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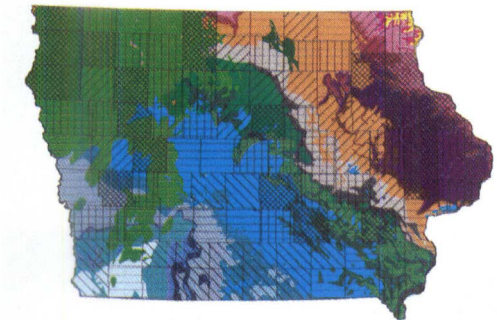
FEATURES



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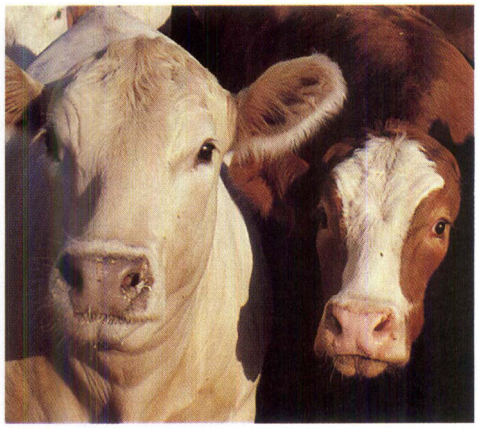

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DEPARTMENTS

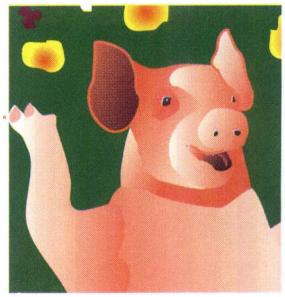

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Illustration by Joann Schissel

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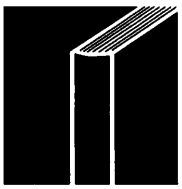

BOOKS, ETC.

The Last Harvest
By Paul Raeburn. 269 pp., 1997. University of Nebraska Press, Lincoln, NB.

The Last Harvest deals with the "genetic gamble" that threatens to destroy American agriculture. The book was written by Paul Raeburn, of the Associated Press, based on extensive research and numerous interviews. Raeburn makes a persuasive argument for the need to improve national agricultural policy and funding related to crop protection and production. *The Last Harvest* is clearly written and very readable. Raeburn uses statistics well to support the points being discussed. The premise of the book is that major crops in the world are based on narrow genetic strains which makes them very vulnerable to pests and global environmental change. It concludes by examining factors that stress agricultural production and presents potential ways out of the predicament. The book would be of interest to all agricultural scientists, social scientists, ecologists, land planners, government officials, (elected, appointed, and civil servants) and persons calling themselves environmentalists.

The Last Harvest contains a brief introduction and seven chapters. The introduction is titled "Betting the farm" and sets out the hypothesis of the book that the primary crops of the United States and the world are based on a narrow germplasm base, particularly in the developed nations. Not only is the germplasm base narrow, but the seed banks to support the crops are not well maintained mostly because they have a low priority from administrators of agricultural programs, and consequently weak budget support from Congress. As a nation we seem to fail to realize that our country's wealth is actually based on its natural resources. We should include in the measures of national financial health, the degree of soil, water, and natural resource conservation. Without careful management of the natural resources, including parental strains of food organisms, the whole human population may one day go hungry.

The first chapter, "Billion dollar corn," leads the reader through the process of the search for parental lines of plants for major crops, using corn as the primary example. The corn search includes perennial strains from Central and South America to provide a wider genetic base for governmental and commercial plant breeders. The second chapter, "Seed banks—Seed morgues," describes the germplasm system of over 500,000 seeds, tubers, and cuttings maintained in a national seed bank, and in seed banks located throughout the world, but with emphasis on the U.S. seed banks. Some of this plant material is no longer found in the wild. Seed bank accessions deteriorate with time and the seeds need to be germinated and new stores of seeds developed based on the viability of individual seeds or propagules. Raeburn relates that there are an inadequate number of scientists (low USDA budgets) conducting this work and that the seed banks are really becoming seed morgues. About $2 million per year is being spent to maintain the seed banks, but the current rate seed replacement rate does not equal the rate of deterioration of the seed accessions. This minimal investment is much lower than the cost of a crop failure catastrophe in the world food system.

Raeburn follows with chapters of "Green Gold" describing the great value crops have to the world, and the risks of having plants "as like as identical twins." In these chapters, especially the one concerning the narrow genetic base of plants, the author uses examples of the potato famine in Ireland and the corn blight of the early 1980s to illustrate how rapidly the food pyramid crumbles when a major crop fails. Since many crops as well as being food material often are products used in manufacturing industries (especially corn), the ramifications of agricultural decline to the nation's economy is underestimated by the casual observer.

The last three chapters deal with concerns about the biosphere and provides some solutions to intensive, monocultural agronomic practices. The chapter titled "One planet—one experiment" primarily addresses the modern extinction rate of organisms as being greater that of any in geologic time. Raeburn cites authorities who point out that we are not only losing macro-organisms, but most likely countless micro-organisms, and that we know so little about the biosphere's species that estimates of the extinction rates are "best guesses." The "Last harvest" chapter points out that crop species are probably at their zenith in production because with modern fertilizers, pesticides, and irrigation practices the genetic potential of the plants are being realized. Agricultural production seems to be at the point of diminishing returns as more cultural inputs are applied. Raeburn takes the reader through the influences of an increasing human population, decreasing soil resources (erosional losses), decreased irrigation efficacy (salts), the huge input of energy (especially in the U.S. and to a lesser extent Europe) for food production, effects of pesticides/fertilizers as nonsource pollutants, and global warming as constraints to increasing food yields. In the case of global warming, the typical greenhouse gases and loss of the ozone layer are pointed out; however, the point that increased CO^2 will promote more plant growth and will possibly improve water use efficiency in plants was not presented. Since the rate of photosynthesis increases with CO^2 concentration, less time is required to produce photosynthate products, leaving less time for evapotranspiration, which could increase water use efficiency by plants, and somewhat offset the negative effects of global warming, such as the expansion of deserts into temperate lands.

The last chapter, "Hard science, soft farming: A way out?" presents a solution to modern intensive farming. Raeburn presents information about people's experiences with sustainable agriculture and low input farming. In many cases, this is the type of farming that was practiced a couple of generations ago in the U.S.. This type of agriculture is based more on crop rotation and less on technological inputs such as synthetic fertilizers, pesticides, and large energy inputs. Wider adoption of integrated pest management (IPM), natural fertilizers, crop rotation, and minimum tillage are extolled as practices that can provide more sustainable agricultural ecosystems.

Raeburn provides a book that leads to contemplation about food sources and dependability of supplies. According to a recent article by the Gannett News Service 25 percent of the food in the U.S. is lost or wasted from the field to table. If only 5 percent of the lost food could be recovered it would feed 4 million people. If the U.S. and other developed nations can detach from a consumerism mode of economy and move to a conservation mode, and increased funding is allocated to protect germplasm, a more dependable food supply will exist for the people of the world.

—Reviewed by John H. Brock, Environmental Resources, School of Planning and Landscape Architecture, Arizona State University, Tempe, AZ.

Agriculture

The agricultural link: How environmental deterioration could disrupt economic progress (1-878071-38-6). By Lester R. Brown. 73 pp., 1997. Worldwatch Institute, 1776 Massachusetts Ave., NW, Washington, D.C. 20036-1904 Phone: (202) 452-1999; fax: (202) 296-7365; email: wwpub@worldwatch.org; internet: www.worldwatch.org. $5 softcover.

Environmental science

Environmental science and technology (ISBN 1-56670-213-5). By Stanley E. Manahan. 576 pp., 1997. CRC Press, 2000 Corporate Blve., NW, Boca Raton, FL 33431. Phone: (800) 272-7737; fax: (800) 374-3401; email: orders@crc-press.com. $49.95 hardcover.

Environmental law handbook, 14th Edition. (ISBN 0-86587-560-X). Edited by Thomas F.P. Sullivan. 587 pp., 1997. Government Institutes, 4 Research Place, Suite 200, Rockville, MD 20850. $79 softbound.

Reproductive hazards of the workplace (ISBN 0-442-02042-2). By L.M. Frazier and M.L. Hage. 640 pp., 1997. Van Nostrand Reinhold, 115 Fifth Avenue, New York, NY 10003. $79.95 hardcover.

Advanced soil mechanics (ISBN 1-56032-561-5). By Braja M. Das, 457 pp., 1997. Taylor & Francis, 1900 Frost Road, Suite 101, Bristol, PA 19007-1598. $79.95, hardcover.

Soil genesis and classification, fourth edition (ISBN 0-8138-1464-2). By S.W. Boul et al. 544 pp., 1997. Iowa State University Press, 2121 S. State Avenue, Ames, IA 50014-8300. Phone: 1-800-862-6657; fax: (515) 292-3348. $59.95 hardcover.

General

Book of lists for regulated hazardous substances, 8th Edition (ISBN 0-86587-585-5). Edited by Government Institutes Staff. 548 pp., 1997. 4 Research Place, Suite 200, Rockville, MD 20850. Phone: (301) 921-2355; fax: (301) 921-0373; email: giinfo@govinst.com. $79 softcover + $6 S&H Domestic/ $15 Intl Airmail.

Conserving peatlands (ISBN 0-85198-998-5). Edited by L. Parkyn, R.E. Stoneman, and H.A.P Ingr. 1997. Oxford University Press, 198 Madison Avenue, New York, N.Y. 10016. $110 cloth.

Mountains of the world (ISBN 1-85070-781-2). By B. Messerli and J.D. Ives. Parthenon Publishing, 25 Blades Court, Deodar Road, London SW15 2NU. Phone: (0181) 875-0909; fax: (0181) 871-9996. $75 softcover.

Recycling organic waste: From urban pollutant to farm resource (ISBN 1-87801-37-8). By Gary Gardner. 60pp., 1997. Worldwatch Institute, 1776 Massachusetts Ave., NW, Washington, D.C. 20036. Phone: (202) 452-1999; fax: (202), +296-7365; email: wwpub@worldwatch.org; internet: www.worldwatch.org. $5 softcover.

Land use

Your land is your legacy: A guide to planning for the future of your farm. By Jerry Cosgrove and Julia Freedgood. 60pp., 1997. AFT National Office, 1920 N Street NW, Suite 400, Washington, D.C. 20036. Phone: (800) 370-4879. $9.95 paper, plus shipping and handling.

This land is our land: Balancing nature and commerce in gateway communities (ISBN 1-55963-545-2). By Jim Howe, Ed McMahon, and Luthor Propst. 165 pp., 1997. Island Press, Box 7, Dept. 2PR, covelo, CA 95428; 1-800-828-1302; website: http://www.islandpress.org. $21.95 paper.

Water resources

1997 Practical guide to hydraulics and hydrology (ISBN 0-9657580-0-1). 216 pp., 1997. Haestad Methods Inc., 35 Brookside Road, Waterbury, CT 06708. Phone: (203) 755-1666; fax: (203) 597-1488; website: http://www.haestad.com. $25 paper.

Water water...nowhere? (ISBN 1-55963-523-1). By David Gillian and Thomas C. Brown. 432 pp, 1997. Island Press, Box 7, Dept. 2PR, Covelo, CA 95428; 1-800-828-1302; website: http://www.islandpress.org. $50.00 cloth; $30.00 paper.

Control and treatment of combined sewer overflows (ISBN 0-442-02405-3). Edited by P.E. Moffa. 384 pp., 1997. Van Nostrand Reinhold, 115 Fifth Avenue, New York, NY 10003. Phone 1-800-842-3636, fax 1-606-525-7778, Academic orders: 1-800-497-4887; email: mktg@axiom-sales.com, internet http://www.vnr.com, $64.95 hardcover.

Errata

The following abstracts were unintentionally omitted from the July-August issue of the *Journal.*

Nebraska's whole farm and ranch planning pilot project

Craig Derickson, NRCS, Lincoln, NE. Phone: 402-437-4112.

Nebraska and five other states are piloting the whole farm and ranch planning (WFRP) process to find ways to help landowners make better decisions about environmental, economic, and production concerns. Many farmers and ranchers are faced with decisions concerning how best to mange their operations for food and fiber production and be a good environmental steward.

The whole farm and ranch planning process leads to the development of a single conservation plan integrating federal, state, and local programs into one user friendly document that will truly help landowners enhance the natural resources for their agricultural operations.

Endorsements form the Governor, Congressional representatives, and numerous federal, state, and local agencies sanctioned the whole farm ranch planning project. Three project sites have been started, and sample plans have been developed using this concept. For example, at one site in the Rainwater Basin, a resource inventory and topographic survey have been completed. One goal of this site is to reduce excessive water during the cropping season yet increase shallow water during the waterfowl migration season. Planning efforts in all project sites continue in 1997.

The 1996 Farm Bill provides opportunities for the Natural Resources Conservation Service and others to work together on conservation provisions in the bill. These provisions are described as tools in the "conservation toolbox" that are available to work with landowners in promoting the enhancement of the natural resources. The toolbox provisions, and the partnership building through whole farm and ranch planning process, can result in a single conservation plan that meets the resource needs of the land unit.

Key words: envirnomental concerns, fiber production, natural resources, single conservatin plan.

EPIC estimates of soil water and nitrogen under semi-arid temperate conditions

Roloff, R. de Jong, and C.A. Campbell, Eastern Cereal and Oilseed Research Centre. Corresponding author: G. Roloff, visiting Scientist, Building 74, Central Experimental Farm, Ottawa, ON K1A OC6, Canada. Phone 613-759-1535; email: roloffg@em.agr.ca.

Tests have indicated that the environmental management model EPIC is acceptable for long-term yield estimation, but it is less suitable to follow yearly variability. To determine the reasons for this, we tested EPIC's ability to replicate soil water and nitrogen contents under spring wheat in the semi-arid Canadian prairies. Total soil water content was consistently underestimated, because of an over production of the potential evapotranspiration. Higher precision was obtained at planting and post-harvest (r^2>0.48) than at the three-leaf and shot blade stages. Predictions of water distribution in the profile were not satisfactory. Nitrate-N was adequately estimated (r^2=o.5) for the <0.30m layers in fallow years. For wheat years and for deeper layers, estimates were poor and consistently lower than measured values, which seems mainly a reflection of inadequate soil water distribution. Improvements in EPIC's soil water subroutine are in progress.

Key words: Environmental management model, over production, yield estimation.