NEW MEXICO
Climate

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Office of the State Climatologist | Department of Agronomy and Horticulture
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# Water, Climate and Agriculture

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Water is a scarce resource in New Mexico and as this year's drought worsens, the demand for water by municipalities will increase. However, cities are not the major users. Agriculture uses 85% of the water in the state, but getting a handle on the tools farmers use to schedule irrigation is a difficult task. The USDA surveyed farmers across the nation (USDA 1998), and asked what methods farmers used in deciding when to irrigate. In New Mexico, 43 % (of 9,078 farmers) responded that they looked at the condition of the crop. This represents the major method of irrigation scheduling (figure 1). Calendar scheduling was used by 19 % of farmers to schedule irrigation and the soil moisture-feel and soil moisture-sensing devices combined to make up 20 % of the users. Unfortunately, only 0.2 % used climate data and computer models to schedule irrigations.

Climate-based irrigation scheduling coupled with soil moisture monitoring allows farmers to change irrigation schedules due to changes in crop development and in climate conditions. This combined method is called the SIS method or **S**cientific **I**rrigation **S**cheduling (Leib et al. 2002),

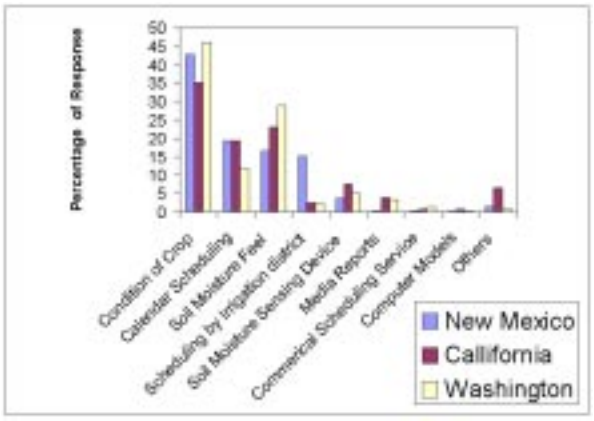


*Figure 1. Methods Used by Farmers in Deciding When to Irrigate in California, New Mexico, and Washington (USDA, 1998)*

Real time monitoring of crop water use can increase the efficiency of a limited resource and increase yields (profits). Hence, California (sample size 73,860 farmers) invested heavily in climate based irrigation scheduling. Unfortunately, the use of computer models to schedule irrigation represented only 1 percent of the irrigation scheduling methods used, compared to only 0.2 percent in New Mexico.

In the Washington state survey, 75% of the farmers had computers but less than 5 percent used their computers to schedule irrigation (Leib et al. 2002).

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*Figure 2. Climate station used to collect climate data for irrigation scheduling at the Fabian Garcia Science Center, New Mexico State University, Las Cruces , NM*

The Washington State survey (Leib et. al 2002) determined that high value crops, such as potatoes and fruit trees, accounted for more than half the acreage being scheduled using SIS which represented 34 percent of the methods used to schedule irrigation in the state (figure 1), and that the predominate reason for using this type of irrigation scheduling was to ensure the quality of the crops. Energy savings, water conservation, high yield, fertilizer savings and non-point pollution reduction were considered secondary benefits.

The average age of farmers is over 50, and many may not be comfortable using computers to schedule irrigations. They may have purchased the computers for use by their children or only for accounting records. The answer to the question of why more farms are not using climate based irrigation scheduling needs more research into what motivates farmers to use any form of SIS. The Washington State survey did not specifically address the issue of why climate based irrigation scheduling was not used by more farmers. This is an issue that must be addressed in future water resources planning activities.

The future of agriculture in New Mexico depends on increasing irrigation efficiency, which depends on increasing use of irrigation scheduling technology. Obviously, crops that have a quality component, such as onions, chile, potatoes, pecans, should be the leaders in adopting this technology. However, water is sufficiently scarce in New Mexico, that all crops should be irrigated using SIS with climate based scheduling models making up as a greater percentage of SIS. A Regional Research Agricultural Experiment Station Coordinating Committee entitled: Climatic Data Applications in Irrigation Scheduling and Water Conservation has been formed to take the lead on this issue, but SIS must become a priority of the Cooperative Extension Service and the Natural Resource and Conservation service before any large change will occur. These organizations must train their people whom can then train the farmers on use of SIS including climate based irrigation scheduling.

**References:**

USDA 2002. 1998 Farm & Ranch Irrigation Survey Census of Agriculture. **http://www.nass.usda.gov/census/census97/fris/fris.htm**

Leib BG, Hattendorf M, Elliott T, Matthews G. 2002. Adoption and adaptation of scientific irrigation scheduling: trends from Washington, USA as of 1998. Agr. Water Manage. 55 (2):105-120.

# Global warming and its impact on New Mexico

The National Oceanic and Atmospheric Administration National Climatic Data Center has reported an increase in global temperatures. Global temperatures are 0.4C (0.7F) above the long-term (1880-1999) average, similar to temperatures observed in 1999. The only years warmer were 1998, 1997, 1995 and 1990. As shown in figure 1 the temperature in New Mexico was 2 C hotter in the year 2000 compared to the 1961-1990 time period average.

Short term changes in temperature are predicted using statistical models and global change models. The models predict a normal air temperature through March 2003. Precipitation is predicted to be slightly above average for Nov, Dec 2002 and January 2003 (figure 2) and average in March, April, and May 2003 meaning that a large winter snow fall in 2003 is not predicted. Thus, runoff is likely to be low in 2003

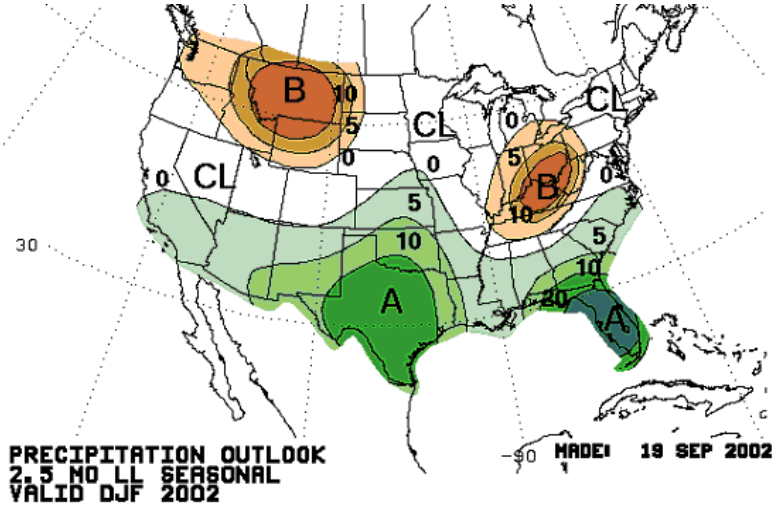


*Figure 2. Precipitation prediction for December through February 2003. Green is above average. Red is below average and the numbers are a measure of the likelihood of the occurence.*

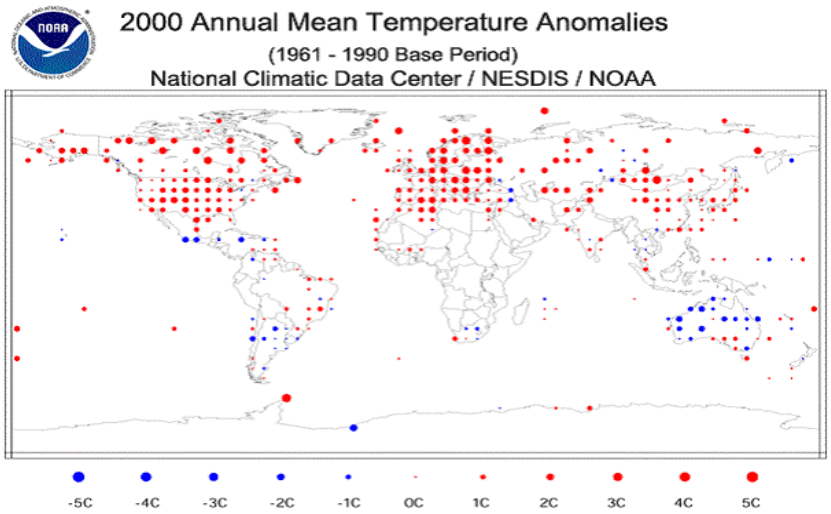


*Figure 1 Annual Mean Temperature Anomalies. Size of the colored dot show the difference between 2000 and the 1961-1990 average.*

# About NMSU's Climate Center

NMSU's Climate Center is home to the state climatologist who helps New Mexicans understand the impact of climate changes on the environment, human health, and agricultural production.

The state climatologist is responsible for archiving weather data and distributing climate information to the public. Unlike meteorologists, climatologists do not provide weather forecasting or up-to-the-minute bulletins. Instead, they use a computerized data collection system to provide statewide weather reports for previous days, as well as for historical information.

The state climatologist puts climate data into a form people can use to make decisions about their lives. During fire season, people use climate data to assess potential fire hazards and to evaluate fire-fighting conditions. Engineers use information about rainfall and flooding to design bridges, culverts, storm sewers, and sanitary sewers. Business owners use climate data to evaluate new business or relocation sites. Farmers use it to anticipate outbreaks of insect pests or crop diseases. People also use climate data when making their recreation and travel plans.

*The office of the state climatologist and its head, the state climatologist, are described in New Mexico Statute 75-4-1 through 75-4-4.*

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