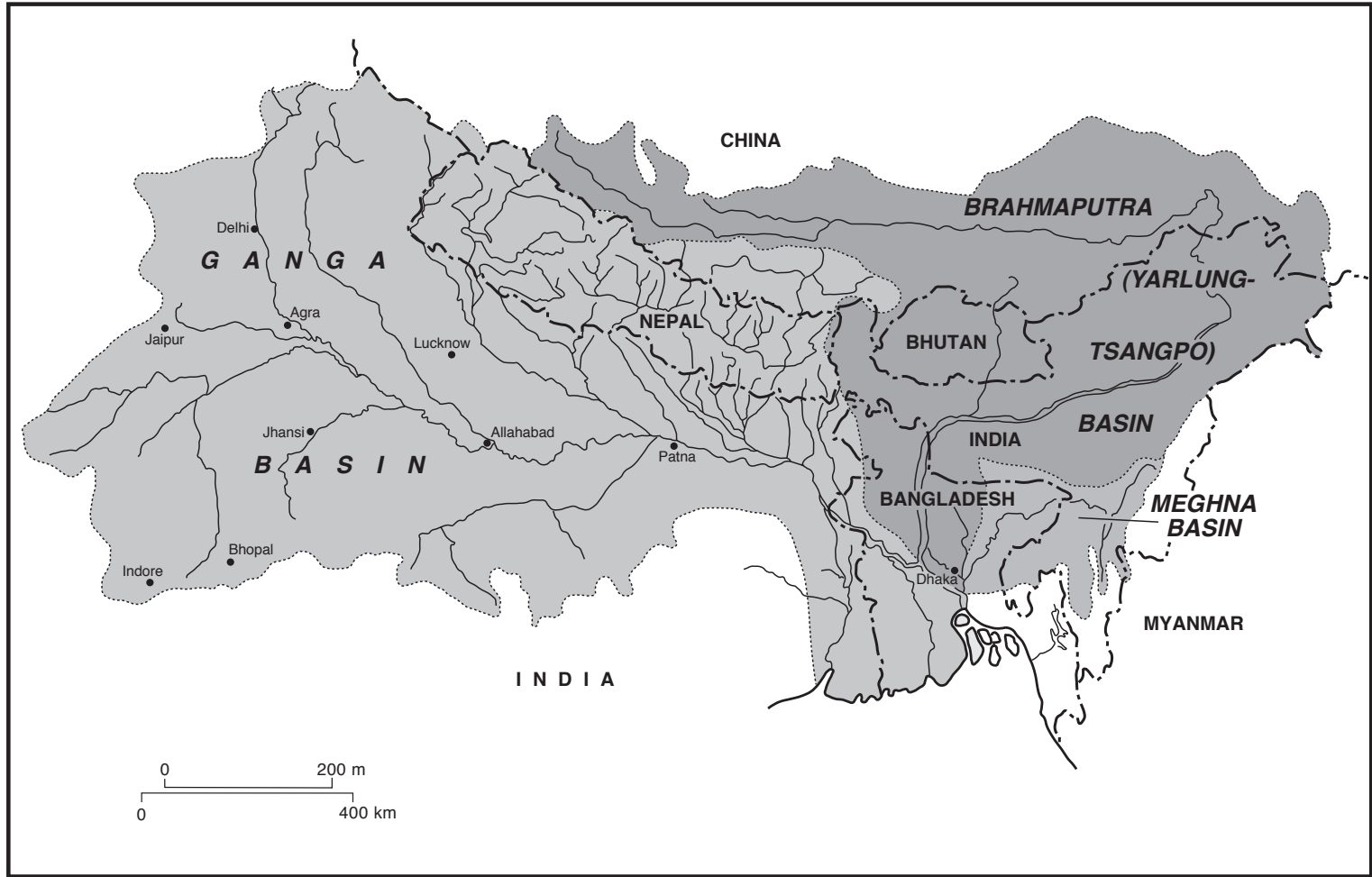
The success of the treaty reflects its vital importance to both parties. However, there has been frequent recourse to the neutral expert mediator appointed under its terms. Over the last decade India has planned a large number of dams for generating hydroelectricity on rivers that flow into Pakistan. Two of the most contentious have been the Baglihar scheme on the Jhelum and the Kishenganga Hydroelectric Project. India has argued that these do not abstract any water and that it will continue to pass to Pakistan as under the agreement. The Independent Court of Arbitration accepted India's case for the Kishenganga Project, with some minor provisos, in December 2013. After the Indian election of May 2014, both Pakistan and India reaffirmed their commitment to the treaty.

Nepal and India

It has been widely argued that development of water storage schemes on the major Himalayan Rivers could provide a solution to some of the region's most severe problems (Verghese 1990). Construction of high dams in the eastern Himalayan valleys could, Verghese argued, create enormous hydro-electric capacity. In the 1980s many in Bangladesh argued that the building of such dams in Nepal would also give Bangladesh protection from the annual floods that are a major hazard. At the same time, it was argued, such dams could help to provide extensive new irrigation in the lowlands, from the Terai of Nepal, across the plains of northern India and into the great Ganga-Brahmaputra-Meghna delta of Bengal. Such a positive scenario has frequently been contested, however, on environmental, human rights and economic grounds. Despite some large-scale developments in the last thirty years, its realization is far from complete (Chapman and Thompson 1995; Hofer 1998; Messerli, Hofer and Wymann 1993).

Development of Nepal's water resources has been hampered by the inherent difficulty of the terrain and the cost of large-scale development. It has also faced the added complexity of great political uncertainty. This has stemmed in part from the required bi- or tri-partite agreement (India and Nepal, or India, Nepal and Bangladesh), in which fundamental differences of objectives have been matched by differing perceptions of the ways in which potential benefits can be equitably shared. Many working in the water sector in Nepal blame India, as the major lower riparian, for preventing upstream development of water resources to meet Nepal's needs, especially in the *Terai* border region of southern Nepal (Price 2014).

There have been both geopolitical and environmental reasons, such as the 2015 earthquakes, that progress in development has been so slow, and why major developments beyond those so far proposed are unlikely to happen in the foreseeable future. In part there is a fear on Nepal's side that any development is likely to benefit India far more than it benefits Nepal. For its part, the Indian government has not wanted to put itself in a negotiation in which it could be outvoted to its own disadvantage. Cooperation on shared water resources has been repeatedly stymied by such fears, and there is little sign of change in the near future (Price 2014).



Map 78 The Ganga-Brahmaputra-Meghna basin

India and Nepal signed the Mahakali Treaty in February 1996. Its timing proved to be inauspicious, as Nepal was about to enter more than a decade of civil war. Not surprisingly, the progress of implementation of the India-Nepal Treaty has been tortuous even by the standards of other major river development projects. By 2014 a Detailed Project Report (DPR) for the project had still not been agreed upon. The third Joint Commission on Water Resources, held twelve years after the original treaty was signed, agreed to establish the Pancheshwar Development Authority, whose terms of reference were agreed to in 2009. In September 2013 the Business Standard reported that India and Nepal had agreed to speed up the construction of the 5600 MW electricity generation project, though major issues remained to be resolved.

A second major project, the Sapta-Kosi (Sun Kosi) scheme, has also been agreed to. The exchange of letters of understanding between the two governments in 2004 followed the 1950s agreements on the river. Under these, a series of flood prevention barrages were built on the river, which rises in Tibet and flows from north to south through Nepal into India. The current proposal is to build a high multi-purpose dam on the Sapta Kosi. A Joint Project Office, established in 2004 to expedite the investigations preparatory to the work, has had repeated extensions to its timetable for reporting and has now been given until February 2017 to complete its findings. The 7.9 Mw Nepal earthquake of April 2015 may stall progress further.

India and Bangladesh

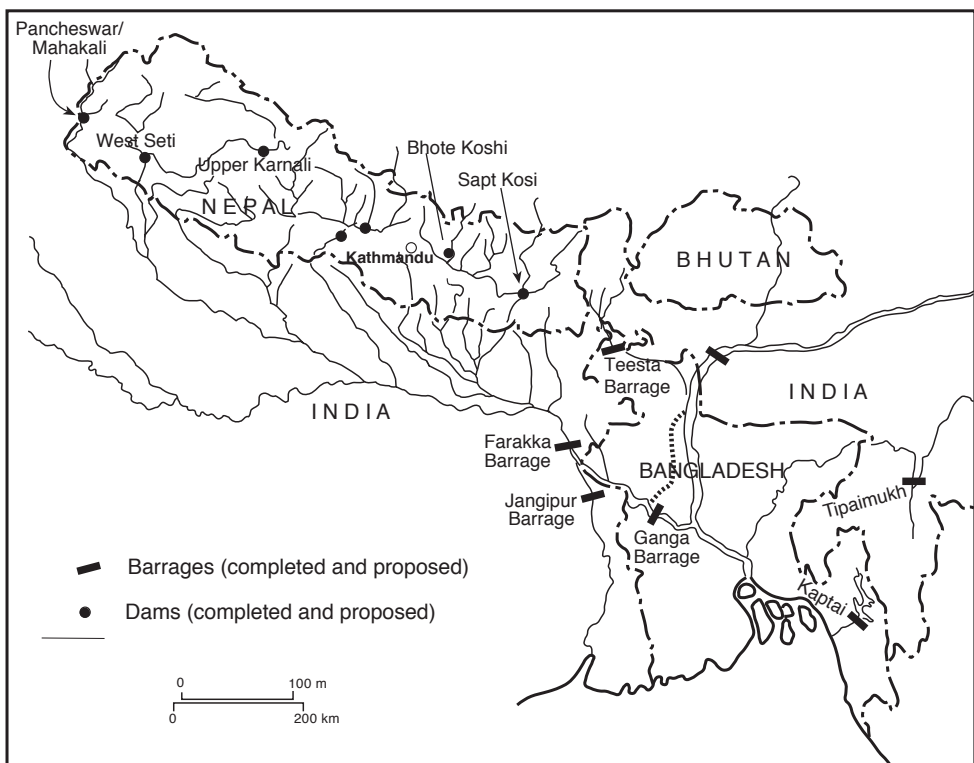
India and Bangladesh share a land border of 4095 km, with 54 rivers crossing the national border. Furthermore, the two countries share over 1100 km of riverine border. 90 per cent of the basin area of the rivers that ultimately enter the sea through Bangladesh lies in India, Nepal or China, and the rivers all cross the border from India; thus, both countries have major interests in their cross-border waters. On the Indian side, the states of Paschimbanga, Assam, Meghalaya, Mizoram and Tripura all have rivers that flow into Bangladesh. Their effective management – for drinking water supplies, for irrigation, to generate hydroelectricity, and to inhibit the damage caused by flooding – is a common interest. Politically to date, however, the common interests have not been perceived to be strong enough to outweigh fears in Bangladesh that India, as the upper riparian, would exercise its power to override Bangladeshi interests.

Bangladesh, largely surrounded by and receiving all its major rivers from India, has been deeply fearful that its own development ambitions would be hampered by India's control and use of the upper waters of the Ganga-Brahmaputra system. The unilateral diversion by India of much of the dry season flow of the Ganga at a newly constructed barrage at Farakka in 1977, led to nearly two decades of bitter dispute over India's rights to the water and the environmental effects of the scheme in practice. India had begun work on the barrage in 1961, ten years before Bangladesh seceded from Pakistan, to try and alleviate increasing problems of dry season water shortage on the River Hugli, on which both the port and the people of Kolkata were heavily dependent.

Anxieties over the deterioration of the flow of the Hugli, itself the result of the eastwards migration of the main course of the Ganga over the previous centuries, went back to the nineteenth century, when schemes were first promoted to tackle the problem by a dry season diversion scheme to bring more Ganga water down the Hugli. In the light of Bangladesh's vigorous objections to the opening of the barrage in 1977, India proposed a number of schemes that, in their view, would have resolved Bangladesh's objections. However, while Bangladesh sought a solution in augmenting the total supply of water in the Ganga by building large dams in Nepal, India proposed the construction of huge canals to link the Brahmaputra and the Ganga. None of these schemes proved politically or, some would say, ecologically, viable.

India and Bangladesh signed a bilateral thirty-year water sharing agreement on December 12, 1996. After two decades of operation, the benefits to Kolkata were highly questionable, and the costs both downstream in Bangladesh and immediately upstream of the works in India were apparent. The treaty, which is reviewed every five years, comes up for renewal in 2026.

A case can already be made for Bangladesh to augment its groundwater irrigation with the use of surface water from the Ganga-Brahmaputra system, which at the moment flows almost entirely into the sea. Some areas, notably the southwest, have major problems with dry season salinity and the lack of good groundwater resources. Brichieri-Colombi and Bradnock (2003) outlined the potential for barrage schemes on the lower Ganga (Padma in Bangladesh) and the Brahmaputra (Jamuna in Bangladesh). To be viable economically such schemes could almost certainly only be cost-effective if they were implemented on a sharing basis with India, but while political obstacles have hampered such cooperation in the past the need for development of this vital water resource is already real (Brichieri-Colombi and Bradnock 2003).



Map 79 Water development proposals in Nepal, India and Bangladesh

Bangladesh and India have two further unresolved disputes over water sharing and development. In November 2011, the two governments reached agreement on sharing the River Teesta, which flows from Sikkim through Paschimbanga into northwestern Bangladesh. The same agreement covered water sharing on the River Feni, running from Tripura into eastern Bangladesh. However, opposition from the Indian state of Paschimbanga has delayed the agreement's ratification. Similar delay also occurred in India's plan to move ahead with building the Tipaimukh dam in Manipur, on the severely flood-affected River Barak. In 2013 India agreed to suspend development of the Tipaimukh Dam until Bangladesh had had the chance to complete an environmental audit in 2015.

India's largest water development plan, the National River Linking Project (NRLP, see below), involves channeling large volumes of water from the Himalayan rivers, including the Brahmaputra, to peninsular India. It is by far the largest challenge facing India and Bangladesh's hydro-diplomacy. Although the BJP government, elected in May 2014, reiterated its commitment to this remarkably ambitious project, its future remains in doubt. Bangladesh regards the potential extraction of a significant proportion of the Brahmaputra's flow with deep concern.

Bhutan and India

Bhutan's predominantly high altitude location in the path of the Indian monsoon and its southward draining rivers shape the character of Bhutan's water resources and opportunities for water exploitation. Its total long-term average renewable resources, 78 km³, far outstrip domestic demand, either directly for water or for the electricity generated by the development of large dams. Although Bhutan is marginally energy deficient in winter, when demand is highest and HEP generation at its lowest, the only realistic market for the high level of summer surplus generation is India. The states of Paschimbanga (West Bengal), Bihar, Jharkhand, Odisha and Sikkim are the main markets.

Bhutan's special relationship with India has encouraged the development of a number of water development schemes. Several high dams have been constructed with Indian assistance. Chukha (1991, 336 MW), Tala (2007, 1020 MW), and Kurichu (2002, 40 MW) are three of the most important schemes. All were built with India covering the costs, generally a mixture of grants (up to 60 per cent) and loans (40 per cent). The largest project to date, the Punatsangchu I and II run of the river hydro-electric scheme, will generate 2220 MW electricity when completed in 2016. The dam will be 141 m high. In 2006 the total HEP capacity was 477 MW. While Bhutan's energy demand in the winter marginally exceeds available supply, in the summer Bhutan exports a high proportion of its electricity to India.

China and its South Asian neighbours

China has a strong interest in water resources originating from the Himalaya, along much of the length of its borders from Pakistan to eastern India. About 70,000 km² of the upper Indus basin lies within China. On the eastern side of the Himalaya the upper reaches of the Brahmaputra/Yarlung Zangbo, about half the total Brahmaputra basin area, lie almost entirely within the Tibet Autonomous Region of China. When it crosses the Indian border the flow, comprised largely of snowmelt from the northern slopes of the Himalaya, is estimated at 165 km³, of which 0.6km³ is withdrawn for agricultural use. China is building a series of dams on its stretch of the river. While it is known that some of these are run of the river HEP schemes, there is speculation, especially in India and Bangladesh, that China intends to withdraw substantial water into the river system draining into mainland China, via a series of channels constructed through the mountain ranges. Although there have been bilateral discussions at a secretary level between India and China over the uses of the Brahmaputra, to date no institutional framework has been established for basin-wide cooperation and planning.

Intra-national cross-border disputes

India and Pakistan both have long-running internal disputes between their states and provinces over cross-border flows. Some of these are classic lower riparian/upper riparian disputes, where historically the first part of the basin to make extensive use of the river water has been at the lower

ends of the river basins, like the Indus and the Kaveri, while subsequent development has increased demand upstream. The Indus Valley Civilisation used annual flooding from the Indus in the lower reaches of the Indus over 4000 years ago (Allchin and Allchin 1997). The Grand Anicut, at the head of the delta of the River Kaveri, was built in the second century ACE, one of the oldest irrigation works still in use. Subsequent economic development upstream in both basins has put increasing demands on the water supply and brought about some of the most intractable water disputes.

Cross-border water disputes in India

The Inter State Water Disputes Act 1956 set the framework within which emerging disputes over river water in Independent India should be settled. The arbitration process introduced under the Act has been resorted to by states across India to resolve cross-border disputes and is still in use.

Kaveri (Cauvery) waters dispute

The River Kaveri rises high in the Western Ghats within 80 km of the Arabian Sea and flows 802 km into the Bay of Bengal at Poompuhar on the eastern coast of the Thanjavur delta. It commands a basin area of 76,000 km², 32,000 km² of which are in Karnataka (upstream) and 44,000 km² in Tamil Nadu (downstream), with minor shares in Kerala upstream and Puducherry (Pondicherry) downstream. The delta section of the river has been intensively used for over 2000 years, but a dispute arose in the 1880s between the British Presidency of Madras, downstream, and the Indian Princely state of Mysore, upstream, which wanted to use the river's water. Two agreements were signed by Madras Presidency and Mysore in 1892 and 1924. These allowed Mysore to build the Krishna Raja Sagar Dam and reservoir for irrigation at Kannambadi near Mysore in 1924. The Mettur Dam, one of India's largest, was built ten years later in what is now Tamil Nadu.

Since Independence in 1947, and the subsequent re-organization of the Indian States in 1956, Mysore was merged into the new state of Karnataka, while parts of Karnataka, Tamil Nadu, Kerala and Andhra Pradesh were carved out of the British Madras Presidency. The new boundaries of the states created new interests in Kaveri waters, with the headwaters of a major tributary of the Kaveri, the River Kabini, rising in Kerala. After more than two decades of failed negotiations, in 1990 the government of India established a Tribunal. This issued its final report in 2007, allocating the shares of the waters shown in Table 31.

The release of water to Tamil Nadu by Karnataka at times of water shortages continues to provoke major political tensions in the two states, and neither has yet fully committed itself to accepting and implementing the Tribunal's proposals.

Table 31 The 2007 settlement of the Kaveri waters dispute

State	Contribution of state km ³ (Karnataka/Tamil Nadu)	Share given by tribunal 2007 Km ³	%
Karnataka	12/11.1	7.6	37
Tamil Nadu	7.1/6.2	11.9	58
Kerala	3.2/3.6	0.9	4
Puducherry (Pondicherry)	-	0.2	1

Note: The estimated contribution of the Kaveri arising from within the different states is given according to the estimates of Karnataka to the left of the oblique (/) and Tamil Nadu to the right.

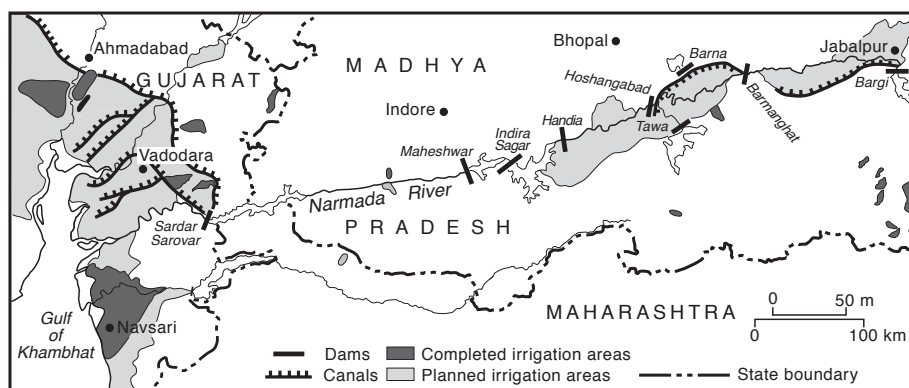
The Narmada and the Sardar Sarovar dispute

Plans to develop the hydro-electric and irrigation potential of peninsular India's largest westward flowing river, the Narmada, go back to Independence and the 1948 Khosla Report, which proposed the exploration of a series of sites for development. By the time the key outlines of the project were identified in 1961 the Bombay Presidency had been divided in the north and north-west into the new states of Gujarat and Maharashtra. The creation of the two states introduced a new political dynamic into the proposals, and Maharashtra rejected proposals that Gujarat had accepted. The Narmada Water Disputes Tribunal, set up in 1969, reported in 1979. The 35 km³ of usable water identified as being available through completion of the Sardar Sarovar project was to be shared as shown in Table 32. Two of the most arid districts in Rajasthan were also to be allocated a small share of the total irrigation water.

Table 32 State-wise allocation of water from the Sardar Sarovar Project

Party States	Allocated share of water - acre feet	% share of power
Madhya Pradesh	18.3 million (22.51 km ³)	57
Gujarat	9 million (11 km ³)	16
Maharashtra	250,000 (0.31 km ³)	27
Rajasthan	500,000 (0.62 km ³)	Nil
Total	28 million (35 km³)	100

Initially supported by the World Bank, the Sardar Sarovar Project roused a storm of environmental activist protest. As a result the World Bank ultimately pulled out, and the Indian Government determined to finance the whole project itself. Opponents of the scheme went to the Supreme Court, which finally accepted the Government's proposed plan. Major elements are now either completed or partially completed.



Map 80 The Sardar-Sarovar scheme - the Narmada Basin

The Krishna dispute

Karnataka, Maharashtra, Telangana and Andhra Pradesh share the Krishna River, the second biggest river in peninsular India. The Krishna rises near Mahabaleshwar in Maharashtra, where it runs for a distance of 303 km. It crosses northern Karnataka for a distance of 480 km. The

remainder of its 1300 km crosses the new state of Telangana before it empties into the Bay of Bengal through Andhra Pradesh. Over 40 years before Telangana was created, Supreme Court Judge R. S. Bachawat declared an award in 1973, which was made binding on the three states in 1976. Maharashtra was awarded 0.56 km³, Karnataka 0.7 km³ and Andhra Pradesh 0.8 km³. However, in July 2014 the government of the new state of Telangana demanded that the agreement be re-negotiated. They argued that while 68 per cent of the river length is in Telangana, Telangana receives only 30 per cent of the water.

The National River Linking Project (NRLP)

The Indian government announced its National River Linking Project in 2005. After struggling for centuries with an almost annual problem of both severe droughts and severe flooding, the scheme was conceived to make use of the water in India's water-surplus Himalayan north and northeast by transferring surplus to the permanently water-deficit parts of the rest of the country. The project has provoked extensive debate within India and beyond, notably in Bangladesh and Nepal, which regard themselves as being potentially adversely affected by the proposed transfer of water to the south. However, criticism has not been restricted to India's neighbours but has run through much of the domestic debate.

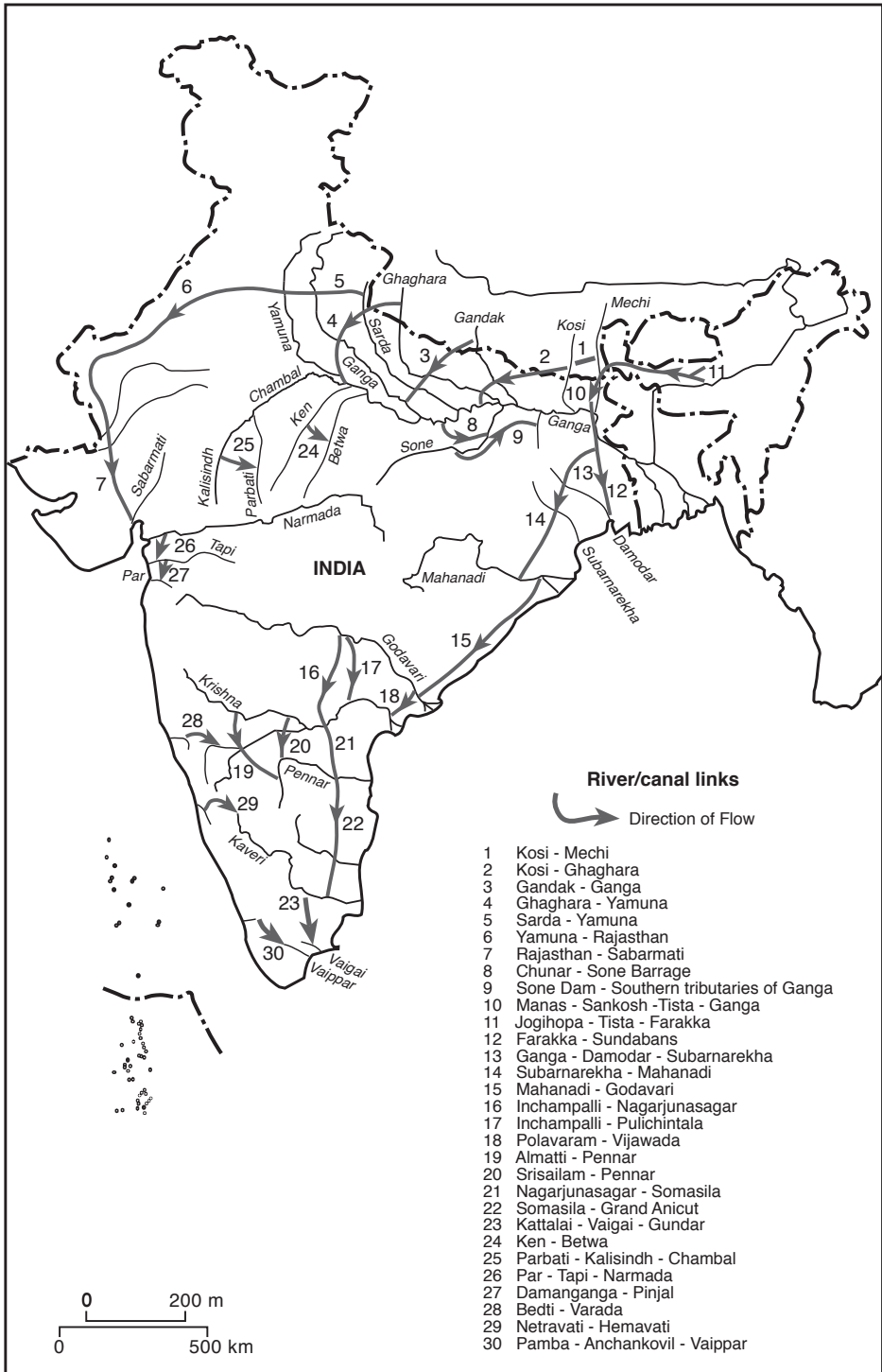
The scale of the full proposal is five times the size of China's Three Gorges Project. It proposes the construction of 30 major link canals and over 3000 reservoirs, themselves serving 12,500 km of canals. Thirty-six Himalayan and peninsular rivers would be linked, and nearly 180 km³ of water would be transferred from the north to the west and south. The project is planned to irrigate as much as 35 million hectares of land and generate 35 GW of electricity. The cost was anticipated at \$120 billion, or up to 1.5 per cent of India's GDP for the next 30 years.

From the outset the proposals have been criticised from a variety of quarters. Even assuming no overrun, their costs were attacked as excessive, difficulties underestimated and benefits exaggerated. Furthermore, environmental groups attacked them on the grounds of their potential to devastate an already precarious ecology. Amarasinghe and Sharma argued in 2008 that much of the discourse to that date had been filled with opinions and assertions, largely lacking analytical rigour (Amarasinghe and Sharma 2008, p. ix). Despite a number of academic studies, the complexity of the project and a pre-occupation with other concerns led the Government to reduce its emphasis on the project to the point at which many thought it was likely to be dropped. Before the 2014 elections the BJP highlighted its commitment to the NRLP. Their early years in government will show the extent to which that commitment is translated into practice.

Cross-border water-sharing disputes in Pakistan

Punjab, the upper riparian of the Indus system in Pakistan, has long been in dispute with Sind, the main lower riparian, over the allocation of waters from the Indus. Every storage scheme upstream is regarded as a threat by Sindhis to their livelihoods, so completely dependent are they on the waters of the Indus. At the same time, Balochistan, which is a lower riparian with respect to Sind, has had its own inter-provincial disputes over the release of its due water allocation from the Chashma Barrage.

The most significant long-running internal dispute in Pakistan has been over the building of a dam on the Indus at Kalabagh in Mianwali District, Punjab. Its major attraction is the potential to realise 3500 MW of hydroelectricity, which would make it Pakistan's largest scheme. It is also claimed that the dam could store 8.6 km³ of water, enough to enable nearly 3 million ha



Map 81 India's National River Linking Project (NRLP)

to be irrigated, largely in Khyber-Pakhtunkhwa. There is united opposition to the plan from all shades of political opinion in Sindh. Successive national governments have committed themselves to building it, only to be followed by its swift cancellation. In 2004 President Musharraf announced that the dam would definitely be built. This plan was repudiated by then-Federal Minister for Power and Water Raja Pervez Ashraf, who said the Kalabagh Dam would not be built. In December 2012 Prime Minister Nawaz Sharif said that a complete national consensus would be needed for the Kalabagh Dam to be built, but in 2015 there remained no evidence of such a consensus emerging (Pakistan Times 2012).

Conclusion

Cross-border water use has had a mixed history in South Asia. The scale of natural water transfer across political boundaries is very large and represents a high proportion of the total water availability in the region. Effective co-operative management, however, is heavily affected by the wider political context. The overwhelming common interest in the joint development of the Indus basin led India and Pakistan to conclude the Indus Waters Treaty, which despite its continuing challenges, has been a uniquely successful and ongoing agreement. Elsewhere co-operative water-sharing has frequently raised intractable political hurdles both between and within states. Their resolution will play a major part in the degree to which the region as a whole can meet the wide-ranging demands for water it will face in the next two decades and more.

26 Natural disasters and environmental risk

Every part of South Asia has a long history of natural disasters. The damage any individual disaster inflicts depends not just on the severity of the event, but also on its location and timing and on the degree of preparedness of and warning available to the population. Thus two earthquakes of equal magnitude, for example, may range in their effects from causing human catastrophe over a wide area to passing almost unnoticed.

Very considerable progress has been made in recent decades in ameliorating the effects of some types of natural disaster in the most disaster-prone areas of South Asia. Some of the worst disasters have occurred where warnings are still either primitive or non-existent, and where preparedness remains rudimentary. This is true of extremely rare events, like the 2004 Sumatra-Andaman tsunami, which caused particularly heavy loss of life in Sri Lanka and parts of southern India. It is also true of earthquakes, which, though common are impossible to predict with precision. The relatively modest 1993 earthquake at Latur in Maharashtra (see Chapter 5) had a magnitude of only M6.2. However, more than 10,000 people died and 30,000 were injured because the earthquake struck at 3:56am local time, when most people were asleep in their homes. Stone and rubble houses collapsed because they were not built to withstand earthquake shocks, and no early warning was possible. On the other hand, as is shown below, early warnings for events like cyclones, which occur every year along the coasts of the Bengal delta and eastern India, have greatly improved, and helped to save many thousands of lives.

The concepts of disasters and environmental risk are interlinked. All of the discussed events have natural causes, though some have been modified by human activity. However, the risks posed by such hazards, and the responses to them, depend on the interaction of human use of the environment with the natural dynamic of the system itself.

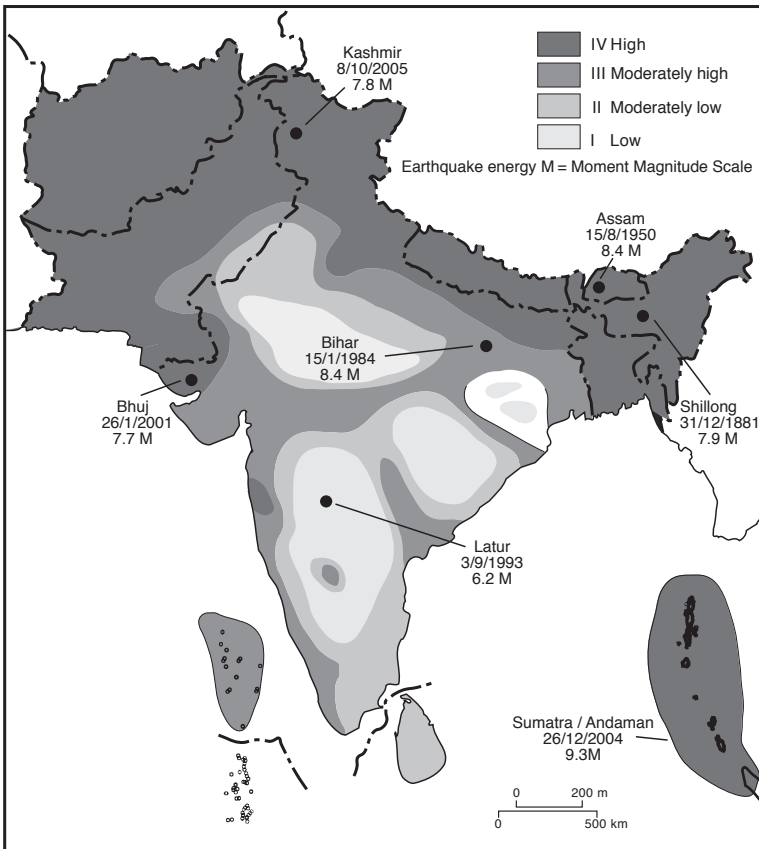
Earthquakes

The distribution of South Asia's major earthquake zones reflects the position of the Indian Plate subduction zone (Chapter 5). As a result of the continual movement northwards of the Indian Plate, at a rate of approximately 4 cm a year, the height of the Himalaya is increasing by about 1 cm a year (USGS 2014). Earthquakes are extremely frequent along the margins of the Indian Plate from Afghanistan and northern Pakistan in the west to the east of Nepal, then southwards through Bangladesh and down the Arakan coast of Myanmar and the Andaman and Nicobar Islands.

Some of the most severe earthquakes in the world's history have occurred in the vicinity of this subduction zone. Shillong was struck by an earthquake of M8.1 magnitude in 1897, and Tibet and Assam were hit by an even larger quake, on August 15, 1950, registering M8.6. The earthquake in 1897 was felt from Myanmar to Delhi, and along the 110 km fault line the slip was between 11 and 16 m, one of the largest in the world. The fatality rate was estimated at about

1500, which in comparison with subsequent, often less severe earthquakes, was slight (Oldham 1899; Bilham and England 2001). Another quake with a magnitude of M8.1 hit Nepal and Bihar on January 15, 1934. This destroyed the towns of Muzaffarpur and Munger, and there was extensive damage in Nepal and Bihar. The epicentre was in Nepal, about 10 km south of Mount Everest, the same region as the M7.9–8.2 quake that hit Nepal on 25 April 2015.

The effects of such earthquakes on humans, animal and plant life and on the evolution of landscapes depends critically on the environments in which they take place. In the high mountains of the Himalaya the very steep slopes readily fracture. This can cause landslides and a dramatic increase in the discharge of sediment into the rivers. In sparsely populated areas the immediate human damage may be limited, but in areas of dense settlement the effects on housing and infrastructure can be devastating. The 2001 Gujarat earthquake (M7.7), centred about 60 km northeast of Bhuj, was estimated to have killed 20,000 and injured a further 165,000. It led to severe damage to upwards of a million buildings. The 2005 Kashmir earthquake, registering M7.6, was centred near Muzaffarabad in Pakistan’s Azad Kashmir. It killed up to 80,000 people, led to the injury of a further 100,000 and the displacement of over 3 million. Tens of thousands of houses and community buildings were destroyed.



Map 82 Historic earthquakes and regions of high seismicity

Note: The strength of the earthquake, given as the Moment Magnitude (M) is shown beneath each earthquake location.

In addition to the loss of life and damage to property, some earthquakes cause radical environmental change. The 1950 Assam earthquake caused major changes in the river ecology of the Brahmaputra. It diverted tributaries, blocked river courses, and hugely increased sediment load in the main river and its tributaries. In so doing, it led to the complete re-shaping of the estuary of the Meghna (Brammer 2012). It transformed what had been a balanced adjustment between river flow and sediment load in a complex, seasonally flooded environment. The environmental changes caused by the 1950 earthquake have been more than matched by those caused by earlier earthquakes. An earthquake in 1762, for example, caused a shift of over 100 miles in the course of the Brahmaputra at Bahadurabad, forcing it to flow to the west of the Madhopur Tract.

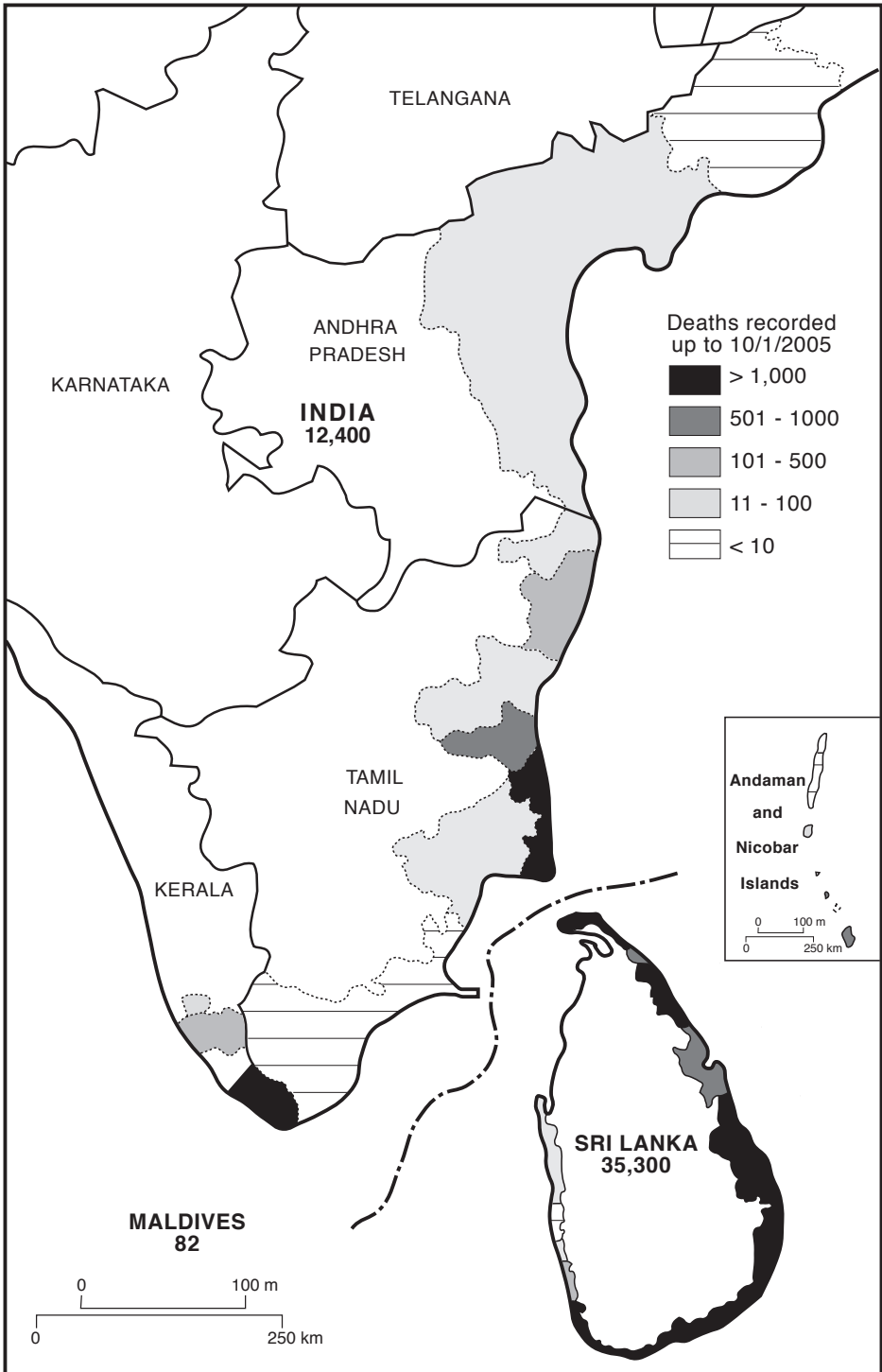
The damage that results from earthquakes may come down to quite local details. For example, the recent, unconsolidated alluvium of the Bengal delta is particularly susceptible to liquefaction. This can have catastrophic consequences for roads and houses, embankments may be totally destroyed, and even large structures such as river barrages may be severely damaged. People who live in the mountainous earthquake-prone regions of the Himalaya take a variety of measures to try and restrict damage, notably by incorporating earthquake-resistant building materials and methods for houses and public buildings. These can significantly reduce the damage hazard.

Tsunamis

The Sumatra-Andaman (or Indian Ocean) tsunami of December 2004 was one of the worst natural disasters in the world. The earthquake that caused it (magnitude M9.1–9.3) was the third largest ever recorded, with its epicentre located above the subduction zone of the Indian Plate, just off the west coast of the Indonesian island of Sumatra. While earthquakes along that subduction zone are common, and even major earthquakes offshore are not unique, tsunamis in the Indian Ocean have been very rare. Partly as a result of their rarity, the Indian Ocean, unlike the Pacific, where tsunamis are much more common, had no tsunami early warning systems in place. Many people in coastal eastern India had felt tremors from the earthquake over 2000 km away, but there was no change in the weather to give any indication of the tsunami to follow. As a result, the earliest indication of a potentially catastrophic event that many thousands of people living by or visiting beaches surrounding the Indian Ocean experienced was the sudden retreat of the sea. This was followed immediately by the arrival of a succession of tsunami waves themselves.

Sri Lanka and India were the second and third worst hit countries after the Indonesian island of Sumatra. Over 50,000 lives were lost in Sri Lanka. In India the death toll was a confirmed figure of 12,000, though it was estimated to be 18,000. While dwarfed by the 130,000 who lost their lives in Indonesia, these numbers were daunting. As Map 83 shows, the areas that suffered damage were remarkably concentrated. The areas primarily affected were the east, south and southwest coast of Sri Lanka and relatively isolated pockets on the coasts of Tamil Nadu and Kerala.

The overwhelming majority of those killed were within 500 metres of the shoreline. The worst affected areas were those unprotected shorelines at right angles to the fault line along which the ocean floor between the Nicobar Islands and Sumatra had sunk so dramatically. As the shock waves reached southern Sri Lanka they were refracted around the southern tip of the island, causing them to swing back and hit the southwest coasts of Sri Lanka and India. The south of India's Andaman and Nicobar Islands were damaged directly by the earthquake as well as by the tsunami waves. The southernmost tip of the Nicobar Islands, Indira Point, which was close to the epicentre of the earthquake, sunk by over four metres.



Map 83 The Sumatra-Andaman tsunami 2004: recorded deaths in Sri Lanka and India

As the US Geological Survey makes clear, tsunamis gain their destructive force from the nature of the shelving beaches that line most coasts (USGS 2015). In the deep ocean, at a depth of 7000 m or more, the wave height is about one metre, but with a wave length of over 280 km this is almost imperceptible at sea. At this depth the wave is moving faster than 900 km/hr. As the ocean becomes shallower, approaching the coastline, bottom friction causes the wave to slow to 36 km/hr at a depth of 10 m, and a wave length of less than 11 km. The energy in the wave becomes concentrated in the forward movement of the mass of water. If the continental shelf gets shallower gently towards the coastline, the wave height increases and sea water can be forced inland to a height of 30 or 40 metres. In the absence of shallow, unprotected beaches, the effects are far less severe. Thus, while the Maldivian atolls are never more than two metres above sea level, and were directly in line of the waves that crossed the Indian Ocean, damage was relatively restricted because the islands rise steeply from the ocean floor. Nonetheless, the tsunami still caused 82 confirmed deaths and an estimated total of 108.

After the 2004 tsunami UNESCO sponsored the opening of an Indian Ocean early warning system. Consisting of 25 seismographic sensors, which transmit data to 26 national tsunami warning organisations, the system became operative in June 2006. However, questions remain as to the effectiveness of the communication of warnings to the populations at risk. The Indian government has also implemented a series of tsunami early warning measures. Through the Indian National Centre for Ocean Information Services (INCOIS) it has installed a set of bottom pressure recorders running north-south between the east coast of mainland India and the Andaman and Nicobar Islands and two in the Arabian Sea. These are linked to surface gauging stations around the Indian coast.

Cyclones

Every year cyclones hit generally well-defined sections of the South Asian coastline. Approximately three quarters are around the Bay of Bengal and one-quarter on coasts of the Arabian Sea (Indian Meteorological Department 2015). The Arabian Sea has a lower frequency of cyclonic storms than the Bay of Bengal and a lower frequency of severe storms, because all cyclones in the region develop in the same core region off the Indonesian coast and track west and northwest. Most of those that reach the Arabian Sea have crossed the Indian landmass and therefore lost energy. In addition, the Arabian Sea is significantly cooler than the Bay of Bengal, reducing the energy available for developing and maintaining cyclonic storms. Furthermore, the damage caused by the cyclonic storms of the Bay of Bengal far outstrips that on the Arabian Sea shoreline of South Asia. This reflects the great physiographical differences between the two shorelines. The low-lying coastline of the Bay of Bengal and the east coast of India are interspersed with very densely populated deltas subject to coastal inundation and storm surge damage. In contrast, most of India's west coast is hilly immediately inland, has no significant deltas and no riverine populations at risk from storm surges such as those that are characteristic of the Bengal delta.

The catastrophe of Cyclone Bhola, which struck the coast of the then East Pakistan on November 12, 1970, brought the cyclone risk faced by the low-lying coastal districts of Bengal to the world's attention. This storm was held responsible for between 300,000 and 500,000 deaths. It caused untold physical damage, including the death of over one million cattle, the loss of 20,000 fishing boats and nearly half a million houses. Cyclone Bhola demonstrated with stark clarity the exposure of some of the least developed parts of the South Asian coastline to natural hazards, and especially to cyclonic storms.

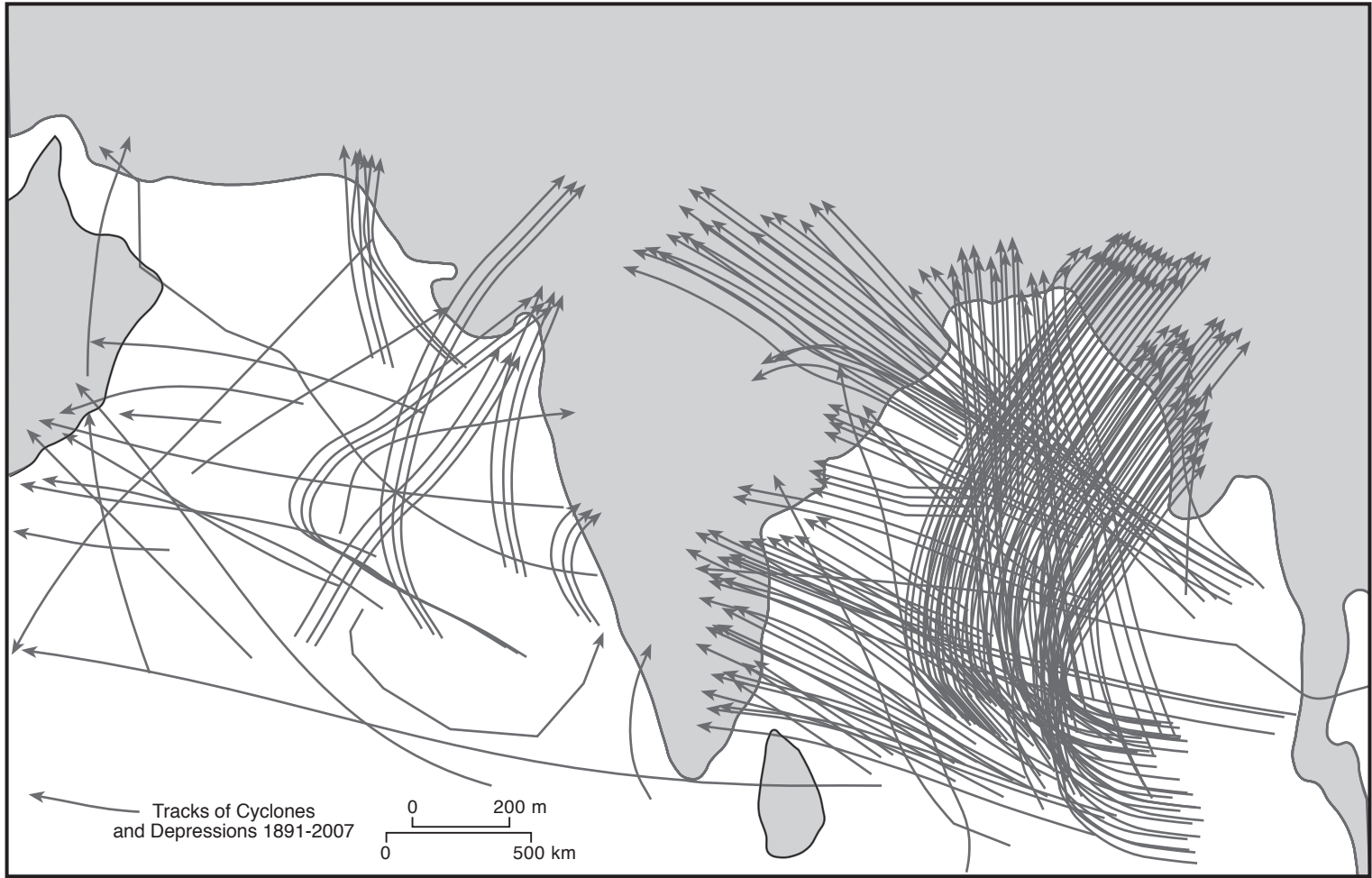
Most cyclones that hit the coasts of Bangladesh and eastern India start as depressions over the very warm seas of the Indian Ocean between 5° and 15°N and 80° and 95°E. They normally, though not exclusively, develop from October to December, after the prevailing westerly winds of the South West monsoon have died away, thereby reducing the vertical wind shear with the high level easterly jet stream. In the late autumn sea temperatures are above the critical point for true cyclone development of 27°C. By October the normally dominant, high-level westerly jet stream has taken up its summer position north of the Himalaya and been replaced by an easterly jet stream, which guides the path of the cyclones from east to west across the Bay of Bengal. The location of the Bay at more than 10°N allows the *Coriolis force*, which is inoperative within 5° of the Equator, to generate the circular wind pattern around the centre of the depression and to intensify into a full cyclone (Barry and Chorley 2010, Chapter 6).

Originating off the coasts of Malaysia and Indonesia, the depressions intensify as they travel west and northwest into the Bay of Bengal before curving northwards. They may make landfall anywhere between the northeast coast of Sri Lanka and Bangladesh. A rise in sea level accompanies the intense low pressure at the heart of cyclonic storms. The funnel shape of the Bay of Bengal increases this temporary rise, generating storm surges in the rivers of the Bengal delta.

Throughout history cyclones have caused destruction and loss of life from Bengal in the north, down the east coast of India to Sri Lanka. Low-lying deltas such as those of the rivers Kaveri, Krishna and Mahanadi, and that of the three great rivers of Bengal, the Ganga, Brahmaputra and Meghna, have always been particularly susceptible to cyclone damage. Records of cyclonic storms go back to at least 1582, when the *Ain-i-Akbari* of the Mughal emperor Akbar put the loss of 'living creatures' at over 2,000,000 (Chowdhury 2003). Even though this number can have been little more than a guess, given the much lower population density of Bengal in the late sixteenth century, the 1582 cyclone may have been one of the most devastating on record.

The many rivers of the Ganga-Brahmaputra-Meghna delta are most at risk from storm surges. In the case of cyclone Bhola the maximum storm surge was over 10 metres. But they are also at risk from the torrential rain and the immensely powerful winds, with a speed of over 250 km/hr, Category 5 on the Saffir-Simpson scale. These are the hallmarks of major cyclonic storms. In addition to the flat terrain and low height above sea levels, the deltas of Bangladesh and eastern India are among the most agriculturally productive and densely populated regions in the world, greatly increasing their exposure to loss of life and to costly damage.

Tables 33 and 34 show considerable variability in the frequency of cyclones in the Bay of Bengal and the Arabian Sea, as well as on land. Over relatively short climatic periods of 20 to 30 years there have been periods of increasing and decreasing frequency. For example, the numbers of severe storms decreased between 1920–50 and 1970–90. In contrast, in between those periods, they increased between 1950 and 1970. Over the long-term there has been a declining trend in the total number of cyclones and of severe cyclones in the region as a whole, though there are somewhat contrasting patterns between the Bay of Bengal (a decreasing recent trend) and the Arabian Sea (relatively constant). O.P. Singh, of the SAARC Meteorological Department, has shown that the number of cyclones in the Bay of Bengal has decreased by about 20 per cent over the last century (Singh 2010, Patwardhan and Bhalme 2001). The period from 1980–2001 saw some of the lowest frequencies in the Bay of Bengal's cyclone record (see Patwardhan and Bhalme 2001). The annual record of cyclonic disturbances over the Bay of Bengal between 1891 and 2014 is tabulated on a continuing basis by the Indian Meteorological Department (2015, continuing).



Map 84 Tracks of cyclones in the Bay of Bengal-Arabian Sea, 1891–2013

Source: Adapted from data from the Indian Meteorological Department

Table 33 Frequency of cyclones in the Arabian Sea and the Bay of Bengal, and on land, 1891–2009

	<i>Bay of Bengal</i>	<i>Arabian Sea</i>	<i>Land</i>	<i>Total</i>
a. 1891–1910	92	33	2	116
b. Mean	4.6	1.65	0.1	5.8
a. 1911–1930	100	15	4	119
b. Mean	5	0.75	0.2	5.95
a. 1931–1950	93	15	4	118
b. Mean	4.65	0.75	0.2	5.9
a. 1951–1970	80	20	2	102
b. Mean	4	1	0.1	5.1
a. 1971–1990	81	17	2	100
b. Mean	4.05	0.85	0.1	5
a. 1991–2009	49	24	1	74
b. Mean	2.58	1.26	0.05	3.89

a. Total number of cyclones during the period.

b. Mean number of cyclones per annum for the period.

Table 34 Frequency of severe cyclones in the Arabian Sea and the Bay of Bengal, and on land, 1891–2009

	<i>Bay of Bengal</i>	<i>Arabian Sea</i>	<i>Land</i>	<i>Total</i>
a. 1891–1910	29	13	1	43
b. Mean	1.45	0.65	0.05	2.15
a. 1911–1930	32	6	2	40
b. Mean	1.6	0.3	0.1	2
a. 1931–1950	33	10	0	43
b. Mean	1.65	0.5	0	2.15
a. 1951–1970	46	10	0	56
b. Mean	2.3	0.5	0	2.8
a. 1971–1990	51	13	1	65
b. Mean	2.55	0.65	0.05	3.25
a. 1991–2009	27	15	0	43
b. Mean	1.42	0.79	0.00	2.26

a. Total number of severe cyclones during the period.

b. Mean number of severe cyclones per annum for the period.

Source: Original data from the Indian Meteorological Department; Singh O.P. (2014)

Even in a period of relatively low cyclone frequency such as the present, the Bay of Bengal and Arabian Sea region can expect up to five severe storms a year. The risk posed by such storms, however, depends critically on precisely where they strike any part of the South Asian coastline and on the degree and nature of preparedness in the areas at risk. The evidence of the four decades following cyclone Bhola shows that, even during the most severe storms, there has been a remarkable reduction in human loss, as a result of the steps taken to improve early warnings and protection.

Early warnings

India now has its own Kalpana-1 and INSAT weather satellites, the latest of which, INSAT-3D, was launched by the French Ariane 5 launcher from Kourou, French Guiana on July 26, 2013. The Indian Meteorological Department has developed its own data processing from its weather satellites. The Krishna delta in Andhra Pradesh was devastated by the 1977 cyclone (06B under the JTWC classification), with over 14,000 killed and nearly \$500 million of damage. This cyclone prompted the government to take a series of damage limitation measures, to good effect. As a result of early warnings and preventative measures taken in the path of the storm, including the evacuation of 11,000 people, the November 21, 2013 Cyclone Helen, resulted in fewer than 20 deaths, though physical damage to buildings and crops was severe.

Bangladesh and Sri Lanka do not have their own satellites but receive early warning data from the American NASA and NOAA satellites. As a result of early warnings the death rate from cyclones has fallen sharply. Even the November 2007 Cyclone Sidr, classified by the JTWC as 'very severe', was estimated to have caused fewer than 4000 deaths. This compares with the nearly 140,000 lives lost in the Chittagong cyclone of April 29, 1991, and the 500,000 deaths in the Bhola cyclone in 1970.

Floods in South Asia

There are few parts of South Asia, including some of its most arid regions, where floods are not an integral part of the environment. The Indus Valley Civilisation, at its height 4000 years ago, took advantage of the annual flooding of the Indus to create a highly productive agricultural system. The Bengal delta owes its origins and continued development to sediment-rich flood waters progressively building up the delta and pushing the coastline out into the Bay of Bengal.

The flood plains of South Asia offered rich rewards for settlement and agriculture but have always carried with them a risk of severe floods. In recent decades such floods have frequently caused great damage and sometimes loss of life. While Bangladesh has the most frequent, and the most widely publicised, severe flooding in the region, Pakistan and India have also suffered major loss of life and extensive damage from floods, and Nepal and Bhutan are at risk from Glacial Lake Outburst Floods (GLOFs).

According to an Asian Development Bank (ADB) Report (Ali, A. 2013), Pakistan suffered 21 major floods in the period 1951–2011 in which nearly 9,000 people died and nearly 110,000 villages were destroyed (Ali 2013). It may seem anomalous that a region like the Indus Basin, predominantly arid with intensively managed water systems, should be subject to flooding on such a scale. Yet the air-masses of South Asia's monsoon climatic system carry unequalled volumes of saturated air across the Indian sub-continent every year. Both the Western Ghats in peninsular India and the Himalaya across the north of the region are responsible for causing intense rainfall, often in short, concentrated bursts. These can overwhelm even the most sophisticated of managed water systems. Where such systems are inadequate, or poorly designed or maintained, they can dramatically exacerbate the problem (Chapman and Rudra 2007).

The Kosi flood of August 18, 2008, which devastated large areas in southern Nepal and the Indian state of Bihar, illustrated the combined effects of intense rainfall, a highly dynamic, earthquake-prone and sediment-generating upper catchment and poorly maintained protective works. In common with all the major rivers flowing from the Himalaya onto the Ganga plains, the Kosi had built a cone of alluvium, augmented every year by new floods and silt. Deposited

at an estimated rate of $18\text{m}^3/\text{ha}/\text{yr}$, this was constantly growing. Until recently it has widely been believed that from the point at which it emerges from the Himalaya onto the plains, the Kosi had migrated 120 km to the west over the 250 years up to 1954. Research by Chakraborty et al (2010) suggests that this hypothesis is untenable, and that the great width of the Kosi fan is the result of random migration of the main course of the river through time, often causing devastation. To end the annual devastation accompanied by this flooding, the Government of India proposed to build a combined power, flood protection and irrigation scheme, with important headworks in Nepal. While the Kosi Barrage was completed in 1963, the proposed high dam in Nepal itself has yet to be agreed upon. The 2008 flood resulted from the breaching of the barrage and 90 per cent of the Kosi pouring into one of its former courses, causing huge loss of life and damage to livestock and property.

According to the Asian Development Bank, flood damage in Asia accounted for 60 per cent of global losses caused by floods during the twentieth century. In Asia it has been estimated by Guha-Sapir et al that there were 1625 flood disasters between 1900 and 2012, resulting in 6.8 million deaths – 98 per cent of the deaths caused by floods worldwide. The economic damage was also huge. 3.4 billion people were estimated as displaced and economic losses totalled \$330 billion. Such figures are inevitably subject to a wide margin of error but give some indication of the scale of the problems posed by flooding in South Asia (Guha-Sapir et al 2011).

In the period 2000–11, Pakistan, India and Bangladesh, after China the three most severely hit countries globally, accounted for \$12 billion, \$10 billion and \$8 billion, respectively. China (\$55 billion) suffered nearly twice as much from flood losses as the whole of South Asia. Yet in terms of per capita or per hectare damage, Bangladesh was by far the most severely affected country in the world. All the countries of South Asia have experienced severe flooding. The nineteenth century Gazettiers of India testify to the scale of the problem in many of its regions. From Tamil Nadu in the south to West Bengal in the east, provincial and state governments have introduced measures to try and reduce the severity of the problem. The case studies of Pakistan and Bangladesh, below, illustrate the scale on which flooding impinges on many aspects of social and economic life in South Asia.

Flooding in Pakistan

According to Ali (Asian Development Bank 2013) there was no evident trend of increased flooding in Pakistan over the six decades after 1950. In the decade of the 1950s five major floods were recorded. In the 1960s there were none, but in the 1970s there were five more. The 1980s saw four, the 1990s four and the first decade of the 2000s three. By far the most extensive area flooded was in 1976 when nearly $82,000\text{ km}^2$ went under water in the Indus valley. This compared with the 2010 floods, when $38,600\text{ km}^2$ was flooded.

Flooding in Pakistan is largely the result of highly concentrated and intense monsoonal rainfall. Normally arriving in August–September, the heaviest rains originate in the foothills of the Himalaya where the moisture-bearing winds are forced to rise over the mountains. This orographic rainfall occurs in the region where the major Indus tributaries flow onto the plains and ultimately into the Indus itself. From here, the rapidly swollen Indus may flood anywhere from the Punjab in the north all the way down to the province of Sindh. Although two of the world's largest dams, at Mangla on the Jhelum and Tarbela on the Indus, have great storage capacity, by late September much of this is filled in anticipation of irrigation needs during the winter. As a result surplus rainfall in the late monsoon may have to be released immediately downstream, contributing directly to the flooding.

Flooding in Bangladesh

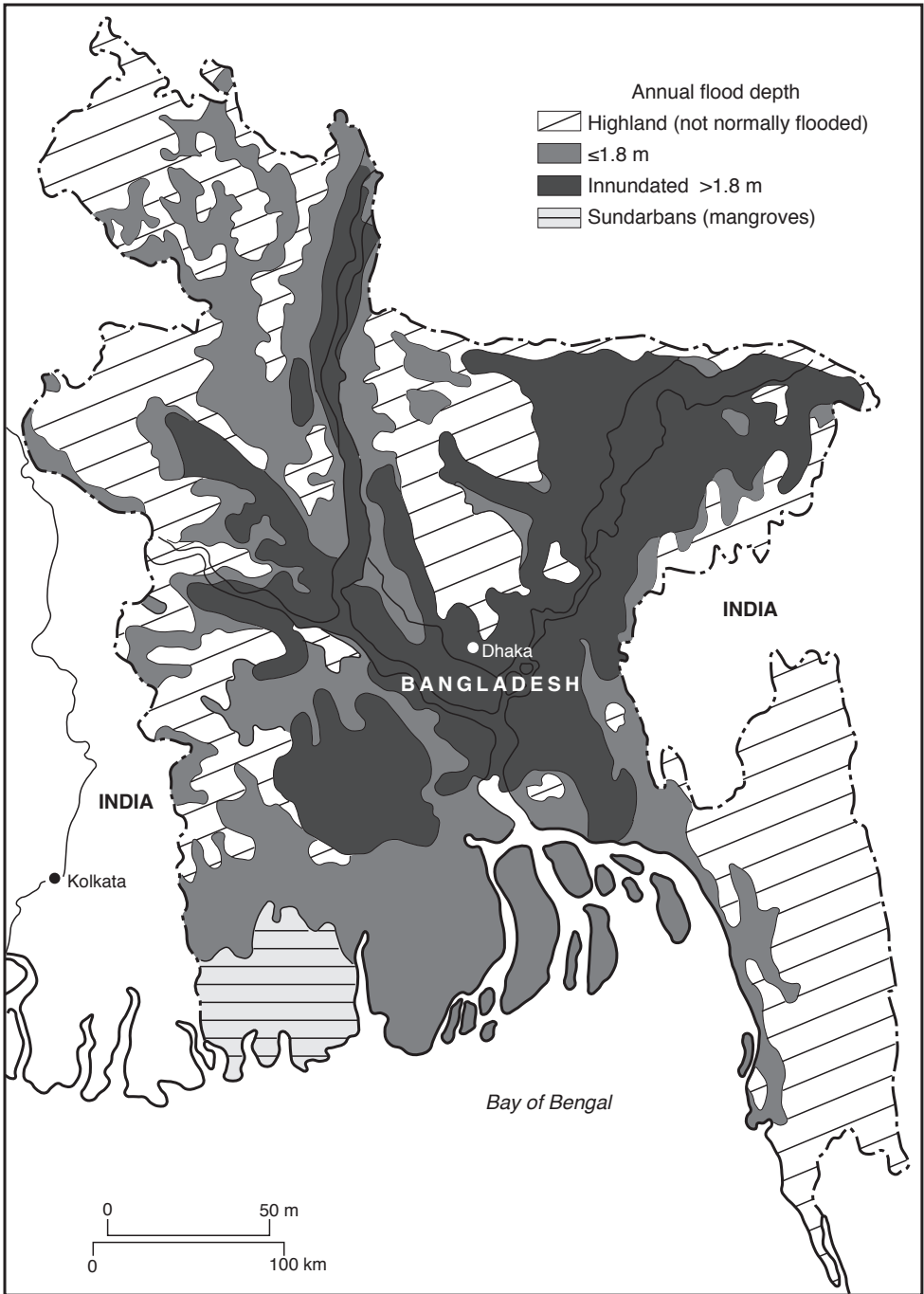
The physical setting in which flooding in Bangladesh takes place is far more varied and dynamic than many writers on contemporary environmental change in Bangladesh suggest. While outside the hill region of Chittagong in the southeast much of Bangladesh is flat and close to sea level, the perception of simplicity and uniformity is seriously mistaken. As Brammer (2014) argued, the failure by, for example, Al Gore (2009), Sir John Houghton (1994, 2009), John Vidal (2013) and others to recognise Bangladesh's environmental diversity has led to 'serious misconceptions' about the potential impacts of sealevel rise on flooding.

Despite its apparent geographical uniformity, Bangladesh's environment is highly complex. Simple explanations for flooding in Bangladesh have often been advanced but are generally mistaken. In the 1970s, for example, it was widely stated that flooding in the Bengal delta was the result of deforestation in the Himalaya and the consequent erosion. This hypothesis has long since been disproved (Ives and Messerli 1989; Hofer, Thomas and Messerli 2006). More recently, 'climate change' has been advanced as a major driver of Bangladesh's floods and consequent river bank erosion. Brammer (1990, 1991, 2004, 2012) demonstrated of the 1987 and 1988 floods in Bangladesh that 'there is no evidence that environmental degradation in the Himalayas or a 'greenhouse' induced rise in sea level have aggravated floods in Bangladesh'. In a 2001 paper, Mirza et al concluded that 'there are claims that flood discharges, areal extent, and damage-costs are getting worse in the Ganges, Brahmaputra and Meghna/Barak basins. ...The results indicate that no conclusive changes have occurred over the last few decades' (Mirza et al 2001).

Bangladesh's floods come from three main sources: the sea, heavy local rainfall, and the overflow of rivers during peak flow season. These are regionally varied across Bangladesh (Brammer 2013). In the southwest of Bangladesh, which is a mainly stable land area, tidal flooding is common in the tidal floodplain. This has exacerbated increasing salinity, especially where increasing volumes of water have been withdrawn from the upstream catchment of the Ganga, including at the Farakka Barrage. Flood defence embankments, built in the 1950s, have in recent years been deliberately breached to encourage prawn farming.

In contrast to the relatively stable tidal delta, the Meghna delta to its east is highly dynamic. It is subject to frequent storm surges and great forces of river bank erosion on the one hand and new deposition on the other. Managing these forces in a delta system the size and complexity of the GBM delta is problematic. Yet the coastal areas of Bangladesh are not the main region of flooding. As Map 85 shows, the main areas of flooding are along the banks of the three major rivers inland of the coastal belt. The tectonic depressions of the northeast and east of the country have many areas flooded annually, mainly by heavy rainfall and stream flow from the surrounding hills. These floods usually reach depths of seven or eight metres. Known as *haors*, these depressions remain densely populated despite their seasonal flooding. Over generations farmers have adapted crop varieties to make even these most difficult of environments productive. Separated from this region by the slightly raised Madhopur Tract, which is above flood level, the banks of the Brahmaputra (or Jamuna in Bangladesh) are regularly overtopped when the river is at its highest, covering huge areas of land.

In a normal year floods may cover 30 per cent of Bangladesh's land surface, while at their greatest extent, as in 1988 or 1998, the two worst floods since 1980, they can inundate 60 per cent of the total. While the physical losses from floods have been significantly reduced in the last three decades, the value of the losses has increased. According to World Bank and Asian Development Bank estimates published in a report from the Bangladesh Ministry of Fisheries and Livestock in



Map 85 Annual flood depth in Bangladesh

Source: Compiled from various data sources (see Brammer, H. 1990, 2012).

2004, total physical losses across the three floods, 1988, 1998 and 2004, went down. The cost in human lives also went down, from 2,300 to 747. The loss of cattle was reduced from over 170,000 to just over 8,000, and the number of homes damaged or destroyed dropped from 7.2 million in 1988 to 4 million in 2004.

Brammer has shown how Bangladesh have demonstrated great resilience and adaptability to their evolving environment. He proposes twelve measures that could help protect against the hazards posed by floods, including:

- maintaining freshwater flows to the western part of the Ganga floodplain;
- managing the Coastal Embankment Projects to gain benefits of sedimentation;
- raising platforms for settlement and agriculture;
- reclaiming land where appropriate.

Conclusion

Devastating natural hazards have been recorded throughout South Asia's history. Some – cyclones and floods, for example – are annual events in some parts of the region. Earthquakes are also common in the seismically active areas along the plate tectonic boundaries. Others, such as the 2004 Sumatra-Andaman tsunami, are extremely rare. Rapid economic development taking place in many parts of South Asia has not yet protected the growing populations from the risk of widespread damage from environmental hazards. Indeed, some forms of inappropriate development may well have exacerbated their effects. Natural hazards continue to pose humanitarian, economic and in some cases geopolitical problems for governments throughout the region.

27 Environmental security

Air and water pollution and soil degradation

The pollution of air and water is one of South Asia's most challenging environmental problems. The Bhopal disaster of December 2–3, 1984, possibly the world's worst civil poison gas catastrophe, exposed the densely populated parts of the city living around the Union Carbide factory to the leak of the lethal gas methyl isocyanate, used in the production of pesticides. It resulted in nearly 4000 deaths and more than 500,000 injuries. The leak, blamed by the government on poor maintenance, became a catastrophe because it occurred on a still winter night. A temperature inversion kept the gas at ground level as it spread through surrounding slums while people slept.

The tragedy of Bhopal drew the world's attention to issues of environmental pollution in South Asia. The great majority of the region's air pollution comes from the mixture of biomass burning (at least 50 per cent) and emissions from industry and vehicles, a pollution that is less dramatic but far more pervasive and costly in human life and well-being. Access to clean drinking water, the most basic of human needs, is still denied to millions in South Asia today.

The concentration of aerosol pollutants in the rapidly growing cities across Asia has been highlighted over the last twenty years by threats to iconic buildings like Agra's Taj Mahal, or events like the 2008 Beijing Olympics and the 2010 Delhi Commonwealth Games. The prevalence of high levels of pollutants in both air and water has become a permanent (though seasonally and regionally variable) characteristic of South Asian environments. Research from the Indian Ocean Experiment (INDOEX), under the auspices of the US National Science Foundation and eight other leading science research agencies around the world, began in 1995. Early results suggested that atmospheric pollution in the region is sufficiently severe and widespread, not only over the landmass but over extensive areas of the adjacent Indian Ocean, to reduce incoming solar radiation, increase solar heating of the lower atmosphere, and reduce winter precipitation. In addition to the possible climatic effects, atmospheric pollution was found experimentally to have the potential to reduce winter-time rice yields in southern India (UNEP 2002, p. 5). In a paper in 2014, Burney and Ramanathan (2014) claimed that high concentrations of black soot and ozone in the atmosphere had reduced the potential increase in wheat yields across India since 1980 by between 35 and 50 per cent. This pollution also has major implications for human health.

It should be noted that Burney and Ramanathan's paper was widely misquoted in press headlines around the world to indicate that wheat yields in India had been halved by air pollution. The findings suggested that: 'Our statistical model suggests that, averaged over India, yields in 2010 were up to 36 per cent lower for wheat than they otherwise would have been, absent climate and pollutant emissions trends, with some densely populated states experiencing 50 per cent relative yield losses'. An example was *The Guardian's* headline: 'India air pollution cutting crop yields by almost half' (*The Guardian*, November 3, 2014).

In addition to the pollution of air and water, soil degradation is widely regarded as a major threat. Along with climate change (Chapter 28), the science behind such concepts is complex and estimates of loss often subject to wide margins of error. Furthermore, political ecologists have demonstrated the politically constructed nature of many such environmental debates, in which 'the science' is bound up with advocacy from various sides.

Air pollution

The World Health Organisation defines air pollution as the 'contamination of the indoor or outdoor environment by any chemical, physical or biological agent that modifies the natural characteristics of the atmosphere' (WHO 2014). This broad definition allows for pollution from a wide range of sources, from vehicle emissions to forest fires. Indoor and outdoor ('ambient') pollution are also distinct. The sources of pollution vary significantly from region to region. Ambient pollution is both a major health hazard and an influence on climate in most parts of the densely inhabited world. Indoor smoke is estimated to be a major health risk for as many as 3 billion people worldwide 'who cook and heat their homes with biomass fuels'. The health hazards of outdoor pollution, largely in the form of micro-particulate matter, were estimated to cause more than 3.7 million premature deaths worldwide in 2012. Nearly 90 per cent of these deaths occur in the developing world (WHO 2014).

Four major pollutants are currently listed by the WHO as hazardous to human health, although their measurement is complex. The size of particulate matter, measured in microns (written as μm , and equivalent to a radius of 0.001 millimetre), is expressed as the number of particles per litre of air. The limits are: particulate matter (PM) - large (≤ 10 microns – $\text{PM}_{\leq 10}$), and small (≤ 2.5 microns – $\text{PM}_{\leq 2.5}$). Such particulate matter and gases comprise a wide range of chemicals, including sulphates, nitrates, ammonia, sodium chloride, black carbon, mineral dust and water. They form a mixture of solid and organic particles and are a major health risk because they penetrate deep into the lungs and cardiovascular system. The major chemical pollutants are ozone (O_3), nitrogen dioxide (NO_2) and sulphur dioxide (SO_2).

The WHO provides guideline values for maximum PM values. For PM_{10} these are set at 20 micrograms ($\mu\text{g}/\text{m}^3$) annual mean and 50 $\mu\text{g}/\text{m}^3$ 24-hour mean. For all the cities, and many rural areas, of South Asia, these limits are greatly exceeded on a routine basis. Although detailed monitoring of these levels is often scattered and rudimentary, the WHO suggests that levels of $\text{PM}_{\leq 10}$ often exceed 70 $\mu\text{g}/\text{m}^3$ in most countries of the developing world. The Ambient Outdoor Air Pollution Database 2014 of the WHO, which reported monitoring 1600 cities worldwide, listed South Asian cities as among the most heavily polluted in the world. Delhi was ranked most polluted and three other Indian cities immediately below it. Even in 1997 Delhi's $\text{PM}_{\leq 10}$ pollution stood at 370 $\mu\text{g}/\text{m}^3$. While the 2014 rankings were disputed by the Indian Central Pollution Board, the seriousness of the air pollution challenge across South Asia is indisputable.

Pollutant gases such as carbon monoxide (CO) and ozone (O_3) are also widely present. Carbon monoxide is a common product of low temperature burning, especially of biomass. The photochemical reactions induced by strong sunlight in an atmosphere with high levels of carbon monoxide, hydrocarbons and nitrogen oxides, leads to 'photochemical smog' and may increase the presence of ozone, which at high levels can be highly injurious to human and plant health. Current evidence suggests that in most parts of the subcontinent ozone levels in themselves are not dangerously high through most of the year. However, over individual cities the trends are serious. In the western Indian city of Pune, for example, Gulfran Beig of the Indian Institute of Tropical Meteorology has reported levels of ozone of over 90 parts per billion (ppb), 10 units

over the WHO guideline, for 40 or 50 days a year, with levels rising at up to 2 per cent per annum (Beig 2009).

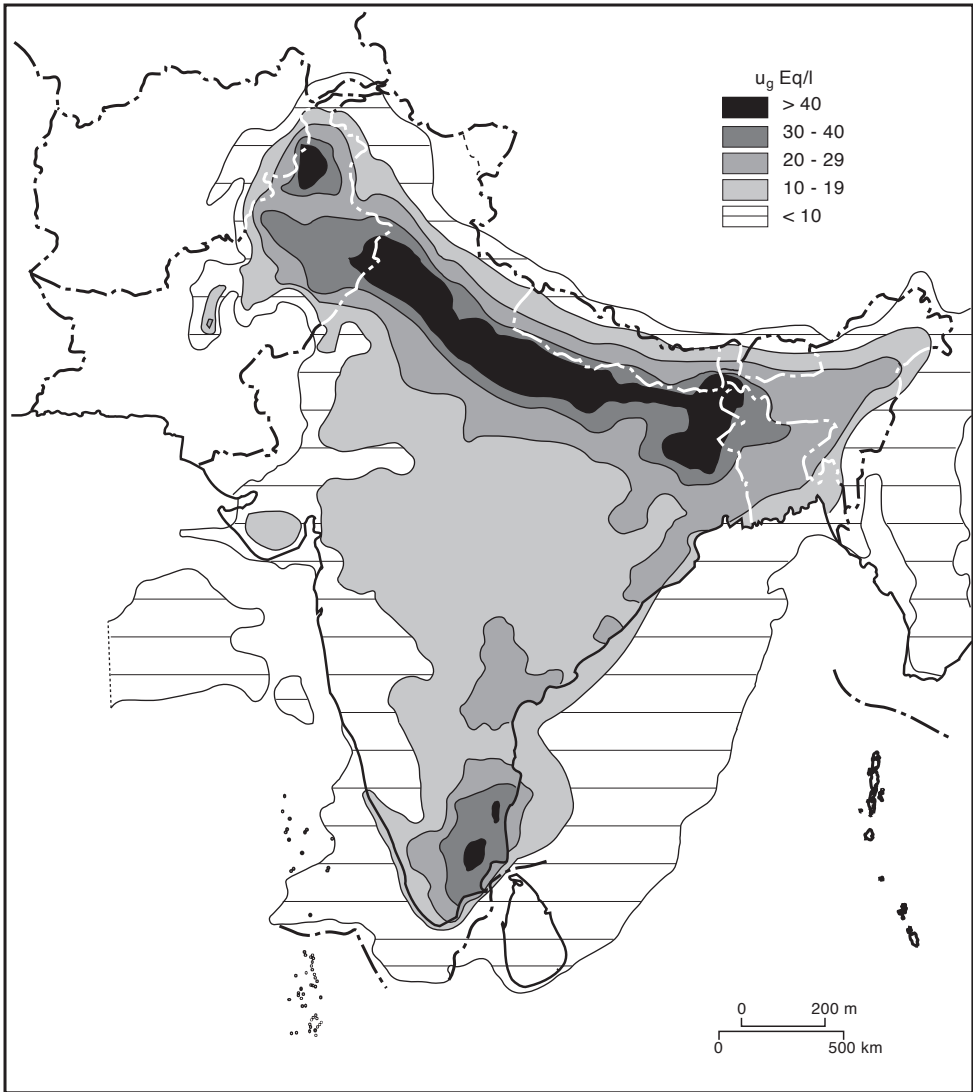
All of the countries of South Asia suffer air pollution, though Jayaratne has shown that nowhere in Sri Lanka experiences more than a few days of above permitted levels of concentration of any of the air pollutant indicators in a year (Jayaratne 2010). Even the island states of Maldives and Sri Lanka, with relatively little home-produced atmospheric pollution, 'import' pollution with the seasonal monsoon wind shifts from the South Asian sub-continent. Major cities are particularly at risk. In 2009 the Ministry of Health in Afghanistan estimated that over 3000 people in Kabul alone were dying because of air pollution (IRIN 2014). A World Bank report in June 2014 claimed that urban air pollution in Pakistan's cities 'is among the most severe in the world and it engenders significant damage to human health and the economy' (Sanchez-Triana et al 2014). The report suggests that in 2005 more than 22,500 adult deaths were caused by urban pollution. Over 5 million children under five years old suffered lower respiratory conditions. The Pakistan Environmental Protection Act of 2005 is intended to address the worst of these problems, but the challenge is enormous.

Air pollution in other South Asian countries is equally challenging. According to Yale's 2014 Environmental Performance Index, Nepal's air quality is 177th out of 178 countries examined. Other South Asian countries listed in the report fare almost as badly. Afghanistan ranks 174, Bangladesh 169, India 155 and Pakistan 148. Even the remote Himalayan hill state of Bhutan ranks 103, and the lightly industrialised island state of Sri Lanka 69 (Yale Center for Environmental Law and Policy 2014).

Preliminary climate modelling results reported by the 2010 UNEP study on the 'Asian Brown Cloud' indicate that there could be substantial regional, and possibly global, climatic effects from the brown cloud haze that has become a recurrent feature of South Asia's winter atmosphere. Although the report acknowledges that 'we are at the very early stages of our understanding of regional climate changes' (UNEP 2010, p. 2), the most direct effect reported is that of reduced radiation reaching the surface, with a '50 to 100 per cent increase in solar heating of the lower atmosphere'. Modelling suggests that there may be effects on reduced long-term precipitation in northern South Asia, with an increase over southern India. However, as the European Commission's Science for Environment Policy Unit observed in 2010, the effects of atmospheric pollution on climate are still an area of active research, and no firm conclusions are yet possible (DG Environment News Alert Service 2014).

Map 86 shows the concentration of the ammonium in precipitation over South Asia. Ammonia in the atmosphere is a significant pollutant, largely derived from agriculture, particularly the breakdown of urea excreted by farm livestock. Released into the atmosphere ammonia is highly soluble in water and combines with other substances to form ammonium, NH_4^+ . Reactions in the air with other substances can produce fine particles, usually removed from the air by rainfall, which then affect plant and water bodies. Datta, Sharma et al (2010) have argued that ammonia released from agricultural crop land is a significant contributor to atmospheric ammonia, enhanced by the application of nitrogenous fertilisers. Their analysis of wheat and rice cropland showed that a 'major portion of nitrogen fertilizer is lost through volatilization as ammonia and surface runoff.'

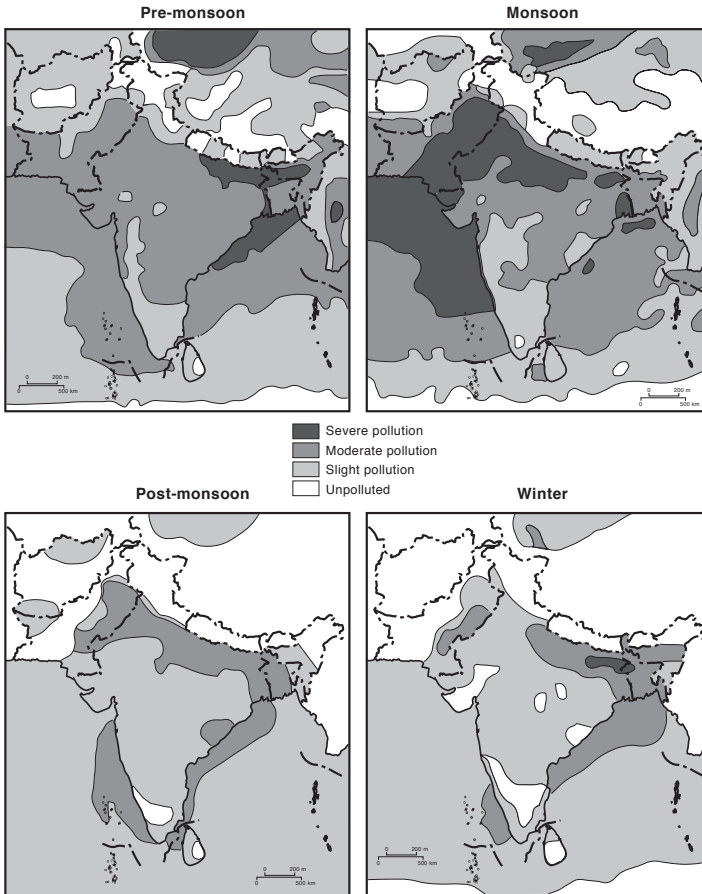
Ammonia as a pollutant from agricultural sources has long been recognised. Arthur Young, the noted eighteenth and early nineteenth century British agricultural reformer, was reported as saying that 'He who is within the sphere of the scent of a dunghill, smells that which his crop would have eaten, if he had permitted it. Instead of manuring his land, he manures the atmosphere; and before his dunghill has finished turning, he has manured another parish, perhaps another county' (Webb et al 2012).



Map 86 Air pollution over South Asia: concentration of ammonium in precipitation, 2014
Source: Swedish Meteorological and Hydrological Institute (2014)

The highest concentration of ammonium in precipitation is in the Indo-Gangetic Plains and southeastern Tamil Nadu, regions with the heaviest concentration of irrigated agriculture and livestock in South Asia. Advances in the use of satellite atmospheric monitoring have made it possible to track the seasonal evolution of aerosol pollution across South Asia (Dey and di Girolamo 2011). Map 87 illustrates the influence of the replacement of the winter northeasterly airstream over the sub-continent by the southwesterlies of the Summer Monsoon. Saharan dust has long been blown across much of northern South Asia in the period before the rains set in. Dey and di Girolamo have shown that this dust makes up only part of the aerosol content of the air, which also shows high concentrations of human-produced aerosols. These have been pushed

out into the Arabian Sea and Indian Ocean during the northeasterlies of the cool season months, only to be pushed back on shore when the monsoon arrives. While the monsoon washes out some of these pollutants, they build up again rapidly after the monsoon. Dey and Di Girolamo attribute this build-up to biomass burning and diesel-fuelled vehicles. The four-season cycle is completed as the northeasterlies are re-established through the winter, dispersing the pollutants across India and into the surrounding ocean.



Map 87 Seasonal shifts in aerosol pollution in South Asia, 2000–10

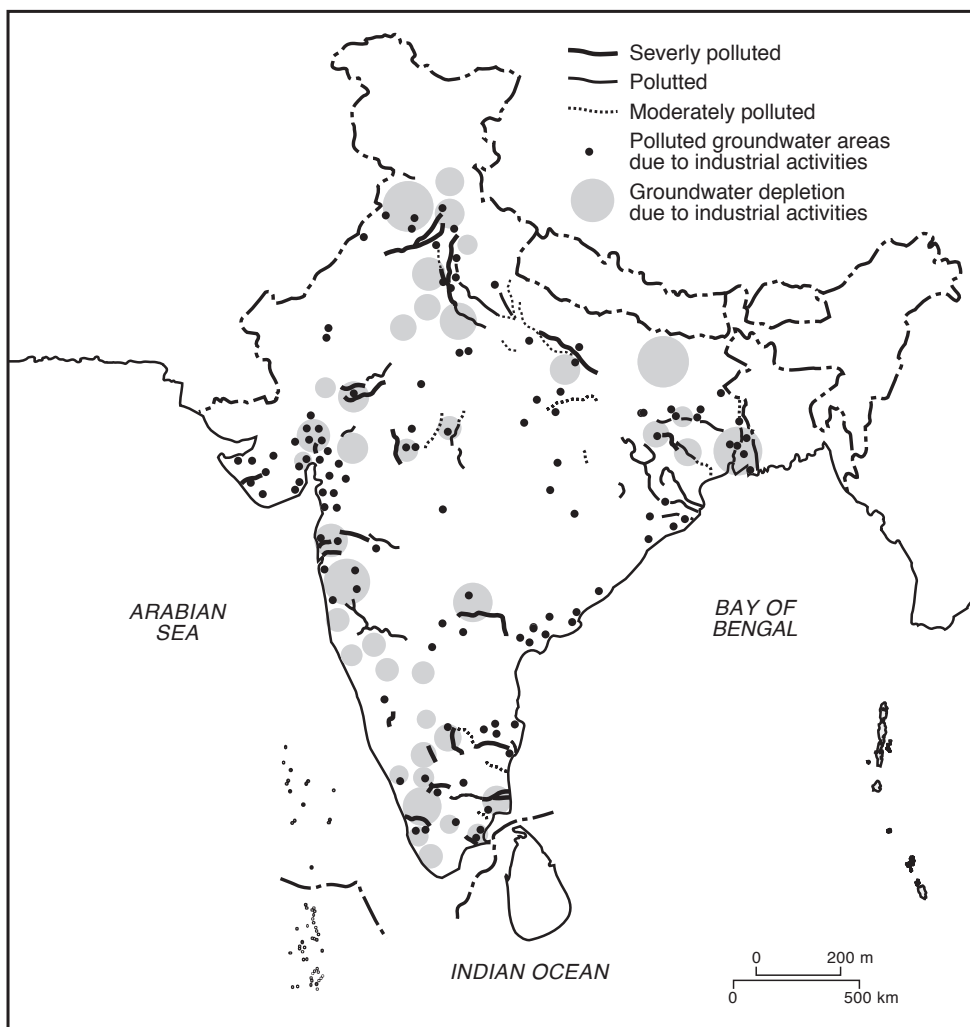
Source: Based on data from NASA/JPL-Caltech/University of Illinois. The original data refer to statistically significant increases in the aerosol optical depth over the ten-year period March 2000–February 2010.

Since the late 1990s there has been a growing interest in the influence of particulate matter in the atmosphere on other aspects of environmental change, notably their effects on climate change scenarios in the South Asian region and on Himalayan snow and ice. It has long been recognised that soot, which includes particles of ‘black carbon’ from the incomplete combustion of fossil fuels, wood and biomass burning, has an effect both on the atmosphere and on the snow and ice surfaces where it may accumulate when precipitated in snowfall or simply deposited from the air. Several scientists have over the years said that increased concentrations of black carbon and troposphere ozone could be disturbing monsoon patterns.

The significance of increasing aerosol pollution had already been recognised in the work of the Indian Ocean Experiment research project (INDOEX), which began in 1995 and expanded to a major survey in January-April 1999 with ships, satellite, aircraft and surface observations (UNEP 2005).

Water pollution

India's Central Pollution Board (2009) estimated that India's cities with a population of more than 100,000 people generated 29 billion litres of wastewater per day, of which the 35 cities with a population of 1 million accounted for 45 per cent. Only 30 per cent of urban wastewater can be collected through the sewerage system, and the total treatment capacity is only 7 billion litres per day. As a result there are large areas of standing sewage water in all major cities. Formal sewerage systems, including the provision of basic toilet facilities, are almost completely absent in most villages of South Asia.



Map 88 Water pollution in India

After Centre for Science and the Environment 2004 Down to Earth Supplement February 29, p. 71

The US National Institute of Environmental Health Sciences defines water pollution as ‘any contamination of water with chemicals or other foreign substances that are detrimental to human, plant, or animal health’ (US Department of Health 2015). Specific contaminants include all those listed above. According to the Institute over 2 billion people worldwide drink water that could be harmful to health.

In a 1997 publication of the WHO, Enderlein et al argued that control of water pollution is urgent across the developing world. This remains true for all the countries of South Asia, though there are wide discrepancies in the availability of safe drinking water from country to country and region to region.

The most common groundwater contaminants identified in the Indian Control Board’s 2007 report were:

- Nitrates – from sewage, fertilisers, landfill and industry, as well as from polluted air;
- Pathogens – causing typhoid, cholera, dysentery, polio and hepatitis;
- Trace metals – lead, mercury, cadmium, copper, chromium and nickel;
- Inorganic constituents – including dissolved salts like chloride;
- Organic compounds – including petroleum derivatives and pesticides.

India classifies water according to use:

- Class A: water suitable for drinking after disinfection but without other treatment;
- Class B: suitable for organized outdoor bathing;
- Class C: for drinking after conventional treatment and disinfection;
- Class D: able to sustain aquatic life;
- Class E: usable for irrigation, industrial cooling and controlled waste disposal.

(After: Enderlein et al 1997)

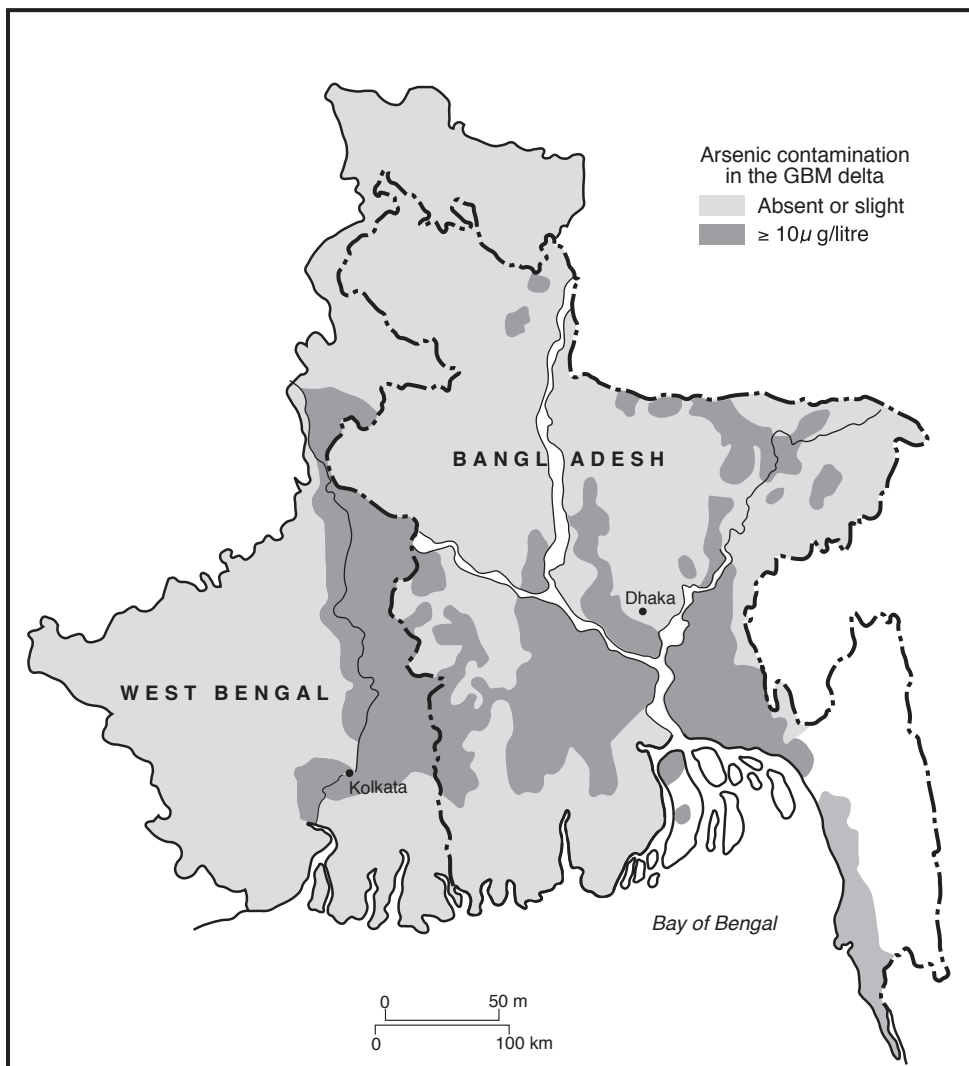
Each class has detailed specifications in terms of specified parameters ranging from pH and total hardness to chemical and mineral characteristics, and permitted concentrations of heavy metals. While in some cases, such as turbidity, hardness, or the presence of minerals such as copper, chlorides or sulphates, the limits may be extended if no alternative sources are available, no relaxation of the standard is allowed in the case of heavy metals such as mercury or cadmium. However, in many parts of South Asia such standards mean little in practice, and the standard is commonly unenforceable (Lane et al 1999).

Because water is a natural solvent and dissolves minerals through which it passes into the ground or over which it runs, most water contains extraneous material. Both surface and groundwater dissolve organic matter from a variety of sources. The contamination by effluent is measurable as biodegradable oxygen demand (BOD) or combined oxygen demand (COD).

Map 88 shows the widespread distribution of sites where water pollution is a serious problem in India. It includes surface and groundwater pollution. Both come from a variety of sources. The most egregious examples of seriously contaminated water come from the northern Indian rivers, notably the Ganga. The Ganga Action Plan (GAP) introduced by Rajiv Gandhi’s government in the late 1980s failed to have any long-term impact. On his election in 2014, Narendra Modi stated that cleaning up India’s rivers would be a top priority for his government. In addition to the Ganga basin, other water pollution hotspots are the industrialised areas of Gujarat southwards to Mumbai and industrial zones of Tamil Nadu and Paschimbanga (West Bengal). However, few groundwater sources in India can claim to be in pristine condition (Central Pollution Control

Board of India 2007). River and other water sources in cities are often particularly heavily polluted, and the release of chemicals and heavy metals from industrial processing plants, such as tanneries, pollutes both rivers downstream and groundwater sources.

An additional problem that has come to prominence since the late 1990s has been the existence of dangerous concentrations of arsenic in groundwater. While this has had particularly widespread and serious consequences in Bangladesh and neighbouring Paschimbanga (West Bengal) arsenic contamination is also found in the Indus plains in Pakistan. Arsenic is present naturally within the sedimentary beds of the Ganga-Brahmaputra-Meghna delta and in other alluvial regions of South Asia. It is released into groundwater as a result of the fluctuation of the water table induced by heavy draw down of groundwater and its seasonal replenishment. The oxidation of arsenic in the previously



Map 89 Arsenic contamination in the GBM delta

Source: Data are drawn from several sources. (See Ravenscroft P. 2007 for a global overview.)

anaerobic conditions of the fully charged aquifer allows arsenic to be leached into the water bodies. An international symposium at the Royal Geographical Society suggested that up to 137 million people may be affected worldwide by arsenic contamination of the groundwater (Ravenscroft 2007).

Land degradation

Land degradation (loss of soil quality) has been a focus of international concern at least since the American dustbowl of the 1930s. The catastrophe that beset the dustbowl states of mid-western America were the result of severe and extended drought combined with the rapid extension of inappropriate agricultural techniques. These had widespread effects well beyond the catastrophic decline in agricultural yields.

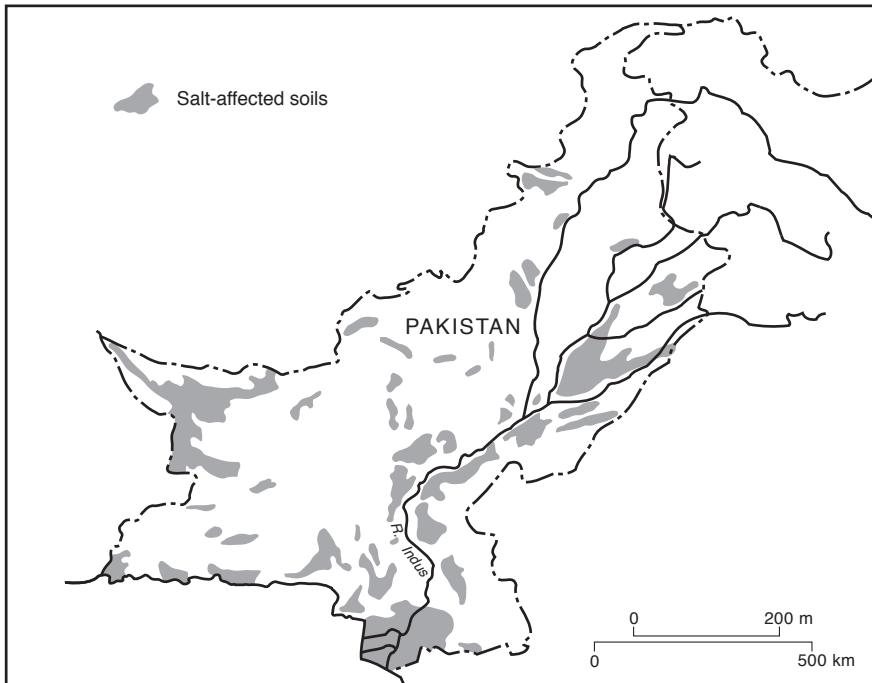
The concept of land degradation remains extremely hard to pin down and quantify. Far-reaching claims are made about the extent and severity of land degradation – through soil erosion and/or soil exhaustion. Thus Eswaran et al have claimed that ‘*In South Asia, annual loss in productivity is estimated at 36 million tons of cereal equivalent valued at US\$5,400 million by water erosion, and US\$1,800 million due to wind erosion*’ (Eswaran et al 2001). As Saunders (2000) has shown, the concept of environmental degradation gained a new lease of life in the mid-1990s and linked the combined variables of ‘drought, desertification, deforestation, soil erosion, water shortage and climate change’ with ‘natural disasters such as cyclones, storm surges and floods’ to predict that the number of ‘environmental refugees’ would double by 2010. He painted an even more alarming picture of the effects of a global-warming induced rise in sea level, suggesting that by 2050 there could be 150 million environmental refugees.

Such extreme figures have often been repeated uncritically by advocates in environmental debates. Saunders’ review of the evolution of the concept of environmental refugees provides an important antidote to such uncritical exaggeration. The coastal regions of South Asia, and especially Bangladesh, have been widely talked of in climate change scenarios as most seriously at risk. Milliman et al (1989), in a paper published by the Woods Hole Oceanographic Institute, predicted that because of subsidence and sea level rise millions of people would be displaced in Bangladesh and Egypt (Saunders 2000, p. 236). On the basis of a draft of this paper, Jacobsen (1988, quoted in Saunders 2000, p. 237) argued that ‘eventually the combination of rising seas, harsher storms, and degradation of the Bengal delta may wreak so much damage that Bangladesh as we know it may virtually cease to exist’. These issues are discussed further in Chapter 28.

Despite the wide margins of error in estimates of soil deterioration in South Asia, and the conceptual challenges in its definition, there is evidence of significant stress. Soil organic matter is very deficient in many parts of South Asia. Sehgal and Abrol (1994) reported a figure of nearly 4 million ha in India as suffering from the depletion of organic matter and/or loss of nutrients - 3 per cent of total arable land (see also Agarwal A. Centre for Science and Environment (CSE) 2001; Brandon et al 1995).

Soil salinity

Salinisation has been reported from many large-scale canal irrigation schemes in South Asia from their inception in the 1840s. Particularly serious in Pakistan, salinisation is common in northern India and, to a smaller extent in canal-irrigated tracts elsewhere in India, especially in coastal districts. Under commonly found climatic conditions in northwestern South Asia with precipitation of less than 600 mm, high temperatures and very high evaporation, the naturally occurring salt in many alluvial rocks and soils can be concentrated when dissolved in irrigation water and may be precipitated in high concentrations on fields.



Map 90 Soil salinisation in Pakistan

Source: Tahir et al (1994)

Where it occurs, as extensively in Pakistan and parts of northern India, salinisation can seriously reduce productivity (British Geological Survey 2001 and 2004; Corbishley and Pearce 2007; Tahir et al 1994). Estimates in the mid-1990s suggested that 10 million ha were affected by salinity in India, of which two and a half million were in the Indo-Gangetic plains. Brandon, Hommann and Kishor reported the loss to crop production at between 6.2 million tonnes (FAO estimate) and 9.7 million tonnes (Indian data).

Map 90 shows the concentration of salinised land in Pakistan in the cultivated areas close to the Indus right down to the delta and outliers in the extremely arid parts of Balochistan. These are generally areas of some of the longest-standing large-scale irrigation schemes in the world. The lost productivity caused by salinisation remains serious.

Conclusion

There are large practical and conceptual problems in identifying the true scale of environmental degradation in South Asia. This represents a major challenge, given the extensive evidence that pollution is a serious problem in many parts of the region. The challenges are real, and the cost to human life and well-being of failure to tackle them effectively are indisputably high. Governments have repeatedly promised much more than they have delivered in terms of environmental protection, and the solution to these wide-ranging problems requires a strong political will and a political environment in which change can be delivered.

28 Climate change in South Asia

Since the first assessment reports of the Intergovernmental Panel for Climate Change (IPCC) were completed in 1990 there has been intense interest in the possible scale and implications of global warming and climate change for all South Asian countries. As a driver of climate change, the chief focus has been on anthropologically heightened global levels of CO₂ in the atmosphere, attributed largely to the increased burning of fossil fuels since the Industrial Revolution, and especially since the Second World War. The atmospheric and oceanic systems, which play a major role in climate, are extremely complex. Average global temperatures reflect the balance of incoming and outgoing radiation and the systems of energy transfer within the oceans and the atmosphere. However, these systems are subject to wide variations of long- and short-term natural variability. As was shown in Chapter 7, they also produce great climatic contrasts from region to region, right down to local scales. This complexity and regional diversity of climate has meant that many questions remain unanswered, both with respect to the climate system itself – long-term changes in temperature and precipitation being the key indicators – and even more with respect to the links with changes elsewhere in the environment.

The last century has seen an increase in global CO₂ in the atmosphere from its pre-industrial levels of around 280 ppmv to 400 ppmv in 2014, a level probably last found over 15 million years ago. However, the causative links between pre-modern temperature variations and changing levels of atmospheric CO₂ are far from straightforward. There are many uncertainties surrounding our understanding of key elements of global and regional weather systems. The behaviour of global jet streams, which shape weather systems in many regions of the world, and which are known to play a crucial role in the monsoon system, is still poorly understood. Tropical climates are strongly affected by El Niño, a natural system of Pacific Ocean currents, which again is still poorly understood and predicted, yet which is known to be strongly related to the behaviour of the monsoon system. Recent research in South Asia has pointed to the contribution of increased levels of aerosols in the atmosphere in reducing wet season precipitation over northern India and increasing the melting of snow and ice in the Himalaya, but such conclusions remain tentative.

Since the adoption of the UN Framework Convention on Climate Change in 1992 much attention has been focused on the consequences of global warming for the wider environment. These include a rise in global sea level, regional changes in weather patterns (often predicted to mean an increase in storms, cyclones and heavy precipitation events), as well as a spread of drought-affected areas and increased water stress. Because of its dense population and low-lying coastal location, Bangladesh in particular has become one of the most commonly quoted examples of the potential damage caused by changes in the environment often associated with continued global warming, but every part of South Asia has come under scrutiny.

Neither CO₂ nor global mean temperatures are simple predictors of wider climatic change. Much of the discussion of climate change depends on the range of atmospheric models developed since the 1980s. Despite the constantly increasing power of the computing models,

long-term projections of individual climates, as distinct from global mean temperatures, are made even more difficult by the uncertainty over scaling-down models from the global to the regional. While a brief indication is given of key projections for South Asian climates over the coming century, this chapter focuses on the historic evidence for climate change across South Asia up to the present. It summarises recent trends in regional temperature and precipitation change in the individual countries of South Asia and the trends to date of environmental events such as floods, cyclones, mountain ice cover and sea level rise. It notes current projections for each country. However, as the IPCC has argued, there are major uncertainties in current regional model projections as a result of inherent uncertainties in modelling the future behaviour of the monsoon (Christensen et al 2013). Where available, data in the country sections below are taken from UNDP Climate change country profiles.

Note: This chapter follows the convention of indicating the months by a capital letter, e.g. MAM is the period March, April and May. The major seasons are DJF (cold season) MAM (hot), JJA (monsoon) and SON (post-monsoon).

Afghanistan

Key indicators 1960–2008

Mean annual temperature has increased by 0.6°C since 1960, an average of 0.13°C per decade. Since 1960, the greatest warming has been in the months SON (0.29°C per decade) and the lowest in the winter months of DJF (0.11°C per decade).

Precipitation has decreased by 2 per cent per decade since 1960. The greatest decrease (2.7mm per month or 6.6 per cent per decade) has been in MAM. The JJA and SON months have seen a small increase. There has been no trend in heavy rainfall events.

Projections

GCM models Climate change models project an increase in temperature of between 1.4°C and 4°C by 2060. Current rates of warming are less than 1°C over the next 50 years. Precipitation in MAM is projected to decrease, though model predictions show an extraordinarily wide range, from -51 to $+9$ per cent.

Afghanistan is located on the northwesterly margins of the South Asian monsoon system and towards the easterly limits of the winter westerly depressions coming from the Mediterranean. Its latitude and relatively high altitude mean that winters are cold and mountain snowfall a vital contributor to the hydrological system. There are significant seasonal and regional variations, and projections are subject to a wide margin of error. Snowfall is a key variable for agriculture, as rivers fed by snowmelt are a vital resource in many parts of the country, both for irrigation and power. A significant and consistent reduction in snowfall could thus have serious consequences, but there is as yet no evidence that such a decline is taking place.

Bangladesh

Key indicators 1960–2008

Mean annual temperature has increased by 0.02°C per decade. The largest increase, 0.12°C per decade, was in the late monsoon months of SON. The hot season (MAM) experienced a drop of -0.09°C per decade.

Precipitation Annual mean rainfall has decreased by 1.1 mm per decade from an annual mean of 2465 mm per annum. JJA precipitation with a mean of 478 mm per month, has registered a decrease of -8 mm , while MAM (mean monthly total 159 mm) have seen an increase of 5.3 mm .

Projections

GCM models Major uncertainties affect the key variables of temperature and precipitation, but are even more pronounced with respect to cyclonic storm frequency and intensity, flooding, and the effects of sea level rise. This is partly because the key processes that shape these phenomena are either still too poorly understood (e.g., cyclones, intense rainfall events) or because non-climatic variables, which have not been taken into account in IPCC surveys, play a crucial role. Sea level rise and river bank erosion, discussed below, are both influenced by the geological dynamism of plate tectonic movement and long-term patterns of river bank erosion, which have led to major changes in the courses of the largest rivers over several centuries.

Environmental risks linked to climate change

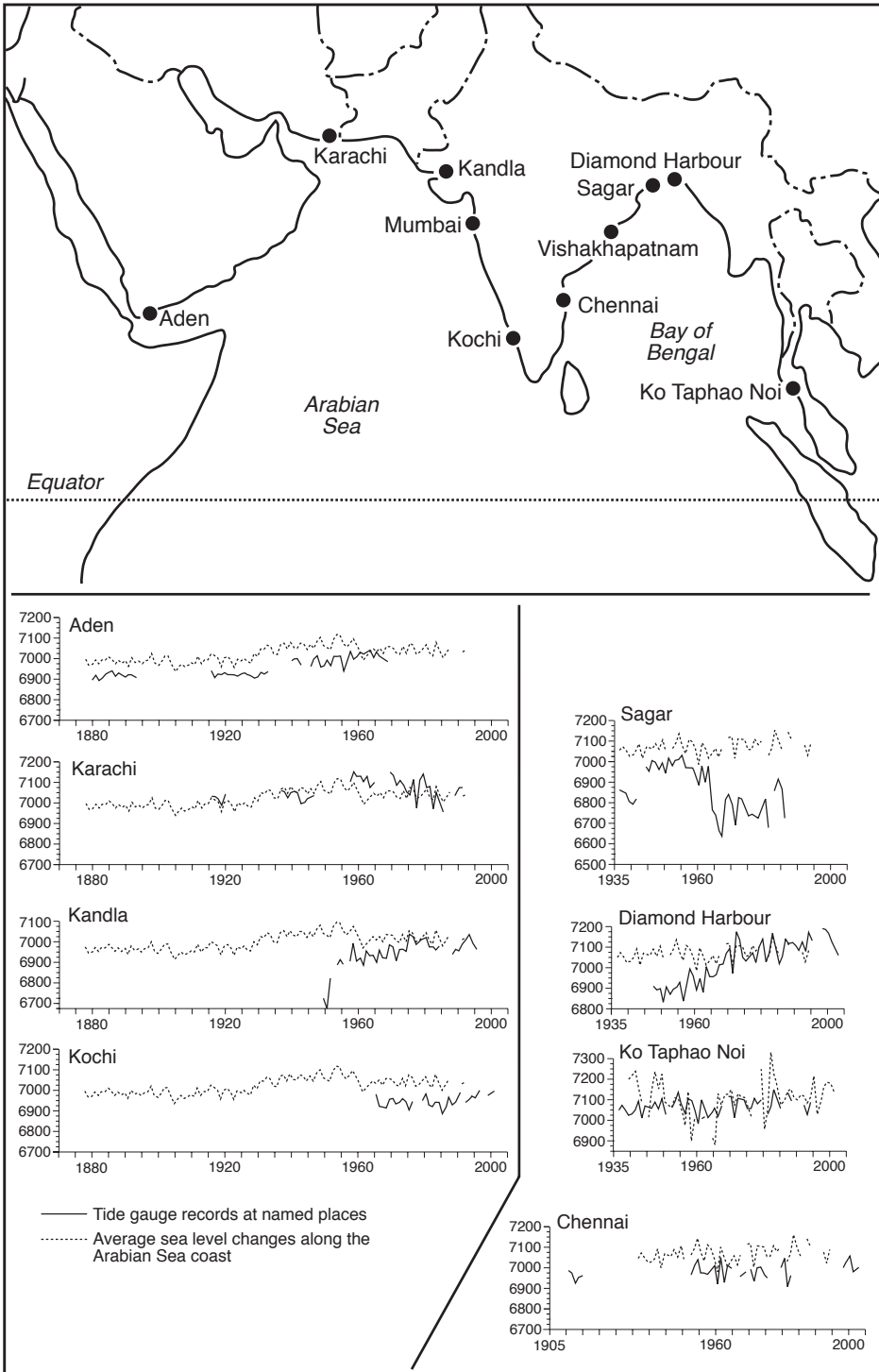
Bangladesh, lying between 21°–26°N, is one of the wettest countries in the world, most regions except the northwest receiving over 2000 mm per annum. About 80 per cent of the total rainfall normally comes in the four-month monsoon period JJAS, and the four-month dry season rainfall is generally less than 200 mm in most areas.

Environmental risks faced by Bangladesh have been frequently repeated over the last thirty years. It has often been claimed that climate change has caused increased flooding, a higher risk of cyclones (both in number and intensity), more frequent extreme events, desertification, and flooding of extensive areas of the coastal margins because of sea level rise induced by global warming. The evidence to date provides no support for many of the claims that the ‘devastating costs’ of climate change are already being felt in Bangladesh. The IPCC reports have very few references to empirical studies of long-term and recent trends in each of these events, though peer-reviewed research has been published with respect to all of these subjects over the last decade. However, the climate records for South Asia held by the Indian Meteorological Department go back into the last quarter of the nineteenth century, and provide invaluable evidence for patterns of change in temperature, precipitation and cyclone and storm frequency and intensity.

Flooding In a normal year about 20 per cent of Bangladesh is flooded, though in the most severe floods up to two thirds of the country has been flooded. Flooding comes from three sources: heavy monsoon rainfall over Bangladesh, which the river system does not have the capacity to drain fast enough; river surges carrying monsoon rain and snow melt from the upper catchment areas of the major rivers – the Brahmaputra, Ganga and Meghna and their tributaries; and storm surges from the sea, notably with the passage of cyclones. The IPCC SREX report on climate change and extreme events stated that ‘there is limited to medium evidence available to assess climate-driven observed changes in the magnitude or frequency of floods at regional scales’. They go on to argue that because of this, and the range of non-climatic variables that affect floods, there is ‘low agreement in this evidence, and thus overall low confidence at the global scale even regarding the sign of these changes’ (Field et al 2013).

Sea level rise The IPCC Fifth Assessment Report says that models currently predict the range of global mean sea level rise to be between 26 and 98 cm by 2100. The authors observed that in the twenty-first century and beyond it is very likely that sea level change will have a strong regional pattern, ‘with some places experiencing significant deviations of local and regional sea level’ (IPCC WG1 2013, Chapter 13, p. 1140).

The risks posed to Bangladesh by a predicted global sea level rise have been widely promoted. In a much-reproduced map showing the area below the 5 metre contour line, Houghton



Map 91 Sea level changes in the northern Bay of Bengal and the Arabian Sea, 1880–2010
 Source: Unnikrishnan and Shankar (2007)

(1997) suggested that sea level rise in Bangladesh threatened to inundate the entire coastal belt of Bangladesh, with the consequent enforced migration of tens of millions of people. This narrative runs through much of the contemporary literature.

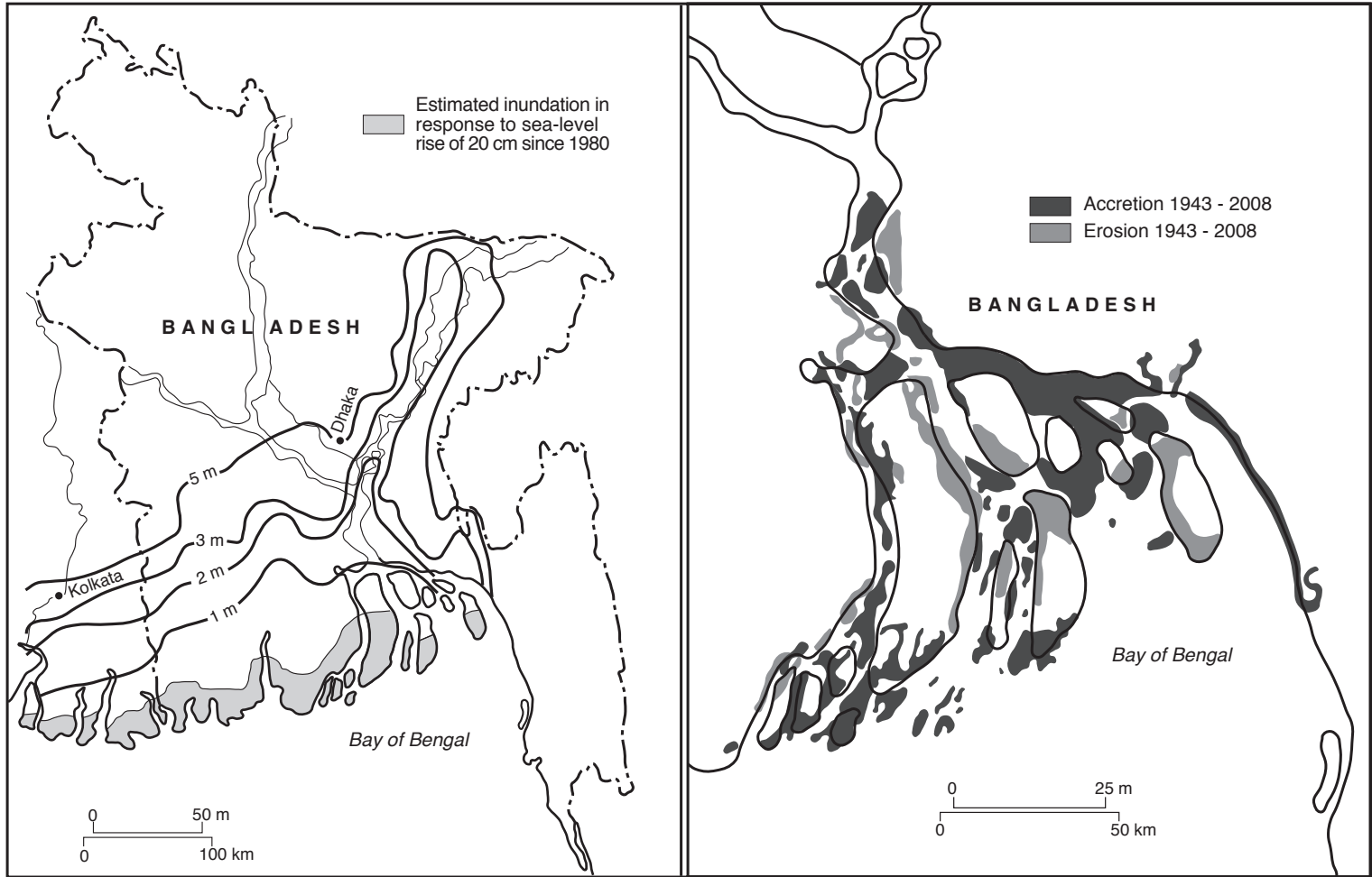
While Sir John Houghton himself acknowledged the importance of sedimentation in the formation of the delta, and the high degree of uncertainty with respect to current forecasts of inundation, many other writers on Bangladesh have failed to do so. The Stern Review, *The Economics of Climate Change* (2006), for example, claimed that ‘Bangladesh faces the permanent loss of large areas of coastal land affecting 35 million people, about one quarter of its population’ (p157). The environmental journalist Paul Brown is just one of many environmental journalists to have repeated the same claims of unprecedented enforced migration. In a caption to a satellite image of Bangladesh and neighbouring parts of India, Brown writes: ‘Along these shores, and similar low lying areas of India, more than 100 million people will be displaced’ (Brown 2006).

Lord Stern took a similarly apocalyptic view of the effect of reduced river flow as a result of the melting of Himalayan glaciers. He wrote: ‘melting glaciers and loss of mountain snow will increase flood risk during the wet season and threaten dry season supplies to one-sixth of the world’s population. Climate change will have serious implication for people who depend on glacial meltwater to maintain supplies during the dry season. Including large parts of the Indian sub-continent...’ (Stern 2006, p. 157). The conflation of glacial meltwater with snowmelt misrepresents the contribution of glacial meltwater to dry season flow of the South Asian river systems, which nowhere contributes more than 5 per cent of total dry season flow, and a far smaller fraction of their total flow. Bangladesh, the Stern Review concluded, ‘faces the permanent loss of large areas of coastal land affecting 35 million people’, while of China he added ‘one quarter of China’s population (300 million people) could suffer from the wholesale reduction in glacial meltwater’ (p157).

In addition to a rise in average global sea level, a full analysis of the impact of sea level rise in coastal Bangladesh needs to take account of three major elements of Bangladesh’s dynamic coastal environment: activity along the tectonic plate boundary that underlies Bangladesh; sedimentation rates in the GBM delta, among the fastest in the world; and the intensive human management of the coastal environment, including the extensive use of embankments to empolder flood-risk land. Brammer (2014) has argued that failure to recognise the diverse and dynamic nature of the Bangladesh environment has led to ‘serious misconceptions’ about the potential effects of sea level rise, a situation aggravated by accounts giving ‘incorrect information on current rates of coastal erosion and land subsidence’.

Brammer wrote: ‘There is a widespread misconception that a rising sea level with global warming will overwhelm Bangladesh’s coastal area contour by contour and will thereby displace as many as 10–30 million people in the 21st century’ (Gore 2009; Houghton 2009). In some accounts, that situation will be aggravated by high rates of land subsidence (Syvitski et al 2009), a recent doubling of the rate of sea level rise (Smith 2012) and rapid, ongoing rates of coastal erosion (Vidal 2013 a, b). Brammer went on to criticize the view that the population of Bangladesh has been and remains helpless in the face of rising sea level, and concludes that ‘those assumptions and descriptions are incorrect’ (Brammer 2014).

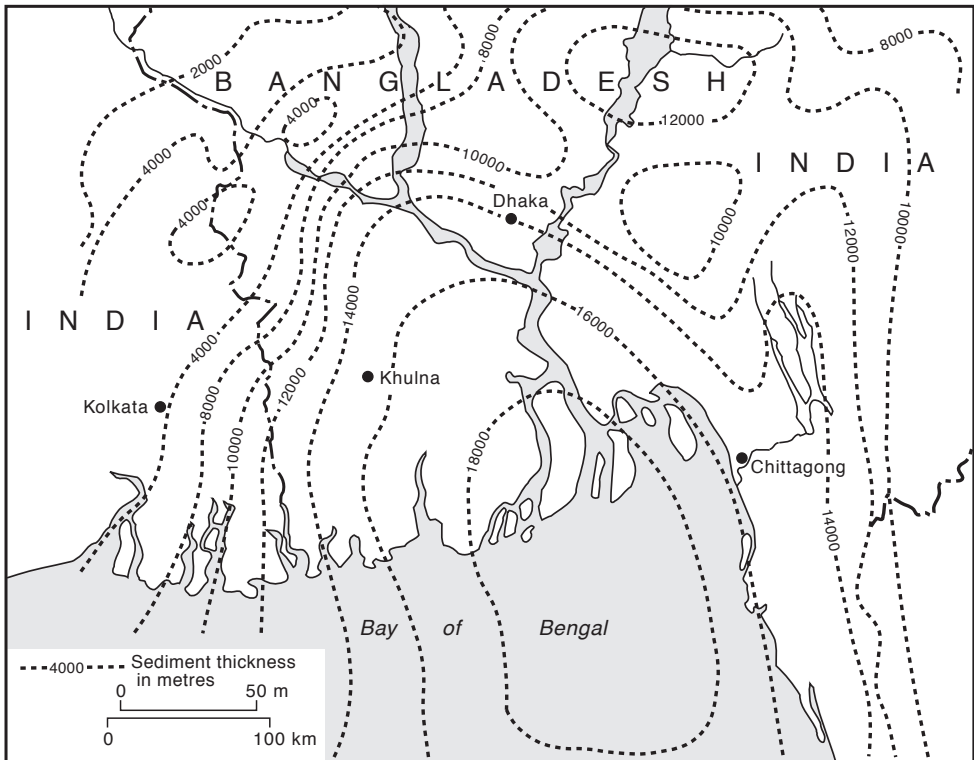
The unique combination of both the natural environmental controls of coastal formation in Bangladesh, and the already great human impact on coastal management means that scenarios that envisage the drowning of much of coastal Bangladesh during this century are very probably misplaced. Human activity, which has already altered much of the coastal environment, has been essential to the ongoing viability of what is the most densely populated rural area in the world. Attention needs to be placed on effective management of that activity to take full account of the dynamic delta environment.



Map 92 a. Modelled sea-level rise in response to climate change in Bangladesh. Note sea-level rise at Diamond Harbour; at the west end of the delta, has been quoted as 5.7mm per annum by Unnikrishnan and Shankar. Syvitski has claimed that subsidence of the delta is 18mm per annum. See discussion below. b. Measured land accretion and erosion, 1943–2008

After: a. Houghton, J. (1997); b. Sarkere M. H. et al (2013) and Brammer (2014).

Unnikrishnan and Shankar (2007) have reviewed long-term trends in sea level in the Bay of Bengal and the Arabian Sea. Although the sea level at Visakhapatnam (Bay of Bengal) and Mumbai (Arabian Sea), each with over 100 years of data recorded by well-established gauges, are well correlated, they do show some differences. These are related to the significantly lower salinity of the Bay of Bengal, resulting from the inflow of the Ganga and Brahmaputra in the north and all but two of the major rivers of peninsular India in the west. Long-term changes in wind patterns are having a measured effect on regional sea level across the Indian Ocean, though many questions about long-term changes in sea level remain unanswered.



Map 93 Sediment depths in the GBM delta

Source: See Goodbred, S. I. and Kuehl S.A. 2000a and b; and Goodbred S. I. et al

The charts show significant local variability in relative sea level change. Using data from the Permanent Service for Mean Sea Level, Unnikrishnan and Shankar showed a regional average rate of sea level rise of 1.29 mm/yr. The wide discrepancy between the mean and the rate of rise for Diamond Harbour, on the Hugli below Kolkata, they attribute to local subsidence. However, Brammer (2014) has pointed out that an upturn in Diamond Harbour's rate of sea level rise in 1975 coincides with the bringing-on-stream of the Farakka Barrage, which increased the dry-season flow of the Hugli.

Cyclones

The nature and history of the cyclone hazard has been discussed in Chapter 26. Cyclone Bhola, which hit the Bengal delta in November 1970, was estimated to cause up to 500,000 deaths. It

brought into sharp focus the degree to which the densely populated coastal lowlands of Bangladesh are exposed to cyclone hazards. As a result of its location at the head of the enclosed Bay of Bengal, the high winds and heavy rain typical of cyclones may also be accompanied by storm surges of over 13 metres, as recorded in the Great Backerganj cyclone of 1876. The storm surge accompanying cyclone Bhola in 1970 was over 10 metres, which came on top of one of the highest tides on record.

Over the last decade there has been widespread speculation that both frequency and intensity of cyclones around the world would increase with global warming. However, there is strong evidence to show that neither cyclone activity nor flooding has increased in recent decades. The IPCC's Fifth Assessment Report was unequivocal about the lack of evidence for increased cyclonic/hurricane storm frequency around the globe. They also stated that there is no evidence of an increase in the magnitude or frequency of floods. Data from the Indian Meteorological Department going back to 1891 support these conclusions.

As was shown in Chapter 26, since 1891 there has been no increase in either the number or the strength of cyclones, either in the Bay of Bengal or in the Arabian Sea. The last thirty years has been the quietest in the region's cyclone record (Maue 2011).

Bhutan

No formal projections from the UNDP database are available for Bhutan.

Key indicators Data for Bhutan are restricted both geographically and through time. 1960–1990 minimum temperatures at Thimpu 3.7°C in January and 5°C in December. Maximum mean temperature in July, the hottest month, was 17.5°C. The mean minimum for 1990–2009 was 4.6°C in January and 6°C in December. For this period maximum temperatures in July and August were both 17.9°C.

Mean annual temperature The mean temperature for the period 1990–2009 was 0.60°C higher than that of the preceding thirty year mean. However, the 1960–90 period was 0.29°C cooler than the preceding thirty years. Thus the mean temperature increase over the sixty years from the mid 1940s to the mean of 1990–2009 was 0.31°C, or 0.05°C per decade.

Precipitation There was no significant change in Bhutan's precipitation during the twentieth century.

Data for Bhutan are from the Climatic Research Unit, University of East Anglia.

India

Key indicators 1960–2008 These figures relate to an average calculated for India as a whole. As has been shown above, India has a wide range of climates.

Mean annual temperature for the 1960–1990 period was 23.8°C. For the period 1990–2009 the mean had risen to 24.22°C, an increase of 0.42°C, equating to a warming of 0.17°C per decade. However, average temperatures for the whole of India give no indication of the wide range of climates across the country. Arora, Goel and Singh have shown that over the last century, records from 115 weather stations that have continuous records show that the mean, mean maximum and mean minimum temperatures across India increased by 0.42°C, 0.92°C and 0.09°C. However, broken down regionally there are sharp differences between northern India

and the south and west. Mean temperatures in the south and west increased over the century by 1.06°C and 0.36°C , respectively. However, in the northern Indian plains temperatures decreased over the century by 0.38°C (Arora et al 2011).

Precipitation Total precipitation across the whole of India was approximately 1 per cent lower for the period 1990–2009 than the average annual precipitation for the preceding three decades.

Projections GCM models Rajendran et al argued in 2013 that ‘Advances in climate modelling now provide the opportunity for utilizing global general circulation models (GCMs) at very high resolution for projections of future climate and extreme events’. They argued that under current warming scenarios, there was likely to be a significant but regionally variable increase in precipitation over much of India but a 10–15 per cent reduction in orographic rainfall over the Western Ghats (Rajendran et al 2013).

(Data for India are from the World Bank and the CRU East Anglia)

Maldives

The Maldivian government regards possible sea level rise as the most important aspect of global climate change for its own future. With a highest point of 2.4 metres above sea level, there is a commonly stated fear that, in common with other similarly placed island states, a rapid sea level rise could inundate the islands.

Assumptions that a rise in global sea level would automatically translate into relative sea level rise around the Maldivian atolls are misplaced. As the IPCC SREX report (2012) observed, sea level itself is subject to widespread regional contrasts as a result of changing wind patterns and ocean currents. Second, coral reefs are growing organisms. Evidence from Male suggests that reef growth began about 6000 years BP, and for the next 3000 years reefs grew at between 3 mm and 10 mm a year. They reached the surface about 3000 years BP (McClanahan 2000). Since that time there have been significant variations in local sea level. Third, the relative height of coral islands depends critically on the movement of the plates on which the bases of the islands sit. The origin of the Maldivian atolls lies in the northward movement of the Indian Plate and the creation of a series of volcanoes along the Chagos ridge, which was formed as the Indian Plate moved north. Current sea level rise recorded on the coasts of the Indian Ocean suggests a current general sea level rise of 1.3 mm a year 13 cm per century. Rates of coral growth alone have more than kept pace with such arise in the recent geological past. As in other coral islands, management may prove a more significant factor in island erosion.

Nepal

Key indicators 1960–2008

Mean annual temperature decreased at a rate of -0.07°C per decade. It has decreased slightly in the six-month warm to hot period MAM (-0.13°C) and JJA (-0.09°C).

Precipitation Precipitation has fallen by 3.2 per cent per decade, comprised mainly of a reduction of 10.8 mm per decade concentrated in JJA.

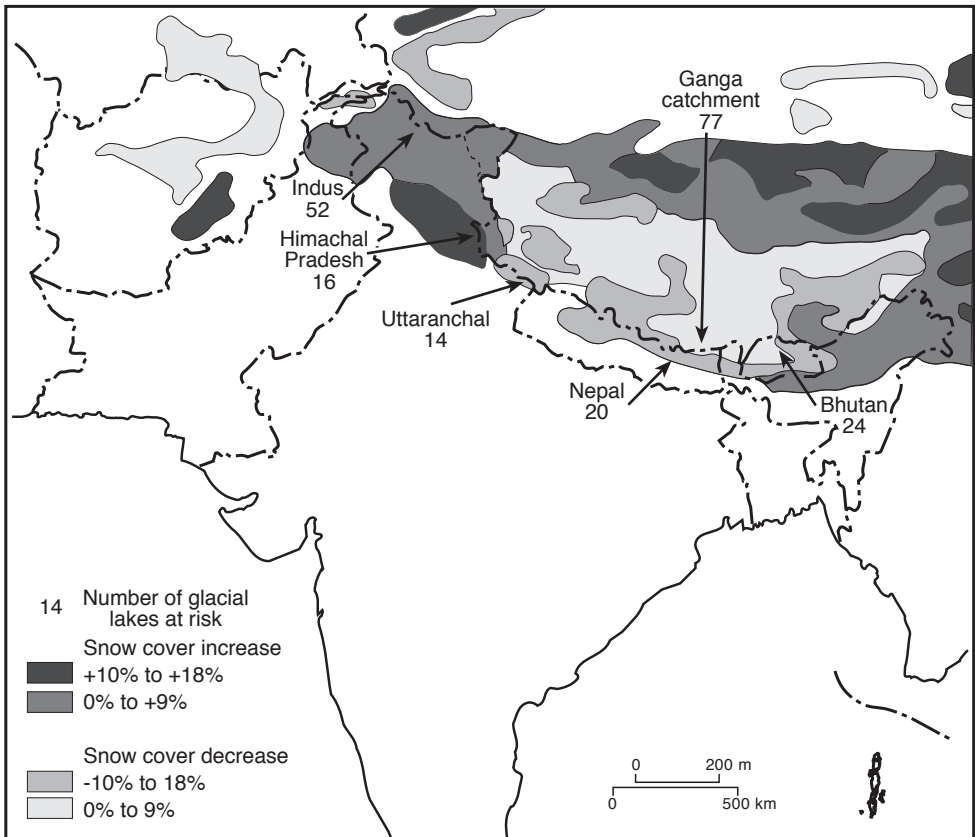
Projections GCM models Mean annual temperatures are projected to rise by between 1.3°C to 3.8°C by 2060 and 1.8° to 5.8°C by 2100. The most rapid warming is projected for DJF and MAM. Wet season (JJA and SON) precipitation is anticipated to increase, though the

range in different models is very wide. For example, some models predict a decrease of 22 per cent per month in JJA precipitation, while others suggest it will increase by as much as 104 per cent.

The wide range of projected precipitation between models reflects in part the influence of local topography. The southern lowlands bordering the Indian Ganga plains have a humid subtropical climate (typically 20°–27°C in summer, though sometimes higher, and 10°–15°C in winter). With a permanent snow line upwards from 5,000 to 5,500 metres, the higher ranges never have above zero temperatures. In the valleys, aspect is a major factor in local temperature and precipitation.

Glacial Lake Outburst Floods (GLOFs)

Glacial Lake Outburst Floods are the most dramatic consequence of high altitude snow and ice melt. When glaciers recede they often leave a terminal moraine, especially in constrained valleys, comprising a consolidated wall of debris from the melted ice, sometimes encasing large blocks of glacier ice. The moraines then act as natural dams, sometimes storing very large volumes of water. The dams are inherently unstable and subject to catastrophic breaching or collapse. Such dams have been a feature of the glaciated Himalaya since the end of the last



Map 94 Glacial Lake Outburst Floods (GLOFs) and snow cover change in the Himalaya/Hindu Kush region, 2000–10

Sources: Gurung D.R., et al (2011, snow cover change); Mool P.K. et al (2001, GLOFs).

glacial maximum, about 12,000 years BP. The bursting of such dams has been known historically to cause major damage in valleys downstream. The most notorious was the outburst flood in the Indus catchment area of 1841. This swept away thousands of villagers and a Sikh army encamped far downstream at Attock. The wall of water was reported to be 24 metres above normal near the natural dam, and was still 13 metres above normal high water level when it reached Attock on the Punjab plains (Evans et al 2011).

Map 94 shows a recent assessment of the distribution of glacial lakes with the risk of collapse, triggering an outburst flood. They are spread across the Himalaya from Bhutan in the east, with 24, across the Ganga catchment (111, including 20 in Nepal and 14 in Uttaranchal), 16 in Himachal Pradesh and 52 in the Indus catchment area. Map 93 also shows changes in snow cover in the Himalaya-Hindu Kush region (after Gurung et al 2011). The central region shows decreases in snow cover over the period 2000–2010 of up to 18 per cent. However, areas running from the west through the north to the east show an increasing trend of up to 18 per cent (Gurung et al 2011). The Nepal earthquake in April 2015 has been predicted to increase the risk of GLOFs.

Pakistan

Key indicators 1960–2008

Mean annual temperature has increased by 0.08°C per decade. The most rapid increase, in OND, has been 0.19°C. There is no evidence of warming in the warmest months themselves, JAS.

Precipitation There has been no discernible trend in precipitation over Pakistan since 1960. There is no trend in extreme daily rainfall events.

Projections

GCM models By the 2060s temperatures are projected to increase by 1.4°C to 3.7°C and by 2100 by between 1.9°C and 6.0°C. Warming is expected to be greatest in northern Pakistan. Models projecting future precipitation in Pakistan vary widely, from –20 per cent to +41 per cent by the 2090s. The average of the models is close to zero change (Christensen et al 2013).

Floods During the monsoon season parts of Pakistan along the Indus River experience extensive flooding. Such flooding has been an annually recurrent feature since before human occupation of the Indus Valley, and played an integral part in the economy of the Indus Valley Civilisation between 4500–1800 years BP. Extreme flooding, normally resulting from particularly heavy monsoon rainfall in the Punjab and the Himalayan foothills, has occurred periodically throughout recorded history. Floods in late July 2010 inundated about 20 per cent of the country's total area (equal to the percentage of land flooded annually in Bangladesh). About 20 million people were affected.

Sri Lanka

At the scale of a relatively small island state climate projections are poorly developed and unreliable. However, Chandrapala et al (1996) have analysed long-term trends in rainfall and temperature for Sri Lanka over the last century.

Mean annual temperature has increased by 0.16°C per decade between 1961 and 1991. The greatest increase, of 0.6°C per decade, has been recorded in the Central Highlands at Nuwara Eliya.

Precipitation Precipitation was 7 per cent lower in the Wet Zone between 1961–1991 compared with 1931–1960.

Climate plays a significant part in Sri Lankan agriculture. The contrasts between the Dry Zone of the north and east and the Wet Zone of the southwest have played a major role in the settlement history and economy of the island as a whole. The GCMs suggest a continuing warming trend for Sri Lanka, but while changes in climate may well prove significant, it is currently impossible to make secure projections as to the amount – or even the direction – of the key variable of precipitation.

Conclusion

Climate, and the extreme weather events that are characteristic of the regional climates of South Asia, have played a major part in the evolution of the contemporary geography of the subcontinent. Today, climate change has come to play an important part in the environmental and political discourse of South Asia. There are many unanswered scientific questions about the scale of changes that may be expected, where they may be expected, and of the possible impacts such changes may have. Areas that are already at risk are readily identified, and in many areas action is needed to deal with current hazards – floods, cyclones, drought are all damaging features of South Asia's climates. At the same time, governments in the region have shown little appetite for following the climate change agendas of Europe and the US, and there is little current indication that this reluctance will change. India joined forces with China, South Africa and Brazil to re-write the Copenhagen Agreements in 2009, and there is little sign that they are yet ready to make a rapid transition to a fossil-fuel-free world, as claimed in November 2014 by the IPCC to be essential by the end of the century if a 2°C rise in global mean temperature is to be avoided.

Section E

Economy and security

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29 The economies of South Asia

In 2014 about half of the world's poorest people lived in South Asia (World Bank 2014). Yet, over the last two decades there has been an impressive record of economic growth. At the end of 2014 India and Pakistan were showing year on year economic growth of about 6 per cent per annum, a growth described by the World Bank as 'solid'. South Asian economic performance as a whole was close behind that of the world-leading South East and East Asian economies, 'carrying regional momentum forward' (World Bank 2014).

This picture of well-founded and secure growth extends back to the early 1990s but is in some senses misleading. Overall, all the countries of the region are still poor. In terms of gross purchasing power parity (PPP), India ranked third in the world in 2014, with over \$7 trillion, but in per capita terms this was still only \$6000, or \$16 per capita a day. Maldives had an income per capita of double that figure, while in Sri Lanka PPP income per capita stood at over \$10,000. By far the poorest of the South Asian countries were Afghanistan (\$1800) and Nepal (\$2400 PPP per capita). Overall, according to the World Bank, over 570 million people in the region still live on less than \$1.25 per day.

Reserves

In 2014 current account deficits had been stabilising, and foreign exchange reserves across the region as a whole were healthy. India's foreign exchange reserves were expected to rise from \$274 billion in 2013–14 to \$321 billion in 2014–15. While India's position was exceptional, other countries in the region also had healthy reserves. In June 2014 Bhutan had enough foreign exchange to cover 17 months' worth of imports, and Nepal 10 months'. The former owed a large proportion of its reserves to the tied export of electricity to India, while the latter depended heavily on inward remittances. Afghanistan had enough reserves to cover 8 months, and Sri Lanka and Bangladesh enough for 6 months. Pakistan and Maldives lagged behind with two months or less of foreign exchange cover for foreign imports.

Inward investment

The positive news of current accounts and foreign exchange reserves was matched in some countries by rising inward investment and a growing manufacturing base. In the description of the World Bank, India saw an 'invigoration' of its Foreign Direct Investment (FDI) and its Foreign Institutional Investment (FII) in the first quarter of 2014–15, and it was not alone. Pakistan's foreign and capital account rose to over \$7 billion in 2013–14, from only \$0.8 billion the year before. Sri Lanka's FDI rose 102 per cent in 2014 compared to 2013, showing a major recovery from the years of the civil war, which ended in 2009.

Export growth

Across the region export growth also improved in 2014. India's global competitiveness was improved by the Rupee devaluation in summer 2013, though by October 2014 this had been eroded by 9 per cent. Sri Lanka's exports were dominated in 2014 not by the traditional crops of tea, rice and coconuts, but by textiles, which accounted for 43 per cent of the total; tea was relegated to second place. The island state's textile exports rose more than 20 per cent year on year in 2014, and total export growth was up nearly 17 per cent. Bangladesh, also now a major textile exporter, continued to see export growth.

Economic strategies

Throughout their post-Independence history all South Asian states have followed the path of a mixed economy. In the first three decades, although the balance between state and private varied from country to country, all gave a leading role for the state in economic planning. Since the early 1990s the balance has shifted away from state ownership and formal planning towards much more liberal economic management. The state also claimed ownership of most large-scale industrial activities, a pattern now substantially revised.

All these trends illustrate the scale of economic change that took place in South Asia over the decades following Independence, most strikingly after 1991. These changes were most unexpected in agriculture, which across the region defied expectations in the 1980s and early 1990s that it would remain the most difficult problem sector of the South Asian economy. While India tried to reduce the greatest of the disparities in agricultural land ownership through reforming the *zamindari* absentee landlord system in the early 1950s, wider land reform measures ran into the ground. In sharp contrast to the experience of nineteenth century European agricultural reform and industrialisation, rural population densities have continued to grow across South Asia. Many landholdings are very small, inequality remains high, and landlessness is increasing. In 2008 it was reported that 5 per cent of farmers owned 64 per cent of the agricultural land in Pakistan, leaving half of rural households landless (Ghosh 2013). Bangladesh inherited a 1950 law from its period as East Pakistan in which a ceiling on landholdings of 33 acres (13.4 ha) had been established in the State Acquisition and Tenancy Act. In 1983 almost a quarter of Bangladesh's farm holdings were less than half a hectare, many of them highly fragmented. By 2006 that proportion had grown to nearly 40 per cent. At the same time the proportion of holdings in excess of 3 ha had shrunk from just under 5 per cent to just over 1 per cent (Bangladesh Bureau of Statistics 2005).

In India, the first two decades of centralised planning produced some solid achievements, but in the middle 1960s across South Asia population growth threatened to outstrip agricultural output, and in most countries of the region industrial growth was still sluggish and often out of date. With no new land to bring under cultivation, and a tapering off in the growth of agricultural output, there were widely expressed fears that India would become wholly dependent on food aid. Indeed, in the late 1960s it was commonly believed that India and its neighbours faced insoluble economic problems. India's Five Year Plans were blown seriously off-course by the end of the Third Plan in 1965 by a disastrous failure of the monsoon. Industry was at best outdated, infrastructure was rudimentary, and many areas had been scarcely touched by any form of modernisation. When Henry Kissinger said in 1971 that an independent Bangladesh would be a 'basket-case', it was a description many in the west were willing to apply to the whole of the sub-continent.

Pakistan, in many respects still a feudal economy in which a high proportion of the country's wealth was in a very small number of private hands, gave a longer rein to the private sector.

In the 1950s Pakistan too experimented with central planning, using a five-year planning approach between 1950 and 1999, when it adopted a Medium Term Development Framework (MTDF). Despite some major developments, such as the construction of the Mangla and Tarbela dams under the Indus Waters Treaty, infrastructure remained inadequate to meet growing demands.

The economic problems of newly independent South Asia were part of its colonial legacy, exacerbated by the challenges of coping with the accompanying political transformations and regional tensions, notably between India and Pakistan. Many parts of South Asia had no industrial base at all. Three of the larger countries, East Pakistan, Afghanistan and Nepal, had no large-scale industry in 1947. Power generation and transport were often rudimentary. Although India had laid the foundations of a more balanced industrial economy, it was still very limited in scope and heavily concentrated in the port cities of Kolkata and Mumbai, with isolated growth poles such as Bengaluru, Madras and Coimbatore, especially in South India. Pakistan had some industrial capacity, but it was concentrated in very few centres and focused on textiles.

Manufacturing activity

Over the two decades following the mid-1990s there was a remarkable boom in South Asia's industrial activity. Despite this growth, characteristic of most of the South Asian countries, the percentage of workers in the factory sector remained very small. It was also very unevenly spread, both between the countries of the region and within the larger countries: India, Pakistan and Bangladesh. These three countries dominated employment in manufacturing industry, with India overwhelmingly the largest and most diverse. Pakistan, Bangladesh and Sri Lanka focused particularly on textiles and related products, while Bhutan, Maldives, Nepal and Afghanistan had a very small manufacturing base.

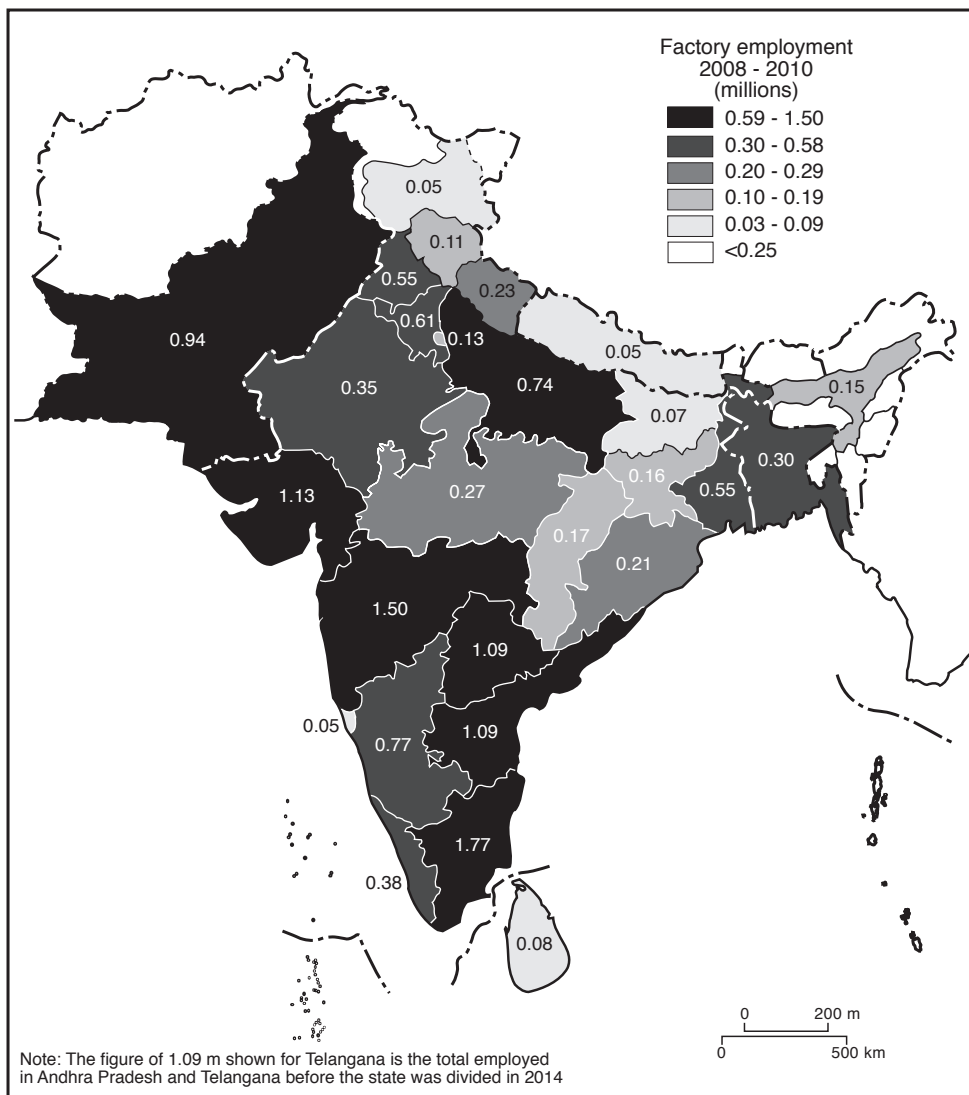
By 2014, the face of manufacturing industry in the larger countries of South Asia was unrecognisable from that of two decades previously. The rapid growth of consumer markets domestically and the opening up of new export markets led to a surge in a diversified production base. While textiles dominated in Sri Lanka and Bangladesh, and to a lesser extent Pakistan, India saw growth across a widening spectrum of industries.

Bangladesh

East Pakistan was one of the least industrialised regions of South Asia. A major supplier of raw jute, both to factories in Kolkata and directly for export as a raw material, even by the time of its secession from Pakistan in 1971 its industrial base was very small. By 2014 the Bangladeshi textile industry had become a \$24 billion export giant, with 5000 factories and an estimated four million employees, mainly women.

India

In India, the two states of Tamil Nadu and Maharashtra accounted for over one-quarter of the employment in the manufacturing industry in 2014. When Andhra Pradesh and Telangana are included, the figure rose to over one-third of the total. In terms of output, Gujarat took second place to Maharashtra, and together they accounted for over half the total output. Add in Tamil Nadu and the share rose to 70 per cent.



Map 95 Factory employment in South Asia, 2008-10

These figures represent some substantial shifts since Independence. West Bengal, once the powerhouse of Indian industrialisation, now accounts for less than 5 per cent of industrial employment. In contrast, Gujarat, parts of western Uttar Pradesh close to Delhi, Punjab and Karnataka are rising fast, while many other states are being left behind. Map 95 picks out these patterns, showing a corridor of relatively concentrated manufacturing industry running from Gujarat in the northwest down through western and central India to Tamil Nadu in the southeast.

In 2014 Indian manufacturing industry contributed 15 per cent of GDP and about 50 per cent of its exports. It has experienced a boom in the manufacturing of engineering goods, which now contribute over one-third of the total manufacturing exports. While progress with the high visibility and high technology space industry has captured headlines, the manufacturing sector has seen

expansion across a wide range of industries. Motor vehicles are one of the leading sectors, with a compound annual growth between 2006 and 2013 of over 12 per cent, other transport equipment accounting for a further 11 per cent. Gems and jewellery and chemicals are also growing rapidly. Manufacturing industry also attracted significant inward investment, notably the motor vehicle industry (\$1.54 billion) and drugs and pharmaceuticals (\$1.12 billion) in 2012–13.

In an October 2014 report the World Bank pointed to the need to carry through an extensive reforms programme if India is to raise its manufacturing growth to a new level. Key bottlenecks remain in infrastructure, and in state level taxes, which cause cross-border holdups and delays. Carrying through the introduction of a national Goods and Services Tax, it is argued, could help transform the efficiency of the domestic manufacturing sector.

Pakistan

Elsewhere in South Asia the manufacturing base remains much less developed than in India. In Pakistan manufacturing contributes 14 per cent of GDP, with total industrial output representing 24 per cent of GDP. However, Pakistan's industrial base is less diversified than India's. Discoveries of copper and gold at Reko Diq in Balochistan in 2006, with an estimated market value at current prices of over \$60 billion, have raised the prospect of a large expansion of the mining sector to add to the natural gas resource, which has been exploited since 1952.

Although Pakistan's industrial economy has expanded at a similar rate to that of India, it has been less diversified. Textiles and apparel together account for more than 40 per cent of employment in the organised sector and two thirds of exports by value – over \$15 billion. However, the World Bank pointed to growth in agro-based industries, iron, steel and construction as key elements in the revival of growth that characterised the 2013–14 statistics, alongside the continuing importance of cotton yarn and fabrics. Energy shortfalls and low productivity are among the constraints holding back even more rapid growth in the manufacturing sector.

Afghanistan

The statistics for merchandise trade quoted here are published by the UN Comtrade (2014). Afghan trade has become increasingly imbalanced throughout the ongoing struggle to defeat the Taliban since 2001. From a low point of just \$100 million in 2001, exports climbed to over \$500 million in 2010. These figures continue to be dwarfed by the value of illegal opium exports. Although opium poppies take up less than 4 per cent of the total cultivated area, the World Bank estimates that the drug trade accounts for up to one-third of total economic output. 90 per cent of the world's opium came from Afghanistan in 2014, when opium production rose by 49 per cent (Buddenberg et al 2014). For 2011 opium exports were estimated at \$1.4 billion, 9 per cent of GDP, representing 90 per cent of the world's opium supplies (UN Office on Drugs and Crime 2011). Imports, on the other hand, grew from just over \$200 million a year to over \$9.15 billion in 2010. Over one-third of Afghanistan's legal exports comprise food, animals, beverages and tobacco. Pakistan was Afghanistan's largest export market in 2010, accounting for just over \$150 million of the \$389 million total. India accounted for \$65 million, with Turkey, Iran and Russia accounting for between \$30 and \$35 million each.

Nepal

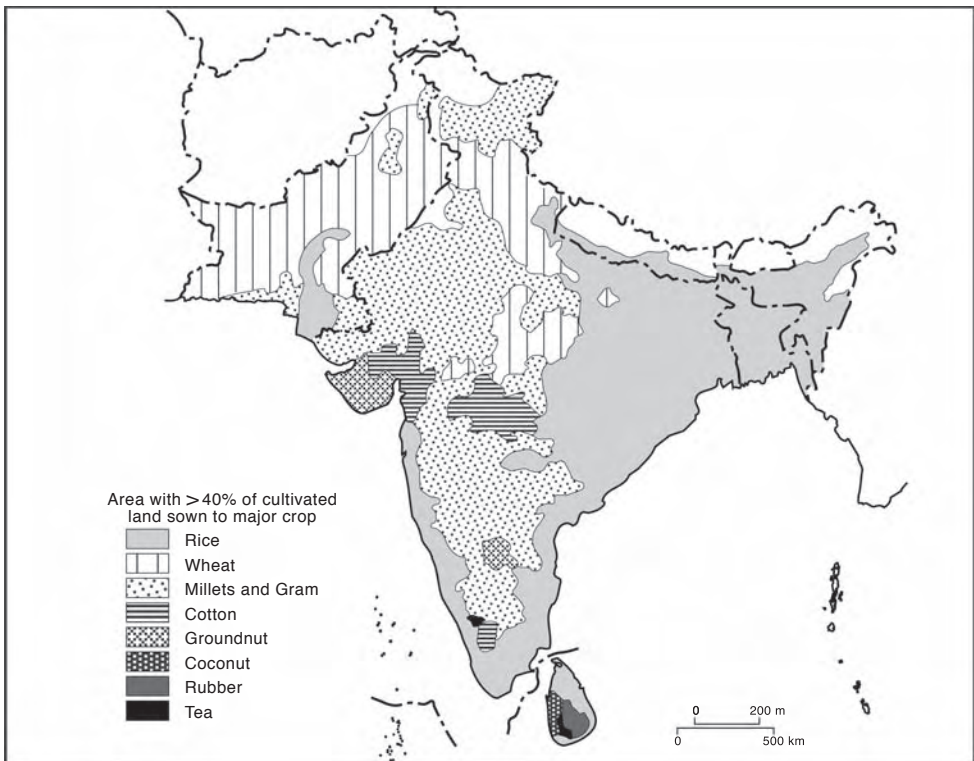
Nepal's ten-year period of outright conflict and twenty years of political instability had a major effect on its domestic economy. Over the period between 1990 and 2010 it had 20 governments.

With an annual per capita income of \$750, it remains one of South Asia's – and the world's – poorest countries. Poor access to power is a major problem in all parts of the economy, with 16 hours a day of power cuts during the dry season. In part, as the World Bank acknowledges, this is ironic, given the immense hydro potential of the country and the keenness of India to develop the electricity-generating potential in Nepal, but a range of political factors have inhibited development. Other aspects of the physical infrastructure, notably roads, are in a perilous condition. Inward investment is a negligible 0.1 per cent of GDP. Tourism is now Nepal's most important industry. Despite the many adverse factors holding it back, the number of tourist arrivals has grown from 6000 in 1962 to over half a million in 2012 (Afram and Del Pero 2012).

Sri Lanka

By far the largest manufacturing industry in Sri Lanka is clothing. Largely for export, including well-known brands in Europe and the US (which takes over 60 per cent of Sri Lanka's garment exports), Sri Lanka's apparel industry accounts for half the country's total exports and 15 per cent of the workforce. Most of the workers are women, largely of Tamil descent. The tea industry also remains very important to Sri Lanka's economy, accounting for just under a quarter of global tea exports and 2 per cent of GDP. It is the world's fourth largest producer.

Agriculture in the South Asian economy



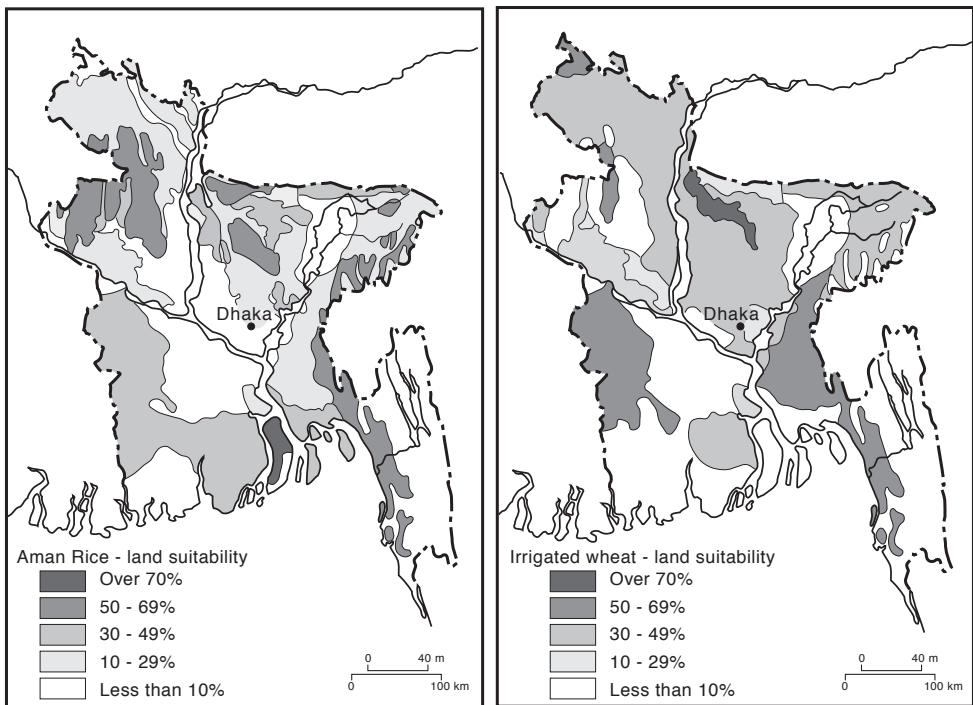
Map 96 Major cropping patterns in South Asia

After: Schwartzberg, J.E. 1978

Three major cropping types dominate South Asian agriculture, though there is great variation in detail right down to the local scale. Wheat, the predominant crop in the northwest, was the first to benefit from Green Revolution seed technology in the late 1960s. Grown primarily as a winter crop, and now largely under irrigation, with the benefit of greatly increased inputs and guaranteed prices, productivity soared, both in India and Pakistan. Wheat production in India rose from 11 million tonnes in 1961 to over 90 million tonnes in 2013, and in Pakistan it grew to over 23 million tonnes in the same period.

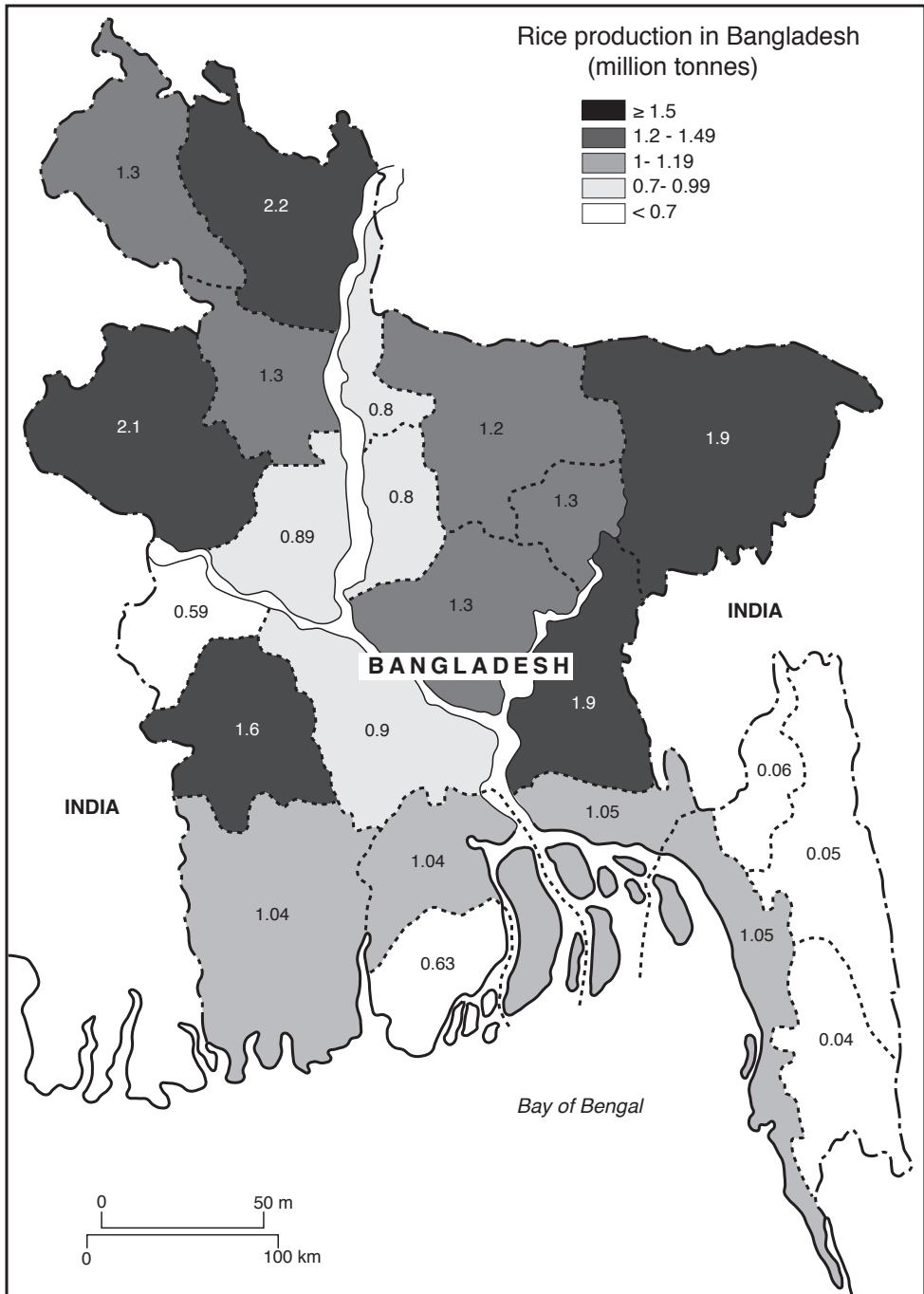
Rice, which is the major crop in the wetter regions of the sub-continent, was slower to pick up Green Revolution benefits, but yields also increased significantly from the late 1970s onwards in most of the rice-growing regions. India alone, which accounts for about 20 per cent of world rice production, produced 50 million tonnes of paddy in 1960. By 2013–14 this had more than trebled to 160 million tonnes. These remarkable increases in production were replicated in other countries of the region. Most striking is the example of Bangladesh. The use of groundwater since the early 1990s has made possible extensive dry-season cultivation, both of rice and wheat. Paddy production in Bangladesh rose from just over 14 million tonnes in 1961 to over 51 million tonnes in 2013. The smaller countries, Nepal and Sri Lanka, have also seen substantial growth in paddy production, in Sri Lanka's case from under 1 million tonnes in 1961 to nearly 4.5 million tonnes in 2013. In Nepal growth was slower, but production still more than doubled from 1961 to its 2013 level of just over 4.5 million tonnes.

While wheat dominates cropping patterns in the dry northwest and rice that of the wetter east and northeast, the central belt of peninsular India, and more marginal rain-fed cropland elsewhere, is sown with sorghum and millets, which are more resilient in conditions



Map 97 Land suitability for *aman* rice and irrigated wheat in Bangladesh

Source: Bradnock R.W. 1983



Map 98 Rice production in Bangladesh, 2010
 Source: Bangladesh Yearbook of Agricultural Statistics 2011, Chapter 3

of unreliable rainfall. These have generally seen much lower increases, and in some cases decreases in production. Sorghum production in India, for example, fell from its peak in the late 1980s of over 12 million tonnes to just over 5 million tonnes in 2013. Millets peaked at over 12 million tonnes in 2003 and fell back to just under 11 million tonnes in 2013. Millets are particularly susceptible to weather conditions as they are largely unirrigated, whereas sorghum, often grown under irrigated conditions, has made way for more profitable alternatives.

The demand for agricultural land in Sri Lanka prompted the Sri Lankan government to engage in large-scale land colonisation schemes in the Dry Zone of the north and east. Meeting the demand for land by Sinhalese small-holders, however, created opposition from the Tamil population who regarded the scheme as an attempt to change the ethnic and political balance of the northeast, contributing to the separatist demands that underlay the Civil War.

Maps 97 and 98 illustrate that the broad-brush national statistics discussed above conceal wide regional disparities at the national scale. As Brammer (2012, 2014) has argued, there is an intimate adaptation to local level conditions of the environment down to the micro-level in Bangladesh, as there is also elsewhere in South Asia. Map 97 shows two categories of land suitability for the monsoon *Aman* rice crop and the *Boro* winter wheat crop in Bangladesh. It shows that the areas best suited for the main monsoon crop of rice are quite different from those best suited for growing dry season irrigated wheat. Map 98 shows total output of rice by major agricultural region of Bangladesh. A range of factors influence the regional contrasts shown in these maps, including susceptibility to and depth of annual flooding, soil type and irrigation source in the dry season for irrigated wheat. The pattern of rice production shown in Map 98 shows the highest production areas are those less often and less deeply flooded. The maps represent the result of a wide and complex range of farmer choices in managing their environment to best effect.

South Asian trade

Today, World Trade Organisation figures show that despite a large increase in absolute volumes of trade between South Asia and the rest of the world, the share of South Asia in world trade has only recently begun to increase. In 2010, India, by far the largest individual South Asian participant in world trade, still only contributed 1.5 per cent of the world's total trade. This compares with over 5 per cent for the ASEAN countries, which have a fraction of South Asia's population and resources.

Despite being relatively small players in world trade, the countries of South Asia are currently undergoing a transformation in their trading relationships with the rest of the world. Given their range in size and economic diversity, there are inevitably great differences in the patterns of trade of the individual nation states. The trade of the smallest, land-locked states of Bhutan and Nepal is dominated by their larger neighbour India. In contrast Pakistan and Bangladesh have for long periods minimised their degree of trading contact with India. This trade has been heavily constrained by the political climate of fear and distrust that has characterised much of the post-Independence period. The potential for triangular trade among India, Pakistan and Bangladesh is indicated both by the large volumes of illegal trade between India and Bangladesh and the volume of bilateral trade between India and Pakistan which, for cosmetic reasons, has for many years been routed via the Gulf states.

Although in global terms after Independence India had a large economy, India itself only took a very modest part in world trade until it began to liberalize its economy after 1991. The picture for other South Asian countries was similar, though individual primary products, notably tea and jute, were very important traded goods. The picture for all the South Asia countries today is changing fast. As is shown by the trade figures for the individual countries of South Asia,

an overall trend has been the development away from raw material and agricultural goods into increasingly complex industrial and service exports.

The great majority of South Asian trade today is with the global economy, the US and Europe continuing to be the major export markets, with imports from China growing strongly over the first decade and a half of the 2000s. Energy imports are dominated by flows of oil and gas from the Gulf, though coal imports were also important in 2013.

South Asia has benefited greatly from its increased openness to world trade. The challenge of protecting India's core domestic interests while continuing the process of reducing world trade barriers under the World Trade Organisation's most recent round of long-drawn out negotiations threatened to derail further global liberalisation. In November 2014, the WTO and India made a deal under which India could protect its huge food reserves scheme.

From its early dependence on the export of primary produce, South Asian trade has diversified, though as a region it continues to be a small contributor to total volumes of world trade. The region as a whole is heavily dependent on energy imports, and despite having resources of gas and petroleum, domestic demand has far outstripped supply. India, the world's fourth biggest consumer of energy in the world after China, the US and Russia, depends on imports for over 40 per cent of its total energy needs. In 2013 it imported over 140 million tonnes of oil (nearly one third of its total import bill), and 16 million tonnes oil equivalent of Liquefied Natural Gas. Despite having the world's fourth largest reserves of coal and being the world's third largest producer, India imported 16 million tonnes of coal in 2013, an amount that has been rising at nearly 20 per cent a year. The Indian Minister of State for Power Piyush Goyal told the World Economic Forum in November 2014 that India could stop importing coal for its thermal plants by 2017, as the government hopes to double coal output from its own mines by 2020.

Intra-regional trade

The remarkably low level of intra-regional communication in South Asia is indicated by the World Bank statistic that only 7 per cent of all telephone calls are intra-regional compared with 71 per cent in East Asia (World Bank 2007). A World Bank report in 2014 argued that there are many opportunities for increasing intra-regional trade. Several focus on removing the current bottlenecks – both physical and political – to the movement of goods and services across the region. India's central geographical position in the region makes bilateral agreements an essential part of an overall improvement. The obstacles are often more political than technical. The World Bank's focus on developing transport corridors picks out some key strategic routes. These include the Kolkata-Kathmandu route, vital to land-locked Nepal's external trade. They have also identified a trade corridor within the Indian state of Mizoram, though freedom of movement for Indian goods across Bangladesh to its northeastern states remains an ambition.

The strength of Bangladeshi textile exports to Europe and the US kept the Bangladeshi Taka strong relative to the Indian Rupee and continued to support highly imbalanced bilateral trade between Bangladesh and India, both legal and illegal, in which Indian exports to Bangladesh far outweighed Bangladesh's exports to India. As a 2014 report of the World Bank argued, such imbalances should not inherently be a problem, as long as the overall balance of trade is healthy, as is the case in Bangladesh. However, the politics of this bilateral imbalance can still be a challenge to relations between the two neighbours.

Nepal's trade within the region has also been affected by the strength of its remittance economy. In 2014, the high level of remittances kept the Nepali Rupee at very high rates and made exports uncompetitive.

As a whole, the World Bank expected the South Asian region to become increasingly dependent on exports for its wide-based economic growth, symbolising the increasing openness of all South Asian economies to the global economy. The heavy dependence on a limited range of agricultural outputs, which characterised the exports of key South Asian countries at Independence, carried serious risks. Tea, jute and cotton, most exported with minimal processing, were overwhelmingly the largest exports from South Asia in 1947. They proved highly susceptible to competition from new sources, as well as from factors such as crop failure. However, in 2014 the World Bank reported that South Asian trade as a whole had become strongly diversified. This diversification should make the South Asian economies more resilient to fluctuations in world markets and provide a stimulus to more stable long-term growth in the GDP.

In 1947 intra-regional trade was still a vital part of the regional economy. Partition rapidly brought much of that trade to a halt, when Pakistan decided to bring the trade in agricultural products, notably jute from East Pakistan to Calcutta to an end. For the following decades trade between the South Asian countries fell to meagre levels.

The formation of the South Asian Association for Regional Cooperation and Development (SAARC), originally at the suggestion of President Ziaur Rahman of Bangladesh, was intended to reverse this trend. Although the effectiveness of SAARC has been widely questioned, under the aegis of SAARC the South Asian countries have committed themselves to increasing freedom in trade across the internal borders of the region. In December 1991 at the SAARC summit in Colombo, agreement was reached to establish a specialist group to bring forward a proposal on liberalising trade among the SAARC members. This was brought into effect through the South Asian Preferential Trading Arrangement (SAPTA) in December 1995. The treaty used the principle of reciprocity as a basis for negotiating tariff reform, the inclusion of all products and commodities and the prioritising of the needs of the least developed countries in the region. By 2009 four rounds had been completed, involving over 5000 commodities and a widening range and deepening set of tariff concessions.

This treaty, coupled with the liberalisation of global trade, encouraged SAARC to move towards a much wider range of freedom for intra-regional trade through the 2004 proposal to create a South Asian Free Trade Area (SAFTA). The eight countries now full members of SAARC created a free trade area of 1.6 billion people in which the SAARC community committed to reducing all trade tariffs to zero by 2016. India, Pakistan and Sri Lanka, the more developed economies of the region, committed themselves to reaching the zero target by 2013. As is shown below, this was not fully achieved.

Moves between India and Pakistan to reduce tariff barriers to a maximum of 5 per cent by 2020 and to remove all non-trade barriers by the same date, a reduction in the number of items on the 'sensitive list' and a perceived change of heart both in India and Pakistan about the value of bilateral trade, have been held by the World Trade Organisation (2012) to change the whole regional trade dynamic. However, to date, despite a growth in trade in agricultural goods between India and Pakistan since SAFTA came into force, it has mainly filled seasonal gaps in the domestic market. Furthermore, there is evidence that 'despite implementation of SAFTA, existence of tariff and non-tariff barriers continue to restrict agricultural trade between the two countries' (Chand and Saxena 2014).

In practice there was a significant caveat to the free trade commitment. All countries were to be allowed to nominate a 'sensitive list', which would be excluded from the free trade agreement. Initially, several member states of SAARC had over 1000 products on their sensitive lists. SAARC has continually sought to obtain agreement on reducing the sensitive lists, and the

potential of intra-regional trade for improving overall standards of living in South Asia is still far from being realised.

Bangladesh, India, Nepal and Sri Lanka had separate lists for lesser-developed and non-lesser-developed countries (LDCs and NLDCs in the table). With the exception of Bhutan, whose sensitive product list grew from 150 to 156, all other countries had agreed to substantial cuts in the number of items listed.

Table 35 Products in SAARC's "sensitive list" before and after January 1, 2012

Country	Products in the sensitive list before 2012	Products in the sensitive list after Jan 1, 2012
Afghanistan	1072	858
Bangladesh	1233 (LDCs) 1241 (NLDCs)	987 (LDCs) 993 (NLDCs)
Bhutan	150	156
India	480 (LDCs) 868 (NLDCs)	25 (LDCs) 614 (NLDCs)
Maldives	681	154
Nepal	1257 (LDCs) 1295 (NLDCs)	998 (LDCs) 1036 (NLDCs)
Pakistan	1169	936
Sri Lanka	1042	837 (LDCs) 963 (NLDCs)

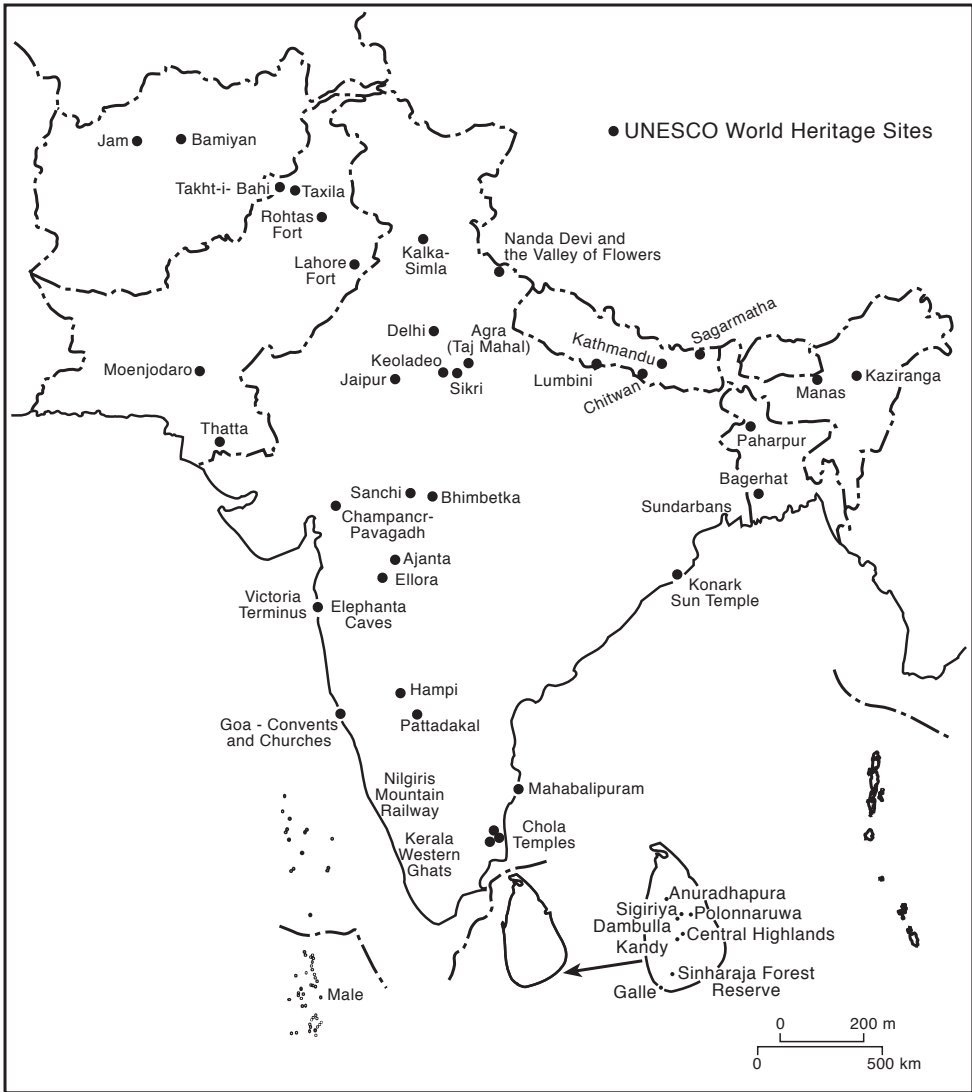
Note: LDC – Least Developed Countries; NLDC – Non-Least Developed Countries

Source: SAARC (2012)

Tourism

The tourism industry in South Asia presents an uneven picture. Superficially the region has a wide range of assets, from areas of outstanding natural beauty, such as the Himalaya in Pakistan, India and Nepal, or the coral atolls of Lakshadweep and Maldives. It also has sites of great architectural or historical interest, many of them recognised as World Heritage Sites (Map 99). Some of the World Heritage Sites shown on Map 99 have global reach as tourist attractions. These include the Taj Mahal in Agra, Mahaballipuram in Tamil Nadu or the Himalayan national parks. Other sites of enormous historical interest, such as Mohenjo Daro and Harappa in Pakistan, major centres of the 4000 year old Indus Valley Civilisation, are little known in the wider world and very little visited.

With occasional exceptions, as in the era of high and consistent growth such as marked the twenty years following Indian economic liberalisation in 1991, international tourism has been one of the notable disappointments in developing economic potential. In 2013 tourism did not account for more than 3 per cent of GDP in any South Asian country other than Maldives. India still received only 6 million international visitors in 2013. Niche markets, such as the atolls of Maldives, were important to their own local economy but there is great capacity for further expansion of tourism across South Asia.



Map 99 World Heritage Sites in South Asia

Source: Unesco 2014

Foreign direct investment

Since 1991 all South Asian countries have liberalised their inward investment regimes and have actively sought to encourage foreign investment, while all of the countries retain significant controls on the nature and direction of inward investment. All this is set in a global context in which both world trade and foreign investment increased rapidly over the decades up to the financial crash of 2008. In South Asia the volume of FDI increased from \$3.4 billion in 1996 to over \$22 billion in 2006. Although this doubled the share of South Asian countries on global FDI, the overall percentage remained at 1.7 per cent in 2006.

Conclusion

South Asia's economies are in the process of a radical transformation, and are now among the most dynamic in the world. With very large domestic markets and an increasing openness to international trade, South Asia, with India at its core, has the potential to become a major driver of global economic development. There remain many major problems. Growth has been uneven, and poverty remains widespread. Social development, notably in literacy and health, is still poor, and the economic challenges of broad-based development that improves the quality of life in every region and for all groups remains. While real progress has been achieved on liberalising trade and benefiting from new access to world markets, progress on increasing internal trade continues to be held back by often seemingly intractable political problems.

30 Defence and security in South Asia

Since the end of the Cold War the geo-strategic position of South Asian countries has been undergoing major re-evaluation. Strategic postures that were adopted up to the end of the Cold War were based on assumptions that were fundamentally challenged by the collapse of the Soviet Union (Bradnock 1992; Chapman 2009). The Cold War positions of the individual countries of South Asia *vis a vis* the world's then-superpowers, reflected the perception of what each saw as its core interests at home. Pakistan viewed the interests of defending itself against possible Indian attack as being strengthened by joining the western-led pacts of the Central Treaty Organisation (CENTO) and the South East Asia Treaty Organisation (SEATO - see Chapter 1). In contrast, India, not wishing to have its new-found independence compromised by being a subservient partner in any strategic alliance, chose to promote non-alignment. Sri Lanka also supported non-alignment but sought to balance India's regional power through making overtures to China. At the heart of the security strategies of South Asian countries during the Cold War was the perception by all of India's neighbours that India itself was not only the giant of South Asia, but, even when bilateral relations were good, the major potential challenge to its own security. In the first two decades of Independence the broad outlines of South Asia's strategic postures were set in a mould that was only broken by the collapse of the Soviet Union.

Pakistan

The perception that India had hegemonic ambitions within the region was arguably most influential with respect to India-Pakistan relations. Always soured by the early conflict over the fate of Jammu and Kashmir, for the first twenty-five years of its existence, Pakistan harboured the belief that India was bent on undoing Partition and incorporating Pakistan back into India itself. At the same time, Pakistan felt that its security had been severely compromised by the nature of the Partition settlement. By adopting the administrative district as the fundamental unit by which the Muslim and non-Muslim majority areas would be separated, many in Pakistan felt that Partition gave them what Jinnah himself called a 'moth-eaten Pakistan'. Instead of gaining the whole of Punjab, up to and including Delhi, the former British Province was cut in two. At the same time, Assam and western Bengal, including Calcutta, went to India, leaving Pakistan with only the poorest, most agricultural districts of East Bengal.

To cap the sense of injustice created by that division, Jinnah's hoped-for accession of both Hyderabad in the south and Jammu and Kashmir in the north never materialised. In Pakistani eyes, it faced a powerful and hostile neighbour in India to its east, and a challenging relationship with Afghanistan, which periodically espoused the cause of either an independent Pashtunistan, or the transfer of the tribal territory of the North West Frontier Province to Afghanistan itself. Strategically, Pakistan thus felt caught in a pincer between two potential, if not always actual,

enemies. Geographically, its long and attenuated shape led Pakistani strategists to think of their country as having no strategic depth with respect to a potential attack from India and thus placed particular emphasis on ensuring that governments in Afghanistan were sympathetic to Pakistani strategic aims. This situation was worsened by the 1971 secession of Bangladesh, achieved with the help of Indian military intervention. That defeat inflicted on the Pakistan Army is still regarded by many in Pakistan as a strategic disaster and a military humiliation.

The failure to gain any strategic military advantage over India has posed particular problems for Pakistan, as the military has formed the government for nearly half its independent life. Democratic governments have often been short-lived, and while there have been several initiatives towards a rapprochement with India, they have been easily derailed. Pakistan's military posture has always been directed towards a perceived military threat from India. When President Zia ul Haq demanded more military aid from the US in the face of the 1979 Soviet occupation of Afghanistan, it was couched in terms of the need for defence against the imminence of Soviet aggression. Yet the great majority of Pakistan's forces remained on the Indian front throughout the Soviet campaign. The attempt to keep a military balance with India was sustained throughout the 1990s. Mrs. Gandhi's decision to test a so-called 'civil nuclear device' in 1974 followed her learning of China's nuclear tests in the late 1960s. Zulfikar Ali Bhutto's reaction was to instruct the Pakistani military to embark on its own nuclear programme. When India tested five devices at Pokharan in 1998, there was a domestic imperative for Pakistan to follow suit with its own tests. As a result India and Pakistan are now both nuclear-armed states but with asymmetrical nuclear doctrines. While India has adopted a 'no first strike' doctrine, and presses Pakistan to do the same, Pakistan has argued that India's overwhelming conventional arms superiority obviates such a doctrine, and first use is built into its strategic response to a conventional attack.

Nepal

While Pakistan cherished a sense of injustice, India's other neighbours, notably Nepal and Sri Lanka, saw India's size and position as giving it the potential to override their national interests, if and when it suited India. In Nepali eyes, its location along the relatively narrow strip of mountainous land between China and India sandwiched it between the two major regional powers, each with their own overriding security agendas. While its cultural, economic and political links had historically been with India, and its only land route to maritime trade was through Kolkata, Nepali strategists saw China as a potential counterweight to India. The descent into chaos from the early 1990s made progress on issues of mutual benefit almost impossible, and only by 2014 was Nepal in a position to try and start re-building its relationships with its neighbours, especially India.

Bangladesh

Even in Bangladesh, after a short honeymoon period following its creation with India's help, distrust of India came to be a powerful political force. Bangladesh is almost completely surrounded by Indian territory, and about 90 per cent of the catchment area of the rivers on which it depends cross India. When in power the Bangladesh National Party has been particularly distrustful of Indian intentions. Disagreements over imbalances of trade, illegal migration, India's decision to build an electrified fence along its entire border with Bangladesh and the overriding question of shared water resources have often soured relations. India has attempted a number of

initiatives to engage constructively with issues that have separated them, an important example being the Ganges Waters Treaty of 1996 which settled the dry-season allocation of water at the Farakka Barrage, but progress on cooperative ventures remains slow.

Sri Lanka

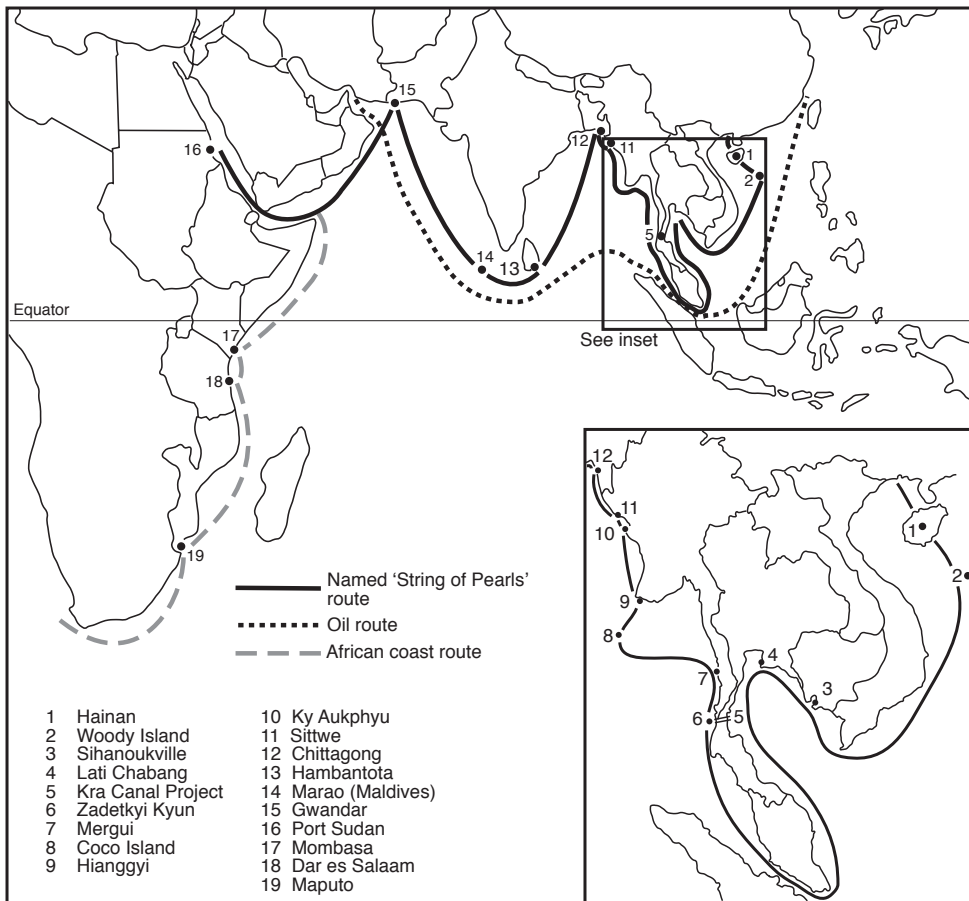
Even though it was relatively prosperous at the time of its own independence in 1948, Sri Lanka saw itself as uniquely exposed to Indian dominance. Some in Sri Lanka saw a Hindu-majority India as a potential threat to its own independence, and to its Buddhist cultural identity. While the largely Buddhist Sinhalese represented 70 per cent of the island's population, resentment of the Tamil population had begun to play a part in Sinhala politics from the 1930s. The presence of the much larger Tamil population across the Palk Straits in India was sometimes represented in Sri Lanka as a strategic threat. In February 1948, immediately after Independence, the Sri Lankan government passed its Sri Lanka Citizenship Act, which denied citizenship to its Tamil tea plantation workers, who had come from India over the preceding century. This created a problem only resolved in 1964 when Lal Bahadur Shastri signed an accord with Mrs. Bandaranaike under which India granted Indian citizenship rights to 524,000 tea estate workers, 300,000 to be given Sri Lankan citizenship, and the future of the remaining 150,000 to be settled by a separate agreement. This was finally made by Mrs. Gandhi and Mrs. Bandaranaike on June 28, 1974. In this agreement, India and Sri Lanka gave citizenship to half each of the remaining 150,000 Tamils of Indian origin.

But those agreements lay in the future. In 1956 the government of S W R D Bandaranaike passed the Sinhala Only Language Act. This proved popular with the Sinhala speaking population but alienated Tamils, who felt increasingly marginalised. With no land neighbours to give Sri Lanka strategic support, successive governments looked elsewhere in the region. In the late 1950s the socialist and strongly anti-western Sri Lanka Freedom Party (SLFP) government of Mrs. Bandaranaike played an active part in the newly formed Non-Aligned Movement. In the 1962 India-China War it tried to act as neutral arbiter between the two. At a time when China was deeply distrusted by the US, the Sri Lankan political parties were split over their foreign policy stance.

In the late 1950s and 1960s the governing SLFP sought closer ties with China, warmly reciprocated at a time when China was still excluded from the United Nations. The signing in 1963 of a Most Favoured Nation Treaty with China in respect of sea-borne trade was a significant marker of Sri Lanka's perception of its strategic interests, which it continues to pursue. In 2014 Sri Lanka endorsed China's proposals for the creation of a Maritime Silk Route, which included a \$1.5 billion investment for the creation of a Colombo Port City. President Xi Jinping, visiting Sri Lanka in September 2014, also opened a coal-fired power plant built with Chinese Aid, which was reported to be capable of supplying half the country's electricity. He also announced further funding of \$600 million for its investment in the new port of Hambantota, on the island's southern coast (Crabtree 2014).

Map 100 shows the chain of Chinese investments across the Indian Ocean, which a US Department of Defense paper christened the Chinese 'String of Pearls' (Washington Times 2005).

While some in the US and India see these investments primarily as giving the potential for an enhanced Chinese military presence in the Indian Ocean, they are defended by the Chinese as purely commercial and economic. Townshend (2011) has argued that there is no evidence that the port investments engaged in by the Chinese have either the purpose or the ability to give China enhanced military security, but there is no doubt that they are affecting Indian perceptions of its external security situation (Townshend 2011).



Map 100 Chinese maritime investment in the Indian Ocean and Southeast Asia
 Source: Washington Times (2005)

Bhutan and Maldives

With very different geographical positions, cultures and histories, the comparatively tiny states of Bhutan and Maldives have always had to look to outside support to sustain their independent identities. Both countries accept India’s interests in their neighbourhoods and work within a framework of maintaining positive relations with it. On the occasion of an attempted coup in Maldives in 1988 the government sought Indian naval help to put it down. Bhutan still has outstanding border issues with China, though in 1998 Bhutan and China signed an agreement to resolve the border dispute peacefully; no treaty has yet been ratified.

Afghanistan

As Afghanistan comes out of twenty-five years of war, it remains too early to anticipate how its strategic posture will develop. Heavily dependent on western aid for its military training and capacity to tackle the continuing Taliban resistance, Afghanistan has struggled to balance the often strongly competitive nature of the interests of Pakistan and India. At the same time it has

borders with the Central Asian Republics of Turkmenistan, Uzbekistan and Tajikistan to the north and Iran to the west, all with complex sensitivities that impinge on Afghanistan's security. The main thrust of the Afghan security forces in the foreseeable future will continue to be keeping the threats to internal security at bay.

India

At the hub of the South Asian region, India could be judged by a number of criteria to be the 'dominant' regional power. With over three-quarters of the region's population, over 80 per cent of its economic wealth and a military capacity that dwarfs that of its South Asian neighbours, it could be represented as having no threats from within the region to its security. That is not how it is seen in India itself, even discounting the fact that India sees its security environment as necessarily including China. Rather than perceiving itself as a monolithic power, from its birth as an independent nation India has seen many of its challenges to secure development coming from the risks posed by its own diversity. It points to its four wars with Pakistan as evidence that Pakistan has repeatedly been willing to use military force against it if it saw an opportunity to weaken India's position. In contrast to its own democratic institutions, many in India share T. V. Paul's view of Pakistan in the contemporary world as a 'warrior state', with India in its sights (Paul 2014).

It was an uprising in 1947–48 in the then-Princely State of Jammu and Kashmir that prompted the Maharajah of Jammu and Kashmir to accede to India, opening the door to face to face conflict between India and Pakistan within less than three months of their Independence. The history of this dispute is still strongly contested. This first war was brought to an end through resolutions of the Security Council of the newly formed United Nations, in particular Resolution 47, adopted on April 21, 1948. This resolution, which was voted on paragraph by paragraph and not as a whole resolution, stipulated that after peace had been established, and Pakistani and Indian forces had left Kashmir, a Plebiscite should be held, giving all Kashmiris the choice of joining India or Pakistan. The pre-conditions for such a plebiscite were never met, and the Ceasefire Line (later the Line of Control) became the line separating Indian and Pakistani-held territory in Jammu and Kashmir.

Pakistan's second war with India was again fought over Kashmir, when in 1965 President Ayub Khan thought that a short military campaign would deliver a grateful Kashmir into Pakistan's hands. Those expectations were proved wrong on all counts, and the second war was ended by ceasefire talks chaired by Alexei Kosygin, Premier of the Soviet Union, in Tashkent. The Tashkent Declaration, ratifying the terms of the cessation of the war in September 1965, was signed on January 10, 1966.

The third war, in 1971, was fought over the wish of East Pakistan for complete autonomy, a wish strongly supported by India, initially politically, and by giving a home to up to ten million refugees, and ultimately by a swift campaign that established the creation of Bangladesh.

The fourth war was launched, again by the Pakistan army, on the Line of Control near Kargil. This also proved a severe miscalculation. Underlying the three Pakistan-led campaigns over Kashmir was the strategic belief that a weakened India could only benefit Pakistan. There was also a strongly held belief in some Pakistani circles that if Jammu and Kashmir were enabled to join Pakistan, India would be fatally weakened, as other regions and states would also seek their independence.

The late nineteenth century British colonial administrator John Strachey is one of the most widely quoted sources for the view that it was a fundamental mistake to view India as a nation with any form of unity. Speaking in Cambridge in 1884, he said: 'The first and most essential

thing to learn about India is that there is not, and never was, an India, or even any country of India, possessing, according to European ideas, any sort of unity, physical, political, social, or religious.... That men of the Punjab, Bengal, the North Western Provinces, and Madras should ever feel that they belong to one great nation is impossible' (Quoted by Yadav 2014).

The Pakistani belief in the inherent weakness of India as a state thus tapped into a widely held view by some leaders of the British Raj in India that India was not, and could never be a nation, as it was too diverse and with too few interests that bound it together. Certainly India's character as a multi-faith, multi-lingual community exposed it in many Indian eyes also to the risk of threats to its internal cohesion. The vigour with which secessionist movements have flourished in parts of India throughout its history lend some weight to that view. As is described below, militant secession movements have multiplied, from Assam and the northeastern hill states to Jammu and Kashmir in the north, through to the southern states of Andhra Pradesh and Tamil Nadu.

India has often seen foreign hands as behind some of these groups. In the northeast it has been China that India has held responsible for sustaining violent campaigns, which continue to disrupt peaceful development. In the northwest it has been Pakistan, providing training and support for militant and terrorist organisations trying to wrest Jammu and Kashmir from Indian control. In the south, the position of the Tamil population of Sri Lanka has continually fed into India politics, and Tamil criticism of Sri Lanka's handling of the Tamil demands for autonomy in Sri Lanka have given the Indian Government constant cause for concern.

South Asian defence capabilities

Within the region only India and Pakistan have large-scale armed forces, though Bangladesh and Sri Lanka spend a greater proportion of their GDP on their security forces (3.5 per cent and 3.14 per cent, respectively, in 2013). Both India and Pakistan depend heavily on imports for military hardware, although India has a far larger domestic ordnance capacity.

India

India's total annual defence budget is US\$38 billion (US\$119 billion PPP), or 2.5 per cent of India's GDP. In November 2014 Narendra Modi, the Indian Prime Minister, urged Indian defence industries to meet a far higher proportion than their current 30 per cent of total military equipment. Reflecting in part their long-term historical strategic links, India continues to import heavily from Russia, with which it established very close links during the Soviet period. Current imports include the recent purchase of the Soviet Kiev class aircraft carrier the Admiral Gorshkov, built in 1987 and purchased in 2004 for a reported price of US\$2.3 billion. It was finally inducted into the Indian fleet on June 14, 2014 as the INS Vikramaditya. Most of India's current submarine fleet of fifteen vessels is of Soviet/Russian origin. The most recent of these is the nuclear submarine Chakra, leased from Russia for 10 years in 2012.

India is augmenting its submarine fleet from France and Germany and has two further nuclear-powered ballistic missile submarines of the Arihant class under construction in its own shipyards, where six diesel-electric submarines are also being built. The expansion of naval capability reflects India's strategic perception that the Indian Ocean and the Pacific are becoming one naval sphere, in which India has a crucial interest. It is particularly wary of increasing Chinese capability and, it is believed, ambitions. Joint exercises with the Japanese Navy in 2012 reflected these concerns. In July-August 2014 the Indian Navy exercised with

the US and the Japanese navies, evidence of the continuing concern over security in the wider maritime region.

The Indian Air Force has also depended heavily on Russian imports. Apart from its fleet of Anglo-French Jaguar fighters, its main ground attack fighter planes are MIG-27s. It has also bought about 100 Israeli-produced Harpy Unmanned Combat Aerial Vehicles. Its fighter plane force includes Russian MIG 29s and 130 Sukhoi-SU30s, ordered in 2000. Two hundred had been made under licence in India by 2014. In 2011 India signed a deal with France for the upgrade of its fleet of Mirage fighter planes, which are highly regarded in the Indian Air Force. The most recent addition is the Indian-produced single-seater multi-role Light Combat Aircraft, the HAL Tejas, which is expected to enter service in 2015.

India's Army comprises three armoured divisions, 13 corps, specialist divisions for mountain warfare, over 350 infantry battalions, 300 artillery regiments, and over 4000 tanks, and it is raising a new armoured strike corps to patrol its Chinese frontier. Russia continues to be a major supplier for the Indian Army. The most recent contract is for the supply of over 2000 T90S and T90M tanks, expected to be in service by 2020. India's Heavy Vehicles Factory manufactures much of this equipment under licence. Its artillery comes from a wider range of sources, including the US, UK and Sweden. The same is true of its missile systems, which have been drawn from France and Israel, as well as Russia. With the exception of its BrahMos Cruise missile, which is jointly manufactured with Russia, all India's ballistic missiles are of Indian design and manufacture. Indeed, the BrahMos missile, which has the capacity to fly at nearly three times the speed of sound over a range of 300 km, is widely seen as a powerful symbol in India of a rising indigenous military capacity (Pillai, 2014).

In addition to Russia, India has large imports from Israel, France and, more recently, the US. The total value of India's military imports in 2012 was US\$24 billion, making it the world's largest arms importer. Despite the high absolute expenditure, there has been criticism of the preparedness of the services for modern warfare. Considerable investment is going into modernising equipment and communications.

Pakistan

Pakistan's defence budget is nearly \$7bn (twenty-fifth in the world). The army had an active armed services personnel strength in 2012 of over 617,000, with a further 500,000 in reserve, a total of over 1.17 million. There were a further 304,000 in the paramilitary services. As in India, conscription has never been used. Pakistan spends 2.7 per cent of its GDP on defence. The armed forces are divided among the three services, the Army, which receives 48 per cent of the defence budget, Air Force (20 per cent) and Navy (10 per cent). An undisclosed proportion of the remainder goes to Pakistan's secret service, the Inter Services Intelligence Agency, the ISI. Pakistan has supplied over 10,000 personnel to UN Peacekeeping duties.

A high proportion of Pakistan's defence equipment comes from foreign sources. The Air Force has 400 combat aircraft, 65,000 personnel, and 3000 pilots. The Army has approximately 2500 tanks, most of Chinese origin. Many of the artillery weapons are imported or manufactured in Pakistan under licence, Austria, Germany, the UK and the US being suppliers alongside China.

The Pakistan Navy has only ten combat ships, all ageing frigates. These are intended to be decommissioned by 2020. The Navy has commissioned four frigates from China and six Oliver Hazard Perry Class frigates from the US. The political situation in Pakistan, and the struggle with the Taliban in Afghanistan and Pakistan, has made Pakistan's procurement of new ships difficult.

Separatist movements in South Asia

All the countries of South Asia except Bhutan and Maldives have had or are currently home to secessionist movements (Brass 1991; Chadha 1997). On Map 101 the major secessionist claims are identified. Some, such as the longstanding dispute over Jammu and Kashmir, have been modified through time. Thus in 1947 the dispute over Kashmir appeared to be a direct choice between Jammu and Kashmir joining India or joining Pakistan. However, since the 1980s in some parts of the former Princely State there has been a rise in the demand for an independent Kashmir (Bradnock 2010). Pakistan itself has faced secessionist claims from Sindh and what is now called Khyber-Pakhtunkhwa. Even the relatively mono-cultural Bangladesh has



Map 101 Separatist political movements in South Asia

secessionist demands from Chakma tribals in the southeast and the Banga Bhumi or Bir Banga movement to create a Hindu homeland in Bangladesh's southwest. The Sikh demand for a Khalistan homeland in Punjab, which led to the catastrophic attack on the Golden Temple in 1984, has not completely destroyed the wish of some Sikhs for a separate state (Gupta 1996). The struggle for a separate state, Tamil Eelam, for the Tamils of Sri Lanka, which the Indian government has always been at pains to try and prevent spreading to its own Tamil community in South India, resulted in thirty years of Civil War and the bloody denouement in 2009. Some secessionist demands have disappeared almost as quickly as they rose; others have remained an important security issue to the present. They remain a significant security concern for the region.

Terrorist movements in South Asia

According to data from the South Asia Terrorism Portal over 112,000 people were killed in terrorism-related violence in South Asia between 2005 and 2014. Of these, just over half were estimated to be terrorists. These figures indicate the continuing scale of terrorism across South Asia. Nearly every country in the region has been directly affected, though the great majority of those killed have been in Pakistan and India. The roots of terrorism have varied. In some, Islamist terrorist groups, including groups related to Al Qaeda, the Taliban or ISIL, have used explicitly religious beliefs as the basis for their campaigns. Others have avowedly political objectives, including separatist movements. In some cultural values and political objectives are combined. Terrorist tactics are not new in South Asia. They were used as weapons by some in the movement for Independence, and there were a number of terrorist incidents during the British Raj. Terrorist tactics have been adopted by political groups across the political spectrum. The Tamil Tigers were the first groups in the world to use suicide bombers, as in the assassination of Rajiv Gandhi on May 21, 1991, at Sriperumbudur in Tamil Nadu. Lashkar e Taiba, a Pakistani-based affiliate of Al Qaeda, was responsible for the twelve coordinated bombing and shooting attacks on targets in Mumbai in November 2008. These included the Taj Hotel and the Chhatrapathi Shivaji Terminal railway station, and killed 164 people and wounded twice as many over three days of the attacks. Lashkar e Taiba is just one of many South Asian terrorist groups.

The numbers are daunting, and the political objectives wide-ranging. In Assam alone there are 36 groups currently listed as active. The other states of India's northeast also have large numbers of groups; Manipur, Meghalaya, and Nagaland a total of 47; Tripura 30; Mizoram 2; and Arunachal Pradesh 1. In the northwest, Jammu and Kashmir has 32 terrorist groups, in addition to the groups that have espoused secessionist aims. The Punjab also claims 12 nationalist groups who use terror, including the Khalistan National Army and the Khalistan Zindabad Force.

On top of these regional groupings are ideological groupings that cross state boundaries. The most notable are those who put themselves on the extreme left of politics, such as the Naxalites, the Peoples War Group and the Communist Party of India Marxist-Leninist Janashakti.

India is far from alone in facing terror. In addition to the terror tactics adopted by the Tamil Tigers, Sri Lanka has faced terror from the Marxist-Leninist group, the Janata Vimukthi Peramuna (JVP), which launched two violent campaigns against the government-in 1971 against the SLFP and in 1987–89 against the UNP government. The latter of these was marked by the use of extreme brutality.

Pakistan is home to over thirty terrorist organisations, though as some regularly change their names, keeping an accurate count is difficult. Over half these groups operate internationally, and some, like the Lashkar e Taiba, the Jaish e Mohammad or the Harkat al Mujahideen, target

Jammu and Kashmir or other Indian locations. The December 13, 2001, attack on the Indian Parliament was the work of suicide militants from Lashkar e Taiba and Jaish e Mohammad, both with headquarters in Pakistan. The attack brought the nuclear-armed India and Pakistan to the brink of war. India has claimed that the attack was masterminded by Pakistan's ISI.

The last two decades of Nepal's history were dominated by the rise of the Communist Party of Nepal-Maoist to power through the use of terrorist methods. Although they were defeated in the 2014 elections and reduced to a small rump of elected members, the leadership still uses the threat of violence in its opposition to government. While democratic governments have not been seriously threatened by terrorist groups in Bangladesh, there have been many violent incidents and attacks. The Harkat ul Jihad al Islami Bangladesh (Huji-B), which was proscribed by the BNP government in 2005, is believed to have about 15,000 members. The group has been involved in attempts to assassinate high-profile political leaders, including a plot to kill the current Prime Minister Sheikh Hasina in 2005.

Conclusion

The South Asian countries face many security threats, within the region and beyond. Unresolved international boundaries, notably those between India and China, represent a continuing source of uncertainty and tension. The dispute over Jammu and Kashmir continues to defy a political resolution that all the parties to it will accept. Internal disputes have challenged national authority in all of the countries of the region except Bhutan. They continue to pose significant threats to stability in India, Pakistan and Afghanistan. For India, however, the challenges go beyond the region to its long-term relationships in the wider world, notably in its sense of Chinese ambitions for the Pacific and the Indian Ocean. Fears of these ambitions are driving India's push not only to indigenise its military capacity, but also to develop a full range of intercontinental ballistic missiles, both as part of its ambitious space programmes and in enhancing its military range.

31 South Asia

Entering an era of co-operative development?

The individual South Asian countries have engaged with the world community in a wide variety of ways ever since the United Nations was formed in 1945. India was a member of the UN from its foundation in 1945, and Afghanistan in 1946. Independent India adopted an explicitly internationalist stance in its foreign relations from its inception, and Jawaharlal Nehru's sister, Vijayalaxmi Pandit, was appointed its first Ambassador to the United Nations in 1947. Pakistan joined in 1947 (despite Afghan protests on the grounds of the illegitimacy, in Afghan eyes, of the Durand Line, which Pakistan had inherited from the British as its western international border), and Ceylon and Nepal in 1955. They were followed by Maldives in 1965, Bhutan in 1971 and Bangladesh in 1974.

India, Pakistan and Bangladesh have all made significant contributions to UN peacekeeping operations worldwide. Overall, India has contributed more than 160,000 troops to 43 peacekeeping missions and in 2014 had a total of nearly 8000 personnel, including 995 police, engaged in ten missions. In 2014 Pakistan was the largest contributor of troops to UN peacekeeping, with over 10,000 troops serving, all in Africa. Bangladesh has also been active in its support of UN peacekeeping missions, currently supplying over 8700 troops, to which Sri Lanka has also committed nearly 2000 troops.

The United Nations has been seen in South Asia as an important mediator of soft power. India in particular has played a very significant part in key UN institutions and activities, including UNCTAD (trade and development), UNEP (environment), UNDP (development) UNHCR (refugees) and UNFPO (family planning). With its wide range of highly qualified personnel, India has supplied large numbers of staff to UN institutions. It continues to press for reform of the Security Council and for an expanded number of permanent seats on it.

The Commonwealth of Nations

Five South Asian countries – India, Pakistan, Bangladesh, Sri Lanka and Maldives – are members of the Commonwealth. As with their membership of the United Nations, they see membership as an important source of soft power. The Commonwealth is valued for its range of activities, notably its support for cultural and development activities and academic and professional interchange, within the context of a commitment under the Commonwealth Charter to shared values of democracy, human rights, and the rule of law.

The three other supranational groups within South and Southeast Asia to which at least some of the South Asian countries either belong or have observer status are the South Asian Association for Regional Cooperation (SAARC, established in 1980), the Association of Southeast Asian Nations (ASEAN, 1967) and The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC, June 1997).



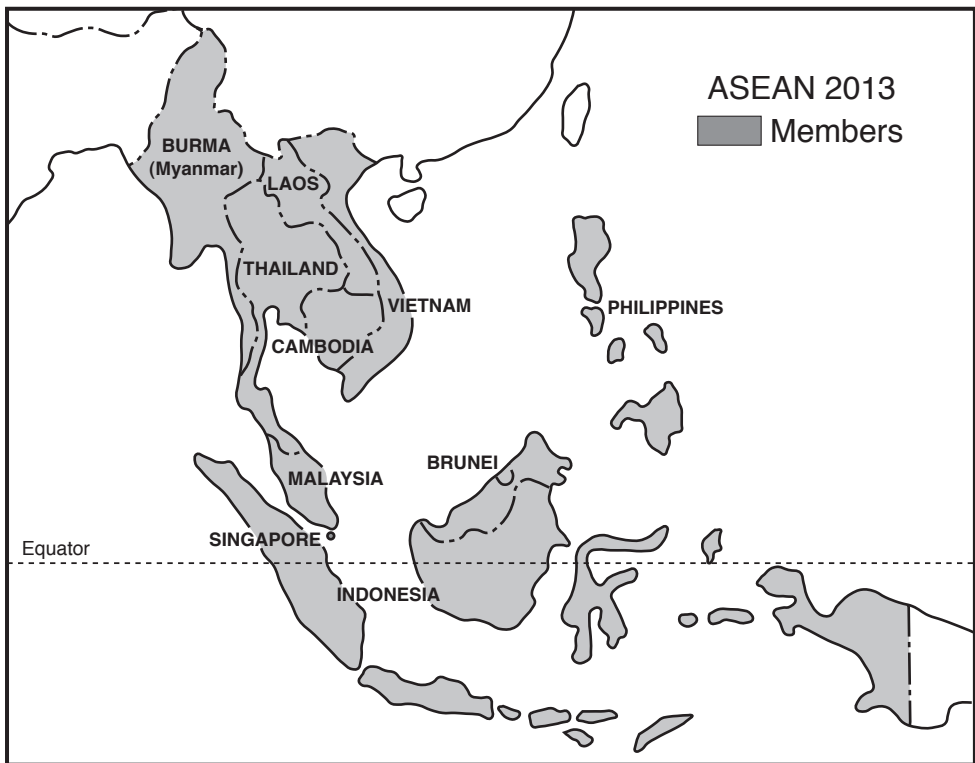
Map 102 South Asia and the Commonwealth of Nations



Map 103 South Asian Association for Regional Cooperation (SAARC), 2015

SAARC comprises the eight nations of South Asia. It was founded as the result of an initiative by the Bangladesh President, Ziaur Rahman, in 1980. Cooperation between countries which represent 20 per cent of the world's population has been widely recognised as having great potential for bringing economic benefits. However, SAARC has often been seen by critics as being slow to realise this potential. It has encouraged a range of initiatives, and has played a lead role in encouraging the development of free trade. The most recent example is the conclusion of a Free Trade agreement (SAFTA) within the region. However, although there have been active steps taken to implement this agreement, many items are still excluded from its terms.

ASEAN has ten Southeast Asian states as full members, comprising Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

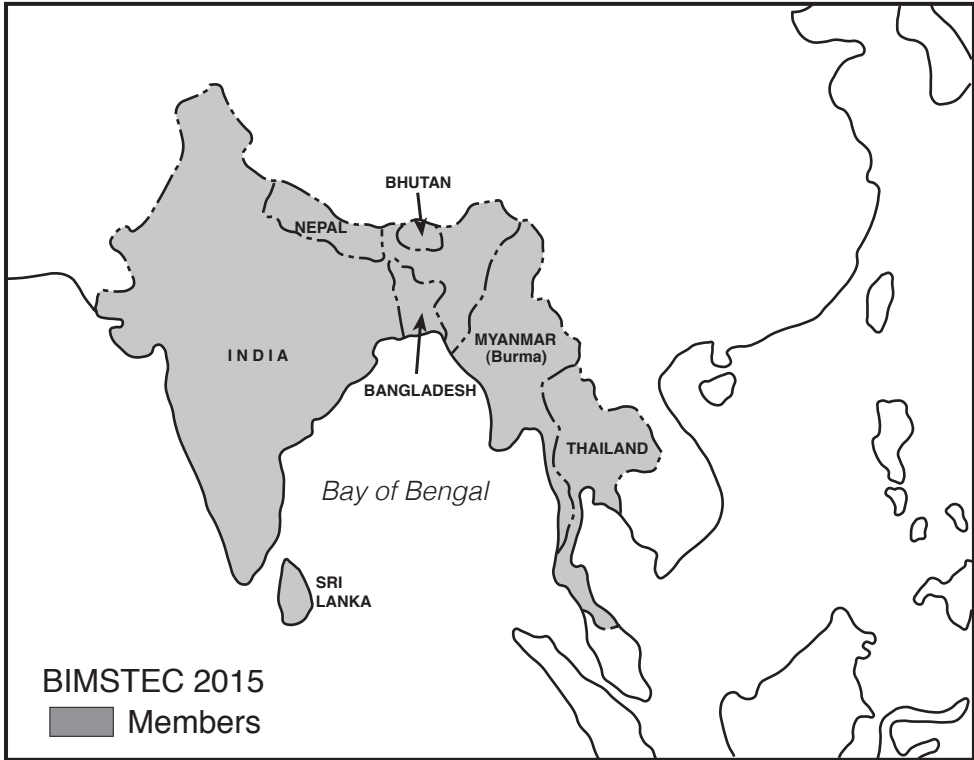


Map 104 Association of Southeast Asian Nations (ASEAN), 2015

BIMSTEC comprises Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka and Thailand. Myanmar is a full member of both ASEAN and BIMSTEC, but the other members of BIMSTEC all hope for a closer relationship with ASEAN that would offer an enhanced trading relationship. Unlike the Commonwealth or the United Nations, neither BIMSTEC nor ASEAN has any prescriptive membership obligations or political conditionality in terms of membership.

BIMSTEC was founded as an attempt to develop links between countries on the Bay of Bengal littoral that had shared economic interests. The initial grouping of Bangladesh, India, Sri Lanka and Thailand was widened to include Myanmar as a full member in 1997, and Nepal and Bhutan in 2003. The first summit was held in 2004, when its official name was recognised.

Its original meeting identified six areas of cooperation, from trade and investment to technology and fisheries, fields subsequently widened to include such diverse topics as agriculture, public health and climate change. The grouping has signed a Free Trade agreement with the objective of developing a free trade area.



Map 105 The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation, 2015

Conclusion

The South Asian region currently has the potential to become one of the world's most dynamic economic regions. Sustained growth over the last two decades, improvements in a wide range of human indicators, and its long and diverse civilisational history make it admired and respected across the world. However, all the countries of the region continue to face daunting problems, both as individual countries and as a region. Violent conflict is part of the living history of South Asia, both within and between countries, and there remain complex political, social and economic problems to be tackled. In 2015 all the countries of the region are facing these from within a democratic framework under the rule of law, though the institutions of governance themselves are frequently under challenge. Through these many challenges, the next decade remains one of real promise. As the South Asian countries reach out to neighbours outside the immediate region, both the achievements and the weaknesses of SAARC suggest that there are no guarantees that the promise to closer links to other Asian countries and the wider world will be easy to achieve. The South Asian countries will have to match their dynamic potential with a spirit of regional and global cooperation that to date has often escaped them, but there are promising signs of a will to achieve it.

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