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Internet Access to Information on Water Quality and Agriculture

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Introduction

The National Agricultural Library (NAL), located in Beltsville, Maryland, near Washington D.C., is the largest agricultural library in the world, containing more than two million volumes and maintaining subscriptions to approximately twenty-two thousand periodicals. NAL, part of the United States Department of Agriculture (USDA), is one of three national libraries of the United States, along with the Library of Congress and the National Library of Medicine (Norris, 1994). NAL serves the agricultural information needs of researchers and educators from government, academia and the private sector in the United States as well as throughout the world.

To better serve its clientele, NAL operates ten information centers that cover a variety of topics. These centers were established over time to provide more in-depth coverage of specific subject areas (USDA, 1994). The Water Quality Information Center began operating in 1990 as part of the USDA's coordinated plan to address water quality concerns (Water Quality Information Center, 1991). As the focal point of NAL's water quality efforts, the center collects, organizes, and disseminates information on the scientific, educational, and public policy aspects of water quality and agriculture.

Shortly after its inception, the center began focusing on developing electronic technology as a means of meeting the needs of center clients. One area of emphasis was developing the Water Information Network (WIN), a conference on NAL's computer bulletin board, the Agricultural Library Forum (Makuch and Schneider, 1993). The center has worked on establishing WIN as a reliable source of up-to-date information relevant to agriculture and water quality (Makuch and Schneider, 1993a). The center continues to maintain WIN and keep it current, but because of vastly greater power and accessibility, current electronic development efforts are concentrating on the Internet.

This paper will describe the Water Quality Information Center's use of the Internet to improve access to information regarding water quality and agriculture.

Uses of the Internet

The Internet is a worldwide communications system linking together thousands of computers (Lane and Summerhill, 1993). Stored in these computers is an enormous amount of information accessible through information client/servers such as Gopher and World Wide Web (WWW). Internet information servers offer these features (Sittler, 1994):

- 	-rapid, low cost information dissemination

- -storage of text, graphics, sound and animation
- -around the clock access
- -instant updates of information
- -elimination of distance as a constraint to access

In addition, information servers can free information workers from much of the drudgery of repetitively answering the same question, while serving an expanded audience (Sittler, 1994).

For examples of how the Internet is being used in the life sciences see Beach, Ozminski and Boufford (1993); Miller (1993); Pool (1993); Varner, Zdrojewski, Ehrlich, Guterbock, Fetrow and Cady (1993); and Boschert (1994).

Special Libraries

Special libraries and information centers generally place a very high emphasis on service to users and the provision of value-added information (Tillman and Ladner, 1994). Answering reference questions, conducting literature searches, making referrals, producing bibliographies, and creating pathfinders to information sources are common activities in an information center. Already accustomed to computer technology through the use of CD-ROMs and online database search services, special librarians can now add the Internet to the list of tools at their disposal (Ladner and Tillman, 1993).

The Internet is a resource for public librarians as well: McClure, Bertot, and Zweizig, (1994) report that nearly forty-one percent of public libraries use Internet at least once per week to help answer patron questions.

WQIC Information on the Internet

The Water Quality Information Center has a Gopher directory and a WWW home page on the Internet. Cost efficiency was the main reason for placing material on Internet. Producing and distributing paper copies of information materials was taxing on the center's few resources. In addition, once posted on the Internet, there is an inexhaustible supply of center publications. The center's major clientele groups (researchers, policy makers and other environmental and agricultural professionals) generally have--or will soon have--Internet access.

The Gopher directory was established on the University of Maryland's InforM gopher server in June 1994. (The center's files are also accessible through the NAL gopher, established in August 1994). In August 1994, a center home page was established on the University of Maryland WWW server. Similar materials are posted at both sites. The remainder of this paper will discuss the Gopher server since it was more fully developed than the WWW site was when this paper was originally submitted (April 1995).

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Table 1. Water Quality Information Center Gopher menu
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Water Quality Information Center (WQIC)


1. About the WQIC WWW/Gopher Files.

2. About the Water Quality Information Center (WQIC).

3. Water-Related Events/

4. Quick Bibliographies/

5. Water Resources Discussion Lists.

6. World Food Day 1994: Water for Life/

7. Other Resources Related to Water Quality/


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Table 1 shows the current (April 1995) Water Quality Information Center Gopher menu. Items one and two describe the center's WWW/Gopher files and the mission and activities of the center, respectively.

Item three in the menu contains two files. One is a listing of calls for papers and meetings related to water quality and agriculture. This file is updated monthly and typically contains eighty to one hundred entries. Information for this file is obtained from periodicals and conference announcements received by the center as well as postings to Internet mailing lists. In fiscal year 1994, more than three hundred different meetings were listed. The other file in item three gives information on satellite videoconferences related to water resources. This file is also updated monthly and usually contains less than ten listings. Information for this file comes primarily from information compiled by Oregon State University and the University of Missouri.

Item four contains Quick Bibliographies produced by the Water Quality Information Center. Bibliographies in NAL's Quick Bibliography series primarily are intended for current awareness, and as the title of the series implies, are not in-depth and exhaustive. They provide a means of introduction to emerging topics. The bibliographies are derived from online searches of the AGRICOLA database produced by NAL and typically contain one-hundred to three-hundred citations. Table 2 shows the Quick Bibliographies currently available.

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Table 2. Quick Bibliographies
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Quick Bibliographies


1. About Quick Bibliographies.

2. Agricultural Perspectives on Water Resource Management in the Americas

3. Attitudes Toward Water Resources.

4. Bioassessment of Water Resources.

5. Dairy Farm Manure Management.

6. Evaluation of Agricultural Best Management Practices.
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7. Expert Systems, Decision Support Systems, and CAI.

8. Hazardous and Toxic Waste Management.

9. Irrigating Efficiently.

10. Monitoring Water for Agricultural Wastes and Agrochemical.

11. Nonpoint-Source Pollution Issues.

12. Regulating Water Quality: Policy, Standards and Laws.

13. Riparian Zones and Filter Strips in Agricultural Operations.

14. Researching Water Quality.

15. Risk Assessment and Communication Related to Water Resources.

16. Simulation Models, GIS, and Nonpoint-Source Pollution.

17. Water Quality and Forestry.

Returning to the main menu (Table 1), users selecting item five can access a listing of Internet discussion lists related to water resources. The listing was compiled by the Water Quality Information Center and is updated as needed. Currently, subscription information for thirty water-related discussion lists is given. The document has been updated twenty-five times since its creation in May, 1994.

Menu item six, "World Food Day 1994: Water for Life," contains information related to the 1994 commemoration of World Food Day, the theme of which was "Water for Life."

Because of the vast amount of information on the Internet, users need guidance in locating information on specific topics. As Maddux (1994) states,

"One of the first things many new users of the Internet experience is an overwhelming sense of information overload. There is simply so much information available that one can become paralyzed by the immensity of trying to locate and then select what will be useful and appropriate."

To answer this concern, item seven, "Other Resources Related to Water Quality," attempts to provide navigational assistance to individuals looking for information on topics related to water quality and agriculture. This directory contains links to other sites on the Internet. These sites have been particularly useful as resources for the Water Quality Information Center and therefore, by extension, should also be useful to the center's clients. Table 3 lists the sites with a brief description of each. Examples of the types of information available at these sights include full-text documents covering pesticide properties and agricultural waste management. In addition to the resources listed in Table 3, the center's WWW site contains links to many additional WWW and Gopher sites.

Table 3. Links provided by the Water Quality Information Center
        Gopher directory (December 1994)

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1. Agricultural Waste Database

Developer(s): A joint project of the Alabama Cooperative
Extension Service, Auburn University, and the Tennessee Valley
Authority.

Scope: The Agricultural Waste Database provides sources of
research-based information concerning solutions to waste
management and by-product utilization. Bibliographies and full
documents can be searched by keyword.

2. California Rivers Assessment (CARA)

Developer(s): Information Center for the Environment,
University of California, Davis

Scope: Contains information related to the California Rivers
Assessment program which is intended to provide a comprehensive
inventory and evaluation of California's river resources. The
initial focus is on the riparian and aquatic components,
reflecting both the value of rivers and streams as natural
resources and the need for information by the managers of those
resources.

3. Chapter 18 of UN Agenda 21: Freshwater Resources.
4. Chapter 18 of UN Agenda 21: Freshwater Resources (Spanish).

Developer(s): United Nations

Scope: Text of Chapter 18, "Protection of the Quality and
Supply of Freshwater Resources: Application of Integrated
Approaches to the Development, Management and Use of Water
Resources," of the Report of the United Nations Conference on
Environment and Development, Rio de Janeiro, June 3-14, 1992.

5. Chesapeake BIOS (Bioregional Information Online Service)

Developer(s): The Alliance for the Chesapeake Bay, The
Northern Virginia Soil and Water Conservation District, The

Potomac Watershed Network, and the George Mason University
Global Change Computing Facility with additional support from
Duggan (Virtual Community) Associates, Pennsylvania Senate
Environmental Resources and Energy Committee, and the
Department of Biology at George Mason University.

Scope: Provides an on-line environmental database with reviews
and updates on the Chesapeake Bay region's physical and
biological resources; current information on regional
environmental organizations and activities; and electronic
access to government repositories for environmental
information.

6. Cooperative Extension Water Quality Initiative
Developer(s): Cooperative Extension Service (CES)

Scope: Contains a collection of documents about water
quality for the CES National Initiative Team on Water Quality;
provides link to CES water quality database at Purdue
University.

7. EPA Journal - Clean Water Issue (Summer 1994)

Developer(s): U. S. Environmental Protection Agency (EPA)

Scope: Text of the Summer 1994 EPA Journal with articles
covering various water issues.

8. EPA Microbiology Gopher -- Cincinnati

Developer(s): U. S. Environmental Protection Agency (EPA)
Environmental Monitoring Systems Laboratory.

Scope: Variety of material related to the field of
environmental microbiology; listings of journal, recent books
and publications and presentations of EPA-Microbiology Research
Division supported research in environmental microbiology.

9. EXTOXNET - EXtension TOXicology NETwork

Developer(s): The Extension Toxicology Network (EXTOXNET) is an

effort of University of California, Davis; Oregon State
University; Michigan State University; and Cornell University.
Support and funding also provided by the USDA/Extension
Service/National Agricultural Pesticide Impact Assessment
Program.

Scope: Goals of EXTOXNET include stimulating dialog on
toxicology issues, developing and making available information
relevant to extension toxicology, and facilitating the exchange
of toxicology-related information in electronic form;
information available includes toxicology newsletters and fact
sheets and keyword searchable Pesticide Information Profiles
and Toxicology Information Briefs.

10. Groundwater Section, Ministry of Environment, British
Columbia, Canada

Developer(s): Groundwater Section, Hydrology Branch
Water Management Division, BC Environment, Lands and Parks,
Province of British Columbia.

Scope: Provides information on the groundwater resources of
British Columbia, Canada; information includes well logs, snow
survey reports, and full text documents on water issues.

11. The Great Lakes Information Network (GLIN)

Developer(s): GLIN is a cooperative effort of regional
organizations; state, federal and provincial agencies;
universities; and the private sector in eight U.S. states and
two Canadian provinces. It is being developed under the
guidance of the Great Lakes Commission with technical and
networking assistance provided by CICNet. Funding for the
two-year pilot was provided by the Ameritech Foundation.

Scope: GLIN was established to provide a binational data and
information service spanning environmental quality, resource
management, transportation, demographic, and economic
development data, information and resources in the Great Lakes
region of the U.S. and Canada; contains a vast amount of
information including news items, calendars, directories and

keyword searchable fact sheets.

12. Universities Water Information Network (UWIN)

Developer(s): The UWIN server has been developed with funding
from the United States Geologic Survey (USGS) in cooperation
with the Universities Council on Water Resources.

Scope: UWIN seeks to bring the information highway to
the water professionals and water to the information highway;
features include listings of employment opportunities, a water
experts directory, online bulletin board permitting interaction
with water professionals, and the ability to search Selected
Water Resources Abstracts (a bibliographic database with
265,000 records produced by the USGS).

13. Water Quality Publications Database (Cooperative Extension)

Developer(s): U. S. Department of Agriculture Extension System
and Purdue University Cooperative Extension System.

Scope: Searchable database of more than two thousand
cooperative extension water publications from throughout the
U. S.; five hundred of the documents are available in full
text.

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Note: Descriptions of most of the resources listed here are
based on information found in the site's "about" files.
Source: Makuch, J.R. 1994. Sources of water quality information
on the Internet. ASAE Paper No. 943533. Presented at the 1994
International Winter Meeting of the American Society of
Agricultural Engineers. Atlanta, Georgia, December 13-16, 1994.

Summary

As science and public policy strive to develop agricultural systems that are environmentally friendly as well
as productive and profitable, the Internet will play an important role in providing efficient access to the
information necessary for progress.

Individuals concerned with issues involving water resources and agriculture have available to them a number of information sources on Internet. One source is the Water Quality Information Center at the National Agricultural Library. Through Gopher and WWW, the center provides information developed at the center and also facilitates access to information provided by other sources. Internet technology progresses rapidly. WWW provides many capabilities not available with Gopher. Consequently, while the center continues to provide materials via Gopher, enhancement of the WWW site has become the priority.

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