Let's Know About . . .

Dawning of Irrigation Day

By A HOLT SCS TECHNICIAN

There may be a new day dawning for many in Holt county. It may mean a decrease in the size of farm units. It may materially increase the total production of the county. It may mean increased money in circulation in the county. It may mean larger cities, schools and industrialization. It may mean a boom for agriculture and for the county's businessmen.

But for some people it will mean more indebtedness and more hard work. In short, it will be a gamble on a new development that may bring handsome dividends to themselves and the rest of the county, depending upon its success and continued development.

What is this new miracle—or hazard? Irrigation!

Irrigation that will begin to develop this year—1953—and not irrigation dependent upon the development of the Niobrara river basin plan which is still in the offing as far as this end of the basin is concerned. The irrigation at hand is from water pumped from wells, springs, or streams of Holt county.

Several test wells have been put down since last fall indicating possibilities of from 600 to 1,000 gallons per minute or more.

Two of the questions that must be answered by prospective irrigators after a water supply has been established are: Will my soil support irrigation profitably, and what is the system of irrigation most practical for my case, sprinkler or gravity?

Although there are many other questions to be answered these two are the ones with which the Soil Conservation District is equipped to aid cooperators through its technical staff.

There are at least two successful sprinkler systems in operation in the Stuart and Atkinson area and it is planned to expand their operations. These men have started in a moderate manner and found it was successful and believe they can successfully expand their systems.

Wherever irrigation is talked one of the first questions in the minds of the people is: "Will the soils of Holt county support irrigation?" "With all its sand and gravel should we even think about irrigation?"

To that the only answer is that some of the soils will, but a large portion of the county, of course, will not. Determination by farms and even by fields will need to be made.

In general a soil that is a deep sandy loam or heavier in texture is feasible to irrigate. Sandier soils and soils with gravel between 20 and 36 inches might be feasible but would require more care, usually involve higher operating costs and require higher added fertility either in the form of commercial fertilizers or longer legume rotations.

If water were available in all places where soil conditions permitted irrigation it is estimated that approximately one-tenth of the land in the county could be irrigated.

Stated another way, about one-third of the land suitable for cultivation could be irrigated if water were available. However, only about 50,000 acres could be classed as good irrigable soil while 100,000 acres would require more intensive care.

For anyone anticipating irrigation it would be well to contact the Soil Conservation District and determine from a land capability map just what part of their place, if any, would be suitable for irrigation. It would be well to do this before tests were made to determine if an available source of water might be found.

In determining whether gravity or sprinkler irrigation should be used, farmers' preference will have a big influence. Where either system will work satisfactorily preference need be weighed only against cost. The cost of leveling, laterals, and so forth should be weighed against the cost of main lines and sprinkler lines. Time required for water application should be considered for both systems. The cost of application of water should be considered.

With a sprinkler head of 40 pounds per square inch the added cost of pumping is equivalent to an additional 92-foot lift. It is estimated that pumping costs will be on the average about 10 cents per acre foot of water for every foot of lift. The efficiency of each system must also be taken into consideration.

With equally good planning and preparation sprinkler systems are about 70 percent efficient while gravity systems are only 60 percent efficient. In other words, for every 100 gallons pumped under sprinkler, 70 gallons will be made available for plant use while with gravity it will be 60.

There are places where sprinkler is practically the only possible means of irrigation. This is true when the infiltration rate of the soil is so rapid that the gravity type would result in exceedingly short water runs or short duration to avoid over-irrigation and excessive water loss. Also where the lay of the land is such as to require excessive leveling for a gravity system (excessive leveling results when costs mount to a prohibitive figure or when cuts over large areas will result in removing all of the top soil and leaving less fertile subsoil or a more sandy or gravelly soil that will result in a very difficult management problem and low production).

Some problems are common to either type of irrigation. Because of the added cost of irrigation it is evident that yields must be maintained at a higher lever if the increased costs are to result in a profit. To do this the fertility must be maintained at a much higher level than for dry land farming. Cropland should be maintained in a longtime alfalfa or alfalfa and bromegrass rotation from one-fourth to one-third of the time. Fields may remain in alfalfa from three to five years but it generally believed that two to three years is more efficient.

This practice will need to be supplemented by shorter rotations of sweet clover or other annual legumes and commercial fertilizer.

However, there is one bright side to this fact: Because moisture to a large degree is controlled, it can be determined by experience just what state of fertility will result in the greatest profit. Where both moisture and yields vary to a greater extent in dry land farming it is much more difficult to determine the most profitable application of fertilizer. (See table at right.)

It is quite possible that with the increased yield under irrigation deficiencies may show up that have not been found as yet under dry land production.

Over-irrigation may result in serious damage from erosion or a great loss of soil nutrients through leaching. It is also possible that over-irrigation may cause water to rise on lower land by capillary action and may bring alkaline salts to the surface. This will develop an alkali condiiton in the soil that may cause productive soils to become practically worthless. To correct this situation in sprinkler systems the length of time water is applied should be cut down or the size of the nozzle should be reduced. In gravity the length of time water is applied or the length of water runs should be reduced. In either case it results from faulty design because type of soil, water peneration, and so forth, were not given proper consideration.

On the other hand, close supervision should be given so that enough water is applied at the proper time. A moisture probe is generally used in connection with soil examination for degree of wetness. If irrigation is delayed until crops show signs of needing moisture it is usually too late and will result in lower yields. Sometimes under-irrigation is a result of poor design. This would be true if the acres to be irrigated exceeded the amount of water available.

The table below gives the average number of acres that can be irrigated from a given well flow:

Gallons per min.	Irrigable acres
450	40
500	44
600	52
700	64
800	72
1000	88

The labor requirements for sprinkler irrigation have also been tabulated and are as follows:

Pipe size	Man hrs. per A. per irrigation
33 inches	.7
4 icnhes	.8
5 inches	1.25
6 inches	1.4

For example, from the charts above it may be seen that a 1,000 gallon per minute well would irrigate 88 acres and would require, using four-inch pipe, 70 man hours of labor to give it one irrigation.

Water requirements of crops is another important factor that irrigators must know and use in planning their operations. According to results from the Scottsbluff field station, potatoes require 17 inches of water with the peak application rate coming the latter part of July; small grains require 17 inches of water with their peak rate being in June; alfalfa, 25 inches of water with its highest rate during the month of July but with relative high rates also during June and August; corn, 22 inches with its peak reached in July.

By using a variety of crops it is possible to spread out the season and use water at different seasons for different crops.

With some soils it is possible to irrigate at off seasons on some crops and maintain a high water content in the soil to tend to reduce the amount of water required at peak seasons.

The information contained in this article in general deals with averages of general facts that may or may not fit field conditions on a given farm. There is probably no field of agriculture with more variation than irrigated farming. The farmer has control of one more factor, moisture, and what he does with it, how he uses it, in connection with his soil conditions, fertility and all other conditions will determine to a large extent how profitable it is for him or whether in some cases it is a profit or a loss. In few fields of endeavor is a broader knowledge or a closer observation necessary in order to make changes that will be of so pronounced benefit.

This article was written solely to give a general picture of irrigation, its benefits, its possibilities, and indeed in some cases its possible hazards.

Amount of Soil Nutrients Used

The following table shows the amount of soil nutrients used by the following crops:

Crop	Yield per Acre	Nitrogen	Phosphorous	Potassium	Calcium
ALFALFA	5 ton	225	60	215	180
CORN	100 bu.	150	75	100	
OATS	80 bu.	85	30		

Over 500 Persons Now Cooperators

Todate well over 500 Holt county farmers and ranches have become cooperators of the local district. Following is a list of the new cooperators with the Holt Soil Conservation District since January 1, 1952:

Rollie Peterson of Stuart, Asa Shermer of Amelia, Art Ziska of Stuart, R. V. Carlisle of Stuart, Ora Yarges of Stuart, Emil Colfack of Atkinson, J. W. Manhalter of Spencer, William J. Murphy of O'Neill, Harold Burge of O'Neill, K. C. Hunt of O'Neill, Laurence Chipps of Ewing, R. Glen Ballagh of Amelia, R. A. Ballagh of Amelia, Forrest Farrand of O'Neill, Earl W. Hoatson of Stuart, Leo Burival of O'Neill, John and Elwin Grutsch of O'Neill, Catherine Winn - Elwin Grutsch of O'Neill, Charles B. Crook of O'Neill, E. W. Reed of Spencer, Charley Peterson-Fred Horne of Dustin, Clay Mashino of Redbird, H. F. and Ed. Heiser of Atkinson, Freeman Knight of O'Neill, Esmond Webber-Richard Trowbridge of Page.

Bruce Johnson of Walnut, Lavern H. Campbell of Stuart, Herbert J. Sweet of Stuart, A. B. and D. F. Scott of Atkinson, F. M. and F. J. Hupp of Ewing, Dvorak Brothers of Stuart, John J. Bauer of Ewing, Mac Simonson of O'Neill, Fred Krugman of O'Neill, A. A. Walters of Chambers, Albert Carson of Redbird, Robert Witherwax of Spencer, Roy H. Grubb of Page, Loran M. Kruse of O'Neill, Ben Vonasek of Star, Albert Kallhoff of O'Neill, S. L. Hertel of Ewing, Harold W. Blain of Middlebranch,, Albert J. Derickson of Star, William Derickson, jr., of Star, John Dalton of O'Neill, Farmers National Ins. Co. of Lincoln, Charley Peterson - Willis Peterson of Stuart, C. Frickel & Sons of Atkinson, M. G. McKathnie of Atkinson, Louis Goeke of Atkinson, Edgar Jungman of Amelia, Gerhardt Luebeke of Page, Karl Keyes of Inman, Frank Belik of Page, Fay Puckett of O'Neill, Howard Oberle of O'Neill, Earl McClanahan of O'Neill, Frank Wilson of Stuart, Rudolph Poessnecker of Atkinson.

Werner Poessnecker of Atkinson, Clair J. Schroth of Middlebranch, D. H. and William Hanson of O'Neill, Mary Bazelman-William Hansen of O'Neill, George Kruse of Dorsey, Dwight Baab of Atkinson, Frank P. Snyder of Page, Emory E. Denny of Clearwater, Jessie Kelley of Page, Elvon and Neale Hamilton of Stuart, Billy Schaaf of Redbird, Otto Drobney of Walnut, Mrs. L. B. Perkins-Henry Durre of Ewing, H. J. Birmingham-A. H. Johnson of O'Neill, William Pat Gallup of O'Neill, C. M. Stevens of Page, Bessie Wilson-F. L. Wilson of Stuart, Z. and N. Rzeszotarski of Atkinson, Bridget and Romaine Rohde of Spencer.

C. F. Abart & Sons of Emmet, Frank Sholes of Middlebranch, Earl Eppenbach of O'Neill, James T. Earley of O'Neili, Felix Hendrick of O'Neill, L. T. Genung of Atkinson, Raymond Bly of Amelia, Howard Slack of Dorsey, James McDonald of O'Neill, George Burke of Ewing, R. V. Fletcher of Hartington, C. J. Harmon of O'Neill, E. E. Clark of Inman, Clayton Nelson of Verdigre, E. L. Fernau of Dorsey, Carl J Thiele of Clearwater, Fred Tucker of O'Neill, Babcock-Morrow of O'Neill, Babcock-Adamson of O'Neill, Elmer Juracek of Star, Marion Davis of Stuart, Otto and Art Baumeister of Stuart, G. L. Obermire of Stuart, John Hawk of Ewing, Veldon Pinkerman of Dorsey, M. V. Landreth of Page, Ed. Fuhrer of O'Neill, William J. Storjohann of Spencer, Howard and Lawrence Rouse of O'Neill, Clarence Gokie of O'Neill, Fritz Schwager of Ewing, Clyde McKenzie of Dorsey, Frank Hawk of Ewing.

Cecil L. Witherwax of Dorsey, R. M. Tomjack of Clearwater, George P. Hansen of O'Neill, W. D. Nelson of Walnut, J. Q. and James Q. Hossack of Chambers, Catherine and Francis Kollman of Stuart, R. H. Strong of Chambers, Ora Philbrick of Stuart, Henry Miksch of Stuart, Martin and Henry Miksch of Stuart, Francis P. Weller of Atkinson, O'Neill Country club of O'Neill, Silas Johnston of Atkinson, William and Robert Thomson of Amelia, Lorenze Reige of Page, Catherine Seger-John Kramer, jr., of Stuart, Julian Sandall of Stuart, John J. Dougherty of Inman, Harry L. Page of O'Neill, O'Malley Bros. of Chambers, C. M. Pierson of O'Neill, William Derickson, sr., of Star, Hilda and Helen Gallagher-Charles Mahoney of O'Neill, Wood Jarman of Chambers, Henry Fleek of Chambers, Vern Wilkinson of Chambers, Eddy E. Schrader of Ewing, Melvin Rexin of Ewing, Ed. Harvey of Chambers, W. P. Elley of Atkinson.

Mrs. Fred Soost of Magnet visited in the L. F. Beckenhauer home on Monday, March 9.