

## WRITING IRRIGATION WATER CONSERVATION PLANS

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The Soil Conservation Service (SCS) has been assisting farmers and ranchers with their conservation needs for over 55 years. Irrigation practices constitute just a portion of the many practices SCS plans and designs. Assistance for irrigators includes designing and laying out irrigation pipelines, tailwater recovery pits, and land leveling; designing sprinkler, surface, and trickle systems; and planning irrigation systems (irrigation water conservation plans).

The initial emphasis of SCS irrigation work was on furrow irrigation systems. Irrigation water conservation plans outlined the system operation. The SCS also designed the practices contained in these plans.

In 1989 the State of Kansas started requiring irrigation water conservation plans for all new permits to use water for irrigation and for a few other situations. The SCS has provided assistance in developing some of these plans.

The following outlines general information that should appear in most SCS plans. Not all planners and designers may think alike on the format and content of the plans, but there are certain guidelines on content set down by the Division of Water Resources and the Kansas Water Office that should be followed. More detailed information on these guidelines can be obtained from the two agencies.

### FORMAT AND CONTENT OF A SCS DEVELOPED PLAN

A plan consists of four basic parts: the narrative, a plan sheet, design sheets, and supporting documentation. The length of each of these items will depend upon the complexity of the irrigation system being planned.

#### Narrative

The narrative is the first part of the plan. It summarizes the design as agreed to by the irrigator and the planner. The basic parameters of the system are spelled out: whether it's a furrow-irrigated or sprinkler-irrigated field; size and location of the field; number of wells or pumps and their size; and other pertinent items. Besides the physical requirements of the system, it also states the tillage and other management requirements needed to achieve the desired irrigation efficiencies.

Other information in the narrative would cover irrigation water management. Irrigation water management is the practice of managing the water to achieve the largest return for the amount of water used while maintaining acceptable system efficiencies. Two parts of irrigation water management are irrigation scheduling and soil moisture monitoring. Irrigation scheduling is the act of scheduling the irrigations at times when they will do the most good. Soil moisture monitoring is measuring the amount of moisture in the root zone. This measurement is necessary because it is difficult to know when and how much to irrigate if the amount of water in the plants root zone is unknown. Irrigation water management should be discussed with the irrigator.

### Plan Sheet

The plan sheet provides more detailed information about the field. A detailed map of the field is shown with location of roads, farmsteads, wells, pipelines, tailwater pits, direction of irrigation for a furrow field, etc. Also, contour lines showing the elevation and slope of the field are superimposed over the drawing of the field itself. The contour lines for sprinkler irrigated fields may be on 5 or 10 foot intervals. For furrow fields, the contours need to be on 1 foot intervals or information is provided that shows the field has been leveled to an acceptable uniform grade.

Other information that can be placed on the plan sheet would include: 1) the cropping plan, which shows what crops will be grown and how many acres of each; 2) soils information, with names of the soils occurring on the field and their irrigation design group and intake family; 3) the design information for any sprinkler used; and 4) information on the water source, capacity (gallons per minute) of the source, and any water quality concerns.

### Design Sheets

Different design sheets are used depending on the type of irrigation system used. The designs are based on information in the SCS Kansas Irrigation Guide and other SCS irrigation references.

For sprinkler systems, information from the plan sheet and information on the physical properties of the system itself (length of system, flowrate, size and location of sprinkler nozzles, etc.) are used to design a new sprinkler system or to verify the design of an existing system. SCS would determine: the maximum allowable and the design application rates of the nozzles; application efficiency of the system; required wetted diameter of the largest nozzle; time to irrigate the field; and the amount of water applied.

Information on the furrow-irrigated fields is obtained from the plan sheet and the physical features of the equipment are obtained from the irrigator. On new systems, the SCS will use the above information to determine the furrow stream size, length of run, application time,

and application efficiency. For an existing system, operational information provided by the irrigator and the physical system features are analyzed to determine if the furrow system is being operated efficiently.

For both types of systems described above, the design of the existing systems may have to be verified with field evaluations. For all designs, an evaluation of the system after the installation of the equipment is recommended.

#### Supporting Documentation

Many different items may be placed in this part of the water conservation plan. One of the most common is the form showing estimated net irrigation water requirements of the different crops for each month during the growing season. This form determines whether the water supply is large enough to provide the total irrigation requirements of the crop, especially during the peak-use month.

Other things that may be part of the supporting documentation are additional design computations, information received from the irrigator during the design and planning processes, any field evaluations of the system, and any other information that may be important to the water conservation plan.

This is a brief overview of the content and format of irrigation water conservation plans. The actual time involved in writing a particular plan may be up to several months if the system is complex and evaluations have to be made. The planning time may be shortened with correct, timely information from the irrigator and if the irrigator can provide help in performing any field surveys and system evaluations that may be required.