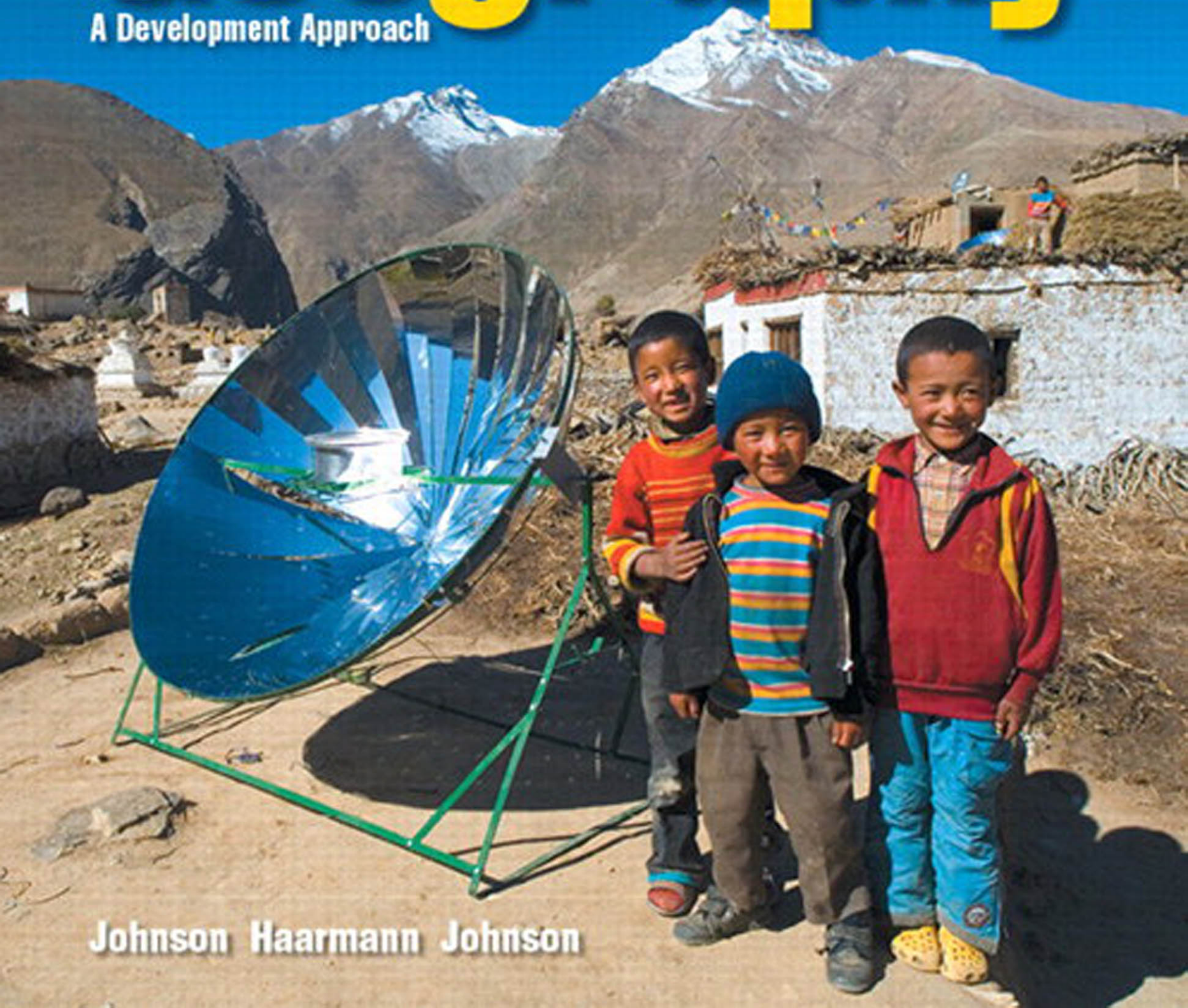


11th Edition

World Regional Geography

A Development Approach



Johnson Haarmann Johnson

World – Political



The Caribbean





Europe



World Regional Geography

A Development Approach



11th Edition

World Regional Geography

A Development Approach

Edited by

Douglas L. Johnson
Clark University

Viola Haarmann
Clark University

Merrill L. Johnson
University of New Orleans

Contributors

Christopher A. Airriess
Ball State University

Simon Batterbury
University of Melbourne, Australia

William C. Rowe
*Independent Scholar and
Development Consultant*

Robert Argenbright
University of Utah

Corey Johnson
*University of North Carolina at
Greensboro*

Samuel Aryeetey-Attoh
Loyola University

Brad D. Jokisch
Ohio University

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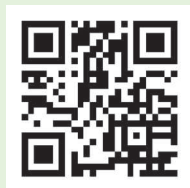
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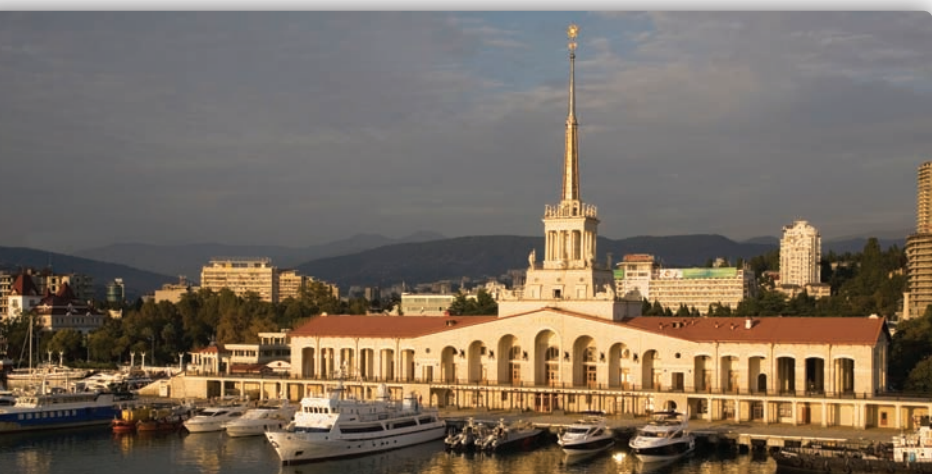
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Preface

We live in a remarkable age when satellites circle the globe in a matter of minutes and messages are sent halfway around the world in seconds. For many, these are the best of times, with progress in health care extending human life expectancies to record levels and with material comforts unheard of even a generation ago. It is easy in such conditions to overlook the fact that most of the world's population still lives in regions characterized by hunger, malnutrition, poor health, and limited educational and economic opportunities. Many also live under restricted personal freedom owing to political, racial, religious, or gender-based prejudice. Even more troubling is the fact that the income gap between technologically advanced countries and those struggling to catch up is increasing.

The purpose of *World Regional Geography* is to introduce students to the geographical foundations of development and to help them recognize the contributions that the study of geography can make to environmentally and culturally sustainable development. As we study the lives of others through this text, we will not only learn about them but also come to better understand ourselves. We will come to realize that development, or the improvement of the human condition, consists of far more than increased economic output and that each person and society contributes to the cultural diversity and richness of the global community.

College students are in a unique position to increase their understanding of the world and to use that knowledge to benefit themselves and others. Through the study of world regional geography, we can begin to comprehend the issues involved in the pursuit of world peace, preservation of the environment, improved health, and higher levels of living. The *Association of American Geographers*, the *National Geographic Society*, the *American Geographical Society*, and the *National Council for Geographic Education* have devoted significant resources and effort to improving geographic awareness. The U.S. Congress has cited geographic education as critical to understanding our increasingly interdependent world.

World Regional Geography is dedicated to college students who are seeking a better understanding of our complex world. It is written for both majors and nonmajors and does not require a background in geography. Its foundation is a basic regional structure. A multiple author approach permits each region to be discussed by an authority in that area. Although our regional specializations vary, we are united in our dedication to expanding geographical awareness and to contributing to the knowledge of the peoples of the world's diverse regions. The ultimate purpose of this book is to help students develop an increased understanding of our world's geographic diversity, both cultural and physical, and a knowledge of how each of us can contribute to the betterment of humankind.

New to the Eleventh Edition

- New **Exploring Environmental Impacts** case studies in each chapter discuss specific environmental challenges to the region, such as tropical deforestation or the Fukushima nuclear disaster.
- New **Focus on Energy** features in each chapter key in on critical energy issues of the regions.
- New **Visualizing Development** features cover a defining development in each world region, supported by engaging visualizations of economic and spatial data.
- New **Environmental Challenges** sections cover major environmental issues in the regions.
- **Chapter Opening Vignettes** with panoramic photographs highlight the human face of each region and draw students into the region's geography and development discussion.
- New **Read & Learn** sections at the beginning of each chapter feature region-specific learning outcomes.
- New **Stop & Think** review questions integrated at the end of thematic sections help students check their comprehension as they read.
- End of chapter review includes a concise bullet point summary, and **Understanding Development** and **Geographers @ Work** questions.
- **Current data** are incorporated from the latest Censuses in each region and from the latest available Population Reference Bureau's *World Population Data Sheet*.
- **New cartography** with modern styles and the latest data, including various recent economic and geopolitical events.
- **MasteringGeography™** is an online homework, tutorial, media, and assessment platform that helps students master concepts. Visual and media-rich tutorials feature immediate wrong-answer feedback and hints that emulate the office-hour experience.
- **Learning Catalytics**, a bring-your-own-device student engagement, assessment, and classroom intelligence system.

The 11th edition also reflects some changes in contributors. We welcome Brad Jokisch as the new author of the Latin America chapter and Corey Johnson as the new author of the Europe chapter, adding fresh perspectives and regional expertise to the discussion of these regions. We want to take this opportunity to express our heartfelt appreciation to our colleague and friend David L. Clawson, who devoted many years of dedicated work as author and editor to *World Regional Geography*.

Organization and Features

After a brief introduction that surveys the basic concepts of geography, *World Regional Geography* opens with a chapter that examines issues related to the nature of development, the impact of globalization, and the importance of taking care of our resources in a sustainable manner. The following eleven chapters are structured within a regional framework.

Although the use of this text as a discrete and unified entity is encouraged, its organization allows a variety of teaching strategies. As time requires, sections treating historical or environmental processes, or specific regions, can be selectively emphasized or omitted. In a two-term sequence, the book facilitates consideration along continental or regional divisions. Table and figure references can encourage students to pursue external data sources and analysis.

World Regional Geography contains numerous features that are designed to assist and stimulate students:

- More than 225 full-color maps and diagrams have been rendered by a professional cartographic studio and thoroughly updated for this edition, incorporating the latest boundary and name changes, as well as physical, cultural, and economic data. The maps are carefully integrated into the text to convey spatial relationships and strengthen our understanding of geographic patterns and concepts.
- More than 450 specially chosen color photographs, over three-quarters of which are new to this edition, help communicate the physical, cultural, and economic nature of individual regions.
- Informative tables and graphs supplement textual material.
- Boxed features highlight subjects of special regional and topical significance, such as cultural diversity, gender and development, environmental issues, migration, natural resource utilization, and distinctive regional events and characteristics.
- Key terms are presented in boldface type within the text and at the end of each chapter; a convenient glossary is provided at the end of the book.
- An end of chapter review includes a concise summary and critical thinking questions that can be used for homework, projects, group work, or in discussion sections.
- MasteringGeography and Learning Catalytics help extend the book with rich media, assessment, and lecture enrichment tools.

Acknowledgments

Every new edition of a textbook is like running a marathon, with many unsung heroes working hard behind the scenes, many supporters lending a hand from the sidelines, and a select few on constant call for advice, help, and crisis management. We want to express our gratitude to all who assisted with the preparation of the 11th edition of *World Regional Geography*. The comments of reviewers and previous readers have been indispensable in helping to give fresh focus to revisions. We owe a debt of gratitude to the numerous reviewers who have generously given their time to offer input over the course of many editions, and specifically want to thank the reviewers who took the time to critique the 10th edition of the book and contributed many constructive suggestions: Gary Brown, *Lonestar Community College*; Craig Campbell, *Youngstown State University*; Patricia Dennis, *Mississippi University for Women*; Robert Dennison, *Heartland Community College*; Dawn Drake, *University of Tennessee*; Alison Feeney, *Shippensburg University*; Chad Garick, *Jones County Junior College*; Anthony Ijomah, *HACC—Harrisburg*; Heidi Lannon, *Santa Fe College*; James Leonard, *Marshall University* (also 11th edition accuracy reviewer); Terry Nelson, *Mount Marty College* (also 11th edition accuracy reviewer); Kirk White, *Harrisburg Area Community College—Lancaster*.

We also thank the reviewers of the 8th and 9th editions: Brian W. Blouet, *the College of William and Mary*; Patricia Boudinot, *George Mason University*; Stanley D. Brunn, *University of Kentucky*; L. Scott Deaner, *Kansas State University*; Greg Gaston, *University of North Alabama*; Tarek A. Joseph, *Henry Ford Community College*; Robert G. Kremer, *Metropolitan State College of Denver*; Paul R. Larson, *Southern Utah University*; Elena Lioubimtseva, *Grand Valley State University*; Franklin Long, *Coastal Carolina Community College*; James Penn, *Grand Valley State University*; Stephen E. Podewell, *Western Michigan University*; Robert Rohli, *Louisiana State University*; Susan C. Slowey, *Blaine College*; Jacob R. Sowers, *Kansas State University*.

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World Regional Geography lives by its regional authors! We want to convey our deep appreciation for their hard work, responsiveness in matters large and small, and endurance in working through the revision process.

Help and advice from colleagues and professionals is essential to a book's successful progress from conception to print. But no project like this can be accomplished without family and friends providing

a sustaining network of support and strength. We have been blessed with an abundance of empathy and understanding and are deeply grateful for their help in pulling this book across the finish line.

Douglas L. Johnson,
Viola Haarmann,
Merrill L. Johnson

About the Authors

Douglas L. Johnson *Editor*

Chapter One, Geography and Development in an Era of Globalization, and Chapter Seven, The Middle East and North Africa



Douglas Johnson is a Professor of Geography Emeritus at Clark University. His geographical career has focused on the North African and Middle Eastern culture realm. Both his

master's thesis and doctoral dissertation at the University of Chicago dealt with the history and spatial implications of nomadism. Studying North Africa and the Middle East and teaching students about the complexities of this region have been a central focus of his work, including lengthy field periods in Libya, Sudan, and Morocco and visiting appointments in the Middle Eastern Center at the University of California, Berkeley and Al-Akhawayn University in Morocco. His research has addressed issues of land degradation and desertification, arid land management, pastoral nomadism, and the cultural ecology of animal keeping. He is the coauthor of *Land Degradation: Creation and Destruction*, 2nd ed. (Rowman & Littlefield, 2007) and from 2003 to 2006 he served as co-editor of the *Geographical Review*. In light of events in the Middle East, contributing to a world regional geography textbook that helps promote better understanding of one of the most conflicted areas in the world seems more important than ever.

Viola Haarmann *Editor*

Chapter One, Geography and Development in an Era of Globalization, and Chapter Seven, The Middle East and North Africa



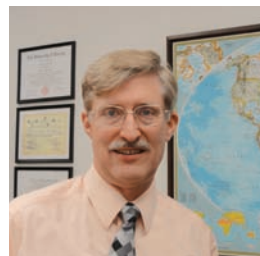
Viola Haarmann is a Research Fellow at the George Perkins Marsh Institute at Clark University. From an early age she was at home both in Europe and North America

as she grew up in Germany and Canada. She earned a dual master's degree in English and Geography, and received her D.Sc. from Hamburg University, Germany, after carrying

out fieldwork on land-use potential and change in the southern Sahel of Sudan's Darfur Province. For many years she held a Sahel project coordinator position at the Hamburg geography department. Since then she has operated primarily as an independent editor of academic research. She served on the editorial board of *The Columbia Gazetteer of the World* (Columbia University Press, 1998), and from 2003 to 2006 as co-editor of the *Geographical Review*. She currently provides English language editorial services to the *International Journal of Disaster Risk Science*. Her special interest is the geography of food and agriculture.

Merrill L. Johnson *Editor*

Chapter One, Geography and Development in an Era of Globalization, and Chapter Two, United States and Canada



In addition to serving as a Professor of Geography, Merrill Johnson is the founding Executive Director for Global UNO at the University of New Orleans. He has a B.A. in International Re-

lations from West Texas A&M University, an M.A. in Geography from Arizona State University, and a Ph.D. in Geography from the University of Georgia. He joined the faculty of the University of New Orleans in 1981, was Chair of the Department of Geography from 1989 to 2000, Associate Dean of the College of Liberal Arts from 2001 to 2008, and Associate Provost/Associate Vice President of Academic Affairs from 2008 to 2013. His long-term academic interests have focused on economic and political geography, particularly in the U.S. South, Canada, and Latin America, with technical interests in cartography and geographic information systems. More recently, he has begun to explore the role of geographers in the development and use of 3-D Internet worlds. While Dr. Johnson has taught a variety of undergraduate and graduate courses in geography, he looks back with special affection at all of the students that he has been privileged to work with in the many, many introductory world regional geography courses that he has taught.

Brad D. Jokisch

Chapter Three, Latin America and the Caribbean

Brad Jokisch is Associate Professor at Ohio University, where he has been teaching since



1997. He received his Ph.D. from Clark University (1998), and did his dissertation work with Billie Lee Turner II before Turner moved to Arizona State. Jokisch is a

specialist in Andean geography, and has carried out most of his fieldwork in Ecuador. He has written on environment and development issues in highland South America and in the Upper Amazon, although his main research interest is in migrants who seek employment outside their native region, particularly in the United States. How these people stay connected with their home community and how their remittances affect development and the environment is the focus of much of his research.

At Ohio University Brad teaches a regional course on Latin America and the Caribbean and other courses (Population, Agriculture) that focus on the region at both the undergraduate and graduate levels. He founded Ohio University's Ecuador study abroad language program, and is widely traveled in Central and South America.

Corey Johnson

Chapter Four, Europe



Corey Johnson is an Assistant Professor of Geography at the University of North Carolina at Greensboro, where he also held a Candace Bernard and Robert Glickman Dean's Professorship

in 2012-13. His research and teaching areas include the political geography of Europe and Eurasia, borders and border security, natural resources and energy geopolitics, and Germany. In 2011-12 he was the Joachim Herz Fellow at the Transatlantic Academy in the German Marshall Fund of the United States in Washington, D.C. Originally from Emporia, Kansas, Corey holds a Ph.D. in geography from the University of Oregon and a BA in Geography and German from the University of Kansas.

Corey Johnson wishes to thank Shane Canup for research assistance and Professor Ron Wixman for many invaluable insights on how to teach and explain the European region.

Robert Argenbright

Chapter Five, *Northern Eurasia*



Robert Argenbright is an Assistant Professor (Lecturer) of Geography at the University of Utah. He earned a B.A., M.A., and Ph.D., all in Geography, from the University of California,

Berkeley. His research focuses on the historical geography of the Soviet Union and the current transformation of Moscow. A brief tour of Moscow and Leningrad in 1975 first piqued his interest in Russia. Since then, he has returned to the region 23 times to conduct research. He has published articles on the U.S.S.R. and post-Soviet Russia in such journals as *Eurasian Geography and Economics*, *The Geographical Review*, *Political Geography*, *Revolutionary Russia*, *The Russian Review*, and *Urban Geography*. He is writing a book with the working title *Moscow under Construction*. Included among the many courses he has taught are Geography of Post-Soviet Eurasia and History of the Soviet Union.

William C. Rowe

Chapter Six, *Central Asia and Afghanistan*



William Rowe, a native of upper East Tennessee and sixth-generation Appalachian tobacco farmer, has traveled, worked, and studied in the Muslim world for over 25 years. He

received his Bachelor of Science in Languages (BSLA) from Georgetown University, with concentrations in Arabic and French. He worked at the American University in Cairo before returning to the United States for his master's on water and population in Southern and Eastern Morocco at the University of Texas at Austin. For his dissertation his focus shifted to the newly independent Muslim nations of Central Asia with an emphasis on Tajikistan and its language, Tajiki. He spent 2 years on research in Tajikistan as it was emerging from its devastating civil war. Since receiving his Ph.D., he has continued his work in Central Asia, most notably in Uzbekistan, Tajikistan, and the Tajik regions of Afghanistan and has been able to witness the changes in the region since American involvement in the wake of 9/11. His research concentrates on the economic and environmental transformations that have occurred since independence in

Central Asia and Afghanistan as well as Muslim identity in post-Soviet Central Asia.

Samuel Aryeetey Attoh

Chapter Eight, *Africa South of the Sahara*



Samuel Aryeetey Attoh is Dean of the Graduate School and Associate Provost for Research at Loyola University Chicago. He received his Ph.D. from Boston University and his

M.A. from Carleton University, Ottawa. He also earned a B.A. with honors from the University of Ghana, Legon. His research and teaching interests are in Urban and Regional Planning, Housing and Community Development, and the Geography of Development in Africa. He is the author of *Geography of Sub-Saharan Africa*, 3rd ed. (Prentice Hall, 2009), has published many articles in geographical journals, and received numerous research grants. He is past chair of the African Specialty Group of the Association of American Geographers, past treasurer of the AAG, and past president of the Illinois Association of Graduate Schools. He has also served on the editorial boards of the *Professional Geographer* and the *African Geographical Review*, advisory boards of World Education Services and the Council of Graduate Schools, and review panels for the National Science Foundation. He is a member of the American Council on Education Fellows, the Council of Graduate Schools, and the American Planning Association. He believes a course in World Regional Geography presents teachers with an opportunity to showcase the integrative and holistic human and physical dimensions of geography and demonstrate how they relate to real world situations—whether social, political, environmental, or economic in nature.

Christopher A. Airriess

Chapter Nine, *South Asia*, Chapter Ten, *East Asia*, and Chapter Eleven, *Southeast Asia*.



Christopher Airriess is a Professor of Geography at Ball State University, Muncie, Indiana. He earned his B.A. and M.A. in Geography at Louisiana State

University, and his Ph.D. in Geography at the University of Kentucky in 1989. Born on Long Island, New York, he spent his childhood in

Singapore and Malaysia. While he has traveled throughout much of the western Pacific Rim, his favorite places are southern China, Indonesia, and Malaysia. His research interests include development, the geography of ports and maritime transport, and the human dimensions of ethnic-Southeast Asians in North America. He is the recipient of two Fulbright Awards that allowed extended visits to Indonesia in 1987, and Hong Kong in 2000. In addition to regularly teaching World Regional Geography, he also teaches Human Geography, and Geography of Asia. He believes that a World Regional Geography course provides an essential piece to the undergraduate educational experience by imparting an understanding of the connections between the environment, culture, society, and economic and political systems within the context of real places where the process of globalization directly and indirectly impacts people's lives.

Simon Batterbury

Chapter Twelve, *Australia, New Zealand, and the Pacific Islands*.



Simon Batterbury teaches environmental studies and geography at the University of Melbourne, Australia, where he is Associate Professor and former Director

of the Master's Program in Environment. His main interest is in how rural households and their livelihood systems alter, and rely upon, local landscapes and environments in countries marginal to the world economy. Born in southeast London, he studied human and physical geography at Reading University and earned an M.A. and Ph.D. at the Graduate School of Geography, Clark University, on the political ecology of natural resource management in Burkina Faso, West Africa. In Burkina he worked for two years with a German aid program helping farmers manage drought and soil erosion. He has taught at the University of Arizona, London School of Economics, Brunel University, and Roskilde University. In 2007–2008 he was a James Martin Fellow, University of Oxford. He has conducted long-term collaborative research on rural development and environmental management in West Africa (Burkina Faso and Niger), Southeast Asia (East Timor), and the Pacific (New Caledonia).

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- The TestGen software, *Test Bank* questions, and answers
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Dire Predictions: Understanding Global Warming by Michael Mann, Lee R. Kump (0136044352). *Dire Predictions* is appropriate for any science or social science course in need of a basic understanding of the reports from the Intergovernmental Panel on Climate Change (IPCC). These periodic reports evaluate the risk of climate change brought on by humans. But the sheer volume of scientific data remains inscrutable to the general public, particularly to those who may still question the validity of climate change. In just over 200 pages, this practical text presents and expands upon the essential findings in a visually stunning and undeniably powerful way to the lay reader. Scientific findings that provide validity to the implications of climate change are presented in clear-cut graphic elements, striking images, and understandable analogies.

Development of the World's Regions

The book introduces students to the geographic foundations of development across the world's diverse regions.

9 South Asia

Christopher A. Airriess

Energy and the Development Challenge

In July 2012 India experienced the largest power blackout in human history, affecting some 600 million people in 20 northern states that comprise the traditional economic core of the country. Trains ground to a halt, traffic signals went haywire, and hospitals lost essential power for a day or more. While the national power company restored 90 percent of the power grid within half a day in some areas, this event was a catastrophic culmination of years of daily power cuts and outages. India, the world's second-fastest growing economy and the sixth greatest consumer of electricity, cannot produce enough power. The blackout was the result of one or more states drawing excess electricity from the national power grid, leading to the collapse of the entire system. India's blackout tells us much about larger development issues directly or indirectly associated with globalization. In addition to energy needs for industrialization, growing affluence of Indians benefiting from the country's engagement with the global economy means increased use of energy-intensive household appliances, especially air conditioners, which have become the new status symbol. But the main challenge is state-owned power firms that sell electricity at low, subsidized prices. Without assurances of acceptable profits by power providers, there is no incentive to invest in needed infrastructure to secure a dependable transmission network. The process of globalization is generally accompanied by the neoliberal philosophy of privatizing state-owned assets to create adequate financial incentives for private capital to thrive. The moral quandary in India, and other poor countries, is what happens to the hundreds of millions of poor people who cannot afford higher electricity costs resulting from privatization. It is difficult to envision India keeping pace with the other BRIC countries (Brazil, Russia, and China), defined as newly advanced economies, as long as a basic economic good such as electricity is in short supply.



▲ Girls reading by candlelight in Assam state during the massive 2012 power outages in India.

Read & Learn

- Describe the climate characteristics that explain the influence of wet and dry monsoons.
- Identify the region's primary environmental and energy challenges.
- Explain how historical movements of peoples and cultures resulted in South Asia's current cultural conflicts.
- Link British colonial rule to the current economic contours of South Asia.
- Identify social and economic forces that reinforce gender inequality in India.
- Describe how the process of globalization affects the lives of India's poor rural population.
- Compare India's urban-industrial regions and link their development to globalization and the government's economic policies since 1990.
- Contrast the political and economic constraints to greater levels of economic development in Pakistan, Nepal, Bangladesh, and Sri Lanka.

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- India: Giant of the Subcontinent 422
- India's Neighbors: Diverse Development Challenges 438



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GEOGRAPHY IN ACTION



Achieving Gender Parity in Sub-Saharan Africa

The 2012 World Development Report on Gender Equality and Development focuses on three key dimensions of gender equality: the accumulation of endowments (education, health, and physical assets), the use of those endowments to take advantage of economic opportunities and generate incomes, and the application of those endowments to take action and exercise control—the ability to make effective choices in the household and in society at large. This is consistent with the 2010 Millennium Development Goal (MDG) Summit's call for action to ensure that women have equal access to education, health care, and economic opportunities, and can be involved in development policy decision-making.

The need for improved gender equality in sub-Saharan Africa is demonstrated by the relatively poor performance of these countries on the United Nations Development Program's (UNDP) Gender Inequality Index and the Gender Empowerment Measure. Most of the progress made on gender parity has been with primary and secondary education, but with few gains in tertiary or post-secondary education. In 2009, the majority of sub-Saharan African countries had a Gender Parity Index (GPI) of more than 0.90 in primary and secondary education, putting them on track to achieve parity by 2015. Malawi (100 girls in school for every 100 boys), Rwanda (100.3), Namibia (103), and Lesotho (107) have already achieved parity. In tertiary education, GPIs over 0.90 have been achieved only by Botswana, Cape Verde, Lesotho, Mauritius, and South Africa. Not much progress has been made toward women's economic empowerment as measured by the share of women employed in the nonagricultural sector. The highest shares are in Ethiopia (47%), South Africa (44%), and Namibia (42%) (Figure 8-3-1). Further gender gaps remain in terms of access to assets (land rights and credit) and in wage earnings. Limited progress has occurred with women's representation in national parliaments. The highest performing countries in 2011 were Rwanda (51%), South Africa (43%), Mozambique (39%), Uganda (37%), and Burundi (36%) (Figure 8-3-2). In two-thirds of sub-Saharan African countries less than 20 percent of the parliamentarians are women.

The Convention on the Elimination of all Forms of Discrimination against Women (CEDAW) and the MDGs show that women's empowerment and gender equality are both global and African priorities. Various programs aimed at empowering African women have been instituted. Microfinancing and cell



▲ FIGURE 8-3-2 Gender parity in Rwanda. At 52 percent Rwanda has the highest percentage of women parliamentarians in the world.

phone-based mobile banking programs now provide women with access to business start-ups, and money transfer services through such organizations as World Women's Banking (WWB), Opportunity Network (WON), Acc Bank in Gambia and Rwanda, and Lease and Finance in Tanzania. Ethiopia previously did not have an equal rights for women, now issues joint titles for wives and husbands through its land certification program. Women in Burundi, South Sudan, and Uganda have increasingly engaged in peace reconstruction efforts following conflict. The Adolescent Girls Initiative (AGI) public-private partnership, has set a set of programs in Liberia, Rwanda, and South Sudan to assist adolescent girls' transition from school to pre-employment through job and vocational training, mentoring, and basic business skills training.

Sources: World Bank, *World Development Report 2012: Gender Equality and Development* (DC); International Bank for Reconstruction and Development/World Bank, 2011; United Nations Development Program, *Assessing Progress in Africa: Millennium Development Goals: MDG Report*; United Nations Development Program



▲ FIGURE 8-3-1 Gender reforms in Ethiopia. Ethiopia is engaging in a number of policy reforms to improve gender equality. This is a call center in Addis Ababa with a largely female workforce.

GEOGRAPHY IN ACTION



The Outsiders: Historical Minorities in Japan

Japan's human resources and culture are not as homogeneous as popular perception would suggest. Ethnic and social minorities make up about 4 percent of the population, or roughly 5 million people. The ethnic minorities consist of Koreans, Chinese, Okinawans, Ainu, and foreign residents. The social minorities, however, are composed of *burakumin*, persons with disabilities, and children of interracial ancestry.

Historically, Japan's cultural homogeneity stems from practices that limit opportunities for people outside the cultural and social mainstream. The Japanese traditionally regard themselves as a unique people, sometimes referring to themselves as the Yamato people, in reference to the Yamato Plain around Kyoto where the Japanese culture developed in centuries past and from which the ancestry of the imperial family is derived. There is still a strong current in Japanese society to preserve the purity of the Yamato majority; anyone else is an outsider and can never hope to be fully accepted into the mainstream. The 1947 constitution expressly prohibits discrimination based on race, creed, sex, social status, or family origin. But that U.S.-imposed provision has not fundamentally altered

guarantee citizenship, and the government makes it very difficult for Koreans to obtain citizenship although most have Japanese names, speak fluent Japanese, and have attempted to integrate into Japanese society. The Koreans remain mired at the lower end of the economic ladder, victims of social and economic discrimination, and tend to live in ghettos in the larger cities.

The Ainu were among Japan's earliest inhabitants (Figure 10-6-1). Racially different and almost exclusively a hunting and fishing people, they also were treated as aliens by the Yamato Japanese. Only 25,000 pureblood are left, mostly in a few locations in Hokkaido. The Ainu have been gradually assimilated into Japanese culture since the early 1800s. In the early 1900s, "native schools" were established in Hokkaido in the hope of making Ainu children more Japanese by destroying their cultural identity. Like Native Americans struggling to maintain some of their identity, there has been an upsurge of cultural pride over the past several decades.

The Okinawans, on the Ryukyu Islands south of Kyushu, were not politically incorporated into Japan until early in the seventeenth century, even though they are ethnically Chinese and speak a language



▲ FIGURE 10-6-1 Elderly Ainu males in traditional dress at the Marimo Festival at Lake Akan, Hokkaido. The festival's function is to celebrate nature, and Ainu culture is just one aspect of the larger festival's events to promote tourism.

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EXPLORING ENVIRONMENTAL IMPACTS



The Battle for New Orleans

Since its founding, New Orleans has been waging a war against nature to counter the related threats of soil subsidence, flooding, loss of coastal wetlands, and increasingly potent hurricanes. In a sense, New Orleans should never have been located where it was. The first French settlers were attracted to the relatively high and fertile natural riverbanks, or levees, along the Mississippi River. Settlers initially avoided the swamps and marshes that lay beyond the levees, but as the city expanded, the land in the backswamps and marshes was settled. Drainage of these muck soils—roughly 90 percent water by volume—triggered soil subsidence. The remaining 10 percent of these soils comprises mostly organic matter that oxidizes when exposed to the atmosphere, compounding the subsidence problem. Subsidence poses especially serious problems for construction, as unstable soils cause foundations to tilt and roads to buckle. The solution is to drive numerous pilings into the ground at the building site, and then pour the structure's cement slab on top of the pilings. This process results in a building that “floats” on its pilings while the ground beneath and around it continues to sink. Thereafter, fill is added to the lands around the building in a never-ending cycle to keep the “ground” at grade. Subsidence has left much of the bowl-shaped city 5–15 feet (2–5 meters) below sea level. Man-made levees keep the Mississippi River and Lake Pontchartrain from pouring into the city, and an elaborate pumping system removes the average 60 inches (1,500 millimeters) of rainfall received annually. For New Orleans residents, the threat of heavy rain presents all sorts of frightening possibilities.

As if living in a bowl-shaped depression below sea level were not threatening enough, New Orleans is losing its natural hurricane protection through erosion of nearby coastal marshes and barrier islands.

River control projects, wetland drainage, channel dredging, construction of petroleum exploration canals, and other factors have substantially reduced land recharge through deposition of river sediment. Coastal Louisiana is losing land to the ocean at the rate of 25–30 square miles (65–78 square kilometers) a year, an area the size of Manhattan. The loss of river sediment also has caused barrier islands to shrink as longshore currents no longer carry sediment loads sufficient to replace land as it erodes away. These wetlands and islands historically have helped to protect New Orleans from deadly hurricane-produced surges of water. Scientists have long argued that a major hurricane is a human catastrophe waiting to happen.

With Hurricane Katrina, theory suddenly became reality. Early in the morning of 29 August 2005, the eye of Hurricane Katrina passed over St. Bernard Parish, brushed against eastern New Orleans and St. Tammany Parish, and slammed with full force into Waveland, Bay St. Louis, Pass Christian, Biloxi, and other coastal Mississippi towns. Katrina had weakened to a strong Category 3 storm before hitting land, but still packed winds greater than 100 miles per hour (160 kilometers per hour) and produced storm surges in excess of 25 feet (8 meters). Government leaders in New Orleans breathed a sigh of relief when Katrina did not directly hit the



▲ **FIGURE 2-2-1 Actual flooding in New Orleans associated with Hurricane Katrina.** This image shows where the water was deepest in New Orleans following Hurricane Katrina and the breach of the levees. Areas along the Mississippi River, where the natural levees are highest, remained relatively dry. Included here are the French Quarter, the West Bank of the river, and an area called Uptown. Areas adjacent to Lake Pontchartrain also remained relatively dry but badly windblown. Those parts in the interior “bowl” of the city, and in eastern New Orleans, received in excess of 11 feet (3.5 meters) of water. Only floodwaters within New Orleans are shown; adjacent parishes and outlying areas were also badly flooded.

Source: United States Geological Service (October 5, 2005), <http://eros.usgs.gov/katrina/products.html>; background image from Landsat 7 (2000).

city. But relief quickly turned into horror when hurricane-protection levees were overtopped and broke under the pressure of storm surges, releasing millions of gallons of water into the city. Katrina caused extreme damage throughout New Orleans and the Mississippi Gulf Coast. Perhaps 80 percent of New Orleans lay under water (Figure 2-2-1). Storm surge ripped apart the Interstate

FOCUS ON ENERGY



Biofuels in Brazil

Brazil's energy consumption is remarkable because the country produces about 45 percent of its energy from renewable sources. Some observers consider Brazil to be the most sustainable large economy in the world. Hydroelectric power contributes part, but biofuels account for the largest portion (29%). This is in stark contrast to the United States where only 7 percent of energy consumption comes from renewable sources, and less than 1 percent from biofuels. A biofuel is any fuel that comes from an organic or biological source. The vast majority of Brazil's biofuel mix is composed of ethanol (ethyl alcohol), which is then blended with gasoline to run much of the country's automobile fleet. Ethanol can be made from a wide variety of crops, but in Brazil nearly all comes from sugarcane (Figure 3-5-1). Brazil produces one-third of the world's sugarcane, occupying approximately 9 million hectares (22 million acres), mostly in South-Central Brazil (São Paulo state). Just over half of the sugar produced is converted to ethanol, totaling over 27 billion liters. Brazil is the second largest producer of ethanol, and the world's largest exporter. The sugar/ethanol

industry is now a substantial part of Brazil's economy (\$48 billion) and employs over 1 million people. Ethanol accounts for half of the gasoline market in Brazil (as opposed to 10% in the United States). Practically all cars sold in Brazil today are flex-fuel vehicles, which means that they can run on either low-ethanol or high-ethanol gasoline, up to 100 percent. One of the most important contributions of biofuels in Brazil is that it reduces greenhouse gas emissions substantially compared to gasoline consumption, perhaps by 80–90 percent.

How has Brazil been successful in substituting a renewable energy source for gasoline? First, the savanna climate of South-Central Brazil and fertile soils of São Paulo state are ideal for growing sugarcane. Sugar is also efficiently processed into ethanol; it has a very positive energy balance, meaning that it produces more energy than it takes to produce the sugar. Converting sugarcane to ethanol is seven times more efficient than converting corn to ethanol, as is done in the United States. The Brazilian government has a long history of supporting ethanol production

and consumption, in large part to reduce petroleum imports and support domestic farmers and processors. Starting in 1975 Brazil began the *Programa Nacional do Alcool*, or the National Alcohol Program, which encouraged converting sugar into ethanol by mandating that gasoline be sold as a gasoline/ethanol blend. By 1993 gasoline/ethanol blends were required to be at least 22 percent ethanol; the figure was increased to 25 percent in 2003. The government also provided subsidies to the ethanol industry, including a guaranteed market, and has taxed gasoline so that it is more expensive compared to a gasoline/ethanol blend. A downturn in the cost of gasoline and an increase in the cost of ethanol in the late 2000s prompted the Brazilian government to announce a \$38 billion plan to increase ethanol production and support the ethanol industry. Brazil hopes to export more ethanol and to provide a steady supply of ethanol to keep it competitive with the cost of gasoline.

The expansion of biofuels in Brazil has provoked controversy. In fact, ethanol has become a central issue in the debate about biofuels, food security, and land use change. Oxfam and other groups have argued that the expansion of biofuels has contributed to the increased cost of food globally. That criticism may apply elsewhere in the world (using corn in the United States), but there is little evidence that expanding sugarcane production came at the expense of raising other crops or increased food prices. Sugarcane occupies less than 5 percent of Brazil's arable land, and most of the sugarcane expansion in São Paulo state replaced pasture for cattle, not food crops. The larger concern is that expansion of sugarcane has an indirect effect on land use, displacing cattle ranching and other land uses northward into the Amazon rain forest.

Sources: José Goldemberg, “The Brazilian biofuels industry,” *Biotechnology for Biofuels* 1 (May 2008): 1–6; Ethan Coffman, “Biofuels: What Place in Our Green Future?” 2009, www.csa.com/discoveryguides/discoveryguides-main.php.

▼ **FIGURE 3-5-1 Sugarcane harvest, Sao Paulo state.** More sugarcane is planted than any other crop in the world, and Brazil grows and produces the most.



▼ **NEW!** Environmental Challenges sections cover major environmental issues in the regions.

Environmental Challenges

It would be difficult to find a region where the human modification of the landscape has been more extensive and dramatic than in Europe. The region's economic success over centuries, even millennia, is often a result of natural resource exploitation and agricultural and manufacturing innovations that profoundly altered the natural environment. Each historical epoch in Europe can be linked to major environmental modifications, and the contemporary landscape of Europe still reflects those changes over time. The Vikings needed wood for their ships and open fields for agriculture and grazing, and they cut down trees wherever they conquered, from the British Isles to Greenland. The Romans did much the same around the Mediterranean; places such as Sicily to this day are largely devoid of forests. Some scholars have attributed the fall of the Roman Empire to self-inflicted economic decline caused by ecological destruction. Five thousand years ago, Scotland's hilly terrain was covered mostly by mixed pine, aspen, birch, and oak forest, but that gave way to the stark, treeless landscapes familiar from films such as *Braveheart* and *Skylark*. That landscape was largely a result of successive waves of deforestation that continued into the early twentieth century. The legendary forests covering most of the southern two-thirds of Germany, the stuff of Grimm's fairy tales, met a similar fate, and the large tracts of forested land along the *Autobahn* are typically heavily managed, second- or third-growth tree stands.

Not all environmental change is caused by humans. Natural climate cycles in past eras caused both human expansions into previously uninhabited areas as well as retrenchment when the climate became less favorable to established livelihoods. Changes in precipitation and temperature can also be linked to periods of political and social unrest as well as disease outbreaks (Figure 4-7). Archaeologists have identified a period from around 300 to 800 C.E., when changing precipitation regimes and below-normal temperatures

and erosion. The scale and, above all, speed of that modification reached its height as a result of the **Industrial Revolution**, which began in northern Britain in the late eighteenth century and spread through much of Europe by the late nineteenth century. Massive industrialization of production required raw materials, transportation networks, and housing for the factory workers. The fuel of choice was coal, which was abundant in the areas most closely tied to industrialization such as northwest England, the Ruhr River valley and Saxony in Germany, and Silesia in Poland. Bituminous, or black coal, typically comes from underground mines and so the surface disturbance is relatively minor, but the low-quality lignite or brown coal is typically strip-mined (Figure 4-8). Large open pits, many now recreational lakes, in parts of eastern Germany

▼ **Figure 4-6 Persebenburg castle, Austria.** Cycling along the Danube in Austria is a very popular vacation activity.



▼ An updated **Introduction** refocuses on geography fundamentals, including information on the history and contemporary relevance of geography, map interpretation, and modern geospatial tools.

Introduction

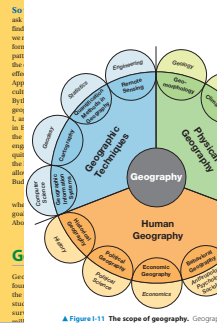
There is a good chance you will use Google Maps today. The most popular smartphone app in the world—well ahead of Facebook, YouTube, and Twitter—Google Maps has become the essential tool of the decade. Never before have so many people been interested in knowing where things are, how to find them, and making connections between what they see on the map with what is mapped on their devices. Geography is seemingly at our fingertips. Yet geography is more than just features on a map. Geography is fundamentally the study of location—the location of physical features, economic activities, human settlements and cultural attributes, and anything else that a person can find on a map—and the connections between those things and places. In other words, geographers have a keen interest in understanding what defines terrestrial space (as opposed to “water” space), and the interactions between people and their environments within that space. For that reason, geography is known as a “spatial” science that, in a fundamental way, studies the why of where.

At the most basic level, students of geography are called on to address three questions:

What is located where? This is the map or the “location list” question that most of us want to answer when we use Google Maps or Google Earth. For example, we may ask where the mountain ranges are located in the eastern United States (hence, the Appalachian system running from Maine to Alabama), or where in Europe ethnic tensions have caused a fractured political geography (hence, the Balkan Peninsula). Asking where people, places, and activities are located provides context and creates a basic knowledge of location that is a starting point for more detailed examination of places later. It also teaches students what is geographically correct, or that the Mississippi River is the major river system of the U.S. Midwest. Knowing where things are is important, but geography is much more than a rote memory exercise more appropriate to long car trips than serious study.

Why are things located where they are? Geographers primarily want to understand why things are located where they are. This is the “spatial” question that looks for the processes that produce a particular geographic pattern. To continue with the water/land example, one knows that the Appalachian mountains

require examining human-environment interactions. Geographers might study the relationship between cropping patterns and the expansion of deserts, or the role of city formative in modifying climate (for example, creating urban heat islands).



▲ **Figure 1-11 The scope of geography.** Geography is a synthesizing and integrating discipline. This diagram shows that geography intersects with many fields of study, including the physical sciences, engineering, social sciences, and humanities.



▲ **Figure 1-12 The National Geographic Bee in 2013.** For twenty-five years and counting, National Geographic Alliance has sponsored a competition involving “bee” at ascending geographic scales. The 50 state winners meet in Washington, DC, for the ultimate showdown, won in 2013 for the first time by a middle school student from Massachusetts.

Government Second to teaching, more geographers probably apply their skills to government agencies than to any other area. At a local level, many are municipal or regional planners, charged with facilitating orderly residential, business, and industrial growth and redevelopment. On a national level, knowledge of distant places and cultures, often in combination with remote sensing, map interpretation, and GIS skills, provide geographers with analytical abilities that are much in demand in government agencies. The Office of the Geographer in the Department of State is a corps of geographic activity, as is service in the diplomatic corps. The United States Agency for International Development (USAID) also includes many geographers whose expertise in resource analysis, re-

central city as opposed to suburban locations, examine the purchasing power of the citizens of a particular community or neighborhood, assess traffic patterns to ensure a new airport is accessible to a high volume of potential customers, evaluate the likely competition that retail firms might experience in the area, and predict the direction

Guided Learning

An integrated learning path guides and engages students through active learning and applied activities.

► **NEW! Read & Learn** sections at the beginning of each chapter feature region-specific learning outcomes, helping students prioritize key concepts and information..

▼ **NEW! Stop & Think** review questions are integrated throughout the chapter text to help students check their comprehension and reflect on the concepts as they read.

Stop & Think

► Why is tourism such a major component of the economy in Central American and Caribbean countries?

Stop & Think

► Can Mexico achieve both economic growth and significant poverty reduction?

▼ Expanded **end of chapter review** includes a concise bullet point **Summary** and **Key Terms** followed by **Understanding Development and Geographers @ Work** critical thinking questions.

Summary

- Latin America and the Caribbean were created out of Europe's accidental discovery of two large continents connected by an isthmus. These continents held millions of people, speaking hundreds of languages in numerous environmental and social settings. The Spanish and Portuguese were the first European powers to reshape the human geography of the Americas, but the British and Dutch would soon follow.
- Dramatic change continued as the European powers imported between 10 and 12 million Africans for slave labor, and indigenous peoples were concentrated into towns with plazas and Roman Catholic cathedrals. By the early 1820s the colonial era ended and geopolitical wrangling ensued. In general the region's economy and population languished until the end of the nineteenth century, when both grew tremendously, reshaping the region's economies, population structure, and cultural makeup. By the start of the twentieth century the influence of Great Britain waned and the influence of the United States grew, especially in Central America and the Caribbean. Panama was created out of an American desire to control a canal that still connects the Atlantic and Pacific realms.
- Latin America's economy underwent two "shocks" and eras of restructuring during the twentieth century. The Great Depression ushered in an era of protected economies and the debt crisis and economic restructuring of the 1980s led to the "lost decade." Most countries reoriented their economies to export primary products, assemble manufactured goods (EPZs), and attract tourists. Thirty years of neoliberal economic policies have brought mixed results, and dissatisfaction has led to the repeal of some neoliberal policies by "Pink Tide" presidents. Brazil has emerged as the largest economy and population, followed distantly by Mexico, which continues to rely heavily on the United States and has yet to become a leader in the region the way Brazil has.
- Latin America has never been isolated, but through trade, tourism, and migration it likely has never been more integrated into the global economy. Free trade agreements are common and China's role has increased. Although progress has been made since the 1980s, income inequality remains high and more than one-quarter of the region's people live in poverty. Millions of Latin Americans left out of the region's economic progress decided to migrate to the United States and Europe, where as a group they remit billions of dollars.
- Latin America and the Caribbean can be divided into coherent, if problematic, subregions. Vast economic and environmental differences exist between and even within the subregions, but there are also strong similarities brought about by a shared history of Iberian conquest and cultural traits. The region faces many economic and environmental challenges. Globalization has created wealth and helped many people, but has left others behind and threatened ecosystems and vital natural resources.
- Like all places, Latin America and the Caribbean are still in the process of becoming. This world region's landscapes, economies, and environments will reflect global processes such as climate change and economic globalization, but also reflect the creativity and determination of its residents as they respond to these processes and participate in the reshaping of their own landscapes and livelihoods.

Key Terms

altitudinal life zones 118	encomiendas 126	Isthmus of Panama 147	quilombos 159
Aztec 121	export processing zones (EPZ) 133	land concentration 125	rain shadow 120
banana republic 146	free trade zones (FTZ) 133	lost decade 129	remittances 140
Bolivian gas wars 157	haciendas 126	maquiladora industry 133	syncretism 126
BRIC (Brazil, Russia, India, and China) countries 158	home town associations (HTA) 140	Maya 121	thermal inversion 121
business process outsourcing (BPO) 133	import substitution industrialization (ISI) 129	Media Luna 157	trade blocs 130
chain migration 138	Inca 121	neoliberalism 129	transnational migration 138
chimpanzas 123	informal economy 130	payment for environmental services (PES) 148	Treaty of Tordesillas 125
ecotourism 136	internally displaced people 158	Pentecostalism 139	voluntourism 136
El Niño 118		primate city 144	Zapatista movement 142
		pristine myth 121	

Read & Learn

- Describe the climate characteristics that explain the influence of wet and dry monsoons.
- Identify the region's primary environmental and energy challenges.
- Explain how historical movements of peoples and cultures resulted in South Asia's current cultural conflicts.
- Link British colonial rule to the current economic contours of South Asia.
- Identify social and economic forces that reinforce gender inequality in India.
- Describe how the process of globalization affects the lives of India's poor rural population.
- Compare India's urban-industrial regions and link their development to globalization and the government's economic policies since 1990.
- Contrast the political and economic constraints to greater levels of economic development in Pakistan, Nepal, Bangladesh, and Sri Lanka.

▼ A **Consistent Thematic Structure** includes general overviews of the region, followed by reviews of the sub-regions. **Environmental and Historical Contexts** of the region begin each chapter.

Europe's Environmental and Historical Contexts

So where is Europe, and maybe more importantly, *what* is it? These questions have been pondered for a very long time, and the answers rarely satisfy students of Europe. Eurasia is the largest landmass on Earth, and looking at imagery from space (Figure 4-1) we can see at its western edge a series of peninsulas and large islands. The word peninsula means "almost an island" and refers to land surrounded on three sides by water. A distinguishing feature of most of what we consider Europe is proximity to oceans or seas and the resulting moderating influences on climate.

▼ **Figure 4-1 Western Eurasia.** Geologically speaking, Europe is not a continent but rather a subcontinent of Eurasia consisting of several peninsulas. The main ones are the Scandinavian, Iberian, Italian, and Balkan peninsulas.



This lack of clear borders and identity makes the story of Europe as a world region compelling. We all "know" of Europe, its centrality to world affairs over centuries, its high culture, marvelous cities, and economic prosperity. It is by and large the most developed world region, with the highest literacy rates, longest lifespans, and smallest disparity between rich and poor. But its varied human and physical geography makes the region full of surprises even to the seasoned traveler and student.

Environmental Setting: Physical Geography Enables Development

Europe's physical geography helps to explain the remarkable trajectory of this region as a major population center and global economic and political powerhouse. Navigable waterways and relatively easy access to the seas promoted trade, while a mild climate and productive agricultural land allowed the region to sustain a large population.

Landforms

Europe is characterized by mountainous zones, plains, and river valleys (see chapter opener map). Most of Europe receives ample precipitation for agriculture, so that very little agricultural land in Europe requires irrigation outside of some areas of the far southern Mediterranean climate region. The major river systems of the region historically have been transportation and communication arteries and sources of drinking water or water for industrial uses rather than the source of vital irrigation waters, as in the case of the Nile, Colorado, or Mekong rivers. Europe's most extensive river system is the Danube, which begins in Germany and passes through eight other countries before emptying into the Black Sea in Romania. The Danube drains a basin encompassing 315,000 square miles (816,000 square kilometers), an area slightly larger than Turkey. Europe's best-known rivers flow mostly toward the Atlantic (Rhine, Seine, Loire, Elbe) or Mediterranean/Adriatic Seas (Ebro, Po). Managing river flow as well as traffic on the navigable river systems has always required some degree of cross-border cooperation, and a recent development that illustrates the political and economic integration of Europe through the European Union is the challenge of cross-border river management, as two-thirds of EU land lies within river drainage basins that cross international borders (see *Exploring Environmental Impacts: Transboundary Water*).

Understanding Development in Latin America and the Caribbean

1. What are the three great landform divisions of Latin America?
2. How does altitude influence temperature, precipitation, and agricultural options in the Andes?
3. What major indigenous civilizations ruled in Latin America before the arrival of Europeans and where were those civilizations located?
4. Why did Latin America experience a major population decline after the European conquest?
5. Where did the slave labor used to produce sugar and other agricultural products come from and how have society and economy adjusted to the end of slavery in the nineteenth century?
6. Why is Panama such an important part of the global transportation system, and will that role continue in the future?
7. What are the gains and the losses produced by NAFTA (North American Free Trade Agreement) in Mexico's economy?
8. What are the advantages and disadvantages of the varying types of tourism in Central America and the Caribbean?
9. Why has Brazil emerged as an important global economy?
10. Why is Evo Morales such an important voice in South America?

Geographers @ Work

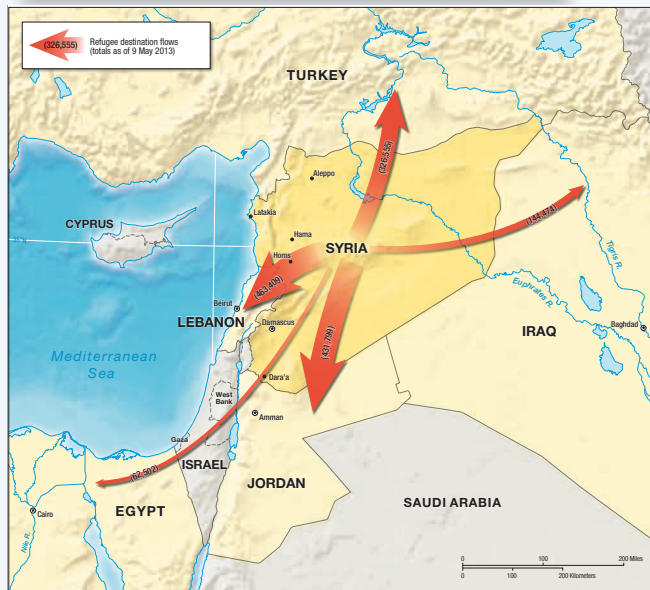
1. Explain the role traditionally played by coca in highland Andean culture in contrast to the impact that drugs derived from this plant have had on both local economies and the global community.
2. Latin America is characterized by many different physical environments. Demonstrate how this diversity influences the planning of agricultural development strategies in the region.
3. Remittances are a vital part of Latin American economies. Evaluate how that money is invested in recipient countries and what strategies might be developed to increase the benefits of those investments.
4. Explain why Paraguayanians are such a prominent part of Argentina's immigrant community.
5. Investigate the benefits and costs of mining lithium on the Bolivian Altiplano.

Geographic Visualization

The 11th edition features a strong focus on compelling visualization, with new features and illustrations throughout, and dramatic updates to the visual program.

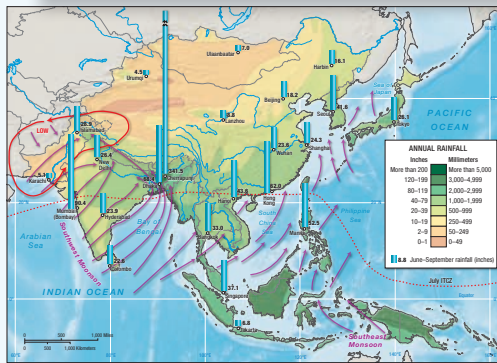
► **NEW! Visualizing Development** features cover a defining development in each world region, supported by engaging visualizations of economic and spatial data.

▼ **A completely overhauled cartographic program** incorporates the latest data and GIS techniques and modern styles in scores of engaging and dynamic maps.



▲ **Figure 7-32 Syrian international refugees as of 9 May 2013.** The Syrian civil war, which evolved from peaceful demonstrations in 2011 to brutal intercommunal warfare by the middle of 2013, sent waves of refugees spilling into neighboring countries.

Source: United Nations High Commission for Refugees, Syria Regional Refugee Response Portal <http://data.unhcr.org/syria/refugees/regional.php>.



▲ **Figure 9-3 Annual rainfall and dominant atmospheric wind patterns over Asia during the summer.** Asia's summer monsoon rains are fed by southerly wind flows. The bars reflect average summer rainfall totals at selected locations.



visualizing DEVELOPMENT

Community, Gender, and Regional Variations in Population Growth

Population growth rates within India vary considerably by ethnic, religious, and caste groups. Although culture certainly influences fertility rates, economic status better explains these differences—Hindus, for example, have fewer children than the lowest castes and Muslims but regional population patterns can also be explained by economic factors. The states with the most rapid growth during the 2001–2011 period were a handful of poorer tribal northeast states. Above-average growth rates also characterize the highly populated and poorer northern “Hindi belt” states of Bihar, Uttar Pradesh, Madhya Pradesh, and Rajasthan. This is in sharp contrast to the richer southern states of Andhra Pradesh and Kerala, where growth rates are significantly below the national average. As an indicator of relative levels of poverty, urban fertility rates in 2010 stood at 1.9 per woman, while in rural regions, 2.8 was the norm.

These statistics express regional variation in population growth but mask the regional gender bias in India's population structure (Figure 9-1-1). Gender bias exists when one or the other sex represents

an abnormally larger percentage of the population. In 2010, there were only 940 Indian females per 1,000 males. Whether for reasons of infanticide, abortion, or nutritional and medical neglect, India has, like China and a number of other developing countries, a deficit in females. In India the problem is extreme. A 2011 United Nations report claims that India exhibits the highest female child mortality rates of any country in the world, and that girls between the ages of one and five are 75 percent more likely to die when compared to boys. At the regional level, the degree of bias favoring males is substantial. Northwest and northern India exhibit stronger gender bias than do southern states. In 2010, the northwestern states of Punjab, Haryana, and Uttar Pradesh were together characterized by a ratio of 892 females per 1,000 males, whereas the far southern states of Karnataka, Kerala, and Tamil Nadu averaged a 1,015 females per 1,000 males. While male in- and out-migration rates impact the

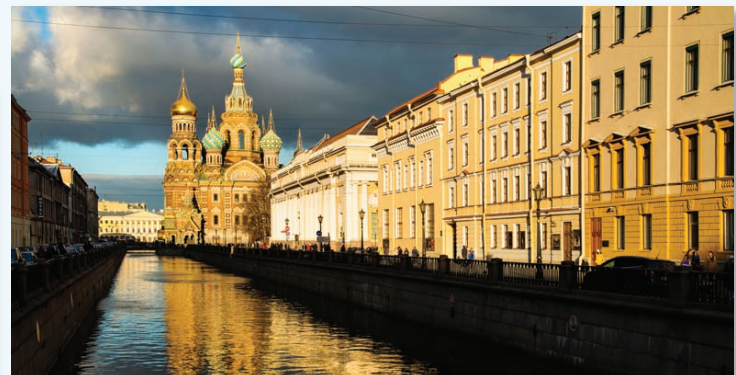
female ratio of a given state, female gender bias is strongly correlated with high rates of female literacy and labor force participation. In southern states, women tend to have greater social and economic freedoms, such as owning land and engaging in a wide variety of empowering economic activities. In the northwest, a patrilineal social structure exists whereby a bride moves to her husband's parents' village, is secluded within the household, and denied access to land and political participation.

Source: Census of India, 2011; Ravinder Kaur, “Across-Region Marriages: Poverty, Female Migration and the Sex Ratio,” *Economic and Political Weekly* 39, no. 25 (2004): 19–25; Mahendra Premi, “Religion in India: A Demographic Perspective,” *Economic and Political Weekly* 39, no. 39 (2004): 4297–4302.

▼ **Figure 9-1-1 Gender bias by Indian political units, 2011.** Much of India is experiencing a severe deficit in females. This map shows the number of females per 1,000 males.



▼ **Over 75% new photos** ensure currency and provide a clear connection with callouts in the text, with geographic IDs provided in all captions.



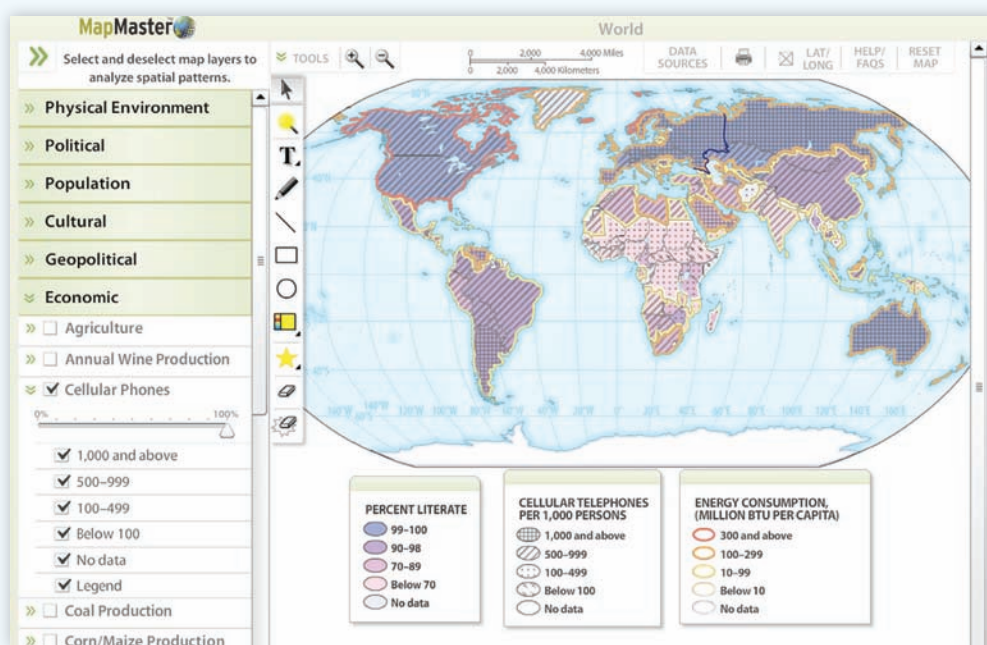
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MasteringGeography delivers engaging, dynamic learning opportunities—focusing on course objectives and responsive to each student’s progress—that are proven to help students absorb world regional course material and understand difficult geographic concepts.

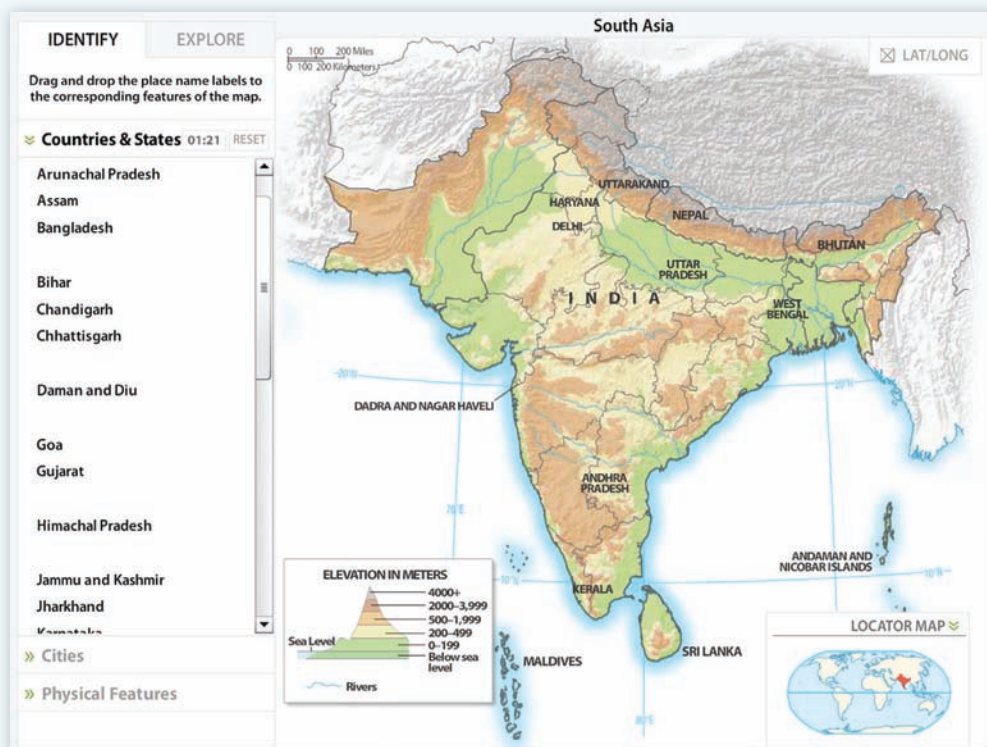
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► **MapMaster Layered Thematic Interactive Map Activities** act as a mini-GIS tool, allowing students to layer various thematic maps to analyze spatial patterns and data at regional and global scales and answer multiple-choice and short-answer questions organized by region and theme. Includes zoom and annotation functionality, and hundreds of map layers with current data from sources such as the U.S. Census, United Nations, CIA, World Bank, and Population Reference Bureau.



► **MapMaster Place Name Interactive Map Activities** have students identify place names of political and physical features at regional and global scales, explore select recent country data from the CIA World Factbook, and answer associated assessment questions.



Help students develop spatial reasoning and a sense of place



► **Geography videos** provide students a sense of place and allow them to explore a range of locations and topics related to world regional and physical geography. Covering issues of economy, development, globalization, climate and climate change, culture, etc., there are 10 multiple choice questions for each video. These video activities allow teachers to test students' understanding and application of concepts, and offer hints and wrong-answer feedback.

▼ **Thinking Spatially and Data Analysis** and NEW **GeoTutor** Activities help students master the toughest concepts and develop spatial reasoning and critical thinking skills by identifying and labeling features from maps, illustrations, graphs, and charts. Students then examine related data sets, answering multiple-choice and increasingly higher-order conceptual questions, which include hints and wrong-answer feedback.



Dynamic Study Modules

Personalize each student's learning experience with Dynamic Study Modules. Created to allow students to study on their own and be better prepared to achieve higher scores on their tests. Mobile app available for iOS and Android devices for study on the go.

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- MapMaster™ interactive maps
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- Geography videos
- Select Geoscience Animations
- "In the News" RSS feeds
- Glossary flashcards
- Optional Pearson eText and more

Callouts to MasteringGeography appear at the end of each chapter to direct students to extend their learning beyond the textbook.

Drag the appropriate labels to their respective targets. Place the blue age-cohort description labels in the blue boxes and the pink population growth descriptions in the pink boxes. You must use all labels and fill all targets.

High population growth pyramid

Relatively large reproductive population

Relatively small productive population

Large young population

Small aging population

Large aging population

Negative population growth pyramid

Small young population

Laredo, TX

Naples, FL

Submit
Hints
My Answers
Give Up
Review Part

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With the Mastering gradebook and diagnostics, you'll be better informed about your students' progress than ever before. Mastering captures the step-by-step work of every student—including wrong answers submitted, hints requested, and time taken at every step of every problem—all providing unique insight into the most common misconceptions of your class.

Quickly monitor and display student results

The **Gradebook** records all scores for automatically graded assignments. Shades of red highlight struggling students and challenging assignments.

NAME	IntroLgy	Ch 2	Ch 3	Lab 2	Ch 4	Ch 5	Ch 6	Ch 7a	Chapter 7b	Lab 4	Ch 8	Ch 9	Ch 12	TOTAL
Class Average	--	78.4	86.0	82.6	88.1	88.5	86.7	91.6	83.7	90.0	88.4	77.7		24.5
Last01, First0...	--	84.4	73.3	83.3	102	99.9	0.0	95.6	101	100	0.0	87.4		46.9
Last02, First0...	--	70.3	84.9	82.9	98.0	49.5	86.2	72.9	47.5	80.0	86.9	66.3		26.2
Last03, First0...	--	73.6	46.0	81.8	104	102	94.9	85.0	100	95.0	99.7	87.3		27.0
Last04, First0...	--	72.5	53.8	0.0	34.3	86.3	65.3	80.0	83.4	90.0	99.2	67.0		30.3
Last05, First0...	--	78.6	69.3	78.6	98.0	87.8	85.2	82.5	34.6	85.0	98.3	87.7		31.9
Last07, First0...	--	77.9	86.7	51.8	101									
Last08, First0...	--	84.4	70.7	82.8	85.3									
Last09, First0...	--	66.2	70.0	78.8	104									
Last10, First0...	--	78.1	70.0	78.6	105									

Diagnostics provide unique insight into class and student performance. With a single click, charts summarize the most difficult questions, vulnerable students, grade distribution, and score improvement over the duration of the course.



With a single click, **Individual Student Performance Data** provides **at-a-glance** statistics into each individual student's performance, including time spent on the question, number of hints opened, and number of wrong and correct answers submitted.

Description: (a) Which country is expected to have the highest percentage of population increase for 2020?

Part A
Which country is expected to have the highest percentage of population increase for 2020?

ANSWER:

- Ethiopia
- India
- China
- Yemen
- Uganda

Answer Stats:	Students	% Correct	% Unfinished	% Req'd Solutions	Wrong/student	Hints/student
Overall	10138	92.5%	6.8%	0.7%	0.6	0
MBDEMOGRADE5	25	100%	0%	0%	0.8	0

Wrong Answers for MBDEMOGRADE5

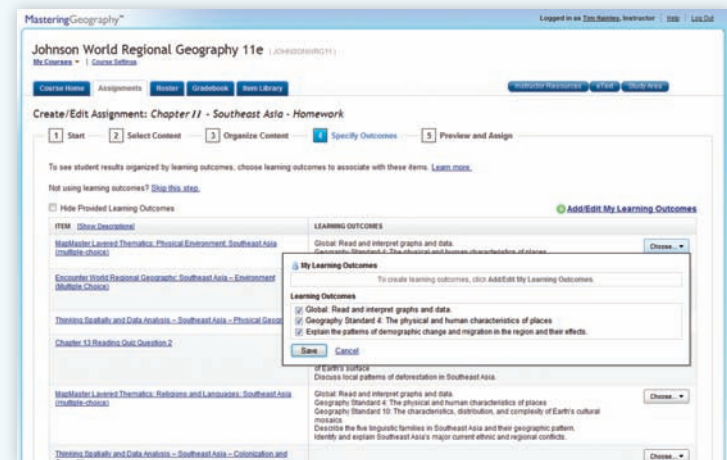
% Wrong	Answer	Response
38.1%	Ethiopia is projected to have an 88% population increase. Are there other countries that will have a higher increase?	
23.8%	Although India is expected to surpass China as the most highly populated country in the world, India is projected to have only a 36% population increase by 2020.	
23.8%	Are you thinking that China has the largest population in the world now? Its population policies have reduced the rate of population growth, and by 2020, China's population is expected to grow only about 13% (still a big number considering the size of China's population)	
14.3%	Yemen is anticipated to have a 96% population increase by 2020. Are there other countries that will have a higher increase?	

Easily measure student performance against your Learning Outcomes

Learning Outcomes

MasteringGeography provides quick and easy access to information on student performance against your learning outcomes and makes it easy to share those results.

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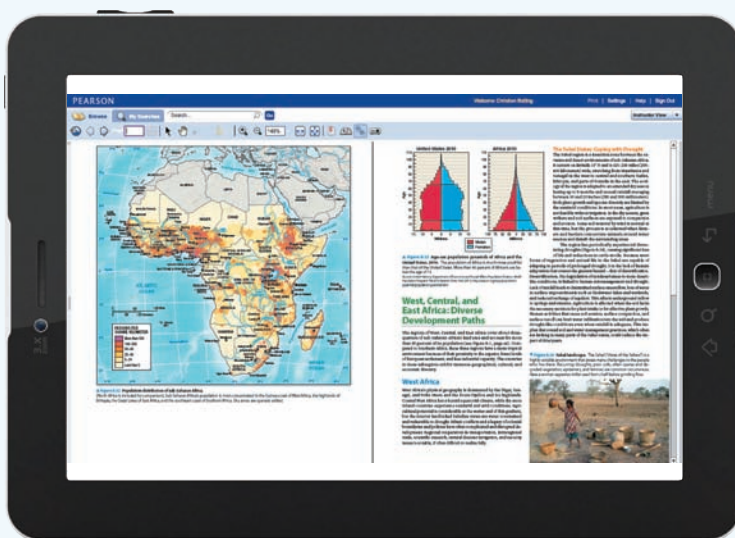
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World Regional Geography

A Development Approach



▲ This Blue Marble image by NASA is a composite of six separate orbits taken on January 23, 2012 by the Suomi National Polar-orbiting Partnership satellite using the Visible Infrared Imaging Radiometer Suite (VIIRS).

Source: NASA/NOAA.

Introduction

There is a good chance you will use Google Maps today. The most popular smartphone app in the world—well ahead of Facebook, YouTube, and Twitter—Google Maps has become the essential tool of the decade. Never before have so many people been interested in knowing where things are, how to find them, and making connections between what they see in real life with what is mapped on their devices. Geography is seemingly at our fingertips. Yet geography is more than just features on a map. **Geography** is fundamentally the study of *location*—the location of physical features, economic activities, human settlement patterns and cultural attributes, and anything else that a person can find on a map—and the connections between those things and places. In other words, geographers have a keen interest in understanding what defines terrestrial space (as opposed to “outer” space), and the interactions between people and their environments within that space. For that reason, geography is known as a “spatial” science that, in a fundamental way, studies the *why* of *where*.

At the most basic level, students of geography are called on to address three questions:

What is located where? This is the map or the “location list” question that most of us want to answer when we use Google Maps or Google Earth. For example, we may ask where the mountains are found in the eastern United States (answer: the Appalachian system running from Maine to Alabama), or where in Europe ethnic tensions have created a fractured political geography (answer: the Balkan Peninsula). Asking where people, places, and activities are located provides context and creates a basic knowledge of locations that is a starting point for more detailed examination of places later. It also teaches students what is geographically correct, so they know that Brazil is a Portuguese-speaking Latin American country, or that the Mississippi River is the major river system of the U.S. Midwest. Knowing where things are is important, but geography is much more than a rote memory exercise more appropriate to long car trips than serious study.

Why are things located where they are? Geographers primarily want to understand *why* things are located where they are. This is the “explanation” question that looks for the processes that produce a particular geographic pattern. To continue with the examples used above, we know that the Appalachian mountain system runs the length of the eastern United States. Why are these mountains where they are? The answer lies in the history of Earth’s colliding continents, a story of plate tectonics that has contributed to the world’s numerous mountain chains. Along the same lines, the Balkan Peninsula has a long tradition of ethnic strife leading to political fracturing, which stems from the highly conflicted territorial histories of the south Slavs and the influences of outside empires. Other “why” questions of interest to geographers may

require examining human-environment interactions. Geographers might study the relationship between cropping patterns and the expansion of deserts, or the role of city structures in modifying climate (for example, creating urban heat islands).

So what? Now that we know where things are and why, we might ask “Who cares?” This is the “significance” question. Geographers find meaning in the geographical phenomena they have identified—we may know where the Appalachians are located and how they were formed, but then we examine their significance to settlement patterns in the early United States (that is, colonial clustering along the eastern seaboard), to weather and climate patterns (orographic effects producing massive rainfall quantities in the southern Appalachians), or to cultural patterns (think of the very different cultures that developed in the remote valleys of the Appalachians). By the same token, we should be reminded that the fractured political geography of the Balkans contributed to the outbreak of World War I, and that political distress following the collapse of communism in Eastern Europe led to the stationing of U.S. troops in parts of the Balkan Peninsula as peacekeepers to separate ethnic groups engaged in bloody conflict. For many Americans, the significance is quite personal. Geographers can also apply their knowledge about the Balkans to understand other parts of the world where upheaval allows ethnic groups to resurrect age-old conflicts, as in the recent Buddhist attacks on Muslims in Myanmar (Burma).

The goal of this book is to help students know and understand where places are, why they are there, and their significance. This goal is addressed using an economic development perspective. Above all, we want students to know that geography matters.

Geography’s Roots

Geography has a rich, ancient, and varied heritage. Its solid foundation rests on the works of ancient scholars, who recorded the physical and cultural characteristics of lands near and far. The study of geography evolved in many civilizations, with the first surviving maps appearing on clay tablets in ancient Iraq six millennia before the present. Folk cultures also developed their own pragmatic body of geographic knowledge—for example, early Polynesians produced maps of wave patterns around South Pacific islands that, combined with their knowledge of the stars and constellations, allowed them to navigate across great stretches of otherwise featureless ocean. But it was the Greeks who made the most enduring contributions to geography’s early formal development. The term “geography” comes to us from the Greek words *geo* (“the earth”) and *graphos* (“to write about” or “describe”).

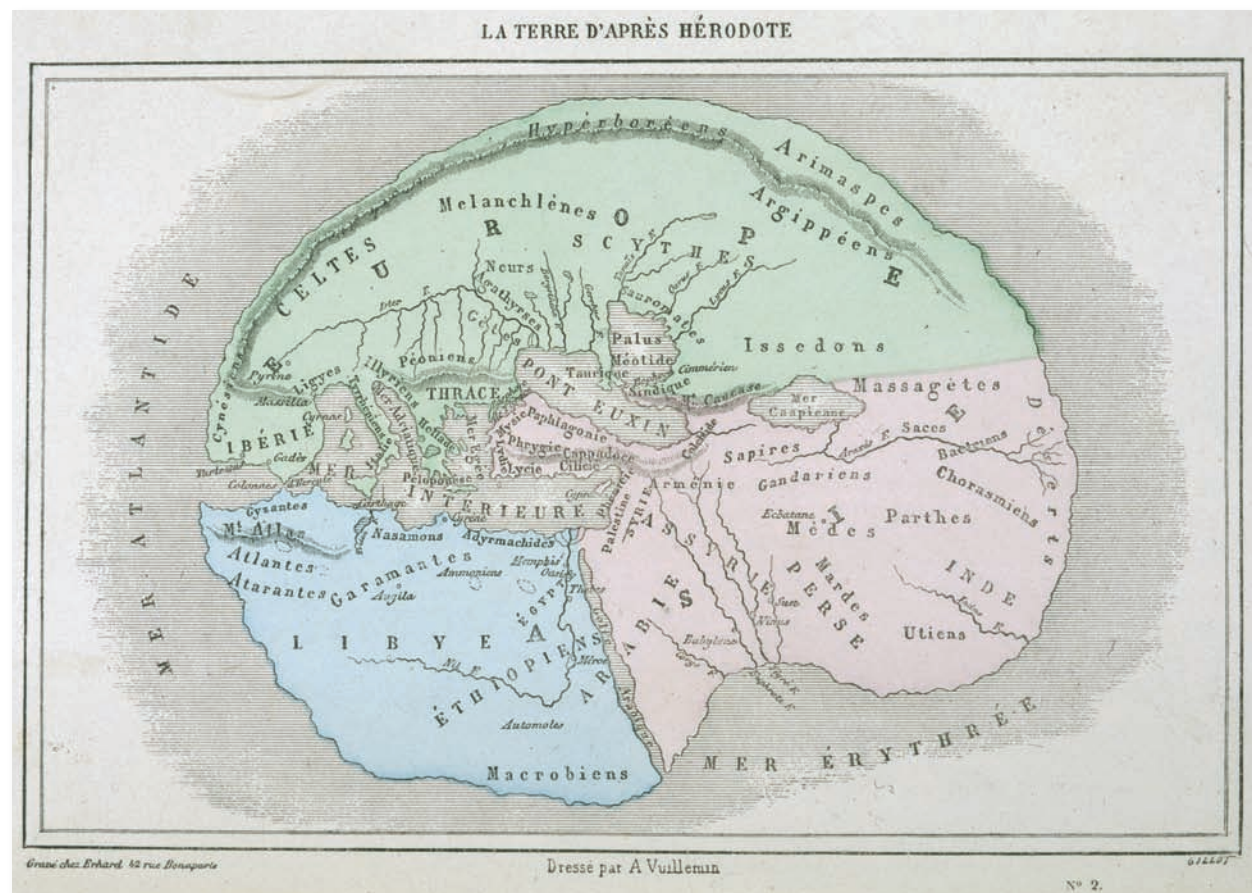
Contributions of the Greeks

The early Greeks studied the same kinds of geographic problems that confront us today, but without the benefit of modern knowledge and technologies. **Herodotus** (ca. 484–425 B.C.), called by some the father of geography as well as the father of history, placed historic events in their geographic settings in his famous *Historia* (ca. 450 B.C.). He described and explained the physical and human geography of his day, with particular emphasis on the seasonal flows of the Nile and Ister (Danube) rivers. Herodotus was also one of the earliest Greek geographers to map and name the continents of Europe, Asia, and Africa, which he called Libya (Figure I-1). **Aristotle** (384–322 B.C.) discussed the physical characteristics of the earth, including temperature, wind, alluvial or stream deposition, and vulcanism, in his *Meteorologica*. Aristotle was also the first to divide the world into three broad climatic zones, which he called the “torrid” (tropical), the “ekumene” (literally, “the home of man,” which corresponded to the mid-latitudes), and the “frigid,” or polar realms. Although Aristotle erroneously believed that neither the torrid nor frigid zones permitted the full development of human potential, his discussion of the influences of physical environments on humans reflected a principal concern of geographic inquiry in all ages.

Other Greek scholars examined the size and shape of the earth and its relationship to the rest of the cosmos. Which methods, they wondered, could be used to show where places are in relation to one another and what people do in the various parts of the world? The

Greeks did not answer all of their questions, but furthered knowledge of the world. **Eratosthenes** (ca. 276–195/194 B.C.) a Greek living in Alexandria, Egypt measured the earth’s circumference. He had learned that on only one day each year (the Northern Hemisphere’s summer solstice) did the noon sun shine directly down a well near what is now the city of Aswan. On that special day Eratosthenes measured the noon sun’s angle at Alexandria, some 500 miles (805 kilometers) north of Aswan, and found that there the sun’s rays were not vertical but cast a shadow of 7.2° from a pole projecting straight up from the earth. Using geometry, he concluded that the distance between Aswan and Alexandria of 500 miles (805 kilometers) must be equal to a 7.2° arc of the earth’s surface. He then computed the value of a full circle’s 360°, estimating the earth’s circumference to be 25,200 miles (40,554 kilometers). Today we know that the circumference at the equator is quite close to that estimate: It is actually 24,901.5 miles (40,073.9 kilometers).

Eratosthenes and other Greeks recognized the need for maps to show the relationships between one place or region and another—a way to locate themselves on Earth and describe their location to other people. To understand the challenge of their task, think of a mark on a smooth, uniform ball and then try to describe the position of the mark. Fortunately, the earth rotates around an axis that intersects the surface at two known points—the North Pole and the South Pole. With those points, the Greek geographers established two reference lines: the equator halfway between the poles and another line extending from pole to pole. They then drew a grid of latitude and



▲ **Figure I-1 The World through the eyes of Herodotus.** We will never know exactly how Herodotus depicted the world in cartographic form; no copy of his famous map survives. This is a French effort to imagine that map based on the places described in the geographical and historical writings of Herodotus.



▲ **Figure I-2 Ptolemy's World Map.** Ptolemy brought the classical period of Greek and Roman geography to a close. His world map, while containing numerous errors, was nevertheless a reflection of the remarkable geographical achievements of the Greek geographers. It stood as the standard reference map of the Western world for more than 1,300 years, until the Age of Exploration brought increased geographical knowledge of the world.

longitude lines from those geographic reference points, thereby locating any point on Earth using just two numbers. For example, the location of Washington, D.C., is 38°50 N, 77°00 W.

The Greeks' next step was to use the **geographic grid** to construct a map whereby all or part of the earth could be drawn on a flat surface and the relative positions of places and regions could be marked. Maps became the tools used by geographers to depict **spatial relationships**. About A.D. 150, a Greek astronomer from Alexandria, **Ptolemy**, (A.D. 90–168), designed a map of the world and then, using a coordinate system, compiled the location of 8,000 known places (Figure I-2). This early work of the Greeks was not flawless; Christopher Columbus, for example, using Ptolemy's estimate of the earth's circumference, thought the world to be much smaller than it actually is and believed he had reached the coast of Asia rather than the Americas.

Geography thrived during Greek and Roman times. New lands were discovered, and inventories of their resources and characteristics had great practical importance. One compiler was **Strabo** (64 B.C.–ca. A.D. 23), whose *Geographia* described the then known world and revealed a fascination with the distinctive physical and human characteristics that make each location unique. Part gazetteer, part travel guide, part handbook for government officials, Strabo's work was an effort to view places in a holistic, multipurpose fashion. The accomplishments of Strabo and other Greeks established geographers as leading figures of their times. Their most enduring contribution was the development of a scholarly approach that emphasized the importance of describing the world from a **spatial perspective** and recognizing the interdependence of the physical and cultural elements of the world. Geography's position was one of acclaim until the Roman Empire began to decline.

Mainstream Western geographical thought can be traced to the ancient Greeks, but other centers of geographical thought existed as well. Islamic explorers and scholars, such as the famed geographer **Muhammad al-Idrisi** (A.D. 1099–1166), served as a bridge from ancient to modern thought. Ancient China was a major center of geographical scholarship and exploration as well, with travel books dating back to A.D. 1000. Marco Polo (c.1254 – 1324), a Venetian merchant, undertook a 24-year journey of discovery to China and East Asia that inspired later European explorers in the same way as did Moroccan explorer Ibn Battuta (1304–1368), who traveled as far as China and Southeast Asia and expanded the horizons of the Muslim world. Although Chinese geography did not eclipse the work of Greek scholars during the classical period, it thrived from the fifth to the fifteenth centuries. During that millennium, Chinese geographers traveled through southern Asia, the Mediterranean, and western Europe. They established human geography, completed regional studies inside and outside China, studied geomorphological processes, and wrote geographical encyclopedias.

The Renaissance and the Age of Discovery

After a decline in the Middle Ages, the Renaissance marked a resurgence of geography and other sciences. New routes to Asia and the Americas were opened, first under the sponsorship of **Prince Henry the Navigator** (A.D. 1394–1460) of Portugal and later by seamen sailing for Spain, Holland, England, and France. Geographer-explorers, including Christopher Columbus, Ferdinand Magellan,



▲ **Figure I-3** A world map (1571) by Flemish cartographer (mapmaker) Abraham Ortelius (1527–1598). By the late sixteenth century, increased exploration was leading to more accurate renderings of world maps. By comparing this view of the east and west coasts of the Americas or the west coast of Africa with the South Pacific, we can see the effect of exploration.

and James Cook, ushered in an Age of Discovery. Renaissance geographers produced increasingly accurate maps (Figure I-3). The physical and cultural characteristics of exotic foreign lands were described, and the processes that created differences and similarities between one place and another were analyzed in greater detail.

European scholars began to question age-old concepts in light of discoveries in other parts of the world, although it took a self-taught mathematician, astronomer, and geographer-navigator from

Salem, Massachusetts, Nathaniel Bowditch (1773–1838), to compute, correct, and publish absolutely accurate navigation tables for mariners (Figure I-4). Bowditch's *The New American Practical Navigator*, first published in 1802, remains the bible of navigators to this day. An age of scientific reasoning began, with experimentation and the testing of hypotheses. New explanations in the natural sciences challenged old ideas about the origin of continents and oceans, the formation of landforms, and the evolution of plants and animals. Scientific travelers—students of natural history—looked for explanations for the varied world around them. Among those was the great German geographer **Alexander von Humboldt** (1769–1859), who traveled widely in Europe and Latin America. His curiosity, careful observation, and extensive knowledge of botany, physics, chemistry, Greek, archaeology, and geology enabled him to synthesize information from a variety of fields into a coherent geographic composite. In his most celebrated work, *Kosmos* (1845–1862), he attempted a comprehensive description of the earth.

Karl Ritter (1779–1859), a contemporary of Humboldt's, first studied geography as a basis for understanding history, but eventually found that geography itself could provide an understanding of the human dimension of the world. His great uncompleted work, *Die Erdkunde*, included nineteen volumes on Africa and Asia. Ritter is generally recognized as having held the first chair of geography at the University of Berlin in 1820. By the middle of the nineteenth century, geography was a respected discipline in



(a)



(b)

▲ **Figure I-4** **Nineteenth Century Geographers @ Work.** Both Nathaniel Bowditch and Alexander von Humboldt engaged in profoundly important research that continues to have great impact and enhanced the reputation of geography. Bowditch (a) was a theoretical and mathematical scholar who applied his skills to the solution of practical navigational problems. His likeness graces the landscape of Mt. Auburn Cemetery in Cambridge, Massachusetts. Humboldt (b) linked extensive field collection of data to a complex understanding of ecosystems and place. Arguably the most famous scholar of his day, he is widely commemorated by statues in Germany and around the world, with one of the more famous located in front of the Berlin university that bears his name.

European universities, and geographical societies served as important meeting places for scholars of all disciplines who were interested in the world around them. From Europe, a new age of geography spread around the world, fostered in part by geographical societies founded in France (1821), Germany (1828), and Great Britain (1830). Geography found a particularly receptive audience in the western hemisphere, where the earliest geographical societies were established in Mexico (1839) and the United States (1851). Americans were eager for knowledge about their country, especially the frontier regions, and geographical literature was particularly popular. Geography as an academic field of study began to flourish in the latter part of the nineteenth century, and in subsequent years spread from a few centers to almost every major college and university.

The Modern Practice of Geography

Modern geography has grown beyond description of the earth. Today's geographers not only describe through words, maps, and statistics, but also analyze interrelationships between physical and cultural phenomena to explain why things are distributed over the earth as they are.

Modern Geography

Modern geography is best understood as the study of how the physical and cultural attributes of the earth interact to form spatial or regional patterns. Modern geography has improved our ability to explain the world by utilizing four traditional areas of study:

1. the location of physical and cultural features and activities (spatial distributions);
2. the relationships between people and the lands that support them;
3. the existence of distinctive areas or regions, including analysis and explanation of how they came to be formed; and
4. the physical characteristics of the earth, perhaps the oldest of all geographic traditions.

The focus of each of these traditions as described by William Pattison¹ is evident in the work of the early Greek scholars. The **spatial tradition**, with its concern for distance, geometry, and movement, can be seen in the work of Ptolemy. The writings of Hippocrates (ca. 460–370 B.C.) were concerned with the relationship of human health to the surrounding environment, a theme common to the **man-land tradition**. The **area studies tradition**, with its concern for the nature of places and for understanding the “where” of places, is evident in Strabo’s *Geographia*. The **earth science tradition**, as a study of the earth and its environments, is identifiable in the work of Aristotle and his students. These classical traditions have been joined by other **perspectives**, such as the **behavioral** or **feminist** or **postmodern**, which enrich traditional approaches to geographic scholarship by incorporating new knowledge and insights into the geographer’s understanding of how the world works.

¹William D. Pattison, “The Four Traditions of Geography,” *Journal of Geography* 63 (May 1964): 211–216; reprinted in the *Journal of Geography* 89 (September–October 1990): 202–206.

The Subdivisions of Geography

Geography has many subdivisions that encompass one or more of the traditional areas of study described. The principal ones are physical geography, human geography, systematic geography, and regional geography.

Physical geography is the study of the environment from the viewpoint of distribution and process. For example, landform geographers, or geomorphologists, are concerned with the location of terrain features and with the ways in which those features have acquired their shapes and forms. Geomorphologists might study the impact of stream deposition in a floodplain, the effect of wind erosion in a dryland, or the formation of coral reefs around a tropical island. Biogeographers are interested in the distribution of plants and animals, the ways organisms live together, the processes (both natural and people-induced) that affect the biological Earth, and the effect of environmental changes on human life. Climatologists study the long-term characteristics of the atmosphere and any climatic differences created by temperature or energy and moisture conditions in various parts of the Earth. Physical geography emphasizes the interdependence of people and the physical earth. Such contemporary problems as ozone depletion, acid precipitation, desertification, rain-forest removal, global warming, and sea level rise are of particular interest (Figure I-5).

Human geography consists of the study of various aspects of our occupancy of the Earth. Urban geographers, for example, examine the location and spatial structure of cities to explain why urban areas are distributed as they are and to account for patterns of settlement and economic and cultural activity within cities. Urban geographers are interested in the process of urban growth and decline, in the types of activities carried on in cities, and in the movement of goods and people within and between cities and metropolitan areas (Figure I-6). Cultural geographers examine the ways in which groups of people organize themselves; they study the distribution and diffusion of

▼ **Figure I-5 Deforestation in the Brazilian Amazon.** Roads open the rain forest to lumbering operations and agricultural settlement. Clearcutting reduces the ability of the forest to grow back, and farmers often find that maintaining cultivation in the face of declining soil fertility is difficult. Invasion by grasses and the expansion of cattle herding are often the result.





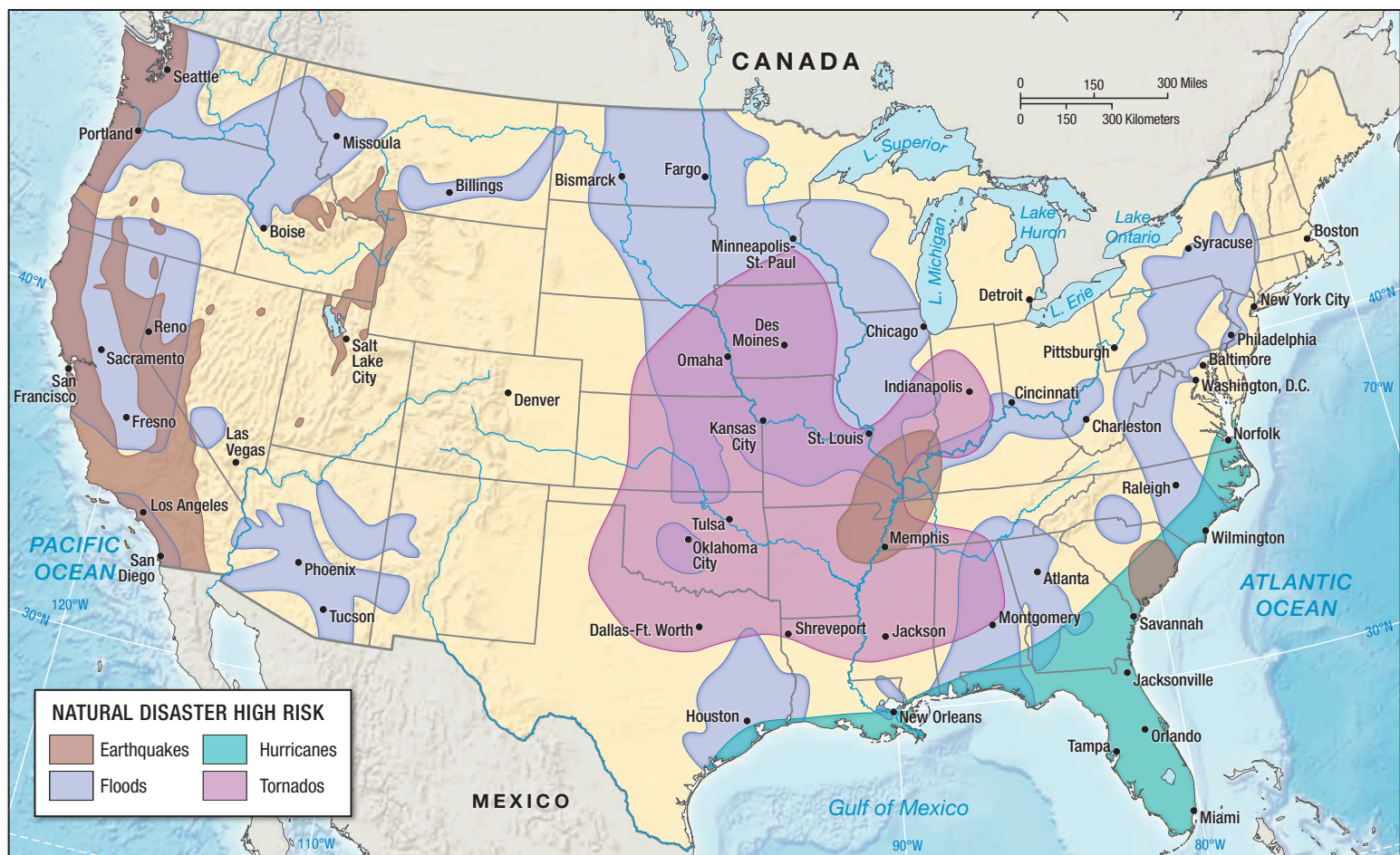
▲ **Figure I-6** New light rail tram in the square of the United Nations in Casablanca, Morocco. The urban transportation system in Moroccan cities is undergoing a massive upgrade as efficient light rail systems are constructed to move large numbers of people in and out of city centers.

such cultural institutions as language and religion, as well as social and political structures. Economic geography involves the study of systems of livelihood, especially the distribution of related activities and explanations for such distribution. Economic geographers are concerned with the analysis of natural and cultural resources, with

their utilization, and with the structures of power and control over and patterns of access to resources at various scales that determine the equity with which resources are shared.

Systematic, or topical, **geography** consists of the study of specific subjects. Historical geographers, for example, study past landscapes and the changes that have taken place. How did the people of the Great Plains organize themselves in 1870, as compared with their organization in 1935 in the midst of the Great Depression? What past characteristics have persisted, and what effect do they have on present-day distributional patterns? Historical geography thus adds depth perception to time, facilitating an explanation of present patterns and their reasons for being. Systematic geographers normally study one aspect of the field—landforms, economic activities, urban places, or natural hazards, for example (Figure I-7).

Regional geography involves the analysis of environmental and human patterns within a single area. A wide variety of facts are placed into a coherent form in order to explain how a region is organized and how it functions. A regional geographer is an expert on a particular area of the world, applying systematic approaches to an understanding of that area (Figure I-8). This textbook applies a regional approach, dividing the globe into 11 broad regions, each with its own distinctive set of shared characteristics, in order to provide the context needed to understand and compare how globalization and development processes, among many others, operate around the world.



▲ **Figure I-7** The regional hazard threat in the United States. Natural hazards are profoundly regional, representing different problems in different parts of the country. How much risk the people of each area will accept determines the type and effectiveness of the management strategies they adopt.

Source: Data from American Red Cross and NOAA.



▲ **Figure I-8 Alpine villagers move cows to high elevation pastures.** Moving cows to high Alpine pastures in spring is a festive occasion throughout the region as decorated animals, festooned with flowers and massive bells, parade through the streets of a village in the canton of Fribourg, Switzerland.

All fields of geography, despite focusing on different sets of phenomena, share the geographic viewpoint; that is, all geographers analyze spatial arrangements (distributions) and search for explanations of the patterns and interrelationships among those and other phenomena. All geographers rely on maps as analytical tools and have added computers and remote-sensing techniques to aid in recording and analyzing data.

The Geographic Information Science Explosion

Twenty-first-century maps are more than just maps—they are analytical tools referred to as **geographic information systems (GIS)** and are part of a larger field of study called geographic information science (GIScience). Broadly defined, GIS is a digital representation of the earth's surface (a site, region, or country) that can be used to describe landscape features (roads, boundaries, mountains, rivers) and can support analysis of these features. In a sense, a GIS is like having a whole atlas in a single computer presentation with the ability to relate different pages of the atlas to each other. The emergence of GIS in the United States is a recent phenomenon. It began when Jack and Laura Dangermond established ESRI, the Environmental Systems Research Institute, in 1982. ESRI's first software program, ARC/INFO, has since developed into a suite of different GIS programs that now dominate the GIS marketplace. A research-oriented GIS software tool called IDRISI was first created by Ron Eastman in 1987, and is a specialized system that is particularly popular with research scientists and conservationist NGOs.

Key to our understanding of GIS is the information layer—a map page showing a specific type of information, such as political boundaries, physical features, economic activities, cultural attributes, or any of a large number of other possibilities (Figure I-9). A GIS project will have multiple layers of information that can be called on to answer a specific question or to address a specific issue. For example, layers may be combined to show electoral districts and income levels in a city (Figure I-10);

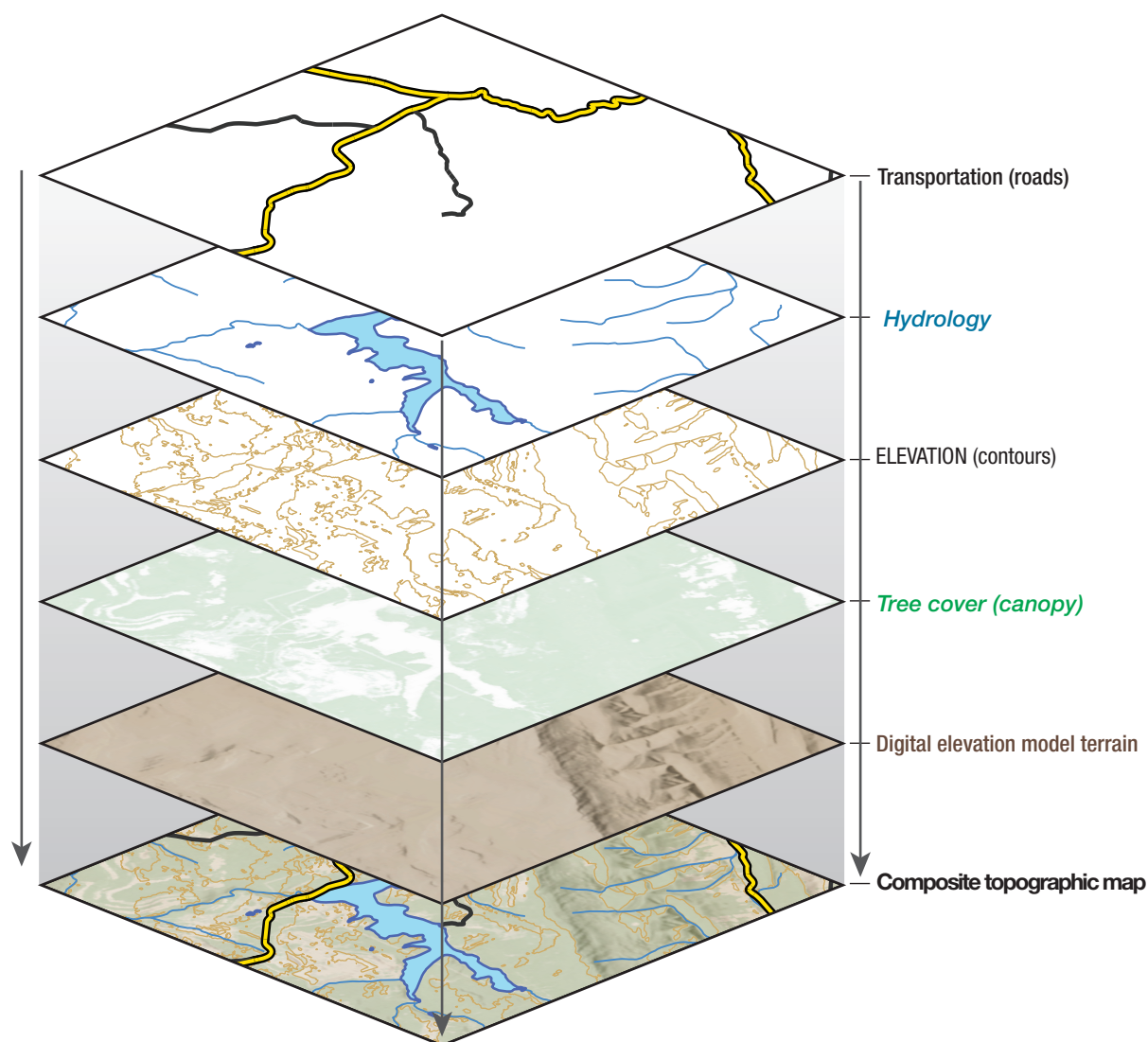
another set of layers may be used to show fire-hazard potential in a national forest, given certain vegetation types and climatic conditions. Distances, areas, and volumes can be computed; searches can be conducted; optimal routes can be selected; and facilities can be located at the most suitable sites. In a fully integrated GIS implementation, some layers may contain satellite imagery or other remotely sensed information, and other layers may contain line data (road networks or county boundaries, for instance) that can be superimposed on the imagery.

The use of GIS is exploding. Governments use GIS to track everything from power lines to demographic profiles. Businesses find geographic information helpful to locate facilities and to develop markets. Law enforcement agencies employ electronic maps to identify crime “hot spots” and to build “geographic profiles” of criminals. Militaries of the twenty-first century rely on GIS for terrain analysis and battlefield information. Political campaigns have discovered the value of mapped profiles of potential voters and the issues that interest them. The list is almost endless. Geographers find that their GIS skills are in high demand by employers in both the public and private sectors, not to mention the everyday life uses like mapping and Google Earth.

Geography and Its Disciplinary Neighbors

Geography is a spatial science that focuses on the location of human and physical phenomena, and their interactions within terrestrial space, which explains geographers' fascination with maps. Geographers are as interested in understanding earth space itself as they are in examining the institutional or physical characteristics of objects that occupy that space. This spatial emphasis has two implications for understanding geography's relationship with neighboring disciplines. First, geography is a bridge between the social and physical sciences, and possesses many characteristics of both areas. Take a look at a typical road map, for example, and note the references to mountains, rivers, cities, boundaries, and roads—all on the same map. While most maps are not so encompassing, the road map demonstrates how geography requires an understanding of both human and physical phenomena. In a different example, a geographer who studies the growing of wheat on the Great Plains needs information on the climate, soils, and landforms of the region (the physical sciences), as well as knowledge of the farmers' cultural characteristics, the transport network, the costs of wheat farming in relation to other economic opportunities, and a host of other socioeconomic factors (the social sciences). For that reason, geography is referred to as a **holistic discipline** that synthesizes knowledge from many fields.

Consequently, geography also touches many related disciplines in both the social and physical sciences (Figure I-11). For example, a political geographer may have interests shared with political scientists, a historical geographer with historians, a biogeographer with biologists, and a GIS person with computer scientists. The list goes on. Remember, however, that the geographer is distinguished from these neighboring disciplines by his or her spatial perspective; other disciplines do not have a spatial starting point, although they may deal with some of the same objects or phenomena.



▲ **Figure I-9 A hypothetical GIS design.** Within a GIS, environmental data attached to a common terrestrial reference system, such as latitude/longitude, can be stacked in layers for spatial comparison and analysis.

Here is an example of how geographers interact with related disciplines, using the case of the economic geographer. Economists are interested in the production, distribution, and consumption of goods and services. They study how people use resources to earn a livelihood, investigating such topics as the costs and benefits of resource allocation, the causes of changes in the economy, the impact of monetary policies, the workings of different economic systems, the problem of supply and demand, and the dynamics of business cycles and forecasting. Economic geographers are also concerned with how people earn their livelihoods, but economic geographers look at where the economic activity takes place and what factors—such as the availability of labor, raw materials, and markets—along with certain physical attributes, influence that location. Economic geographers are less interested in learning about the economics of the auto industry than in understanding why auto manufacturing is located where it is, keeping in mind that economic considerations cannot be ignored in understanding location. They want to know about the historical, physical, social, as well as economic contexts of auto plant location.

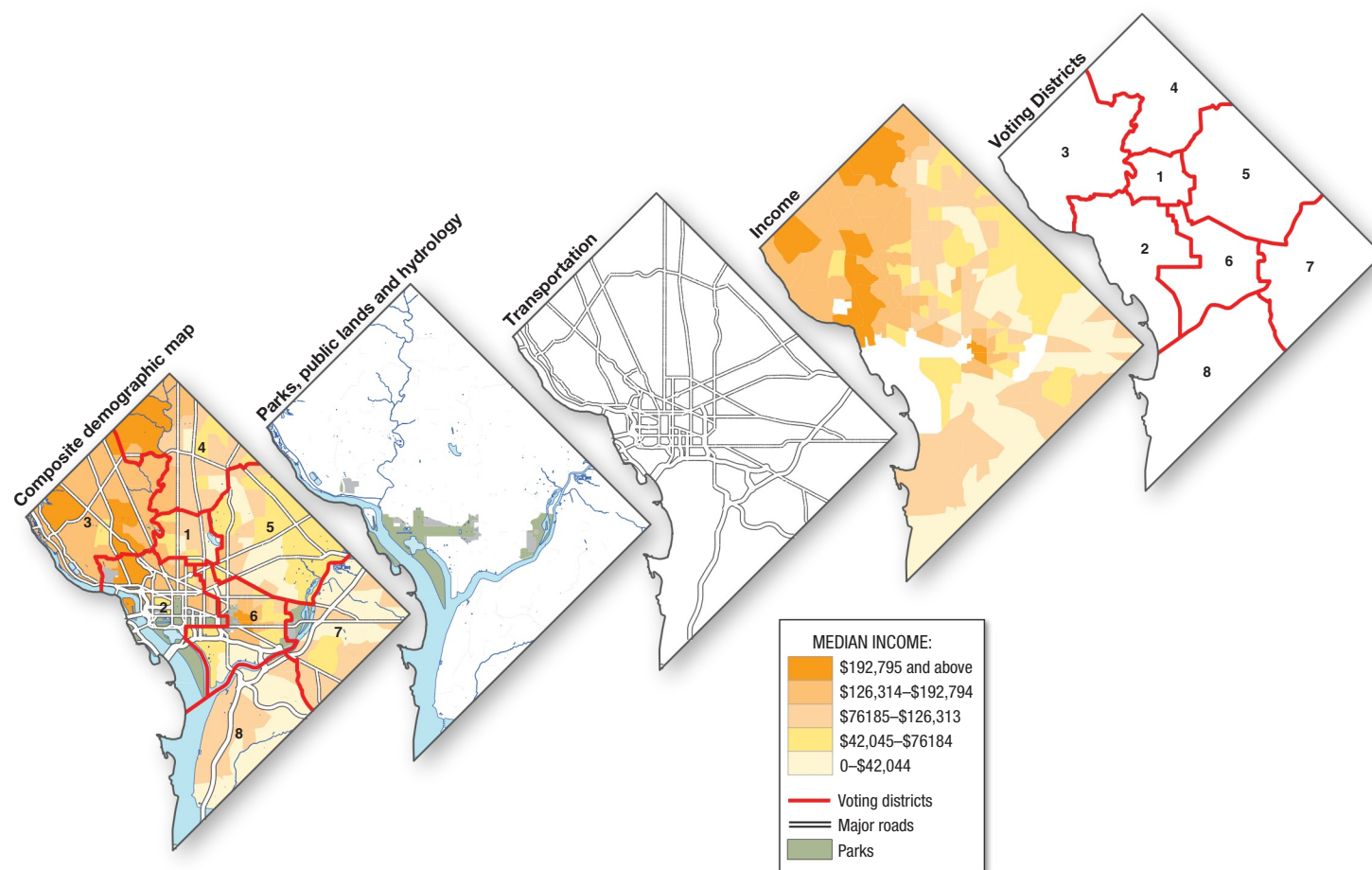
Geography is not the only integrating discipline; so is the study of history. But history uses a **chronological (time) framework**, whereas

geography's perspective involves a **chorological (place) framework**. Neither can be studied effectively without a knowledge of the other. Isaiah Bowman (1878–1950), former president of Johns Hopkins University, emphasized that “a man [or woman] is not educated who lacks a sense of time [history] and place [geography].”² By integrating information in a regional context, as we do in this textbook, the geographer pulls together knowledge shared with a variety of disciplines into a single, all-encompassing, whole. In so doing, geography can provide insights and understanding that would not be available through separate study of the individual elements.

Applied Geography

Modern geographers differ from their late nineteenth and early twentieth century predecessors in emphasizing explanation rather than description. They ask not only “where” questions but “why” questions. This shift in emphasis has increased geography's utility

²Quoted in Alfred H. Meyer and John H. Strietmeyer, *Geography in World Society* (Philadelphia: Lippincott, 1963), 31.



▲ Figure I-10 A hypothetical GIS application. This illustration shows how various types of map information can be electronically combined into a single presentation.

in solving many problems of our contemporary world. The result is increased employment in roles such as market and location analysts, urban or regional planners, cartographers, environmental analysts, and teachers.

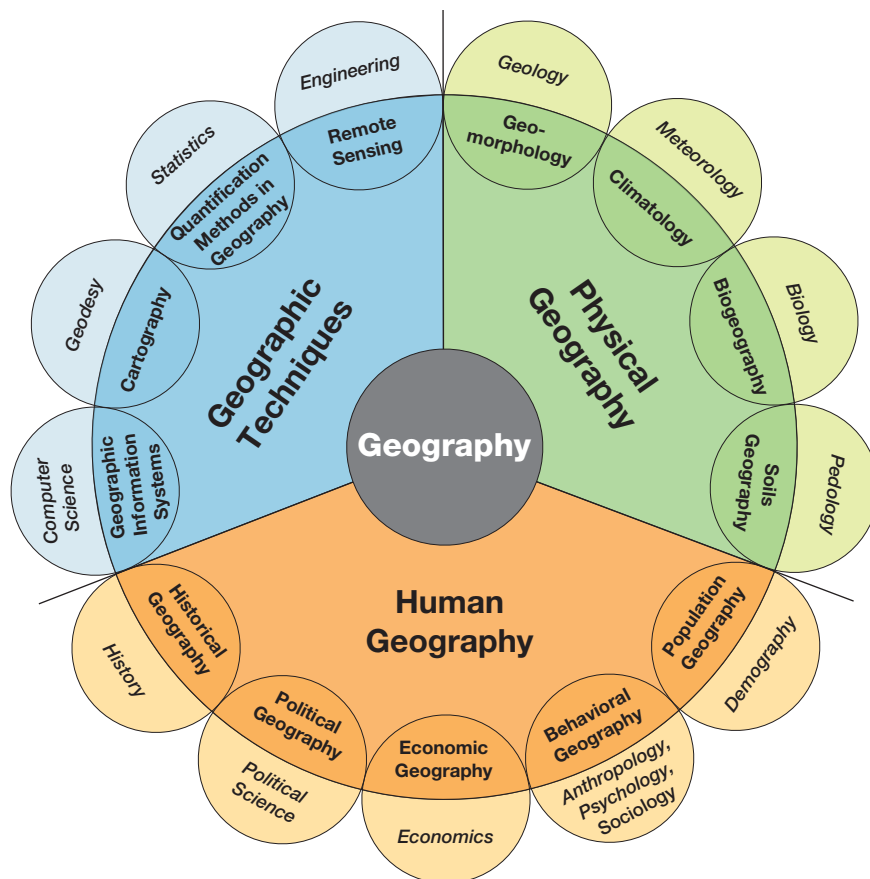
Education

Traditionally many geographers have been employed as teachers, although geography as a specific subject is taught with varying emphasis in different parts of the country and at different levels in the curriculum. Many Americans have little contact with geography as a formal subject after middle school, and the general public's geographic knowledge and skills are often inadequate. Reading a map is a basic skill, yet many people have difficulties performing this fundamental task. Many citizens find it difficult to locate other countries on a map and frequently know little about the cultures, values, and beliefs of other communities. The *Goals 2000: The Educate America Act*, passed by Congress in 1994, designated geography as one of several fundamental subjects that deserved more attention in school curricula. National Geography Awareness Week has been promoted since the late 1980s as a way to encourage a wider positive perception of geography's contemporary importance. Since 1989, the National Geographic Society has sponsored the National Geographic Bee; this contest tests the geographic knowledge of middle school students in a series of local and state competitions that culminates in a "final exam" between the 50 state winners (Figure I-12). Beginning in 2001, the College Board has

included geography in its advanced placement course system and has offered advance placement geography exams as part of its SAT (scholastic aptitude test) array. Where there are increasing numbers of students taking geography courses, there are also opportunities for larger numbers of geographically trained teachers! This development is good for both American education and for newly minted teachers, since the ways in which the United States is connected to the larger world—from the need for products and materials not readily available in the United States, to migrants fleeing adverse economic conditions in their homelands, to foreign policy entanglements—will only grow greater as we move deeper into the twenty-first century.

Business

Many of the skills that geographers possess, particularly those related to location, are very useful in the business world. Many geographers have found employment as locational analysts or environmental consultants. Banks would be foolish to make loans to new businesses or to established companies wishing to start new outlets or franchises without first determining whether the proposed location is an economically advantageous one. It is as important to the financial institution lending start-up money as it is to the business owner to know that the new restaurant or comic book store or gift shop will make money. How else can the bank be sure that the principle and interest on its loan will be repaid? Many large companies retain their own internal group of locational analysts who travel from site to site, study the relative benefits of



▲ **Figure I-11 The scope of geography.** Geography is a synthesizing and integrating discipline. This diagram shows that geography interrelates with many fields of study, including the physical sciences, engineering, social sciences, and humanities.

central city as opposed to suburban locations, examine the purchasing power of the citizens of a particular community or neighborhood, assess traffic patterns to ensure a new outlet is accessible to a high volume of potential customers, evaluate the likely competition that rival firms might represent in the area, and predict the direction that patterns of growth and decline in the regional economy are likely to experience. Once all the data are assembled, it is possible to determine whether a proposed location is a good one or not.

The skills of physical geographers and students of environmental hazards also have application to real world problems. Concerns about the environmental impacts of economic development require the preparation of environmental impact statements before a project can proceed. Federal law requires that changes with impacts on the environment, such as new housing developments, industrial plant expansion plans, road construction, wetland drainage, and many other activities, must be identified, their scope assessed, and potential damages mitigated before a project can begin. Geographers have often played a major role in environmental impact assessment as well as in the emergency management of hazards, both natural and human-caused (Figure I-13).³ Geographers have also employed their general knowledge of foreign areas by helping companies understand the challenges and opportunities that businesses in those places are likely to encounter, as well as providing cartographic, climatological,

³David Alexander, *Principles of Emergency Planning and Management* (New York: Oxford University Press, 2002).



▲ **Figure I-12 The National Geographic Bee in 2013.** For twenty-five years and counting, National Geographic and state Geographic Alliances have sponsored a competition involving “bees” at ascending geographical scales. The 50 state winners meet in Washington, D.C. for the ultimate showdown, won in 2013 for the first time by a middle school student from Massachusetts.

geographic information science analysis, travel agent, and consumer behavior services to firms and individuals wishing to conduct business outside the North American continent.

Government

Second to teaching, more geographers probably apply their skills to government agencies than to any other area. At a local level, many are municipal or regional planners, charged with facilitating orderly residential, business, and industrial growth and redevelopment. On a national level, knowledge of distant places and cultures, often in combination with remote sensing, map interpretation, and GIS skills, provide geographers with analytical abilities that are much in demand in government agencies. The Office of the Geographer in the Department of State is a focus of geographic activity, as is service in the diplomatic corps. The United States Agency for International Development (USAID) also includes many geographers whose expertise in resource analysis, regional development, planning, and sustainability science provides

▼ **Figure I-13 Tornado devastation in Moore, Oklahoma.** A tornado with winds over 200 miles per hour hit Moore on 20 May 2013, killing 23 people and causing over \$2,000,000 in damages. Despite a history of severe tornadoes in this area, few shelters exist in private or public buildings to reduce loss of life.

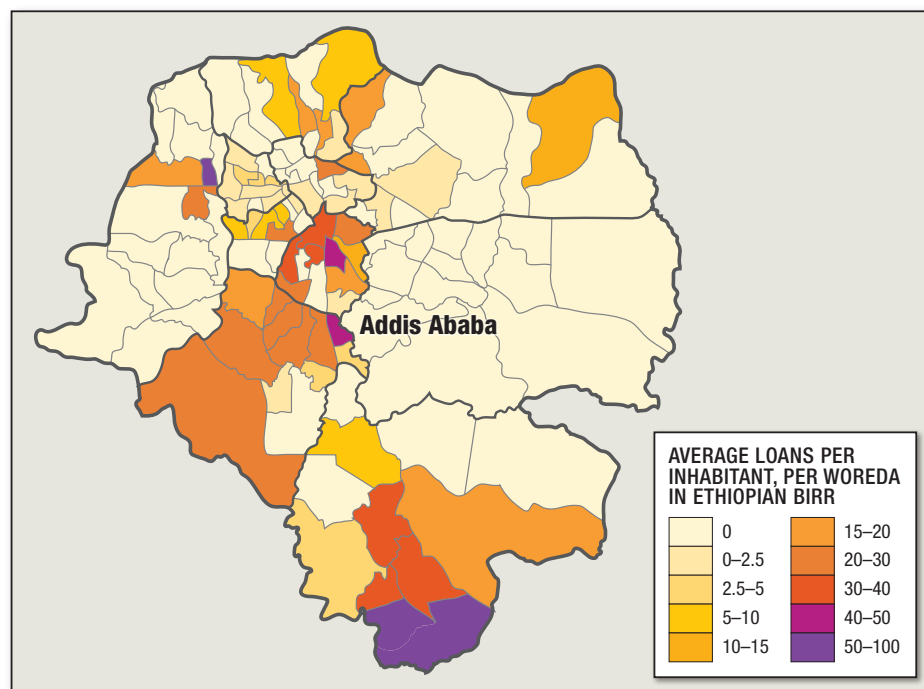


valued services. Internationally, geographers often work closely with agencies of the United Nations such as FAO (Food and Agriculture Organization), UNEP (United Nations Environment Program), and the United Nations University, as well as with international financial institutions such as the World Bank and the Inter-American Development Bank. For geographers who view governmental agencies as excessively bureaucratic and too “top down” in their approach to promoting economic development, NGOs (non-governmental organizations) engaged in grassroots development activities have provided a productive outlet for energy and initiative.

Humans suffer from two types of economic poverty: sudden disaster, such as war, hurricane, or famine and lack of economic development caused by complex historical and environmental factors. MapAction creates maps in disaster zones that present information about disaster situations on critical subjects, such as concentrations of people, emergency health care, logistics, or emergency shelter. Disaster victims need food, shelter, and medical care, and these maps help practical relief organizations such as the Red Cross to accurately deliver aid to the people in greatest need.

Global MapAid (GMA) compliments disaster relief by mapping longer-term solutions to poverty, often starting immediately after the disaster relief phase ends. These maps show victims of poverty or disaster returnees where to get help from medical facilities, government offices, and anything else of practical value. Vivaly, GMA also makes poverty solution maps to promote sustainable employment in poverty zones, with maps combining overlays that match up vocational educational schools and microcredit organizations with their student catchment areas. These maps are used by both victims of poverty and NGOs interested in getting afflicted people into gainful employment, which in turn empowers them to take care of themselves rather than relying on others. In this way, all stakeholders—media, relief agencies, donors, and those in need—can coordinate the daunting task of rebuilding homes, reconstructing lives, and promoting development.

The work of GMA demonstrates one way in which geography can be applied to real-world situations and can make a difference in human lives. The GMA map in Figure I-14 shows the distribution of



▲ **Figure I-14 Geography @ Work in disaster aid.** Lending money to marginalized people with good ideas for a new business helps promote initiative and development. Identifying areas where loans have been made helps clarify the parts of Addis Ababa most likely to benefit from future microfinance programs in this example of GlobalMapAid’s work.

Source: copyright © Global MapAid. Reprinted by permission.

microcredit across the capital city of Ethiopia, Addis Ababa in 2013. The lighter areas illustrate areas of greater need where the ratio of loan money to the underlying population is lower. These areas would probably be worthy of consideration for more microcredit by donors and microfinance institutions.

Increasingly large numbers of geographers are engaged in employing geographical skills to the pragmatic world of improving people’s daily lives. And increasingly large numbers of people, geographers or not, are engaged with geography through GPS devices, storm tracking, Google Maps, maps on Facebook, and many other applications.

Summary

► This overview explains what geography is about. Geography is a spatial science that focuses on the location of human and physical phenomena, and their interactions. These interactions include relationships between people and their environments.

► Central issues for geographers include the “where,” “why,” and “so what” questions. Geography is a holistic discipline that is integrative in its spatial approach and touches on a variety of sister disciplines. Above all, geography matters!

Key Terms

Alexander von Humboldt I-6
 area studies tradition I-7
 Aristotle I-4
 behavioral perspective I-7
 chorological framework I-10
 chronological framework I-10
 earth science tradition I-7
 Eratosthenes I-4

feminist perspective I-7
 geographic grid I-5
 geographic information systems (GIS) I-9
 geography I-3
 Herodotus I-4
 holistic discipline I-9
 human geography I-7

Karl Ritter I-6
 man-land tradition I-7
 Muhammad al-Idrisi I-5
 physical geography I-7
 postmodern perspective I-7
 Prince Henry the Navigator I-5
 Ptolemy I-5
 regional geography I-8

spatial perspective I-5
 spatial relationships I-5
 spatial tradition I-7
 Strabo I-5
 systematic geography I-8

1 Geography and Development in an Era of Globalization

**Merrill L. Johnson,
Douglas L. Johnson, and
Viola Haarmann**

Give a Man an Animal...

Small-scale development initiatives have an astonishing ability to multiply and spread rapidly. Their transformative power is directly related to how closely they address immediate local needs. Securing adequate nutrition, particularly protein, is a universal human requirement. But poor people find this need difficult to meet, particularly when social and environmental constraints are great and are deeply embedded.

Fortunately, a potential solution is readily available—animals. Many nongovernmental organizations (NGOs) feature animals among their development programs because each female animal has the ability to reproduce many times. A model and leader in this style of development is Heifer International, which began operation in 1944, and has since expanded from large stock (cows, camels, water buffalo, llama) to small stock (goats, sheep, pigs, rabbits, guinea pigs) to still smaller animals (chickens, ducks, honeybees). The operating strategy is simple: once a potential development community is identified, animals suitable to local needs and culture are identified, eligible recipients are trained, and each recipient is given an animal. Beginning initially with heifers (young, full-grown cows, often pregnant with their first calf) intended for World War II relief in postwar Europe, the program has grown to include over 120 countries. The recipient of a heifer is required to give the first female offspring to a properly vetted neighbor. Decisions on who receives a gift heifer are informed by advice from a local village council, as well as local Heifer staff. Each person who receives an animal is obligated to give an animal to someone else until everyone in the village who wants livestock or poultry has access to their own animals.

Each animal keeper's herd or flock can grow until it reaches a limit imposed by available fodder or family needs. Because the offspring of the original gift animal and their offspring can be sold to meet domestic expenses, the animal population never increases exponentially. Male animals are sold for their meat or muscle power, female animals generate surplus milk sold fresh or converted into dairy products, and hair and wool from both are valuable for domestic crafts that also have income-generating prospects. Animal owners find themselves owning a capital resource that grows faster than the compound interest earned by deposits in a bank. This development strategy has become an important grassroots approach used by many NGOs as part of their development project portfolio.





Read & Learn

- ▶ Define “development” and list the various ways in which it can be interpreted.
- ▶ Describe the major economic revolutions and show how they inform our understanding of development.
- ▶ Explain population growth through human history and link this to development.
- ▶ Identify and characterize the major “players” in the globalization process.
- ▶ Discuss the environmental challenges facing the world today and connect these challenges to human activities and the development process.
- ▶ Define “environmental stewardship” and outline this concept in the context of development.
- ▶ Describe cultural attributes and processes and how these influence development.
- ▶ Evaluate the role of per capita income in the development process and suggest other measures.
- ▶ Characterize the actual and potential role women play in development.
- ▶ Examine the role of different energy sources in sustainable energy futures, particularly for populations currently without access to electricity.

▲ An extended Kenyan family proudly displays its dairy goats, obtained through a Heifer International project.

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- Environment, Society, and Development 20
- Geographic Dimensions of Development 43



1

Geography and Development in an Era of Globalization

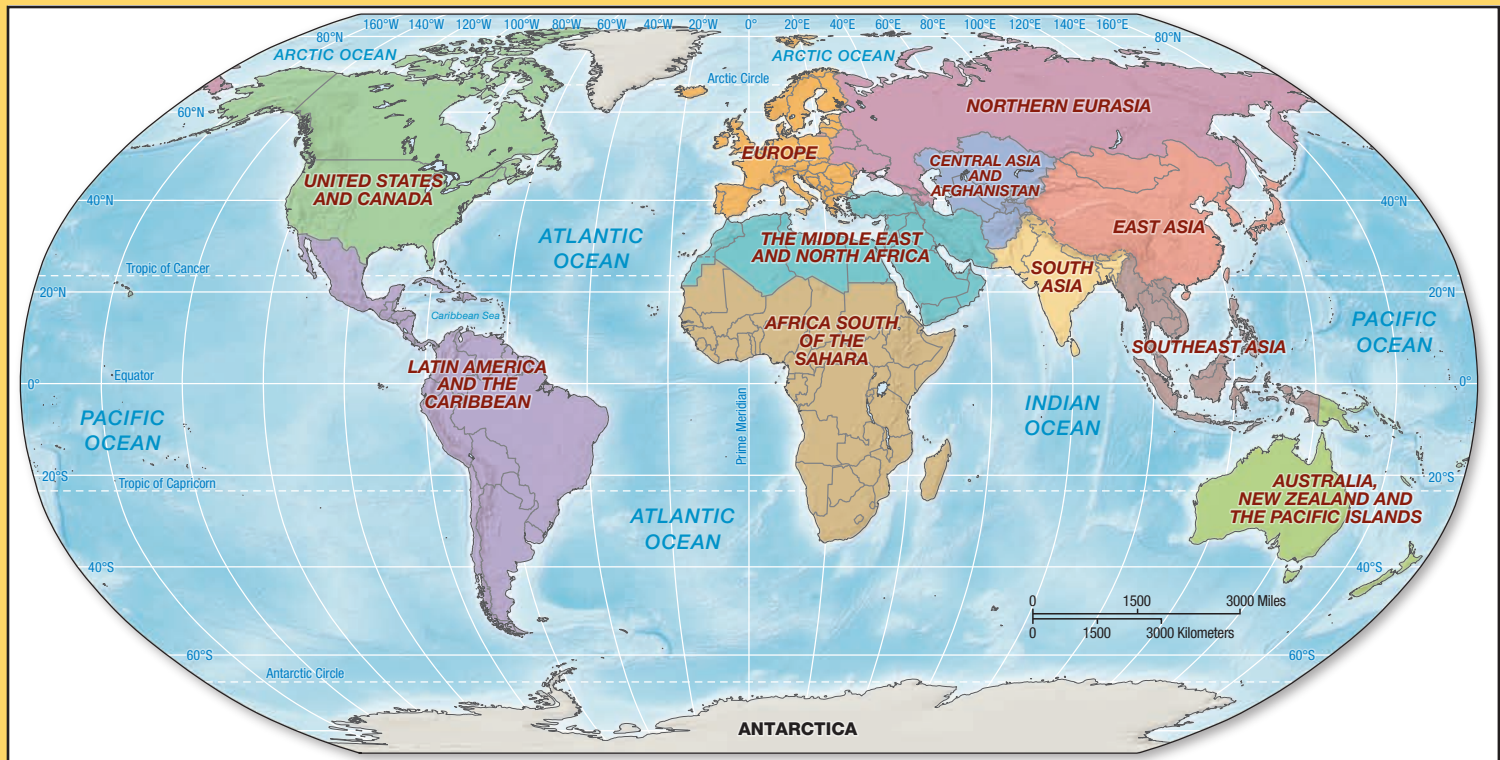


Figure 1-0 The major regions of the world.

World regional geography explains where places and activities are located, and why. We identify 11 major regions in which broad natural, cultural, historical, and economic patterns show many similarities. Within each large region, smaller regions of different sizes exist, each possessing features similar to, as well as distinct from, those of their larger region. Australia is a very different place from Fiji! People living in each place have different origins, grow different crops, have different cuisines, can access different resources, are exposed to different hazards, have created different cultures and technologies, understand their world and find meaning for their existence in different ways, and communicate through different languages and media. Why this complex mosaic of place-based regions exists, how these regions are developing as globalization brings distant places into increasingly close contact, and what prospects people have in each region to improve the material and nonmaterial quality of their lives is the focus of this book.

The word **development** is used in a variety of ways. Basically, it denotes a progressive improvement of the human condition, in both material and nonmaterial ways. Economic development signifies a process of long-term advancement in the physical and material quality of life. Development also has nonmaterial dimensions, many of which relate to the achievement of personal fulfillment through the exercise of individual freedoms. Because most nonmaterial aspects of development cannot be easily measured in a numerical or statistical sense, this volume is organized primarily on the basis of economically developed and less-developed regions. Economic development can be measured in several ways—by income, energy use, employment, and various other indicators. Such measures must be kept in proper perspective, for each may tell us little about other aspects of an area, a country, or a people. For example, differences in income may simply reflect more basic differences in cultural goals and values. Therefore we also address other aspects of development, including social class structure, health, educational achievement, gender relations, and political and religious freedom.

After an overview of the meaning of development in an age of globalization, we consider the natural environment, primarily from the standpoint of resources and how people use those resources in more or less sustainable ways. We also pay attention to elements of culture, especially those that influence development. We use measures of economic well-being to define the more-developed and less-developed regions of the world, discuss their characteristics, and present some theories of development. This discussion sets the stage for further exploration of the more-developed and less-developed regions of the world.

Development and Globalization

It is trite but true to remark that the world is getting smaller. Not only are we bombarded daily with news from around the world, but events in other countries also influence our daily lives. The attack by radical Islamic terrorists on the World Trade Center in

New York in 2001 claimed nearly 3,000 lives, and brought home to Americans the intensity of conflicts in the Middle East. In less violent and catastrophic ways, but with serious consequences in terms of job loss, today most clothes are made in Asia rather than in the United States, and call center jobs are frequently outsourced to India and other countries. A coffee crop failure, the development of a new high-yielding variety of wheat, the discovery of a new chemical process, an outbreak of a new flu strain, and scores of other distant events originating in distant places may all materially affect the way we live.

The Meaning of Development

This book takes a developmental approach to the understanding of world regional geography. One of the most serious ethical issues of our time is the great disparity in material and nonmaterial well-being that exists among the world's societies. With a more intimate world brought about by better communication and transportation, knowledge of how others live is at our fingertips. Economically less fortunate individuals and communities often aim to follow more rapidly the development path of their materially richer neighbors, but may be frustrated in their attempts by cultural, social, and political constraints (Figure 1-1). The disparity in economic achievement is widening, and the social and political ramifications affect us all. The causes and consequences of that development disparity provide the focus and theme of this volume. We begin by examining the various meanings of development, how the term is used in this book, and the manner in which development can be examined in an era of globalization.

Development—What's in a Name?

The term “development” is complex in its meanings and implications. Development embraces more than economic improvement, although the economic component figures prominently and normally comes to mind when hearing the word “development.” Scholars also study issues related to social and political development, and

▼ **Figure 1-1 Favela Morumbi in Sao Paulo.** Urban areas often display sharp landscape contrasts, but few are more stark than the close location of wealth and poverty in many cities.



on occasion consider a psychological component. Development is only one of many terms applied to the processes of change, or lack of change, that have come to distinguish the economic and political circumstances of different countries. Indeed, there is a tyranny of labels—“undeveloped,” “stagnant,” “emerging,” “less developed,” to list but a few—with each producing meanings that may or may not be helpful in understanding the change process. Although an industrializing country’s economic performance may be deficient when measured by these standards in comparison to postindustrial states, the same country may be very highly developed in other dimensions of human activity, such as art, homeopathic medicine, environmental values, or care of the elderly. In this book, we generally use expressions such as “developed,” “developing,” or “less developed” to describe material and nonmaterial aspects of growth and change in countries and regions. In addition to material indicators, such as gross national income, industrial output, or foreign trade balance, commonly employed nonmaterial parameters might include nutritional status, adult literacy rate, demographic trends, and life expectancy at birth.

Development—Toward a Definition

Development means different things to different people; but for our purposes development refers to a progressive improvement of the human condition in both material and nonmaterial ways. We should be aware of certain assumptions that guide our understanding of what this path to improvement looks like.

First, development is a process of change that may or may not embrace the developmental ideals associated with North America and Europe. The paths to modern economies followed by Americans and Europeans may not be workable and/or desirable in other countries, given their specific cultural and environmental contexts. For example, American farmers use tractors and combines to achieve a high level of agricultural productivity per farm. Are tractors and combines really needed to increase productivity and improve well-being in many peasant-farm settings? If so, what will be the consequences for densely populated rural areas?

Second, development is a process of change that is not necessarily synonymous with economic growth. In market economies, a high priority is placed on increasing output—more production is good! But improvement of the human condition may or may not be immediately associated with growth in the production of goods and services. Improvements in welfare may come from such simple expedients as providing clean water to an isolated rural community, which may make village families happy and healthy but is unlikely to cause a spike in the local stock market. Some cultures may object to the materialistic impulses that create economic growth.

Third, development also is a process of change that is sustainable in the dual sense that improvements in human welfare today should not be achieved at the expense of future generations and should be made in a manner sensitive to environmental impacts. For example, exploitation of natural resources to extract as much value in as short a time as possible without regard to long-term implications is not a sustainable development strategy, even though short-term profits and economic growth might be impressive. Overusing an aquifer in an arid environment to promote agricultural development would only be acceptable if the resulting development and profits are part of a conscious strategy to produce a set of activities that could endure for a long time in the future.

We can define development as a process of change that leads to improved well-being in people’s lives, takes into account the needs of future generations, and is compatible with local cultural and environmental contexts. Consistent with this definition and the assumptions that support it, we can identify four components—people, natural environment, culture, and history—that figure prominently in the development process, particularly economic development. An important component of the economic development process is people—their numbers, distribution, consumption, production, and technology base. Improved sanitation and medical science have lowered death rates sharply over the past two centuries and caused unprecedented world population growth. If the additional workers prove, through the adoption of improved technologies, to be more productive than their ancestors, material levels of living will increase despite population growth. If, however, production levels remain constant or decrease, living conditions will decline.

The natural environment of a country or region provides both the stage for development and the materials necessary to achieve developmental goals. Some environments have abundant supplies of raw materials that can be used for economic gain. For example, the well-watered alluvial floodplain of a river, coupled with a long growing season, provides many opportunities for productive agriculture (Figure 1-2).

Culture—the way in which a society organizes itself in terms of beliefs, values, customs, and lifestyles—greatly influences both the direction and the degree of economic development. Many cultures embrace materialistic values, wherein the acquisition of material wealth is viewed as an index of individual worth and success. Other cultures do not place so high a priority on material achievement (Figure 1-3). The social and political structure of a society also has a direct influence on development. Some countries have achieved a relatively high level of social and political equality, assuring the fullest possible development of their human resources. Others are characterized by rigid social stratification, gender inequalities, and political control by elites that prevent large portions of their populations from achieving their true potential. Similarly, the collective values of some cultures

▼ **Figure 1-2 China’s Yangtze River delta and alluvial plain.** Rich farmland has long dominated land use in coastal and riverine China. This tradition continues as the new bullet train crosses the Yangtze delta on an elevated track that conserves precious farmland.





▲ **Figure 1-3 Children explore a laptop in Australia.** Traditional values and modern technology are integrated seamlessly in the lives of these children as they examine their world and its possibilities.

encourage the adoption of new ideas and technologies, while those of others discourage experimentation and change.

Concurrently, never forget history. That the past is a key to the present and a guidepost to the future is well demonstrated in the formation of the world's various cultures and their economic activities. Economic development is not a short-term process. In most places that are now undergoing rapid change or have attained a high level of economic well-being, the necessary foundations or prerequisites for economic development were laid decades, even centuries, ago. For example, the cornerstones of Europe's Industrial Revolution, which began in the middle of the eighteenth century, were formed during the Renaissance, with beginnings in Roman and Greek times and even earlier.

Stop & Think

► The "development" process is not strictly economic and does not necessarily mean "growth." Explain.

Human Transitions and Development Processes

Current interest in economic development obscures the reality of the long-term nature of development and change. For every contemporary development, there is a deep history of growth and change in values, technologies, and understandings of the world we live in. Transitions that appear abrupt are only observable in retrospect, and the economic revolutions that we tend to emphasize are invariably preceded by long, slow developments in social, political, and cultural spheres.

The Significance of Economic Revolutions

The development process involves a change or a transition of some sort—preferably one leading to economic, political, and/or social improvement. Typically such change is slow and plodding, and hardly perceptible over time. At times, however, change occurs rapidly and massively, leading to a fundamental transformation of society. Such

a transformation is commonly referred to as a revolution. It may be a political, economic, or social revolution; but in every instance it involves a transition that is fundamental, a change that transforms society to its core. The American Revolution, for example, led to a fundamental change in the structure of U.S. politics and government.

Perhaps 10,000 years ago, people learned how to domesticate plants and animals, leading to one of the world's most transforming economic developments—the **Agricultural Revolution**. Instead of wandering around eating whatever Mother Nature's bounty provided, people gradually settled down and started raising crops. Rather than relying on hunting game and fish, they began herding livestock and breeding animals. New technologies were introduced, from the simple hoe to more complex irrigation systems. The ancient Egyptians, for example, developed lift devices to divert water from the Nile River to irrigate some of their fields during low-flow periods of the year, an innovation that thoroughly transformed their capacity to produce crops and create surpluses.

A key to understanding the meaning of the Agricultural Revolution is to understand the significance of **agricultural surplus**. Before the domestication of plants and animals, people lived literally hand-to-mouth, and everybody was involved in the process of finding food. With domestication, agricultural productivity soared to the point that some farmers produced more than they consumed, creating surpluses. Consequently, not everyone had to live on a farm and devote all their time to providing food and fiber. Towns and cities appeared, supported by the farmers' surpluses.

The first real towns and cities arose perhaps 8,000 years ago in parts of the world, often the floodplains of rivers, where agricultural productivity was greatest. Life in these settlements was more congested but was somewhat easier and more secure than life in the countryside. Permanent homes, even substantial houses, replaced the crude huts or caves that may have served as temporary lodgings for more mobile hunting and gathering peoples. Many tools and other large and small luxuries were acquired, such as chairs, tables, and beds, which previously were impractical because of the migratory way of life. Materialism may have had its true beginning with the development of agriculture. Possessions could be accumulated and passed on to new generations.

Thanks to surpluses and the growth of cities, economies and societies became more complex. Expanding populations, production, and interpersonal contact required increased group action and led to the growth of secular leadership organizations. Political organizations were established to settle disputes, govern, and provide leadership for collective action in warfare and in such public works as irrigation, drainage, and road building. The formation of a priestly class helped formalize religion. Religious leaders were frequently the holders of both philosophical and practical knowledge, often serving as medical practitioners and weather forecasters. In the Mayan civilization of southern Mexico and Guatemala, for example, priests developed an agricultural calendar based on the progression of the sun, the planets, and the stars. It predicted the beginning of wet and dry seasons and told farmers when to prepare the land for planting to take full advantage of the seasonal rains. As increased production per worker yielded more than a family unit needed, a portion of the labor force was freed not only for government and religious activities but also for activities such as pottery making, metallurgy, and weaving (Figure 1-4).

The connection between the production of surpluses and the appearance of complex, urban-oriented societies occurred only in the most environmentally favored locations—the Nile River valley, the valley of the Tigris and Euphrates rivers, and the Indus River valley to name only a few locations. Elsewhere, the benefits of the Agricultural Revolution were limited to a more sedentary version of a subsistence existence, which was still an improvement over the migratory hunter-gatherer societies that existed previously.

In a sense, the agricultural revolutions have never completely ended. A second revolution began in Europe in the mid-seventeenth century in which new technologies and procedures were applied to farming, partly to increase farming's commercial potential. By the twentieth century, still another revolution occurred that replaced most farm labor with machinery and eventually led to a corporate takeover of many family farms. A single farm could now support dozens of non-farmers. In our lifetimes, a biosciences revolution has altered the nature of agriculture by introducing fundamentally new crop varieties capable of generating dramatically higher yields. The **Green Revolution** combined selected high-yielding crop varieties with technological packages of fertilizer, pesticides, water management, and capital to boost yields. Detailed knowledge of the genetic makeup of plants and animals has permitted microscopic cutting and splicing of DNA chains and the transfer of genes from one species to another. The result is the creation of genetically modified crops with potentially much improved yield characteristics but unknown potential impact on the biosphere.

Remember what a revolution is: a fundamental change in the way that something is done. By the mid-eighteenth century, it was time for a fundamental change in the way that goods were made—a manufacturing or **Industrial Revolution**. Manufacturing is a human activity that has existed since before the beginning of civilization. The prehistoric cave dweller who chipped a piece of flint into a spear point was involved in manufacturing. So were the ancient Greeks and Romans when they shaped pottery out of clay and transformed ore into metal ornaments. But this manufacturing process relied on manual labor (hence the term “manu” facturing) and relatively unsophisticated forms of technology. In the medieval period, for example,

the shoemaker depended on his hammer, shaping tools, and a strong arm to make shoes; the blacksmith had his fire, bellows, anvil, hammer, and an even stronger arm to bend iron; and the tailor made use of his needle, thread, and the dexterity of his hands to stitch cloth. This type of handicraft manufacturing was slow and inefficient, although quality could be, and often still is, very high.

Everything changed beginning in the mid-1700s. Europe and North America entered an age of mass production of manufactured goods, using much more sophisticated technology and large industrial workforces. This fundamental change in manufacturing represented a response to at least two major forces: First, an age of innovation had dawned thanks to the thinking and discoveries of the Renaissance, which led to the introduction of new technologies to speed up the production of goods. In 1769, for example, James Watt developed a practical steam engine. His innovation paved the way for a wholesale mechanization of the manufacturing process and for the steam engine to become the main source of power for the Industrial Revolution in its first century and a half. Coal became the industrial fuel of choice, replacing biofuels such as wood or charcoal. New furnace-based technologies emerged to replace the time-tested, but highly inefficient, charcoal method of iron processing. New spinning and weaving technologies made the volume manufacturing of cloth much more efficient. Machinery replaced muscle power and inanimate energy replaced animate energy. Second, the way in which production was organized changed drastically. Manufacturing no longer was a single activity done by a craftsman in his shop, but a volume enterprise carried out in a factory—a stand-alone building containing a full-time industrial workforce and an array of machines. Demand for processed goods exceeded what the cottage industries and craft shops of the day could produce, and the more efficient factory was the only way to supply this demand. Over time, craftsmen and small guilds gradually disappeared or remained in isolated pockets as quaint reminders of a pre-Revolutionary past. The factory came to epitomize all that the Industrial Revolution was about, as well as to symbolize the social and environmental price paid in the name of production efficiency.

The Industrial Revolution spawned companion revolutions. Development of the steam engine led to a transportation revolution. Steam power was first applied to maritime shipping in 1807; by 1829, steam railway locomotives were being built. Steam power significantly diminished the **friction of distance**, or the difficulty of moving from place to place. Before railroads, a traveler walking the 948 miles (1,525 kilometers) from New York to St. Louis took more than six weeks to make the journey; by 1870, with railroads, the trip became a matter of about three days; today a commercial airliner can cover the distance in under three hours! Transportation efficiency contributed to production efficiency in manufacturing centers. The Industrial Revolution promoted the agricultural revolutions by creating a new way of doing things down on the farm. Tractors, combines, and other equipment quickly replaced sweat and muscle in the cultivation of crops, which created a large farm population looking for another line of work. Most of that work took the form of factory jobs in cities, which contributed to a massive population transfer as people

▼ **Figure 1-4** Mayan ruins at Palenque, Chiapas, Mexico. Surpluses supported the specialization in production and crafts that sustained increasingly elaborate material forms and urban structures.



swarmed into the cities in search of work. The impact often was profound. The village of Essen, Germany, for example, had 4,000 people in 1800; by 1920, there were 439,000 people working in a highly industrialized city. Similar stories can be told for the United States. In 1800, the vast majority of people worldwide lived in the countryside. By 2000, an overwhelming majority of people in developed countries lived in towns and cities.

Currently an **Information Revolution** is reshaping societies, economies, and personal lives. Who in the twenty-first century can imagine living without a cell phone or laptop computer? We are part of what increasingly is called the Information Age and/or the New Economy. We are really looking at the second great information revolution. The first such revolution we can trace back to Johann Gutenberg, a German, who in 1450 built the first printing press. It would be hard to overstate the fundamental changes that occurred because of the printing press.

Communicating information is a basic human activity—even prehistoric cave dwellers conveyed information when they painted pictures of animals on cave walls. It is a matter of how the information is produced, stored, accessed, and applied that creates a revolution; in the Information Age, it all boiled down to a single transforming technology: the microprocessor. Mechanical computers have existed for some time—even the ancient abacus can be considered a type of computer—but it took the miniaturization and integration of electronic circuits to create the fundamental changes that led to the current Information Revolution. The first true electronic computers appeared after World War II and required a whole room to do what a good smartphone does today. More space-efficient mainframe computers followed, and by the 1990s desktops and laptops became everyday appliances. In the twenty-first century, thanks to constant innovation, hardly anything is done without computer involvement (Figure 1-5).

In partnership with the microchip, we must also credit innovations in communications technology for the revolutionary changes of the late twentieth century. The Internet permits nearly

▼ **Figure 1-5 Auto assembly plant in Wuhan, China.** Highly automated and computerized assembly lines typify Chinese automobile manufacturing. The growth of industry in Hubei province, focused on Wuhan, reflects the steady development of inland centers of industrial development in China.



instantaneous communication worldwide between connected computers. Satellites and cellular phone technology have made wireless voice and data communication the norm rather than the exception. Time and distance constraints have not disappeared. They have been modified by the ability to contact a significant proportion of the rest of the world by simply punching in a number.

Stop & Think

► What is the power of the “surplus” to effect change, not just in economic terms but in social conditions?

Where Does Population Change Fit In?

Revolutions create many fundamental changes, but some of the most pronounced and enduring transformations occur in the dynamic behavior of human populations. We briefly review how global population numbers have changed over time, and then examine selected population concepts and growth models that help us understand the pivotal role of population in economic change and development.

At the dawn of the Agricultural Revolution, when animals and crops were first domesticated, the world’s population was extremely low (Figure 1-6). Population clusters, usually associated with areas of agricultural surplus, later spread throughout the world, along with the diffusion of crops and animals. In a few places, such as Australia, the diffusion process was delayed until the coming of European colonists. Today, only in polar zones, remote drylands, and other harsh physical environments do small and dwindling numbers of people still live by the age-old occupations of hunting, fishing, and gathering.

At the beginning of the Christian era, world population totaled little more than 260 million people, most of whom were located in the Old World. The majority of those people lived within three great empires: the Roman Empire, around the fringe of the Mediterranean Sea and northward into Europe; the lands of the Han dynasty of China, which extended into Southeast Asia; and the Mauryan Empire of northern India. In those empires, the simpler political, economic, and social organizations of agricultural villages vied with the more complex, integrating structures of the empires and the newly created cities. Urbanism became a way of life. By 1650, the world’s population had grown to more than 500 million, despite interruptions of famine, plague, and warfare. Most of the growth was in and around the preexisting centers, with gradual expansion of the populace into areas once sparsely settled. Productive capacity expanded with improved technology and new resources. Urbanization, the process by which towns and cities are formed, became more pronounced, though agriculture remained the primary livelihood for most people.

Since 1650, the world’s population has increased rapidly. It took an estimated 1,650 years for the population to double from 260 million to 500 million. By 1850, just 200 years later, the population had doubled again to approximately 1.175 billion. Within the next 100 years, the population nearly doubled a third time, reaching 2 billion. By 1975, it had doubled yet again, to 4 billion. As of mid-2013, the world had more than 7.1 billion people; by 2025 it may exceed 7.9 billion.