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SUPPLEMENTAL IRRIGATION . . . CAREFUL PLANNING IS ESSENTIAL

Harry Rubey

Professor of Civil Engineering

Reprinted from

What's New in Crops and Soils

Vol. 7, August - September, 1955

COLLEGE OF ENGINEERING
THE ENGINEERING EXPERIMENT STATION

The Engineering Experiment Station was organized in 1909 as a part of the College of Engineering. The staff of the Station includes all members of the Faculty of the College of Engineering, together with Research Assistants supported by the Station Funds.

The Station is primarily an engineering research institution engaged in the investigation of fundamental engineering problems of general interest, in the improvement of engineering design, and in the development of new industrial processes.

The Station desires particularly to co-operate with industries of Missouri in the solution of such problems. For this purpose, there is available not only the special equipment belonging to the Station but all of the equipment and facilities of the College of Engineering not in immediate use for class instruction.

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Supplemental Irrigation . . . Careful Planning Is Essential

by Harry Rubey

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Supplemental Irrigation . .

by Harry Rubey

A GOOD start is important in all farm operations. There are few places, however, where this is more true than in the use of supplemental irrigation in the humid areas.

Every farm has a slightly different situation. If the irrigation system is to be successful, it must be well planned to fit the peculiar requirements of the farm on which it is installed. This planning is up to the farmer who makes the installation.

There is no one easy rule for installing a system. There are a number of steps, however, which, if carefully followed, will help in assuring a satisfactory system. The rewards from carefully planned irrigation can be high. Poorly planned, it can be a costly and unsatisfactory problem for its owner.

What are the steps necessary in starting an irrigation system? In the order that they should be followed, they are:

(1) Ask your teacher of agriculture or your county agent to recommend a competent irrigation adviser. He may be a local man, a representative of your state agricultural college, a Soil Conservation Service man, or other experienced person.

It may be wise at this time to avoid those with something to sell you. Your dealings with them will come later. Work closely with your adviser.

(2) With the advice of your expert, decide definitely whether you wish to enter wholeheartedly into a more modern and more productive type of agriculture.

The project will involve considerable expense and labor, but it offers promise of larger, better quality crops in most years, with elimination of drouth damage in dry years. Often these larger crops will produce earnings of 100 percent on the annual cost of irrigation. There will be a correspondingly great increase in the value of the land.

Make your plans many months before planting time. Spring rains sometimes delay leveling and planting. Advice, materials, and time for installation are available then. Due to the rapid growth of supplemental irrigation, equipment must be ordered well in advance. After the crop is planted, or dry weather sets in, it is too late.

If a large acreage is to be irrigated, it is usually better to devote the first season to varied experiments on smaller acreages.

(3) Secure a good one-foot contour map for surface irrigation on flatter topography, or one with less detail on it for slopes over 5 percent or for sprinkling. Map scales of 1 inch = 100 feet are suitable for farms under 80 acres, while 1 inch = 200 feet may be used for larger acreages.

(4) Decide what fields you wish to put into what crops over the next 15 years or so. This is the probable life of your equipment. Allow for rotation and for scheduled balanced farming. This will influence your irrigation planning, especially your leveling for surface irrigation and the capacity of your water supply and distribution system.

(5) Try to plan a diversification and scheduling of crops (by the Thornthwaite or an equally good method) so that your entire irrigated acreage will not usually need water badly at the same time. Your water supply then will irrigate more acres, or irrigate in shorter hours daily, or assure a more adequate supply of water in very dry weather.

(6) Select your water supply and method of getting the water from the source to the field. It may be desirable to install a pump and pipes large enough for future expansion and for altered plans. The majority of farmers expand their irrigated acreage.

If you are to use electricity, contact your electric power company regarding your power lines and your pumping power rate. If a well is needed, a reli-

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able local well driller and pump installer must be selected and consulted. Be careful about accepting the low bids from less reliable firms. Often a little more money will give a much better water supply. Assure yourself that your right to use the water is adequate.

(7) Decide whether your labor will irrigate on a full-time or an odd-job basis and how you will schedule their time. Two shifts may be advisable. This will vitally affect the design of your irrigation system and your labor requirements.

(8) Decide whether you will use surface irrigation or sprinkling. If the latter, invite complete proposals from dealers for the entire pump and sprinkler system in place. Make the dealer completely responsible for the whole installation and its operation according to the specifications of the American Society of Agricultural Engineers and the Sprinkler Irrigation Association. The dealers nearer you are often preferable since service and repairs will be more quickly available.

(9) If surface irrigation is preferred, then a layout of pipe, ditches, and leveling must be made for you by a competent irrigation adviser.

(10) Remember that crops and crop varieties other than those commonly grown in your area may be better adapted to irrigation. Consult your crop adviser as to the crop, the strain, the expected yield, the plant population, fertilization, etc.

(11) About this time arrange your financing, using loans from the Federal Farmers' Home Administration, if that appears advisable. That Administration, or any loaner, will like to know your plans as previously outlined in items 1 through 10.

(12) Get everything planned and all necessary construction and leveling done before the crops are planted.

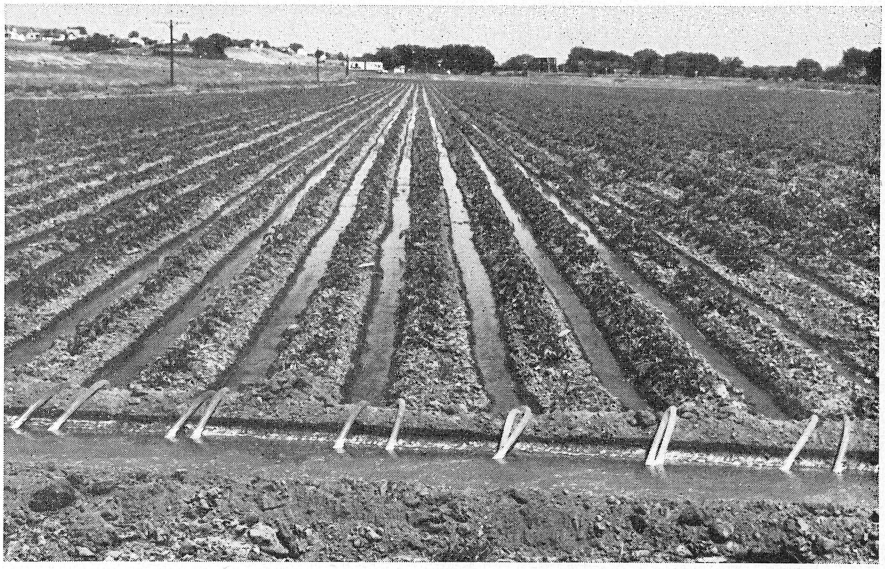
(13) Irrigate as suggested by your adviser, keeping in touch with the local station of the Weather Bureau. Too much or too little water at the wrong time may do more harm than good. Use the irrigation and crop scheduling method of Dr. C. W. Thornthwaite of Seabrook, New Jersey, or something that will give equally good results.

(14) Cooperate with your agricultural college on a few test plots.

(15) Discuss your results with your adviser and plan to improve the operation next year. Growing conditions are now largely under your control, and you will continually improve your practices.

(16) A final reiteration: Get competent advice and follow it. Irrigation applied only by common sense and as drouth relief may be helpful, but it will not secure optimum results.

The highest type of agriculture and production requires irrigation, but it may also be well to say that it also requires intensive fertilization, closer spacing of plants, selected strains of plants, scheduling of crops by the Thornthwaite or similar method, balanced farming and weed and pest control, and essential education and advice. Irrigation is only part of a good crop production program. END



(R) Plastic siphon pipes are used to irrigate potatoes at Mandan, N. D.

(Below) This ditch spreading method is used mostly on pasture and grain at Bowbelle, N.D. (Two photos courtesy Greater N. Dak. Assn., Fargo)

PUBLICATIONS OF THE ENGINEERING REPRINT SERIES

Copies of the complete list of publications may be secured from the Director of the Engineering Experiment Station, University of Missouri

Reprint No.

11. Ternary System Ethyl Alcohol--n--Heptane-Water at 30°C, by Joseph L. Schweppe, Research Engineer, C. F. Braun and Co. and James R. Lorah, Associate Professor Chemical Engineering. Reprinted from Industrial and Engineering Chemistry, Vol. 26, p. 2391, November 1954.
The Rectifying Property of Polarized Barium Titanate, by Donald L. Waidelich, Associate Director, Engineering Experiment Station and Professor of Electrical Engineering. Reprinted from Journal of the Acoustical Society of America, Vol. 25, p. 796, July 1953.

12. Chip Breakers Studies 1, Design and Performance of Ground Chip Breakers, Erik K. Henriksen, Associate Professor of Mechanical Engineering

    Balanced Design Will Fit the Chip Breaker to the Job, from American Machinist, April 26, 1954, pp. 117-124, Special Report No. 360.

    How to Select Chip Breakers I, II, III, from American Machinist, May 10, 1954, pp. 179, 181, 183, Reference Book Sheets.

    Chip Breaking-A Study of Three-Dimensional Chip Flow, from page No. 53-5-9, presented at the A.S.M.E. Spring Meeting, Columbus, Ohio, April 28-30, 1953.

    Economical Chip Breakers for Machining Steel, from Technical Aids to Small Business, May 1954, pp. 1-8.

13. The Design of Sampled-Data Feedback Systems by Gladwyn V. Lago, Associate Professor of Electrical Engineering and John G. Truxal, Polytechnic Institute of Brooklyn. Reprinted from Transactions of the A.I.E.E., Vol. 73, Part 2, p. 247, 1954.

14. Selection of Personnel by George W. Elliott, Assistant Professor of Mechanical Engineering. Reprinted from the 1954 Transcript of the Midwest Feed Production School.

15. Lightweight Aggregates for Structural Concrete by Adrain Pauw, Associate Professor of Civil Engineering. Reprinted from the Proceedings of the A.S.C.E., Vol. 81, Separate No. 584, January 1955.

16. Coating Thickness Measurements Using Pulsed Eddy Currents by Donald L. Waidelich, Associate Director, Engineering Experiment Station. Reprinted from the Proceedings of the National Electronics Conference, Vol. 10, February 1955.

17. Additions to Sample-Data Theory by G. V. Lago, Associate Professor of Electrical Engineering. Reprinted from the Proceedings of the National Electronics Conference, Vol. 10, February 1955.

18. Additions to Z-Transformation Theory for Sample-Data Systems by Gladwyn V. Lago, Associate Professor of Electrical Engineering. Reprinted from Transactions of the American Institute of Electrical Engineers, Vol. 74, January, 1955.

19. Tension Control for High Strength Structural Bolts by Adrian Pauw, Professor of Civil Engineering and Leonard L. Howard, Lakeland Engineering Associates, Inc., with a discussion on the Turn-of-the-Nut Method by E. J. Ruble, Association of American Railroads. Reprinted from the Proceedings of the American Institute of Steel Construction, National Engineering Conference, April 18-19, 1955.

20. Autotransformer Betters Motor Phase Conversion by Joseph C. Hogan, Associate Professor of Electrical Engineering. Reprinted from Electrical World, Vol. 144, p. 120, October 17, 1955.

21. Sequence Summation Factors by Adrain Pauw, Professor of Civil Engineering. Reprinted from the Proceedings of the American Society of Civil Engineers. Vol. 81, Paper No. 763, August, 1955.

22. Pulsed Eddy Currents Gage Plating Thickness by Donald L. Waidelich, Associate Director, Engineering Experiment Station. Reprinted from Electronics, Vol. 28, p. 146, November, 1955.

23. Relay Protection for Lines Being Sleet-Melted by the Short-Circuit Method by J. C. Hogan, Associate Professor of Electrical Engineering and C. G. Pebler, Commonwealth Associates, Inc. Reprinted from Transactions of the American Institute of Electrical Engineers, Vol. 74, December, 1955.

24. Supplemental Irrigation....Careful Planning is Essential by Harry Rubey, Professor of Civil Engineering. Reprinted from What's New in Crops and Soils, Vol. 7, August-September, 1955.

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