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CROP WATCH

University of Nebraska Cooperative Extension
Institute of Agriculture and Natural Resources

No. 2003-1

Surface water reserves expected to reach all-time low; next few months critical

University and government speakers painted a somber picture of the state's drought and long-term recovery when they met twice in the last week. The governor's Climate Assessment Response Committee (CARC) met Jan. 30 to view and discuss the latest assessments of climate, water reserves, snowpack, pastures, and the short- and long-term forecasts. Details from this meeting were presented to the Governor's Drought Task Force Monday, Feb. 3. Although recent storm activity gives room for optimism, it is probably too late to

radically improve prospects for producers relying on surface irrigation delivery this year.

As of Jan. 27, Lake McConaughy stood at 722,400 acre-feet, which is 41% of capacity and 52% of long-term average for this date. On Sept. 23, 2001 McConaughy stood at 573,800 af, or 33% of capacity. Inflows are currently averaging 700 cubic feet per second (cfs), compared to the normal inflow average for this time of year of 1100-1200 cfs. These levels are below what was projected last fall.

Lake McConaughy is projected to peak out at 800,000 acre-feet prior to irrigation season. This would be the

lowest spring peak since the lake was filled in 1948. The all time record low was 380,000 acre-feet in 1956, which could easily occur with irrigation this year. Of special note, representatives of the Natural Resource and Conservation Service believe the 800,000 acre-feet projection may be too optimistic.

Conditions within the Republican River basin are as bad, or worse, than the Platte River system. As of Jan. 27, there was zero flow at the Colorado-Nebraska border. There has been no flow for over two weeks.

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Focus: drought

Several stories in this week's *Crop Watch* address the continuing drought and how producers can adjust for it in the 2003 cropping season. The next regular issue will be in early March

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Early wheat irrigation advised when temperatures warm

Contrary to popular belief, winter wheat and alfalfa don't go dormant in winter.

Any time soil temperature at the crown level (typically about 1 inch below the soil surface) is above 32°F, winter wheat and alfalfa will grow, albeit slowly in most winters. Dry, windy conditions this winter have promoted winter growth while at the same time drying out the surface soil in many locations. Winter desiccation is the primary cause of winter kill in alfalfa and winter wheat.

Growers who can apply water, preferably 0.5 inch, to their wheat crop may benefit by using a three-

to four-day warm spell of above freezing temperatures to replenish the surface moisture.

A winter irrigation can accomplish two things. It will reduce plant stress caused by dry conditions and moderate soil temperature fluctuations. Wet soil is more resistant to temperature fluctuations than dry soil. Large temperature fluctuations often create more problems for winter wheat than extreme cold weather. Applying water at this time of year could make a big difference in winter survival and spring plant vigor. Growers will

(Continued on page 4)

Management tips

◆ **Contact your local NRCS or NRD office to learn whether cost-share programs are available in your area** for renovations or maintenance of existing irrigation equipment or purchase of new center pivot equipment. While USDA funds are not currently available through the Water Savings Section of the Environmental Quality Incentives Program (EQIP), cost-share funds may become available later this year.

◆ **Take time now before planting and irrigation begin to check and maintain machinery, implements and irrigation equipment.** Quick-fixes made during the rush of the season should be permanently repaired to avoid unnecessary breakdowns at critical periods.

◆ **March 15 is the deadline for enrolling spring crops for crop insurance.** (See story on page 5.)

New publications

The following new or revised publications were recently released by the University of Nebraska Cooperative Extension

Selecting Alfalfa Varieties for Nebraska, EC03-153, to be available next week, includes a discussion of how to compare and select varieties, a table of characteristics and relative yields of alfalfa varieties, based on selected Nebraska tests, 1982-2002; a similar table of alfalfa variety characteristics for experimental seed; and a table of seed sources.

2003 Guide for Weed Management in Nebraska, EC02-130, features detailed herbicide information and recommendations based on objective field trials for a range of crops and cropping conditions. It includes tables of herbicide efficacy for specific crops and weeds, herbicide application rates and times, costs and helpful comments under varying planning conditions and treatment periods.

Briefs

Third driest year in 2002

Last year was the third driest year for Nebraska and Wyoming in the more than a century that records have been kept, according to Mike Hayes, a climate impact specialist with the National Drought Mitigation Center at UNL. Moderate to extreme drought conditions extend across the High Plains and much of the West, including more than 30% of the continental United States. Only droughts of the 1930s and late 1950s affected a greater percentage of the country's land mass.

NU field test results

Nebraska Corn Hybrid Tests, EC02-105, and *Soybean Variety Tests*, EC02-104, are available from local NU Cooperative Extension offices and on the Web at <http://varietytest.unl.edu>. Each year several hundred soybean varieties and corn hybrids are tested at about 30 sites across the state. Corn and soybean results provide information on yield, moisture, bushel weight and diseases; soybean results also include height, maturity date, oil and protein content, lodging data,

and this year, the results of a soybean cyst nematode test. Results from other variety tests, including sorghum, winter wheat, spring wheat, alfalfa and sunflower, also are available. The results provide an unbiased comparison of how entries from seed companies perform at different locations under different conditions. Lenis Nelson, Extension crop variety specialist, said. "What the producer pays for the seed doesn't differ much, but choosing the variety that will give them the best performance can have significant yield results."

Speakers go on-line

If you weren't able to attend the **Drought Facts and Strategies Conference** Jan. 22 in Scottsbluff, you can view some of the sessions on the Web at http://cropwatch.unl.edu/archives/2002/crop02-29.htm/drought_video_clips. Sponsored by the NU Panhandle Research and Extension Center, this urban-focused conference addressed the issues that agriculture, cities, municipalities, landowners, urban residents and businesses are facing due to the drought.



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Water reserves *(Continued from page 1)*

Harlan County Reservoir stands at 51% of capacity, compared to 79% at this time last year. Other reservoirs across southwestern Nebraska are as follows (first value: this year; second value: last year): Bonny (Colorado): 46% (57%); Enders: 28% (29%); Swanson: 20% (23%); Butler: 36% (51%); and Strunk: 56% (78%).

Some preliminary estimated water delivery information was presented to the CARC Committee based on information through Jan. 14. (See table, page 10.) These are estimates and do not constitute guaranteed delivery.

Snow melt runoff projections for the Platte Watershed continue to decrease. The basin snowpack in Colorado and Wyoming was over 125% of normal in mid-November and had dropped to 75% of normal by Jan. 1. Runoff projections for the spring peak are projected to be approximately 55% of normal if the basin receives average snowfall through mid-April.

If snowfall within the basin continues to remain below normal, these estimates will be lowered. In order for the snowpack to achieve normal conditions by the statistical peak in mid-April, the basin will need to receive nearly 200% of average snowfall during the next 10 weeks. Even with a normal snowpack, runoff would only average 80-90% of normal. Conditions are so dry in Wyoming that more of the melt water would be lost to infiltration than normally would be expected.

An additional concern has been raised by scientists monitoring the snowpack feeding the Platte and Missouri river basins. While many of the south-facing mountain slopes are

Most of central and western Nebraska has accumulated three-year precipitation deficits of 75-100% of normal annual precipitation.

nearly barren above tree line, many of the monitoring sites are in protected areas below tree line. The scientists are concerned that runoff estimates actually may be less than previously projected, by as much as 20% in some locations.

Pasture concerns

Speakers also addressed current pasture conditions and future viability of pastures. Of the 1.1 million acres in CRP in Nebraska, 318,000 acres were grazed or hayed last year. Farm Service Agency representatives were concerned as to whether these acres will provide adequate forage this year if they are again released for emergency assistance.

Native prairie species have suffered from the prolonged drought and by some estimates may take over a year to fully recover. Some Panhandle producers have expressed concern that pastures are so poor that they may not provide an adequate forage base this year.

Governor Johanns asked FSA representatives to advise U.S. Secretary of Agriculture Ann Veneman of the state's current situation. He also requested that they ask what steps the state should take to begin the process of drought declarations, if needed, in order to expedite the release of CRP. Since CRP release is dictated by percent of normal precipitation received over a defined time, it was hoped that by notifying Secretary Veneman now Nebraska might warrant special consideration of carryover effects from last year's drought on pastures.

The forecast

The weather during the next three to four months will dictate much about how Nebraska fares during the upcoming production

season. Most areas of central and western Nebraska have accumulated three-year precipitation deficits of 75-100% of normal annual precipitation. The statistical likelihood of completely alleviating these deficits over the next year is less than 5%. It would take nearly 400% of normal precipitation to eliminate this deficit by May 1.

Long-lead models continue to point toward the tendency for above normal precipitation during the next three months; however, with each successive release of these forecasts, the models have reduced the statistical likelihood. Recent precipitation trends are encouraging, but we have seen these wet periods off and on for the past 15-18 months. Usually, they have lasted only four to six weeks and have been followed by extremely dry conditions. Until a prolonged wet spell occurs, we will need to treat current events as a mild wet spell in an overall dry pattern.

It is entirely possible that dryland crops could have a normal or even above normal production year in 2003. We will need to see abundant moisture during the next four months to build soil moisture reserves. At present, all of the High Plains Regional Climate Center soil moisture sites are pointing toward an average of two inches of available moisture. This ranges from a low of one inch of available moisture for western Nebraska sites to four inches at extreme eastern Nebraska sites. All of the moisture is contained in the top two feet of the soil profile.

Even if abundant rains do fall this spring and summer, the hydrological situation will persist into next year. In order for reservoirs in western Nebraska to return to normal, above normal mountain snows will be required through next winter. It is important to remember that reservoirs in Colorado and Wyoming are as bad or worse than those in Nebraska. We need to see these lakes return to normal before significant recovery can be expected.

Al Dutcher
State Climatologist

Climate/drought resources

- Drought Information and Resources for Nebraskans, UNL's IANR, <http://ianrhome.unl.edu/drought/>
- National Drought Mitigation Center at <http://drought.unl.edu>

Irrigating wheat *(Continued from page 1)*

need to turn off and drain their irrigation systems before night time temperatures drop below freezing or keep their systems running throughout the night to prevent damage to the system. (Running high-pressure irrigation systems with sprinklers above the pipes in freezing or near-freezing weather is not advised since ice may build up on the pipe and the weight may cause undue stress or damage. In this case you may want to wait until temperatures are expected to be clearly above freezing while it's running.)

Alfalfa has a deeper root system than wheat, but in many cases it also would benefit from pre-season irrigation. University specialists have long advocated late fall or early spring irrigation of alfalfa to

build up water in the soil profile. Apply only as much as the soil can rapidly absorb so that there is no standing water to freeze and form ice on or near the plant, potentially smothering it.

It can be a fine line between replenishing a critical water source and indirectly damaging the plant. Not applying too much at any one time also will allow for any precipitation to be absorbed. Another advantage of a light spring irrigation is that it will help maintain residue cover, helping to limit erosion from wind.

Drew Lyon, Extension Dryland Crops Specialist, Panhandle REC
Bruce Anderson
Extension Forage Specialist
Bill Kranz, Extension Irrigation Specialist, Northeast REC

Wheat production guide offers on-line, timely resources

With dry conditions throughout the state and uncertain irrigation prospects for the coming year, many growers decided last fall to increase their winter wheat acreage. A number of these growers lack recent experience with the crop.

The 2003 version of the web-based *Wheat Production Handbook* (available on-line at www.panhandle.unl.edu/personnel/lyon/wheathbk.htm) is an ideal resource containing the best and latest information on growing winter wheat in Nebraska. One of the recent additions to the handbook is our new NebGuide, *Producing Irrigated Winter Wheat*. This is a valuable reference for the many new winter wheat growers who have added wheat to their irrigated rotations due to drought conditions. Also new this year are two NebGuides with the latest University of Nebraska recommendations for fertilizing winter wheat: *Fertiliz-*

ing Winter Wheat I: Nitrogen, Potassium, and Micronutrients, NebGuide G02-1460, and Fertilizing Winter Wheat II: Phosphorus, NebGuide G02-1461. In addition to these new materials, growers can find information on crop development, variety selection, fertilizer application, seeding, weed control, insects, diseases, irrigation, harvesting, economics, marketing, feeding, and fallow management.

Be sure to bookmark this site and reference it for winter wheat production information.

Drew Lyon, Extension Dryland Crops Specialist, Panhandle REC

Mycotoxins in corn widespread in 2002; risk high for 2003

Grain molds and mycotoxin contamination were widespread in the 2002 corn crop. Most of the irrigated corn was free of aflatoxin or well below the FDA action level (300 ppb) for feed-grade corn; however, approximately 39% (28 of 72 samples) of the corn crop surveyed by the Nebraska Department of Agriculture exceeded the FDA action level for food-grade corn (20 ppb). Since most of that corn was intended for livestock feed, the economic impact of the aflatoxin contamination was minimal.

With respect to fumonisin contamination, approximately 40% (29 of 72 samples) of the corn crop surveyed by the Nebraska Department of Agriculture exceeded the FDA action level for food-grade corn (5 ppm). This was a significant issue for some food-grade corn producers and marketers in Nebraska. Horses should not be fed grain contaminated at this level (5 ppm). No samples were determined to have greater than the FDA action level for mature cattle (60 ppm). Many samples exceeded the fumonisin action level established for swine (20 ppm) and appropriate caution should be exercised in feeding this grain to hogs.

The long-range forecast for the 2003 growing season projects another year of below average precipitation and above average temperatures. If that holds true, the risk of aflatoxin contamination in the 2003 corn crop will be high. The level of heat and moisture stress during pollination will determine the level of risk in each field. Other factors may increase the risk of aflatoxin contamination, including, insect damage during the grain fill period and in postharvest storage, hybrid genetics, and mechanical damage during harvest and

(Continued on page 6)

As drought conditions linger

Addressing program and crop insurance issues

Western Nebraska farmers are facing some difficult decisions as they evaluate traditional and alternative crops that can be planted in an extremely dry year and plan for production in 2003. The agronomic decisions are compounded by concerns about farm program eligibility and crop insurance availability.

Fortunately, the Farm Security and Rural Investment Act of 2002 retained all of the planting flexibility allowed in the 1996 farm bill. The "Freedom to Farm" program removed nearly all restrictions in terms of the crops that may be planted on base acres. Producers may plant any program or non-program crop on base acres, with the exception of designated fruit and vegetable (FAV) crops. In western Nebraska, the key FAV crop in irrigated cropping systems is dry edible beans. Growers with a history of planting dry beans will be allowed to plant them on all "free" or non-base acres with no penalty, and on base acres with an acre-for-acre reduction in direct farm payments. This payment reduction will not be a limiting factor for dry bean producers.

The crop insurance issues are more difficult to evaluate. Irrigated crop producers are facing limited water supplies and uncertainty in the notification dates on these water sources. (*See preliminary surface water allocation estimates on page 10.*) This uncertainty will have numerous implications as producers make planting decisions and attempt to insure the crops that are planted.

Lack of rainfall for irrigated producers is not an insurable peril. For those producers planning to grow crops without any irrigation water on traditionally irrigated land, the crops will be insurable. However, these crops will only be insurable as dryland crops. The

Uncertainties about water allocations are making it harder for producers to determine what to plant and how to insure it.

yield history on these irrigated farms will not be applicable, so these farms will need to use "T" yields that may not reflect the actual productivity of the land base. Because dryland production is inherently more risky, the premiums paid for the reduced yields of the dryland production will be higher. This is a double edged sword for producers looking to plant dryland crops on previously irrigated acres that will not have a water supply in 2003.

For the farm that is expecting some water to be available, the percentage of the land that is expected to have an adequate water supply to make a crop will be insurable as irrigated production. The remainder will need to be insured as dryland production. Timeliness of information from the Bureau of Reclamation and irrigation districts on the amount of water available for irrigation will influence the actual insurability of the crops planted this spring. As information on water availability becomes available, insurance providers will need to determine whether crops are going to be insurable and whether all of the acreage is insurable as an irrigated practice.

The final option for producers is to take the prevented planting (PP) option in the crop insurance program. Initially developed for producers in areas that may be too wet for spring planting, the prevented planting provision is available in all insurance contracts with drought included as one of the perils.

The prevented planting coverage is difficult to understand, and even more difficult to actually implement. Prevented planting can be applied for, assuming that the time for planting and the late planting period, according to the coverage, has passed. The lack of moisture in conjunction with a failed water supply should qualify the producer for prevented planting. This assumes that the condition is prevalent throughout the area, meaning that a number of farmers in an area will need to apply for the same peril.

For irrigation districts that may not have water, this will be a matter of proving that the water is not available for a significant portion of the acres in the irrigation district. Prevented planting will require that the producer has purchased insurance and paid the appropriate premiums. In addition, the actual adjustments will not occur until late in the season. The prevented planting regulations are not easy to understand and should be reviewed with a crop insurance professional before considering this option.

Growers who take the prevented planting option will be able to leave the land idle, plant a cover crop, or plant a crop for grazing. Any crop that is planted and harvested for sale will not be allowed on prevented planting acres. The other concern with prevented planting claims is a limit on the number of times that it may be claimed. If this drought persists into 2004, any acres that prevented

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Crop insurance *(Continued from page 5)*

planting was claimed on in 2003 would not be eligible for prevented planting on that crop in 2004.

Spring crops will need to be enrolled in insurance programs by March 15, similar to previous years. If the intention is either dryland, irrigated, or prevented planting on irrigated land, the crop must be enrolled in the crop insurance program by this deadline.

The most important consideration for crop producers facing drought and limited irrigation water supplies is to remain informed about the options available, both for crops and the programs that will allow for insurance. Check with crop insurance advisors before

Feb. 14 Market Journal to address drought and crop insurance issues

Guest speakers on the Feb. 14 Market Journal broadcast will discuss crop and farming options and crop insurance issues related to this year's dry conditions.

NU Extension speakers will include Bob Klein, cropping systems specialist; Bill Kranz, irrigation specialist; Roger Elmore, crops specialist; Dean Yonts, irrigation specialist; and Richard Ferguson, soils specialist. Franklin Choutka, Nebraska claims manager, North Central Crop Insurance Company, will discuss insurance coverage issues this year. Regular features on the weather and markets also will be included.

The show will air at noon Feb. 14 on the Dish Network's University House Channel (NAUHS) 9411. It also will be available at the following Cooperative Extension offices: Boone, Cass, Holt, Madison, Saunders, Sioux, Valley, Washington, and York. For more information, visit the Market Journal Web site at marketjournal.unl.edu.

making any decisions that divert from the standard practices.

**Paul Burgener, Extension
Agricultural Economist
Panhandle REC**

Women In Ag Marketing program Feb. 19 in Kearney

Nebraska farm and ranch women will learn the benefits and key elements of marketing and creating marketing plans at a Feb. 19 NU Cooperative Extension program in Kearney. The Women in Agriculture Marketing Program will be from 9 a.m. to 3 p.m. at the Holiday Inn.

Participants will learn about five common mistakes in grain marketing, grain pricing tools, the role of crop insurance in marketing plans, said Deborah Rood, programs coordinator for the UNL agricultural economics department. They also will write personalized marketing plans and then use a simulation game to test their plans. Speakers will include Ed Usset and Robert Craven from the Center for Farm Financial Management at the University of Minnesota.

Cost is \$25. Registration deadline is Feb. 14. For more information or to register, send name, address, phone number and a check payable to the University of Nebraska to Women in Agriculture, 303 C Filley Hall, University of Nebraska, Lincoln, Neb. 68583-0922.

Mycotoxins *(Continued from page 3)*

postharvest handling. A crop management plan should be developed to minimize crop stress and insect or mechanical damage.

Many thanks to the Nebraska Department of Agriculture and the Lincoln Grain Inspection Service for providing useful information in monitoring the mycotoxin issue in

Nebraska No-till Conference Feb. 13

The Nebraska No-till Conference on Feb. 13 will focus on adapting no-till to corn and soybean production. Basing their recommendations on years of field research and on-farm trials, speakers will discuss the benefits of no-till farming and how producers can make it work for them.

Featured speaker Dwayne Beck, research manager at the Dakota Lakes Research Farm, a no-till operation in Pierre, S.D., will discuss the benefits of no-till, especially under dry conditions. Beck has been developing no-till systems for irrigated and dryland areas in central South Dakota since 1985. The systems have allowed producers to profitably adopt no-till techniques.

Paul Jasa, NU extension engineer, will speak on no-till system management, planting equipment, adjustments, operation, soil structure and compaction.

Pre-registration is due by Feb. 11. For more information or to register, contact NU Cooperative Extension at (402) 624-8030 or (800) 529-8030 or e-mail at kglewen1@unl.edu. The event is free and sponsored by Cooperative Extension in NU's Institute of Agriculture and Natural Resources, Nebraska Soybean Board, Lower Platte North Natural Resources District, USDA Natural Resources Conservation Service and USDA Farm Services Agency.

Nebraska. For more information on grain molds and mycotoxins see the NU Cooperative Extension publication, *Grain Molds and Mycotoxins in Corn* (G00-1408), available on the Web at <http://www.ianr.unl.edu/pubs/plantdisease/g1408.htm>

**Jim Stack, Extension Plant
Pathologist, South Central Ag Lab**

Select crops suited to available water

Crop producers in many areas of Nebraska will have limited water for irrigation in 2003. The subsoil moisture is below normal, the winter precipitation has been sparse, and the long range forecasts do not indicate enough excess moisture to help many areas catch up to average levels. This is due to both drought and over-development of ground water resources. In those areas where water is likely to be restricted, the timing of water deliveries may not correlate with crop water needs, making it important to select a crop whose water needs match when water is likely to be available. Soybean, for example, uses most of its water during pod fill. If water is not available then, yields will be greatly affected.

What are a crop producer's best options for selecting crops this year, given the prospects for limited water supplies?

1. Before making any cropping decisions, check with the appropriate Farm Service Agency, CRC coverage, Revenue Assurance, etc. regarding any restrictions.

2. When selecting crops, look at when the crop most needs water as well as how much water will be needed. Compare when the crop needs the water with when it will be available from the irrigation district. If water is not expected to be available during a critical growth period, consider another crop. Try to make adjustments that will work in a dry year, but will not limit potential yields if the drought ends.

3. Make sure there is an economic use for the crop being considered as well as the technical expertise and equipment necessary for growing a different crop.

Seed companies continue to improve the yield under both dry and wet conditions and some rate the drought tolerance of the seed they market. Changes in maturity

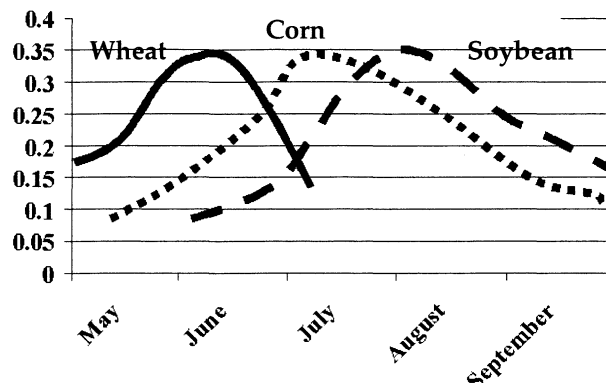
and time of critical events can influence how a variety responds to drought. Earlier maturing, drought hardy varieties make sense as long as you don't give up much yield potential. You probably will not be able to make direct comparisons of drought ratings since they use different scales and criteria.

When we look across the state of Nebraska, varieties and hybrids have a rather limited area of adaptation. Both corn and soybean need to stay fairly close to their adapted areas. When comparing yields of potential varieties and hybrids, look within your geographic area and consider the experiences you've had on your farm. Don't throw out all your current varieties and replace them with ones you've never tried. It is safest to replace 25% or less of the acres with a new, untried variety or hybrid.

Crop traits

Corn. When water is limited, avoid full season corn hybrids and adjust fertility rates for a lower yield goal. Reducing plant population for corn can reduce water use, but populations must be planted below approximately 16,000 plants per acre before substantial water savings can be expected. With lower plant populations, weed control becomes even more important later into the season. Also, studies have shown that water stress early in corn has much less of an impact on yield than water stress during tasseling. If water supplies are limited, concentrate irrigation at tassel time.

Soybean. For soybean, if the soil profile is near field capacity at



Daily plant water use throughout the season for wheat, corn, and soybean. Critical periods of high water use differ among the crops, allowing for targeted irrigation when each crop needs it most.

planting, the late flower through pod elongation periods are critical water use periods. If there is a chance water may not be available at pod fill, consider planting the soybean earlier (although frost and some insects may increase risks). Planting earlier may allow the plant to have access to more rainfall events than if the crop is planted later. In addition, early planted soybeans may be better able to take advantage of surface water releases in June and late July which are timed to the needs of corn production.

At the Rogers Memorial Farm, 10 miles east of Lincoln, Paul Jasa, Extension engineer, no-till planted

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Table 1. Soybean planting date and yield for two maturity dates.

Planting date	Soybean yield, bu/A	
	2.4 Maturity	3.2 Maturity
March 6	42	38
March 29	43	35
April 19	38	37
May 10	39	37
May 31	36	37
June 21	28	27

Seed coated with Rival™ and Allegiance™

Crop selection

(Continued from page 6)

soybean to evaluate planting date and whether late planted soybean would have adequate rainfall or soil moisture during August for the important pod fill period, the main determinate of yield. In 2000 it rained in July but not in August during pod fill. *Table 1* lists planting dates and soybean yield for two maturity dates.

Last year some soybean fields seemed to tolerate drought a little longer in wider rows, however the benefit wasn't enough to warrant changing your present system.

Dry bean. In western Nebraska dry bean is a good choice where water supplies are limited. Because dry bean is not a program crop and is considered a fruit or vegetable crop, be sure an acreage increase does not jeopardize your corn base. Early or late water stress on dry bean has been shown to depress yields somewhat; however, maintaining soil water during flowering can still produce respectable yields. Although dry bean only uses about 16 inches of water, most of it is used during July and early August. If water availability is limited to early spring, production can be reduced.

Small grains and forages. Most areas of the state have the greatest potential for precipitation in early spring. Even though conditions are dry, excess rain during the spring can result in water loss to deep percolation or runoff. Planting a crop such as small grains and forages or having winter wheat planted may allow irrigators to take better advantage of the spring rains. These crops are actively growing in the early spring and can use the water that may not be useable by more traditional row crops. In some parts of the state, animal forages may be a good option for producers who also raise cattle since the cost of forage will likely increase if dry conditions persist.

Summary

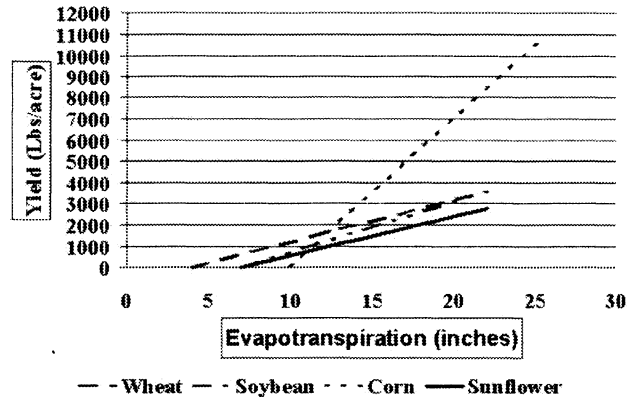
Planning and adjusting for expected limited water supplies

Different crops respond differently to water and to the timing of water delivery. For corn it takes about 10 inches of soil water to get the first bushel of grain.

After the first bushel of corn, each additional inch of water available to the corn plant will increase yield by 12-16 bu/ac. For

soybean it takes about 7 inches of soil water to get the first bushel with yield increasing by 3-4 bu/ac for every additional inch of crop water use. In severely dry summers every additional inch of water could make the difference between loss and profit.

A center pivot must be capable of delivering the amount of water needed by the crop during the peak crop water use period. *Table 1* illustrates the amount of water that can be applied with different system capacities and with one crop or with multiple crops whose critical water needs are at different times (see *Figure 2*). For example, if a 130-acre field was planted half to wheat and half to corn, an 800-gpm system would be able to apply 0.64 inches a day to the half of the field requiring



Evapotranspiration (in inches) at various yields.

water most at that time.

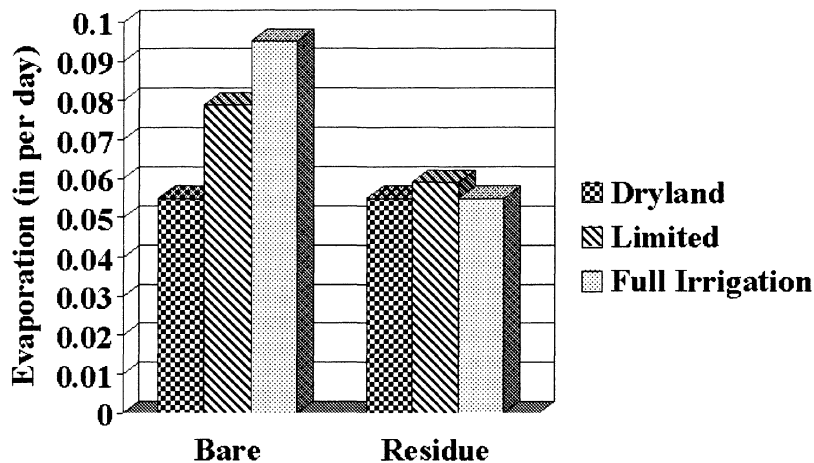
To operate efficiently, many irrigation districts plan to deliver a minimum of 1 inch of water per week. For example, if 6 inches of irrigation water is available for the summer, the maximum length of the irrigation season would be six weeks -- less if water demands are greater than 1 inch per week.

The Bureau of Reclamation has estimated that the amounts of water listed in *Table 2* (page 10) will be available for 2003. The district uses these estimates to determine how much to supply water users. In districts where water is expected to be restricted, reduce the estimates if the district does not plan to deliver 1 inch of water every six to seven days.

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Table 1. The amount of water that can be applied to a single crop or multiple crops requiring water at *different* times on a 130-acre system.

System Capacity	Number of Crops		
	One	Two (inches per day)	Three
200 gpm	0.08	0.16	0.24
400 gpm	0.16	0.32	0.48
600 gpm	0.24	0.48	0.73
800 gpm	0.32	0.64	0.96
1000 gpm	0.40	0.80	1.21



Using no-till on center pivot-irrigated fields can save even more soil moisture than no-till in dryland fields because the residue on the soil surface reduces evaporation from wet soil surfaces

Conserve any soil moisture

With water supplies expected to be limited, it will be even more important that ever to conserve existing soil moisture to provide the best possible growing conditions for whatever crop you plant this spring. Following are some recommendations for conserving soil moisture:

- **Control weeds on a timely basis by selecting the right herbicide and applying it at the right time.** Even small weeds can use a substantial amount of water. University of Nebraska research suggests that in dry seasons the critical period of weed control moves closer to plant emergence. Because weeds compete more vigorously for available soil water than most crops, weeds can easily get the upper hand and limit water available for plant growth and development.

- **For dryland conditions, reducing tillage operations conserves soil water by keeping crop residues on the soil surface.** Crop residues provide a barrier between incoming radiation and the soil surface which lowers soil evaporation loss. Keeping crop

residue on the soil surface also can help suppress weed growth, improve infiltration rates of the soil and reduce soil crusting from raindrop impact. All are especially important when precipitation finally comes in torrents with summer thunderstorms.

- **Use no-till on center pivot-irrigated fields to save even more soil moisture -- as much as 1 to 4 inches -- as compared to no-till in dryland fields.** First, by eliminating tillage prior to planting and in-season cultivations, water is saved just as in dryland. It's estimated that each tillage pass can cause 0.5-0.75 inch of soil moisture loss. Equally important in irrigated fields is that when residue is *not* left on the soil surface, evaporation from the wet soil increases after every water application, for as much as a 2.0 to 2.5 inch loss (*see figure*). Minimizing or eliminating tillage will maintain more surface residue while helping limit soil moisture loss.

Robert Klein, Extension Cropping Systems Specialist
West Central REC

Limited irrigation water

(Continued from page 7)

In the North Platte Valley drainage, ownership of water in reservoirs at the end of December was only 73,000 acre-feet. This compares to 261,000 acre-feet last year when water supplies ran out in early August and an average water ownership of 557,000 acre-feet. Needless to say, without significant snow in the Colorado and Wyoming mountains coupled with spring rains, water delivery could be severely limited to four to six weeks or less. Current snow pack as of December 31 in the North Platte Valley drainage area averages about 60% of normal.

Irrigators with low capacity groundwater wells also will need to prepare for dry soil conditions by maintaining and preparing their systems for a potential early start. If the soil moisture is not near field capacity at planting, regardless of the crop, irrigation will need to begin earlier in the season than usual to keep from getting too far behind. As soon as weather permits, system maintenance and repairs should be initiated to avoid any unnecessary delays.

Bob Klein, Extension Cropping Systems Specialist
West Central REC
Dean Yonts, Extension Irrigation Specialist
Panhandle REC
Bill Kranz, Extension Irrigation Specialist, Northeast REC

Crop selection

(Continued from page 6)

Soil water conditions may change but it appears likely that areas in Nebraska will face shortages of irrigation water. Always check with the appropriate agency before selecting crop, planting dates, and other production practices which may affect eligibility for programs.

Bob Klein, Extension Cropping Systems Specialist
West Central REC
Lenis Nelson, Extension Crop Variety Specialist

Limited irrigation water (Continued from page 9)

Table 2. Estimated water availability for 2003, as of Jan. 14, 2003, Bureau of Reclamation. Note, however, that if conditions don't improve, some districts have said that they may not deliver any water in 2003.

District	Estimated Farm Delivery (inches)
Mirage Flats	4.0
Ainsworth	Full supply
Sargent**	15.0
Farwell**	12.0
Twin Loops	Full supply
Frenchman Valley and H&RW	1.0
Frenchman-Cambridge, Meeker, Red Willow and Bartley	2.5
Cambridge Canal	8.0
Almena	4.5
Bostwick in Nebraska	7.0*
Bostwick in Kansas	8.5*
Kirwin	11.0
Webster	10.0
Glen Elder	Full supply
Central Nebraska Public Power and Irrigation District***	Full supply
Other canals that contract for storage water out of Lake McConaughy	Yet to be determined

*Estimates based on most recent delivery efficiencies
 **Estimates provided by the Loup Basin Reclamation District which now controls these reservoirs.
 ***Estimate provided by the Central Nebraska Public Power and Irrigation District.

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