Sustainable Agriculture Annotated Bibliography

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For more resources and information on obtaining them, see the Resource List, which is arranged by topic.

Agrios, G. N. *Plant Pathology*. San Diego: Academic Press, 1988.

Despite increasing use of fungicides and non-chemical controls, plant pathogens destroy 12–15% of all potential crop production. This textbook describes how basic epidemiological information on pathogen survival, infection, and spread supports increased research on (1) disease induction mechanisms and resistance and (2) breeding crops for resistance to pathogens. Also covered is the biological control of these pathogens.

Allen, Patricia, and Debra van Dusen, eds. *Global Perspectives on Agroecology and Sustainable Agricultural Systems*. IFOAM International Scientific Conference. Santa Cruz: Agroecology Program, University of California. 1988.

Organic farmers have a strong interest in environmentally sound agriculture. In particular, they tend to avoid commercial fertilizers and pesticides. This extensive double volume includes about 100 scientific papers presented at a conference sponsored by the International Federation of Organic Agriculture Movements [see "Organizations" section of Resource List.]. Examples are drawn from all over the world.

Altieri, Miguel A. *Agroecology: The Science of Sustainable Agriculture*. 2nd ed. Boulder, CO: Westview Press, 1995.

Sustainable agriculture, an important factor in agroecology, is based on balancing crops, soils, nutrients, sunlight, moisture, and biodiversity in agroecosystems. This book provides a general overview of agroecology, along with many examples of sustainable agricultural systems in South America.

Altieri, Miguel A., and Susanna B. Hecht. *Agroecology and Small Farm Development*. Boca Raton, FL: CRC Press, 1990.

In Latin America and other parts of the world, the high-tech, intensive-agriculture practices currently encouraged may have adverse social and environmental impacts. This book discusses benefits of traditional agricultural practices for small farms in these countries. Written by a wide array of specialists in the natural and social sciences, it includes 25 chapters covering such topics as:

- crop genetic diversity
- traditional farming systems
- social and cultural aspects of small farms
- women's role
- farming systems research and extension
- history of small farm development

Borlaug, Norman, Rattan Lal, David Pimentel, Hugh Popenoe, and Noel Vietmeyer. *Vetiver Grass: A Thin Green Line Against Erosion*. Washington: National Academy of Sciences, 1993.

For developing nations, soil erosion is a serious economic and environmental burden. In the tropics, a few hours of torrential rain or wind can wash away huge amounts of soil and nutrients, reducing cropland productivity. When eroded soil accumulates in waterways, fish die, irrigation storage is reduced, and electricity generation declines. Vetiver, a little-known tropical grass, appears to offer a way for some locations to control erosion: when thin hedges are planted on the contour at appropriate intervals, soil accumulates behind them and helps maintain the productivity of the tropical soil. This book reports on situations in various countries and on crops where this grass has been used effectively for soil conservation.

Carroll, C. Ronald, John Vandermeer, and Peter M. Rosset. *Agroecology*. New York: McGraw-Hill, 1990.

The public is recognizing that new, intense agriculture methods have many environmental and economic costs. The study of agroecology is helpful to the joint efforts of agriculturists, ecologists, botanists, sociologists, and economists to achieve more balance and sustainability in agricultural production. Topics in this book include: hunger and poverty, climate, soils, plant domestication, energy use in agriculture, integrated pest management, intercropping, and traditional agricultural systems.

Committee on the Role of Alternative Farming Methods in Modern Production Agriculture, National Research Council. *Alternative Agriculture*. Washington: National Academy of Sciences, 1989.

Conventional farming in this country has many negative environmental effects. It erodes and salinizes soil. It creates pesticide and antibiotic residues in foods. It overuses groundwater resources. And the U. S. Environmental Protection Agency has identified agricultural pesticides and fertilizer nitrates as our country's largest nonpoint source of water pollution. This publication presents data, reviews problems regarding conventional agriculture, and assesses alternative farming practices that can make U.S. agriculture profitable and environmentally sound. Also included are case studies of successful farming with minimal use of chemicals.

Committee on Sustainable Agriculture and the Environment in the Humid Tropics, National Research Council. *Sustainable Agriculture and the Environment in the Humid Tropics*. Washington: National Academy of Sciences, 1993.

Agriculture's increasingly adverse effects on the earth's land, water, atmosphere, and biological resources emphasize why new approaches to stewardship and sustainable management are needed. This report suggests three main goals for sustainable agriculture in the humid tropics: (1) maintain the biological and ecological productivity of natural resources, (2) maintain economic returns, and (3) help maintain the quality of life.

Edens, Thomas C., Cynthia Fridgen, and Susan L. Battenfield. *Sustainable Agriculture and Integrated Farming Systems*. 1984 Conference Proceedings. East Lansing: Michigan State University Press, 1985.

Many U. S. farmers suffer financial difficulties due to the high costs of fossil-based inputs, including fertilizers and pesticides. Some of these problems are related to new technologies, especially those that save labor. This book stresses careful testing of new technologies and recommends that soil, water, air, and biota be managed as renewable resources and not depleted or degraded. Various authors explain how understanding the interactions within the agroecosystem leads to improved agricultural sustainability.

Edwards, Clive A., Rattan Lal, Patrick Madden, Robert H. Millier, and Gar House. *Sustainable Agricultural Systems*. Ankeny, Iowa: Soil and Water Conservation Society, 1990.

Intensive agriculture depends heavily on fossil-energy chemical inputs and crop monoculture, which have led to reduced farmer profits and serious damage to land, water, and biodiversity. This book's authors explain why more sustainable and integrated systems of agricultural production are needed by the expanding human population. The 38 chapters cover various strategies for making agriculture more economically and ecologically sound by reducing the use of chemicals and fossil energy and improving crop management techniques.

Fluck, Richard C., ed. *Energy in Farm Production*. Amsterdam: Elsevier, 1992.

Agriculture is essentially an energy-conversion process, where human, fossil, and solar energy are converted into food and fiber products. Early agriculture involved humans tilling and planting seeds and eventually harvesting the solar energy captured at the end of the growing season. Modern agriculture, however, gets its higher yields by using fossil fuels (for power tractors and other farm machinery) and fossil-based fertilizers and pesticides. With worldwide fossil fuel reserves expected to last only 30–50 years, how will we handle production when they are depleted? Various authors provide chapters on the energy inputs for fertilizers, pesticides, corn production, irrigation, and livestock production.

Gleick, Peter H., ed. *Water in Crisis: A Guide to the World's Fresh Water Resources*. New York: Oxford University Press, 1993.

Agriculture consumes most of our freshwater resources for irrigation and food production. For example, each kilogram of corn or wheat produced requires about 1,000 liters of water. Thus, water shortages are a significant factor in the decline in world food production. Water is also the prime source of diseases: according the World Health Organization, 90% of the human diseases in developing countries are water-borne. For this book, various specialists have written chapters on such topics as water in agriculture, the hydrologic cycle, water treatment, minimum amounts of water for countries, conflicts among nations for water, and water use in energy production.

Gliessman, Stephen R. *Agroecology: Researching the Ecological Basis for Sustainable Agriculture*. New York: Springer-Verlag, 1990.

This book investigates the emerging, interdisciplinary area of agroecology. A number of case studies demonstrate how to combine the more productive aspects of agronomy with the more systems-oriented approaches of ecology. Several leading scientists discuss examples of the diversity and complexity of agroecological research, ranging from insect ecology to design and management of agroecosystems from the tropics to the temperate region. Included are assessments of various methodologies for quantifying and evaluating agroecosystems and their sustainability.

Kidd, Charles, and David Pimentel. *Integrated Resource Management: Agroforestry for Development*. San Diego, CA: Academic Press, 1992.

From 1950 to 1980, the use of fossil energy for fertilizers, pesticides, and irrigation increased food production in some parts of the world by 300–400%. However, since then per-capita food production has been limited by lack of arable land, water for irrigation, and fossil energy. Many current agricultural practices also cause soil erosion, water shortages and pollution, and the complex effects of pesticide use. Can agriculture do a better job of managing resources? Yes, and one of the technologies includes more effective use of agroforestry. The first half of this book examines the world population problem, food and water shortages, soil degradation, loss of biodiversity, and shrubs and trees used in agroforestry. The second half presents case studies on the effective use of agroforestry for improved agriculture and biomass production for fuel.

Lal, Rattan, and B. A. Stewart. *Soil Degradation*. New York: Springer-Verlag, 1990.

This volume presents soil degradation information from an array of scientists. Topics covered include soil compaction and erosion, land degradation, soil wetness, chemical and biological degradation, and salinization. In addition, the book highlights the principal processes of soil degradation in different regions, discusses how erosion affects crop production, and analyzes soil conservation and strategies for restoring degraded lands. The book provides practical information on conserving natural resources and increasing food production.

Madden, J. Patrick. "Farms that Succeed Using LISA." In *Farm Management: How to Achieve Your Farm Business (Yearbook of Agriculture),* 220–225. Washington: USDA, 1989.

Dozens of case histories explain how farmers changing to low-input, sustainable agriculture have successfully drawn good incomes while protecting their environments. For instance, one corn producer found total costs for each acre farmed conventionally to be $218 (with net returns of $95); per-acre costs for low-input management were only $128 (with net returns of $171). Examples show that sustainable agricultural management techniques are profitable for other crops as well.

McIsaac, Gregory, and William R. Edwards, eds. *Sustainable Agriculture in the American Midwest: Lessons from the Past, Prospects for the Future*. Urbana: University of Illinois Press, 1994.

This volume provides an overview and detailed assessment of ecological, social, and technical issues related to the sustainability of agriculture in the Midwest. The discussion is focused on dynamic, natural, and social agriculture processes occurring over time in that region. The book implies that changes are needed to ensure the development of sustainable agricultural systems.

McLaren, Digby J., and Brian J. Skinner, eds. *Resources and World Development*. Chichester, England: Wiley, 1987.

The world's growing population has major impacts on the essential resources once thought to be unlimited: we now observe serious shortages of the arable land, water, energy, and biological resources vital to food production, quality environment, and a high standard of living for everyone. The many chapters in this book cover land, water, energy, biological resources, agriculture, mining minerals, economic development, and environmental degradation.

Mepham, T. B., G. A. Tucker, and J. Wiseman. *Issues in Agricultural Bioethics*. Nottingham, England: Nottingham University Press, 1995.

In recent decades, agriculture has been faced with growing environmental and economic problems. Increasing along with the use of technological innovations (especially in developed countries) is concern about the "environmental and economic" costs of agricultural production: food safety and security, animal welfare, and environmental sustainability. One major concern is biotechnology, especially genetic engineering (e.g., herbicide resistence in crops leads to increased herbicide use and production). This book discusses these issues and suggests practical solutions.

Metcalf, Robert Lee, and Robert A. Metcalf. *Destructive and Useful Insects: Their Habits and Control*. 5th ed. New York: McGraw-Hill, 1993.

The book comprehensively covers more than 600 species of North American insects, including all major agricultural and medically important species. Included are detailed life history and habits, field keys for species identification, Integrated Pest Managment control measures, and a selected bibliography for further reading.

Myers, Norman. *Gaia: An Atlas of Planet Management*. Garden City, NY: Anchor Press/Doubleday, 1993.

This book is no ordinary atlas. It maps and analyses our living planet at a critical point in its history: as humans threaten to disrupt and exhaust some of its resources. The volume organizes the mass of available environmental data, statistical predictions, and often-conflicting opinions and solutions into a coherent structure. It addresses land, oceans, elements, evolution, humans, civilizations, and management.

O'Connel, P. F. "Sustainable Agriculture." In *Agriculture and the Environment (Yearbook of Agriculture),* 175–185. Washington: USDA, 1991.

This article reports on the serious environmental problems resulting from the yearly application of about 20 billion pounds of fertilizers and 1.1 billion pounds of pesticides. The author gives a detailed explanation of integrated crop management (ICM) and why it is considered the most effective way to reduce chemical pollution caused by agriculture. ICM's benefits are illustrated by a study in South Dakota during the 1988 drought: the farms employing ICM made profits, while the farms relying heavily on chemicals showed net losses.

Olson, Richard K., ed. *Integrating Sustainable Agriculture, Ecology, and Environmental Policy*. Binghamton, NY: Food Products Press, 1992.

This is a report of a conference sponsored by the U.S. Environmental Protection Agency and the Institute for Alternative Agriculture. Participants included ecologists, economists, sociologists, soil scientists, and government policy-makers. Of interest is how these diverse groups view sustainability and strategies to improve agriculture. One major question debated was this: what level of interaction is needed by ecologists and agriculturists to help them work together for a sustainable U.S. agriculture system?

Paoletti, M. G., and David Pimentel. "Biotic Diversity in Agroecosystems." *Agriculture, Ecosystems and Environment* 40, no. 1-4 (1992): special volume.

The preservation of biodiversity is a high priority among biologists, ecologists, environmentalists, and agriculturists. Although these specialists understand the impact human activities have on biodiversity, few studies have focused on the importance of biodiversity in natural and agricultural systems. This book and its authors assess the diverse interactions among plants and animals and their role in maintaining the productivity of agricultural and natural ecosystems.

Paoletti, M. G., B. R. Stinner, and G. G. Lorenzoni. "Agricultural Ecology and the Environment." *Agriculture, Ecosystems and Environment* 27, no. 1-4 (1989).

Several authors explain why the goal of an economically and environmentally sustainable agriculture requires effort from the disciplines of ecology, agronomy, sociology, economics, genetics, engineering, horticulture, entomology, plant pathology, and weed science. The article identifies trends in sustainable agriculture such as reduced use of commercial fertilizers and pesticides, increased use of biological resources and biodiversity, and application of socioeconomics.

Pimentel, David, and Charles W. Hall. *Food and Natural Resources*. San Diego, CA: Academic Press, 1989.

Adequate food supply depends on numerous natural resources: land, water, solar and fossil energy, forests, other plant and animal species, and fisheries. Whereas solar energy is almost infinite, fossil energy is finite and being rapidly depleted. The other resources are renewable but only within certain limits; they are, in a sense, also finite. This book describes the complex interactions and dependencies among these various resources.

Pimentel, David, ed. *World Soil Erosion and Conservation*. New York: Cambridge University Press, 1993.

With almost all the world's food coming from land, soil erosion is one of today's most serious environmental problems. During the past 40 years, nearly 30% of our arable land was lost due to erosion; that rate is increasing. The U.S. Soil Conservation Service has successfully encouraged some farmers to adopt soil conservation practices on their farms, but government price supports and various technologies recommended by agriculturists (e.g., large monocultures, abandonment of crop rotations, removal of tree shelterbelts) have intensified erosion. The soil erosion and conservation situation is worse worldwide. This book provides the perspectives of soil scientists from around the world, each assessing the seriousness of the erosion problem in his nation and offering recommendations for conservation.

Postel, Sandra. *Last Oasis: Facing Water Scarcity*. New York: W.W. Norton, 1992.

Water is the gravest factor limiting food production. Human communities developed in river valleys and floodplains because access to water is crucial to survival. We are now in an era of shortages. Currently, 26 countries have more people than their water supplies can sustain. The Middle East has historically battled over water, and these problems are intensifying. The same is true in the Western United States. Agriculture is the largest user of water in the U.S. and world, but many technologies are available to reduce consumption by 50–70%. This highly readable volume explains the seriousness of water problems worldwide.

Thurston, H. David, et al. *Slash/Mulch: How Farmers Use It and What Researchers Know About It.* Ithaca, NY: Cornell International Institute for Food, Agriculture and Development, 1994.

This book assesses how slash / mulch techniques can improve the welfare of farmers in developing countries while reducing environmental degradation, especially erosion. For instance, one of the successful strategies discussed in detail involves growing a jack bean crop, cutting it to make a nutrient mulch, and immediately planting corn, which grows through the mulch and achieves high yields.

Treoh, Frederick, and Louis Thompson. *Soils and Soil Fertility.* New York: Oxford University Press, 1993.

This book is broad in scope, with chapters on soil chemistry, organic matter, mineralogy, and water management. In addition, it includes information on specialized areas such as urban and rural land use, artificial soils for greenhouse culture, and turf grasses. The book has a great many tables and figures that provide detailed and valuable data on all aspects of soils, nutrients, and conservation of resources.

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