





**WORLD
RESOURCES**
2000-2001

SOURCES

ACRONYMS

ACKNOWLEDGMENTS

NOTES AND
REFERENCES

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Acronyms

AAAS	American Association for the Advancement of Science	GAIM	Global Analysis, Integration and Modelling Task Force, International Geosphere-Biosphere Program
ACIAR	Australian Centre for International Agricultural Research	GCSSF	Governor's Commission for a Sustainable South Florida
AGIDS	Amsterdam Research Institute for Global Issues and Development Studies	GEF	Global Environment Facility
BGS	British Geological Survey	GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Pollution
BP/RAC	Blue Plan for the Mediterranean/Regional Activity Centre	GLASOD	Global Assessment of Soil Degradation
CANARI	Caribbean Natural Resources Institute	GOOS	Global Ocean Observing System
CARPE	Central African Regional Program for the Environment	GUO	Global Urban Observatory
CDIAC	Carbon Dioxide Information Analysis Center	IAI	Inter-American Institute for Global Change Research
CGIAR	Consultative Group on International Agricultural Research	ICLARM	International Center for Living Aquatic Resources Management
CI	Conservation International	ICO	International Coffee Organization
CIAT	International Center for Tropical Agriculture	ICOLD	International Commission on Large Dams
CIESIN	Center for International Earth Science Information Network	ICSU	International Council for Science
CIMMYT	International Maize and Wheat Improvement Center, Mexico	IEA	International Energy Agency
CONABIO	National Commission for the Knowledge and Use of Biodiversity	IFAD	International Fund for Agricultural Development
COP-5	Conference of the Parties to the Convention on Biological Diversity	IFDC	International Fertilizer Development Center
CORAL	Coral Reef Alliance	IFPRI	International Food Policy Research Institute
CRSSA	Center for Remote Sensing and Spatial Analysis	IGBP	International Geosphere-Biosphere Programme
C&SF Project	Central and South Florida Project	IIASA	International Institute for Applied Systems Analysis
CSIR	Council for Scientific and Industrial Research, South Africa	IJHD	International Journal on Hydropower and Dams
CSRC	Complex Systems Research Center	IMERCSA	Musokotwane Environment Resource Centre for Southern Africa
DOE	United States Department of Energy	IMF	International Monetary Fund
ECE	European Commission for Europe	IPCC	Intergovernmental Panel on Climate Change
EEA	European Environment Agency	IRF	International Road Federation
EFI	European Forest Institute	IRN	International Rivers Network
EMEP	Co-Operative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe	ISRIC	International Soil Reference and Information Centre
EIA	Energy Information Administration	ITTO	International Tropical Timber Organization
ESA	Ecological Society of America	IUCN	IUCN-The World Conservation Union
ESRI	Environmental Systems Research Institute	MRC	Mekong River Commission
EVRI	Environmental Valuation Reference Inventory	NASA	National Aeronautics and Space Administration
FAO	Food and Agriculture Organization of the United Nations	NOAA	National Oceanic and Atmospheric Administration
FAOSTAT	FAO Statistical Databases	NOAA/NGDC	National Geophysical Data Center
FSC	Forest Stewardship Council	NOAA/NOS	National Ocean Service
		NRC	National Research Council

NRDC	Natural Resources Defense Council
ODI	Overseas Development Institute
OECD	Organisation for Economic Co-Operation and Development
ORNL	Oak Ridge National Laboratory
OVI	Ocean Voice International
PAGE	Pilot Analysis of Global Ecosystems
PRB	Population Reference Bureau
RFF	Resources for the Future
SARDC	Southern African Research and Documentation Centre
SFERTF	South Florida Ecosystem Restoration Task Force
SFWMD	South Florida Water Management District
Sida	Swedish International Development Cooperation Agency
TNC	The Nature Conservancy
UC Berkeley	University of California at Berkeley
UC Davis	University of California, Davis
UCSD	University of California, San Diego
UNCHS	United Nations Centre for Human Settlements (Habitat)
UNDP	United Nations Development Programme
UN-ECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFIP	United Nations Fund for International Partnerships
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNPD	United Nations Population Division
UNSTAT	United Nations Statistical Division
USACE	United States Army Corps of Engineers
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USDA/NASS	National Agricultural Statistics Service
USDA/NRCS	Natural Resources Conservation Service
USGS	United States Geological Survey
USGS/EDC	Earth Resources Observation Systems (EROS) Data Center
U.S. EPA	United States Environmental Protection Agency
USOTA	United States Office of Technology Assessment
UT Austin	University of Texas at Austin
WBCSD	World Business Council for Sustainable Development

WCFSO	World Commission on Forests and Sustainable Development
WCMC	World Conservation Monitoring Centre
WHO	World Health Organization
WMO	World Meteorological Organization
WRI	World Resources Institute
WTO	World Trade Organization
WWF	World Wildlife Fund

Abbreviations for Units of Measure

AVHRR	advanced very high resolution radiometer
Bha	billion hectares
cm	centimeter
GtC	billion tons or gigatons of carbon
km	kilometer
l	liter
m	meter
mi	mile
MtC	metric tonne of carbon
Mha	million hectares
ha	hectare
MW	megawatt
MMTCE	million metric tons of carbon equivalents
ppm	parts per million
ppb	parts per billion

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European Forest Institute
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Global Environment Facility
Global Runoff Data Center, Germany
International Center for Tropical Agriculture
International Coffee Organization

International Energy Agency
International Fertilizer Development Center
International Food Policy Research Institute
International Institute for Applied Systems Analysis
International Livestock Research Institute
International Monetary Fund
International Potato Center
International Road Federation
International Soil Reference and Information Centre
International Tanker Owners Pollution Federation
Island Resources Foundation
IUCN-The World Conservation Union
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Man and the Biosphere Program
National Agricultural Statistics Service
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United Nations Children's Fund
United Nations Economic Commission for Europe
United Nations Educational, Scientific and Cultural Organization
United Nations Fund for International Partnerships
United Nations Population Division
United Nations Statistical Division
United States Agency for International Development, Global Bureau
United States Army Corps of Engineers, Construction Engineering Research Labs
United States Department of Agriculture, Forest Service, National Agricultural Statistics Service, and National Resources Conservation Service
United States Fish and Wildlife Service, National Wetlands Inventory
United States Geological Survey
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PART I RETHINKING THE LINK

CHAPTER 1 LINKING PEOPLE AND ECOSYSTEMS

Main text

Editor: Gregory Mock (WRI). Contributing writers: John Dixon (World Bank), Kirk Hamilton (World Bank), Stefano Pagiola (World Bank), Christine Mlot (consultant), and Gregory Mock (WRI).

Box 1.1 History of Use and Abuse

Editor: Janet Overton (WRI). Writer: Lori Han (WRI). Reviewers: John McNeill (Georgetown University) and Walter V. Reid (consultant).

Box 1.2 Linking Ecosystems and People

Editors/writers: Gregory Mock (WRI), Christine Mlot (consultant), and Janet Overton (WRI).

Box 1.3 Water Filtration and Purification

Editor: Wendy Vanasselt (WRI). Contributing writers: Christine Mlot (consultant) and Wendy Vanasselt (WRI). Reviewer: Katherine C. Ewel (USDA Forest Service, Institute of Pacific Islands Forestry).

Box 1.4 Pollination

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Box 1.5 Biological Diversity

Editor/writer: Wendy Vanasselt (WRI). Reviewer: Nels Johnson (WRI).

Box 1.6 Carbon Storage

Editors: Janet Overton (WRI) and Carol Rosen (WRI). Contributing writers: Christine Mlot (consultant), Wendy Vanasselt (WRI), Greg Mock (WRI), and Robert Livernash (consultant). Reviewer: Chas Feinstein (World Bank).

Box 1.7 Linking People and Ecosystems: Human-Induced Pressures

Editor/writer: Carol Rosen (WRI).

Box 1.8 Invasive Species

Editor/writer: Wendy Vanasselt (WRI). Reviewer: Nels Johnson (WRI).

Box 1.9 Trade-Offs: Lake Victoria's Ecosystem Balance Sheet

Editor: Gregory Mock (WRI). Writer: Carmen Revenga (WRI). Reviewer: Les Kaufman (Boston University).

Box 1.10 Domesticating the World: Conversion of Natural Ecosystems

Editor/writer: Gregory Mock (WRI). Reviewer: Norbert Henninger (WRI). Map: Siobhan Murray (WRI).

Box 1.11 How Much Do We Consume?

Editor/writer: Gregory Mock (WRI). Reviewer: Emily Matthews (WRI).

Box 1.12 Pollution and Ecosystems

Editor: Wendy Vanasselt (WRI). Contributing writers: Wendy Vanasselt (WRI), Greg Mock (WRI), and Robert Livernash (consultant).

Box 1.13 The Human Population

Editor/writer: Janet Overton (WRI).

Box 1.14 Valuing the Invaluable

Editor: Wendy Vanasselt (WRI). Contributing writer: Christine Mlot (consultant). Reviewers: John Dixon (World Bank), Stefano Pagiola (World Bank), and David Simpson (RFF).

Box 1.15 Ecotourism and Conservation: Are They Compatible?

Editor/writer: Wendy Vanasselt (WRI). Reviewers: Katrina Brandon (Organization for Tropical Studies) and James N. Sweeting (CI).

Box 1.16 Uprooting Communal Tenure in Indonesian Forests

Editor: Janet Overton (WRI). Contributing writer: Richard Payne (consultant). Reviewer: Owen J. Lynch (NRDC).

Box 1.17 Rural Poverty and Adaptation

Editor: Wendy Vanasselt (WRI). Contributing writers: Wendy Vanasselt (WRI) and Sara Scherr (University of Maryland). Reviewers: Simon Batterbury (London School of Economics) and Tim Forsyth (Kennedy School of Government, Harvard University).

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Mountain Ecosystems

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CHAPTER 3 LIVING IN ECOSYSTEMS

Agroecosystems

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Cuba's Agricultural Revolution: A Return to Oxen and Organics

Editor: Wendy Vanasselt (WRI). Contributing writer: Joel Bourne (consultant). Reviewers: Miguel A. Altieri (UC Berkeley), J. Paul Mueller (North Carolina State University), and Peter Rosset (Institute for Food and Development Policy/Food First).

Coastal Ecosystems

Replumbing the Everglades: Wetlands Restoration in South Florida

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Managing Mankòtè Mangrove

Editor/writer: Wendy Vanasselt (WRI). Reviewers: Lauretta Burke (WRI) and Allan Smith (CANARI).

Forest Ecosystems

Up From the Roots: Regenerating Dhani Forest Through Community Action

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Freshwater Systems

Working for Water, Working for Human Welfare in South Africa

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Managing the Mekong River: Will a Regional Approach Work?

Editor: Wendy Vanasselt (WRI). Contributing writers: Nathan Badenoch (WRI), Jake Brunner (WRI), and Greg Mock (WRI). Reviewers: John Dore (WRI/REPSI) and Glenn S. Morgan (World Bank). Map: Kirsten Thompson (WRI).

New York City's Watershed Protection Plan

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Grassland Ecosystems

Sustaining the Steppe: The Future of Mongolia's Grasslands

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Notes

1. *Extent and Growth.* To determine the extent of agroecosystems, the International Geosphere-Biosphere Programme (IGBP) defined agroecosystems on the basis of remote sensing imagery and defined agricultural regions as areas where more than 40 percent of the land is used for cropland or highly managed pasture. Using this definition, agroecosystems account for 21 percent of total land area (USGS EDC 1998). However, this excludes significant areas where there is overlap with forest and grassland ecosystems, since, in fact, land use is often fragmented spatially. Where agriculture mixes with other land uses—forests or grasslands—a mosaic of land cover is formed.

For the PAGE study, satellite data were reinterpreted to incorporate mosaic areas that have a 30 percent or more intensity of cropland or managed pasture. Using this approach, approximately 6 percent of areas classified as forest and 14 percent classified as grasslands by IGBP fall within the global extent of agroecosystems as defined by PAGE. Thus the percentage of agricultural land area totals 28 percent (Wood et al. [PAGE] 2000).

2. *Economic Importance.* The total value of agricultural production output was calculated by weighting 134 primary crop and 23 pri-

mary livestock commodity quantities by their respective average international agricultural prices (calculated by the Gary-Khamis method) during 1989–91.

3. *Soil Degradation.* It is difficult to reconcile these results with observed growth in food production in Asia, even allowing for past increases in fertilizer application rates. But this apparent incompatibility highlights the basic challenge of using existing data sets in making credible assessments of the state and changing capacity of ecosystems.

4. *Deforestation and Forest Loss.* See for example: Holmes, Derek (2000, draft of 25 February), Deforestation in Indonesia: A Review of the Situation in Sumatra, Kalimantan, and Sulawesi. (Draft report in preparation for the World Bank, based on mapping carried out by the Indonesian Ministry of Forestry and Estate Crops; data are subject to final revision, but are not expected to change significantly.)

5. *Supply and Demand.* PAGE researchers used a slightly lower estimate of global runoff than previous analyses and discounted the use of fossil water sources, since such use is unsustainable in the long term.

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Chapter 2

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