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## Water Current, Volume 21, September 1989

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# Water Current

Water Center

University of Nebraska

September 1989

## United Nations Association — Nebraska Division Hears Roger Gold's "World's Water Problems"

Just as in Biblical times and pre-Biblical mythology, many of the world's nations are looking for methods for water to come from the ground and for ensuring that the water be pure enough to drink, Roger Gold, Water Center Director, told the Nebraska Division of the United Nations Association in August.

When the National Association of Conservation Districts—Northern Plains—met in Montana in June, attendees were asked to think globally about the environment, but to "act locally." Federal expenditures for environmental issues are 1.3 percent of the budget, the lowest it has ever been, but with more environmental problems than we have ever had. So, in many cases even in our sophisticated country, water quality and quantity are sometimes elusive.

Just a few of the water concerns in our world today:

Close to home in the Virgin Islands—local cisterns will be evaluated to determine if they contain legionella bacteria that cause respiratory illnesses and problems with the gastrointestinal system. An evaluation of commercial bottled water will determine if the water is free of contaminants, and still other research will look at the quality of sea water used for recreation. All problems.

Meanwhile in southern Guam, drinking water is supplied mainly by surface water—streams, springs, seeps and a large man-made reservoir, Fena Lake. This lake on a military reservation drains six square miles of

watershed, which is forested and grows on limestone that caps the southwestern Guam mountains. When the lake was built 30 years ago, it stored 7,000 acre-ft. of water. Now, due to siltation, this has been reduced to 440-acre ft. Turbidity of the lake water rises during storms and fine silts on the bottom are stirred up by rain. Treatment with alum and lime to remove the silts from the lake water used for drinking costs about \$200 per day and generates some 800 pounds of sludge per day that must be disposed of in a nearby landfill.

In southeast Asia, in Vietnam, there are problems such as acid sulfate soil areas, lands affected by intrusions of

salt water and areas without supplies of household water. About 1.5 million hectares in the Vietnamese Delta are in crop production, but another 2.1 million hectares are unused due to acid sulfate soil conditions, or sea water intrusion. But the biggest water problem there is the lack of water during the dry season. In the monsoons, water is collected in large pottery urns as it runs off roofs. This is used for cooking and drinking. During the six months of the dry season, there is no water.

On the other hand, during the years (1981 to 1990) of the United Nations Water Decade, attention has been to

*(continued on page 8)*

### Groundwater—One Word or Two?

*There's an on-going debate between the "one-worders" and the "two-worders."*

*Sometimes it's a heated discussion.*

*Sometimes with well-referenced examples.*

*Among the two-worders are the U.S. Geological Survey, UNESCO, Webster's New World Dictionary (1982), Funk and Wagnall's Standard Dictionary (1980), and the New York Times Everyday Dictionary (1982).*

*One-worders are many of the 54 Water Research Institutes or Centers, including the Nebraska Water Center.*

*What is your preference and why?*

*Drop us a note. We'll tally your preferences and report back to you. Write to:*

*One Word or Two  
Water Current Editor  
101 Natural Resources Hall  
University of Nebraska  
Lincoln, NE 68583-0818*



# Sandhills Water Resources and Irrigation Observed on Annual Nebraska Tour

Management, resources and conservation were the focus of the annual Nebraska Water Resources and Irrigation four-bus tour that traveled the Sandhills in early August.

Nitrate management was highlighted when Jim Schepers, USDA-ARS and University of Nebraska agronomist, explained two-year research projects on the Carl Gangwish farm at Shelton.

"Some corn hybrids seem to be more nitrogen-efficient than others and we're trying to pinpoint those hybrids that produce the most amount of corn with the least amount of nitrogen fertilizer," Schepers said.

He said that in a few years, management practices may be imposed on crop producers that could include:

- Limit amount of fertilizer applied
- Require soil testing, or specify time and form of nitrogen application
- Require specific winter cover crops.

These measures, he said, reduce the potential for nitrogen leaching into groundwater. Schepers said he hopes his research will be a way to better utilize nitrogen fertilizer.

Schepers' two sets of plots include cover crops testing use of water and how nitrogen is utilized by the plant. He applies no nitrogen, "a little bit" of nitrogen and too much nitrogen to corn and checks the results with a Lincoln-produced leaf punch. This

sophisticated punch quickly samples leaves of a number of plants. Leaf samples are then analyzed for nitrogen content.

Additional nitrogen management research plots, a cooperative project of the UNL extension service and natural resources districts, show how deep soil testing can reduce nitrogen fertilizer application. Research plots will show corn producers how the environment and production costs can be saved when nitrogen management techniques are changed with yield goals met.

Another stop was at the Davis Creek Dam. Begun in 1980, the dam is about a third complete and will eventually cost about \$20 million. This dam and reservoir about six miles north of Burwell, will complete the North Loup project. Surface water for 53,000 acres would be provided through the Mirdan Canal completed in 1987.

The group visited the Calamus Dam and Reservoir several years ago and witnessed the construction. On a return visit during this tour, they saw a project begun in June that in four years will include a fish hatchery.

This \$6 million hatchery will provide:

- 52,000,000 walleyes
- 1,000,000 hybrid bass
- 100,000 tiger muskie
- 300,000 rainbow trout
- 100,000 largemouth bass and
- 100,000 bluegill

*(continued on page 6)*

## Survey Reveals Recreational Activities of Nebraskans

Nebraskans spent about \$26.1 million on nature-related recreation in the Platte River Valley in 1987, according to the Nebraska Annual Social Indicators Survey conducted by the University of Nebraska Bureau of Sociological Research.

More than 93 percent of the respondents agreed that the state benefits economically from recreation in the Platte River Valley. Besides, 80.7 percent said there are economic benefits from people observing Sandhill cranes and rare and endangered species of birds there. Nearly \$2 million was spent "observing, photographing or feeding wildlife."

A majority of respondents, 86.8 percent, favored limiting future water diversions for agricultural use to protect wildlife habitat and preserve natural areas adjacent to Nebraska's rivers.

The survey showed that about 356,000 citizens went swimming and spent about \$52 million. Boating was preferred by 379,000 Nebraskans who spent more than \$135 million.

Three out of four Nebraskans are willing to pay an additional tax or user-fee to support Platte River Valley development for recreation that is nature-associated.

Furthermore, between a choice of preserving a wetland for ducks and other nonendangered wildlife or using it as a housing development, 85.4 percent of Nebraskans chose wildlife preservation.

The survey was tallied in cooperation with the Nebraska Game and Parks Commission and the Central Platte Natural Resources District. This telephone survey of 1,800 respondents tabulated the amount of time spent on activities and the estimated money spent on each activity.

In a 1980 national survey, the U.S. Department of the Interior reported that wildlife-associated recreation is one of the country's most popular forms of outdoor recreation with 59 percent of the population, 99.8 million people, participating in fishing, hunting or observing, photographing or feeding wildlife.

September 1989

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# Farm Conservation and Water Protection Act of 1989

**J. David Aiken**  
**Associate Professor of**  
**Agricultural Economics**  
**(Water and Agricultural Law Specialist)**

An important groundwater policy concern is the effect of federal farm programs on groundwater pollution from fertilizer and pesticide use. Most observers expect groundwater protection to be a major part of the conservation provisions of the 1990 farm bill. S.970, the first major Congressional proposal to deal with ground water protection and federal farm policies, previews how the 1990 farm bill conservation issues may be debated. Significantly, the bill takes a voluntary-cross compliance approach to groundwater protection.

LISA. S.970, the proposed federal Farm Conservation and Water Protection Act of 1989, was introduced by Sen. Wyche Fowler (D-Ga.). One objective of S.970 is to reduce pollution by encouraging low input-sustainable agriculture (LISA) practices. In the past, the federal farm program has encouraged monoculture and discouraged crop rotation by making land planted in a non-program crop (such as a conserving crop in a crop rotation system) thereafter ineligible for farm program benefits. This reduced farm program payments to the farmer and also reduced the value of the land taken out (or forced out) of the farm program. Critics contend that monoculture, i.e. continuous planting of a single crop rather than rotating crops, increases crop vulnerability to pests and therefore increases the need for pesticides.

An important provision of S.970 encouraging crop rotation would allow farmers to put 40 percent of their land into an approved crop rotation program without losing farm program eligibility. S.970 would also encourage LISA by providing technical assistance to farmers wishing to adopt LISA practices, and by allowing farmers adopting LISA practices to receive higher 1989 crop support prices rather than lower 1990 crop support prices.

To obtain these high price support prices, however, farmers would be required to adopt and follow "farm management plans." The plans would essentially assist the farmer in making the transition, over five years, to LISA farming practices that reduce soil erosion and agricultural chemical use to low levels. The LISA farming practices would include crop rotations, tillage systems, nutrient management strategies, soil conserving and building practices, and integrated pest, weed and disease management programs.

*Groundwater protection.* The groundwater quality title of S.970 would require farmers receiving farm program benefits to allow USDA either:

1. To test the farmer's well for nitrate or pesticide contamination or
2. To investigate potential agrichemical sources of groundwater contamination.

If more than two wells in a conservation district (Natural Resources District for Nebraska) had fertilizer or pesticide contaminant levels of 25 percent of the drinking water limit for nitrates or pesticides, farmers within the conservation district would then be eligible for USDA technical assistance to prepare "farm groundwater protection plans" (GWPPs). The purpose of the GWPP would be to reduce agrichemical use and therefore to prevent groundwater contamination from exceeding the drinking water limit.

If a farmer were to refuse to prepare a GWPP for his/her farm, the farmer would be required to give USDA a description of his/her farming practices, including annual agrichemical usage to remain eligible for farm program benefits.

Three types of GWPPs would be available to farmers under S.970:

1. A best management practices (BMP) plan,
2. A farm management plan (described above), and
3. An integrated pest management plan.

The purpose of all three plans is to reduce fertilizer and/or pesticide use

to prevent groundwater contamination exceeding drinking water limits. The integrated pest management plan is not defined in S.970. BMP is defined as:

1. A system or combination of practices designed to minimize agrichemical use,
2. Techniques for determining appropriate chemical application rates,
3. Timing and chemical placement methods, and
4. Increased emphasis on cropping sequences, rotations, or both.

All of these practices would have the practical effect of reducing groundwater contamination from agrichemical use. BMP is also defined by S.970 as including:

1. Pesticide use training,
2. Proper handling, storage and disposal of agrichemicals, and
3. Improved collection, handling and application of manures and organic wastes.

BMP plans, then, presumably would be plans incorporating some or all of these BMPs to reduce groundwater contamination. Farmers encountering economic hardship as a result of adopting a GWPP would be eligible for financial assistance of 75 percent of the cost of adopting the GWPP up to \$3,500 annually for up to 15 years.

*Implications.* The issue of restricting agrichemical use is controversial, whether raised in the context of federal farm programs, or regarding direct state or federal regulation of agrichemical use. S.970 should not be taken as the direction the 1990 farm bill will necessarily take regarding groundwater protection and agrichemicals. Nonetheless, S.970 is worth evaluating as it previews many issues that will be part of the 1990 farm bill debate.

S.970 probably represents the "environmental" approach to groundwater protection in the 1990 farm bill because most of the major national environmental groups participated in its drafting. Thus while more extreme policies, such as total elimination of all agrichemical use in

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# New Staff at Water Center

New staff at the Water Center are Bob Kuzelka and Mark Burbach, who began work with the Center in July.

Kuzelka, a member of the Nebraska Chapter of the American Planning Association, is assistant director at the Water Center, and Burbach is field manager and sample coordinator.

Roger Gold, Water Center director, said, "The new staff will increase our effectiveness and provide for more depth in Water Center programs and activities. The Center is fortunate in having additional staff with the backgrounds of these two that will enhance our program planning and field work."

## Colorado State Receives \$9 Million for Somalian Water Management Project

FORT COLLINS, Colo.—A five-year, \$8.9 million contract has been awarded Colorado State University for a water management project on the Shebelli River in Somalia, East Africa, according to the U.S. Agency for International Development.

As primary contractor, the university will provide technical assistance to Somalia to increase irrigated agricultural production.

"Somalia has a number of problems—land and water management are two major ones," said Marvin Jensen, director of the Somalia project and the Colorado Institute for Irrigation Management at Colorado State.

Colorado State will provide technical assistance in five areas: project coordination and support; basinwide management of Shebelli River water resources; irrigated agriculture research to improve crop, water and soil management; advisory assistance in rehabilitation works design; and a training plan.

Somalia is one of Africa's poorest countries with a per capita annual income of \$280. Serious problems in Somalia include civil conflict in the northern part of the country, acute food shortages, refugees from Ethiopia, crippling debt and a foreign exchange crisis.

Kuzelka, a Norfolk, Neb., native shares his university appointment with the Department of Forestry, Fisheries and Wildlife where he is an associate professor, and the Conservation and Survey Division as an assistant to the director.

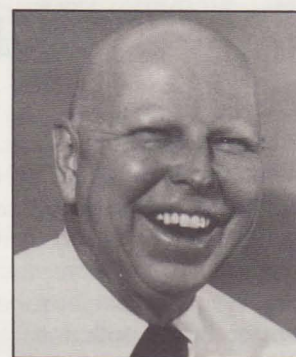
He received a Bachelor of Architecture degree from UNL in 1962 and a Master of Science degree in Community and Regional Planning from the University of Texas at Austin in 1967. Kuzelka was with the Town and Country Planning at the University of Sydney, Australia from 1967 to 1968 on a Fulbright Scholarship. From 1969 to 1979 he was the Comprehensive Planning Coordinator with the Nebraska State Office of Planning and Programming.

As a water resources planner from 1979 to the present at UNL, he has worked on two policy issue studies for the State Water Planning and Review Process and many other water-related projects.

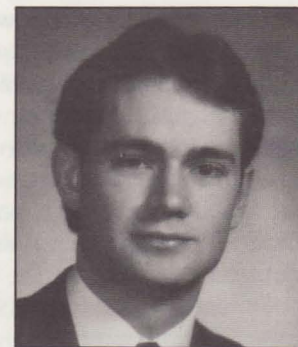
Burbach is from Hartington and graduated from UNL in 1985 with a Bachelor's degree in Natural Resources and Biology. He received a Master's degree in Water Resources Planning and Management from UNL in 1988. His master's thesis, "Groundwater Quality Management Alternatives: South Platte NRD and the City of Sidney, Nebraska," documented agricultural and urban land-use practices and subsequent management alternatives to stabilize and/or reduce groundwater nitrate contamination in the Sidney area.

His graduate research also included the determination of nitrogen contribution of field-applied manure.

For the past four years, Burbach has been associated with Roy Spalding, now associate director of the Water Center. He has been involved in many diverse water quality investigations. His duties have included coordinating and supervising water quality investigations; designing, installing and monitoring multi-level samplers; coring of the vadose zone; and performing conservative tracer studies. His major interests include groundwater management with regard to agrichemicals.



*Bob  
Kuzelka*



*Mark  
Burbach*

## EPA Announces Third Method to Determine Drinking Water Coliforms

An amendment to the Safe Drinking Water Act of 1986 calls for a third method of analyzing total coliforms in public drinking water systems. The Environmental Protection Agency (EPA) has determined that the third alternative procedure is substantially equivalent in both precision and accuracy to the techniques already approved.

The three techniques are:

- \* The multiple-tube fermentation (MTF)
- \* The Membrane Filter (MF) and
- \* The Minimal Medium (MMO-MUG).

Any of these tests may be used to analyze drinking water samples for the estimation of coliform bacteria to determine compliance with the current maximum contaminant levels for this group of organisms.

Public water systems must use laboratories approved by the state to analyze most regulated drinking water contaminants, including coliforms. EPA is encouraging states to allow certified labs to use this new test.

EPA stresses that MMO-MUG, the third alternative test, is for coliform bacteria only, and other tests should be used for heterotrophic bacteria.



# NRD History and Mission Explained in Booklet Now Available to Public

Although conservation of Nebraska's natural resources is everyone's responsibility, Natural Resources Districts (NRDs) address local concerns and provide help and local solutions toward conserving our natural resources, according to a new booklet published by the Nebraska Association of Resources Districts.

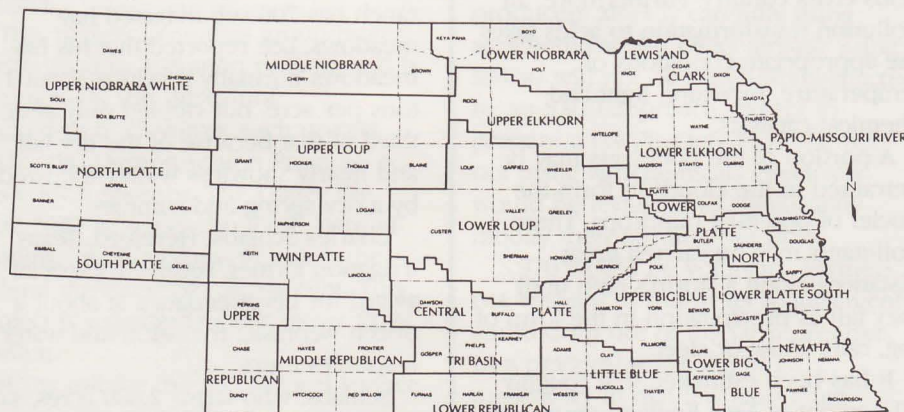
In 1969 the Nebraska Legislature passed laws that combined 154 special interest groups into 24 multipurpose Natural Resources Districts. In 1989, a merger reduced them to 23 NRDs. The Districts began working in 1972. They are funded by local property taxes and they cooperate with, combine and administer funds of other state, local and federal agencies to provide services to protect Nebraska's natural resources, the booklet says.

Local management plans for soil

erosion and sediment problems were addressed with the 1986 Nebraska Erosion and Sediment Control Act. NRDs developed local management plans to address these problems.

In 1987, the Natural Resources Districts began administering the Nebraska Chemigation Act (LB 284). Each of the 23 NRDs inspect and certify all irrigation systems that pump agricultural chemicals (chemigation) through a closed pipe. LB 284 was passed in order to prevent groundwater contamination through chemigation.

For a copy of "Natural Resources Districts - Unique, Progressive Leadership in Conservation," contact the Nebraska Association of Resources Districts, 1327 H St., Suite 102, Lincoln, NE 68508, or phone 402-474-3383.



**NEBRASKA NATURAL RESOURCES DISTRICT BOUNDARIES**

Nebraska Natural Resources Commission 1-89

## White House Conference on Water Resources Proposed by NWA to Discuss Water Issues

*The National Water Alliance, a Washington D.C., bipartisan educational group, is proposing a White House Conference on Water Resources for 1991.*

*A briefing paper has been presented to Manuel Lujan Jr., Secretary of the Interior, that outlines six regional conferences that would be held before the National White House Conference.*

*Strong support by Secretary Lujan suggests that this may be a forum for drafting major water resources legislation in 1992. The National Water Alliance proposal called for the president to convene a White House*

*Conference "to discuss key water resource issues in the U.S."*

*Administrative representatives, members of Congress, state and local government officials, community and business leaders, nonprofit organizations, academic representatives, concerned citizens and water resources experts would be invited to attend the conference.*

*Preliminary topics to be discussed include: groundwater protection, wetlands protection, water supply, surface water quality, water resources, financing, water rights/transfers, pollution prevention and water conservation.*

## Calendar

- Oct. 2** American Water Resources Association, Illinois Section, annual conference, Hotel Pere Marquette, Peoria, IL., "Water Resources, GIS Applications, and Wetlands." Phone: 309-675-418.
- Oct. 3** University of Nebraska Water-Related Scientists Water Policy Forum. Phone: 402-472-3305.
- Oct. 7** Nebraska Water Conference Council fall meeting, University of Nebraska-Lincoln East Campus Union. Breakfast at 7:30 a.m. Phone: 402-472-3305.
- Oct. 17** Aquifer Protection Seminar "Tools and Options for Action at the Local Governmental Level." New York, New York. Phone: 508-362-5570.
- Oct. 19** Same seminar in Washington, D.C.
- Oct. 25-27** Groundwater and Agrichemicals: Suggested Policy Directions for 1990, Freshwater Foundation, Radisson Hotel, St. Paul, MN. Phone: 612-471-8407.
- Oct. 27** Institute of Agriculture and Natural Resources, UNL, open house, "New Directions," 10 a.m. to 9 p.m. East Campus Union.
- Oct. 31- Nov. 1** Tracers in Hydrogeology: Principles, Problems and Practical Applications, annual meeting of the Association of Ground Water Scientists and Engineers, Houston, Texas. Phone: 614-761-1711.
- Nov. 1-3** The Midwest Groundwater Quality Protection Challenge Conference, Pheasant Run Resort Hotel, St. Charles, IL. Sponsored by Water Resources Centers of Minnesota, Iowa, Wisconsin, Illinois, Michigan, Indiana and Ohio. Phone: 515-353-3742.
- Nov. 16** Nebraska Groundwater Foundation Fall Symposium, "Risky Business: Assessing Groundwater Impacts," Hilton Hotel, Lincoln, NE.
- Nov. 20-21** Natural Resources Districts annual board meeting, Norfolk.
- Jan. 15- July 15, 1990** International post-graduate course on Hydrology, Budapest, Hungary. Sponsored by UNESCO. Phone: 361-143-043, Budapest.



## Acid Rain International Problem; Midwest's Too

It's not just an international problem or an Eastern U.S. problem, it's a Midwest problem, too. Acid rain, or acid deposition, affects many natural and man-made resources downwind from industrial regions of the world.

What is acid deposition? It's a new pollution problem. Actually, acid rain has existed since the turn of the century, it increased drastically until the 1950s and leveled off in the 1980s. Now, it's a major threat to the quality of life in Massachusetts, according to a report, "Acid Rain in Massachusetts," published by the Water Resources Research Center at the University of

### Deadline for Grant Proposals to USGS Announced by Center

The Nebraska Water Center has received guidelines for matching grant proposals under Section 105 of the Water Resources Research Act of 1984, P.L. 98-242. The deadline for such proposals to arrive at the U. S. Geological Survey office in Washington, D.C. is *Nov. 21, 1989*.

Proposals should be no more than 3 years in duration and should be within the range of \$80,000 and \$350,000 combined federal and matching funds. Matching funds must be on a dollar-for-dollar basis, but federal funds are limited to not more than \$175,000.

The following areas will be of particular interest to USGS in funding FY 1989 proposals: Problems of Groundwater Quality; Institutional Change in Water Resource Management; Science and Technology of Water-Quality Management; and Climate Variability and the Hydrologic Cycle.

The Nebraska Water Center will work with principal investigators in developing research proposals and budgets, University budget forms and signature sheets. All proposals should be submitted through the department head for signature and then be received in the Water Center Director's office. Therefore, proposals must be received at the Director's office no later than Nov. 1, 1989 to allow time for University signatures. Any proposals submitted after Nov. 1, 1989 will not be considered.

Massachusetts at Amherst.

Acid rain is created by emissions of sulfur dioxide and nitrogen oxides from oil and coal-burning electric utilities, industry, cars and trucks. However, most emissions occur in the Midwest. The top 10 sulfur dioxide emitting states are: Ohio, Pennsylvania, Indiana, Illinois, Missouri, Texas, Kentucky, Florida, West Virginia and Tennessee. These states account for 57 percent of the total sulfur dioxide emissions in the U.S.

On the other hand, six New England states account for less than 3 percent of the total and Massachusetts accounts for just 1.3 percent. The statistics are about the same for nitrogen oxide emissions.

This is what happens: pollutants are emitted into the atmosphere and are transported and transformed into acids. Weather systems carry these acids cross country. Furthermore, air pollution transformation to acids takes the appropriate conditions of temperature, moisture, light and chemical catalysts.

A portion of the pollutants may be entrained in the clouds to form the nuclei of potential raindrops. These pollutants may be carried great distances along a storm's path until they fall as precipitation in the form of fog, rain, snow or sleet.

It has been estimated that roughly 70 percent of New England deposition originates from sources west and southwest—generally in the direction of the Ohio River Valley in the Midwest.

Acid deposition and other air pollutants cause forests and fields to decline and may affect pollination of horticulturally important species. Acid rain is damaging statues and structures and it affects health and welfare.

"Increased acidity increases corrosion in water pipes and adds dangerous metals to drinking water," the report states.

Emission reduction calls for interregional and international cooperation with innovative sharing of cleanup costs.

Finally, the United States is the only major emitting nation which has not agreed to major SO<sub>2</sub> reductions.

## Sandhills Water

(continued from page 2)

Fish production will begin in spring, 1991, with the federal government providing 75 percent and Nebraska, 25 percent, of the financing. Approximately 191 tons of feed per year will be used at the hatchery, Bob Kutz, manager of the U.S. Bureau of Reclamation's Nebraska-Kansas office at Grand Island, said.

A National Farms, Inc., farrow-through-finish confinement pork production facility near Atkinson was explained, where thousands of sows are housed in complexes. The grow-finish barns were built in the early 1980s.

At Long Pine State Park during a lunch break, discussion of unappropriated water rights in Long Pine Creek was heard.

One of the final stops on the tour was at the Cherry County John R. Lee Ranch at Brownlee. This 6,700-acre ranch has 700 sub-irrigated hay meadows. Lee reported that his hay meadows normally produce about 1.5 tons per acre, but yielded only about a third of that because of the dry fall and nearly snowless winter followed by a dry spring and summer.

Charles Schlabs, Hereford, Texas irrigation farmer, received a special award for his attendance at about a dozen Nebraska irrigation and water resources tours.

Schlabs, who farms 2,600 acres, said, "It's not unusual for dryland crops to fail, but this year even our irrigated crops are in trouble in Texas."

He said methods to conserve water and best management practices are a couple of the things he takes back to Texas from the Nebraska tours.

"Basically, though, we have a lot of farming practices that are the same. We're more alike than different," he said.

These annual tours are co-sponsored by the University of Nebraska Institute of Agriculture and Natural Resources and the Nebraska Water Conference Council, composed of about 90 groups in Nebraska that have water interests.



# York Groundwater Recharge Demonstration Project the First of 21 Projects to Fill in Summer

One of the first projects constructed under the High Plains States Groundwater Demonstration Program is in the Upper Big Blue Natural Resources District (NRD). It is located two miles west of York and about 50 miles west of Lincoln.

As one of the stops on the 1989 August Nebraska Water Resources and Irrigation tour, participants were just days short of the Aug. 7 official groundbreaking ceremony. It is one of 21 projects funded by the federal government under the High Plains States Groundwater Demonstration Program Act of 1983.

The 50-acre reservoir will store 310 acre-ft. of water, and will be about a mile and a half along a tributary of Beaver Creek. Schwisow Enterprises, Inc., of Beatrice was awarded the contract for the first phase of the project.

This project promotes groundwater recharge demonstration projects and is managed by the Bureau of Reclamation. However, each project under the Demonstration Program Act has a local sponsor. The Upper Big Blue NRD provides the local share of funding, or 20 percent to match the federal government's 80 percent. This project is expected to cost about \$1.8 million.

Plans call for the use of local surface water to test methods of supplementing groundwater reserves. The project will include a dam and reservoir for surface water storage and recharge components—an injection well to add water directly into the aquifer and spreading basins to allow water to filter into the groundwater from the surface.

A series of monitoring wells will help determine the effectiveness of the recharge methods. Wells will also monitor the groundwater quality in the aquifer. Later, a water treatment plant will be added to remove sediments, agricultural chemicals and reduce nitrates to drinking water quality levels before water stored in the reservoir is injected through the well into the groundwater.

The present schedule calls for the reservoir to begin to fill next summer, according to Upper Big Blue NRD officials.

## Farm Conservation — Water Protection Act

(continued from page 3)

10 years, may be raised, the more moderate strategy of S.970 is likely to define the most restrictive policy that receives serious congressional consideration.

Secondly, S.970 takes a BMP approach to restricting agrichemical use. This means that instead of requiring all farmers to reduce agrichemical use across the board 10 percent (or 50 percent or whatever), restrictions will require farmers to use agrichemical BMPs. This means that producers already carefully using agrichemicals (in effect already using BMPs) will not be significantly affected by an S.970 approach, except to prepare a GWPP. Only those farmers not using agrichemicals effectively would be required to significantly modify their farming practices.

S.970 would be voluntary. Farmers not wishing to follow its requirements could drop out of the farm program. In a practical sense, S.970 is mandatory in that few cash grain farmers can afford not to participate in the farm program. Nonetheless, the farmer does have the option of leaving the farm program to avoid the S.970 agrichemical restrictions.

S.970 takes a preventative approach to groundwater protection. Many, including policy makers in Nebraska, assume that nitrate and pesticide levels in groundwater are not a concern until they reach the drinking water limit. The better policy is to prevent nitrate and pesticide levels from reaching drinking water limits through BMPs or other regulations. S.970 recognizes this and triggers the agrichemical provisions when contaminant levels reach 25 percent of the drinking water limit. Whether two wells in a conservation district is the appropriate number of observations to trigger the

agrchemical provisions is a separate issue.

*Conclusion.* Federal regulation of pesticides is imminent. EPA is putting the final touches on its *Pesticides in Groundwater Strategy*, which ultimately will restrict the use of individual pesticides when their use threatens drinking water. EPA is also establishing drinking water limits for pesticides, and may have drinking water limits for virtually all the pesticides used in Nebraska by 1995.

Pesticides are the great unknown in Nebraska groundwater policy considerations: municipalities now need not test for pesticide contamination in their water supplies and the real extent of pesticides contamination in Nebraska is not known. The current preoccupation with nitrate pollution of groundwater will soon be replaced with the concern of how to deal with pesticide contamination, also.

S.970 shows how public concerns regarding agrichemical contamination of groundwater will change both the federal farm program and agrichemical use in Nebraska and the U.S. While reasonable people may disagree regarding specific provisions of S.970 and similar proposals, no one can seriously dispute the need to control agrichemical use to protect and maintain the quality of our drinking water.

## Proposals for Midwest Water Quality Initiative Welcomed

The Midwest Water Quality Research Initiative that will be implemented in FY-1990 calls for the establishment of comprehensive research sites to evaluate Midwest Crop Production Systems. These systems would minimize the contamination of water resources with agriculture fertilizers and pesticides, according to Roger Gold at the Water Center.

It is anticipated that several sites will be selected in predominantly corn and soybean production areas. It is estimated that funds in excess of \$1 million will be available for FY-1990. The RFP is due for publication in the Federal Register in early October.

For those interested in participating in these programs or submitting proposals, contact Gold at the Water Center, 402-472-3305.



## United Nation's Association

*(continued from page 1)*

the supply of safe drinking water and basic sanitation to the African continent.

In Uganda they have been fighting to re-establish the efficiently operated water and sewage treatment plants that are pre-1950. During the upheavals of the Idi Amin regime of the 1970s, the country's infrastructure was reduced to shambles. This included water supply and sewage treatment plants.

British consultants found potable water reduced and sewage by-passing inundated works and flowing directly into watercourses.

Finland is assisting Kenya in its water supply program that will provide clean water by the year 2000. Eighty-seven water points that include springs, shallow wells and boreholes will be constructed.

Described as the world's largest public health engineering project, the Greater Cairo Wastewater Scheme is scheduled to be completed in 1994. A system, to cope with the effluent from a population that may reach 16 million by the turn of the century, was first

constructed 75 years ago for a million people. USAID has assisted in the first stage of the project.

Because Hong Kong has no natural lakes, rivers or underground water, an adequate water supply has always been a problem here. Since 1877, 17 impounding reservoirs have been commissioned, but with a shortage of natural storage sites, Hong Kong built Plover Cove, a "reservoir in the sea." Even with this new reservoir and a desalination plant, a new source of water had to be found. So, Hong Kong looked to its neighbor, China, for a major source of water. In 1960, Hong Kong received piped water from China. Several extensions on this project have brought more pipeline and pumping plants on line. By 1995, this expanded distribution of water from China to Hong Kong will be complete. The Water Supplies Department of Hong Kong feels its water supply is well assured. However, the problem would be catastrophic if China turned off the tap. Hong Kong would be deprived of the bulk of its water supply. China ranks sixth internationally in water resources.

The future of Mexico City's water supply is bleak. Pre-Hispanics had immediate access to fresh-water, but poor management of water reservoirs is leading the Valley of Mexico into a dangerously dry spell.

An example: at the La Laguna reservoir in the northern state of Coahuila, water is continuously pumped. This lowers the water table and land exposes natural arsenic in underground aquifers. This is a serious threat to local residents.

Another problem is the growing migration to the capital. About 4,000 people arrive in the city every day. Although Mexico City has an adequate rainfall, the rainfall seeps directly into the sewer system and is pumped out with the city's waste instead of being collected in underground wells so that underground aquifers could be replenished. Water rationing has been suggested in Mexico City.

And finally, in the Philippines, only 63 percent of the 60 million inhabitants have access to safe and adequate water. A two-and-a-half year project will provide 100,000 water wells.



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