

M I N U T E S

SPECIAL COMMITTEE ON NATURAL RESOURCES

October 3, 1977
Room 529, State House

Members Present

Senator Charlie Angell, Chairperson
Representative Anita Niles, Vice-Chairperson
Senator Fred A. Kerr
Representative James Cubit
Representative Larry E. Erne
Representative Keith Farrar
Representative R.D. McCrum

Staff Present

Emalene Correll, Kansas Legislative Research Department
Don Hayward, Revisor of Statutes Office
Ramon Powers, Kansas Legislative Research Department

Others Present

Don Christy, Scott City, Kansas
Joan Callan-Waywood, State Planning and Research, Topeka, Kansas
Harris L. Mackey, Division of Water Resources, State Board of Agriculture,
Topeka, Kansas
Guy Gibson, Division of Water Resources, State Board of Agriculture, Topeka,
Kansas
Grace Wilson, League of Women Voters, Topeka, Kansas
Jack Pearson, Kansas Association of Commerce and Industry, Topeka, Kansas
Ernie Mosher, League of Municipalities, Topeka, Kansas
Paul E. Fleenor, Kansas Farm Bureau, Manhattan, Kansas
Ruth Groves, League of Women Voters, Topeka, Kansas

Morning Session

The meeting was called to order at 10:05 a.m. by the Chairman, Senator Charlie Angell.

The following corrections were made to the minutes of the September 6-7, 1977 meeting: page 8, paragraph 6, after "depressions" insert "creating storage"; page 9, regulation No. 11, line 2, change the second "is" to "shows". A motion was made and seconded to approve the minutes of the September 6-7, 1977 meeting as corrected. Motion carried.

Staff reported on livestock water use in confined feeding operations--information requested by the Committee at its previous meeting.

Staff reported that Mr. Hagman, County Assessors Association, who had been contacted in accordance with the directive of the Committee, stated county assessors are not involved with the assessments made by groundwater management districts. In the counties he serves, Mr. Hageman had given some informal assistance to the Board of Directors in regard to the probable funding varying assessment rates would bring in when the board was trying to develop its first budget.

Staff stated a county clerk, contacted at the suggestion of the Chairman, stated the provisions for assessment under the Groundwater Management District Act have created extra work for county clerks for which they receive no additional reimbursement or staff.

The groundwater management district office sends in the list of land which is supposed to be included. Then cards, which have to be pulled by hand, have to be checked to determine how much land is involved and the assessment then has to be computed. Additional work was created when amended lists were submitted. Another problem was that as soon as tax statements were out and people found they had an additional tax because they were in a groundwater management district, they called the county clerk's office and wanted out of the district. The county clerk contacted felt there was no authority for removing land in the middle of the year. Staff referred to two letters to Senator Fred Kerr from district managers which had been distributed to the Committee (Attachment A).

In answer to a question, Don Christy stated the philosophy of all water district laws is taxation according to benefits received.

It was noted that apparently people had not been aware they could be taxed or of the procedure to petition out of the district. This problem should be taken care of in future years.

After noting that the Task Force on Water Resources seems to be moving toward giving more power to groundwater management districts, removing the provision to petition out of the district and basing the tax on the type of water use, i.e., irrigation, was suggested. Another suggestion was to base the tax on the acre feet of water allotted to the land under a water right. This would give a stable base for budgeting and would eliminate the need for calculating assessments each year. It was noted that groundwater management districts can levy a user charge but to date only one district has done so.

Staff pointed out the present law relates to the use of water and called attention to the definition of "user" which is based on the use of not less than one acre foot of water per year and the definition of "person". The intent of the first definition was apparently to eliminate domestic users. Staff also noted that special assessments for specific types of capitol improvements benefiting certain persons can be assessed against those persons. This could mean an additional assessment beyond the limits established in the act.

A motion was made and seconded to amend K.S.A. 1976 Supp. 82a-1030 to base the tax assessment on the amount of the water right. Guy Gibson, Chief Engineer, Division of Water Resources, stated he has been asked to appear before the Special Committee on Assessment and Taxation relative to irrigated land. If asked, he will propose the tax be based on the vested water right, the final certificate of appropriation or the permit to appropriate water. Motion carried.

The need to report the action of this Committee to the Special Committee on Assessment and Taxation was noted.

In answer to questions, the following points were made: The approach suggested by Mr. Gibson could encourage a landowner to let the Division of Water Resources check his pump because it could lower his tax. When the well can no longer produce the amount specified on one of the above documents, the landowner can ask to have the specified amount lowered. In the case of someone with rights to water from a river with insufficient flow, a small assessment could be made to hold the water right for the time when flow is sufficient.

A motion was made and seconded to reconsider the previous motion. Motion carried. In discussion it was clarified that the intent of the first motion was to include the amount of the vested water right, or the amount specified on the permit or final certificate.

The problem of determining assessments when streamflow is inadequate for existing water rights or when a person does not need water but wants to retain his right was discussed. Adding a sentence to the effect that no tax would be collected for a year in which no water was used was suggested. Another suggestion was to say no tax would be collected for a year in which water was not available. It was noted these approaches would have a negative affect on the intent to provide the district a stable base for budgeting purposes.

Mr. Gibson pointed out that a person not using water from streamflow in any one year would probably be willing to pay a small assessment to maintain his water right. He noted that he has said he would not consider this type of failure to make use of water an abandoned right. It was also pointed out that even though there is an intermittent flow, the person has a right to store the water.

The original motion carried on the second vote with Representative Erne casting a "no" vote.

Staff stated statutes of most western states were checked for their definition of "domestic use". Most of them are an attempt to put common law into statutory law and are very similar to the definition in Kansas law. The limits between domestic and commercial use have been left to the courts to decide. Decisions in cases in other states seem to be based on what is reasonable. This is not to say that a specific number of livestock cannot be added to the statutory definition. Staff noted that in 1957 the words "in normal operation of a farm" were added to the Kansas statute. The question is whether a person is raising cattle on his land or just maintaining cattle for sale - the distinction between farm use and a feed lot. Staff stated they did not think a change was needed in the Kansas statute unless the Committee wished to specifically define the number of livestock to be used in determining whether a domestic or commercial use is made of the water.

In answer to a question, staff stated they felt the present interpretation of the law would not hold up in court.

Mr. Gibson stated he was concerned about using a specific head count because it might hurt farmers. In answer to a question, he stated he thought only about ten percent of those operating under domestic use were actually feedlots. Reference was made to an Oklahoma law which defines domestic use as so many head per acre.

Using the amount of acre feet of water used as the delineating factor was suggested.

Bill Draft - Artesian Well Statutes

Staff presented a bill draft repealing the artesian well statutes (Attachment B) as requested by the Committee. Staff stated the appropriate agencies had been contacted and they indicated they did not know of any active artesian well districts. Any artesian wells would now be covered under the Water Appropriation Act. A motion was made and seconded to recommend the proposed repealer bill for introduction and favorable passage. Motion carried.

Bill Draft - Termination Date for Vested Rights

Staff distributed a bill draft establishing July, 1980 as the termination date for claiming vesting rights (Attachment C). Staff stated the bill draft establishes procedure for notice, adds hearings, incorporates an appeal procedure used in the Water Appropriation Act and provides for adjudication between water right holders.

In answer to questions, staff stated K.S.A. 92a-704 was repealed because this bill is a substitute procedure for the procedure mandated by that statute. Establishing a definite termination date would not create a constitutional problem since any claimant to a vested right could go through the court. Many states put a termination date in their law originally. Staff confirmed that a vested right can be abandoned.

In answer to a question, Mr. Gibson stated he did not see any problem with the proposed bill. He did not think there would be a number of hearings if the hearing requirement is retained.

A motion was made and seconded to recommend the proposed bill for introduction and for favorable passage. Motion carried.

Guy Gibson, Chief Engineer, Division of Water Resources, gave the following staffing report: As of October 1, 1977, 58 of the 66 authorized positions were filled. All nine new positions are filled but it will take time to train these persons. A man is being considered for the C-2 position in the dam and levee program. Because of a resignation, some in-agency promotions have been made leaving an Engineer Technician position in Topeka. This position will be filled as soon as the Board of Agriculture meets. Attempts are being made to reclassify an Engineering Technician II position to a Clerk II position. The pay scale would remain the same. He noted seasonal positions in Topeka and Garden City during the first of the year and in Stafford and Stockton during the summer. When Phase II of the federal dam inspection program is funded, another position will be open. Requests for next year include an Assistant Chief Engineer, with

ten years experience and licensed in Kansas, at the same pay bracket as the Chief Engineer. The purpose of this request is to train someone for the position of Chief Engineer. The Chief Engineer would be reclassified to Step VI as an incentive for someone to consider the Assistant Chief Engineer position. A computer operator-manager position is also requested.

Mr. Gibson then gave a report on the progress toward computerization. Virgil Basgall, Department of Administration, has assigned Hunter Crowden to work with the Division to develop a plan to be discussed with other agencies supplying and using the Division's data. Hopefully, recommendations will be ready for the legislature during the 1978 Session.

In answer to questions about computerization, Mr. Gibson stated they will probably recommend that each agency have a terminal so they can have direct access to the information. An additional \$40,000 has been requested for 1978 to pay the Data Processing Division of the Department of Administration for the work being done by Mr. Crowder. There is \$125,000 in the 1979 budget request to complete the study and initiate the program. Computerization will probably not reduce the number of employees. Presently some employees are being trained to operate new machines that are being installed and it will take people to operate the computer system. The computer program should be totally operational by 1980. Until then the present information system will be maintained.

In answer to questions about implementation of S.B. 4, Mr. Gibson stated they are not quite up to the 90-day processing time which is the Division's goal. However, action will not be taken against anyone who filed his application on time if staffing has not permitted its processing by the deadline. The number of applications being filed has dropped from 20 to 25 per day to about 5 per day.

Answering questions about the federal dam and levee program, Mr. Gibson stated that presently construction of any dam or levee ten feet high which will retain more than 15 acre feet of water not on a private stream has to have state authorization. Although this authorization includes the provision that the structure will be maintained to the satisfaction of the Chief Engineer, there is no authorization for the Chief Engineer to go on the property to do an inspection. He stated that so far he has always been able to work it out with the landowner so an inspection could be made, but having specific authority to enter property for this purpose would be helpful. Phase I of the federal program did not require on-site inspections but Phase II, funded totally by federal monies, will require such inspections. At this point it is not clear whether the inspections will be done by federal people or by state people although the feeling of the landowners seems to be that they would rather have the state do inspections.

In answer to further questions, Mr. Gibson stated the Division does not presently inspect structures in accord with any federal program. However, in response to calls from the Corp of Engineers, inspections have been made and people have been told a structure should be removed because it is a hazard to people downstream. In some cases they have recommended that land below the structure be used only for parks.

Mr. Gibson stated that the federal agency had approached him about utilizing some new programs totally funded with federal monies with only a few strings attached. Meetings have been held relative to a grant of \$75,000 to test irrigations and industrial wells to determine the quantity of water actually being pumped. The tests would be conducted by an engineering firm under a contract with the Division. In answer to a question, Mr. Gibson stated that he hoped the statutes creating the Division gave it the authority to contract with private firms since it has been done on federal dam inspections. He noted the Secretary of the Board of Agriculture also signs the contract.

The Committee recessed for lunch at 12:00 noon and reconvened at 1:30 p.m.

Afternoon Session

Jack Pearson, Kansas Association of Commerce and Industry, presented a written statement concerning the cooperation and coordination of state agencies having water-related activities (Attachment D). In answer to questions Mr. Pearson stated that there is also good cooperation from all agencies in providing information for new industries coming into the state or to assist in solving problems which industries might have. The one concern of the Association is that there not be excessive rules and regulations.

Ernie A. Mosher, League of Kansas Municipalities, presented a written statement relative to coordination between state agencies involved in water resources activities (Attachment E). In answer to questions Mr. Mosher made the following points: Cities are becoming more concerned about the groundwater supply and want to be sure their interests are considered. There is no past evidence that cities will be short-changed if the Division of Water Resources stays within the Board of Agriculture. They have found there is possibly some overlapping in that the Department of Health and Environment and the Kansas Water Resources Board are both involved in the area of water quality. However, they have not heard too many complaints and the total system works surprisingly well. There have not been notable problems between state and local agencies. Municipalities are probably not monitoring the groundwater management districts' rules and regulations very well.

Virgil Huseman, Kansas Livestock Association, stated they had conducted a telephone survey and had found no indication there is a lack of cooperation between the state agencies involved in water related activities. If the wrong agency is contacted they refer the caller to the proper agency. He stated that since the present system is working, the Association would urge caution in any moves to combine agencies or in re-organization.

In answer to questions about feedlots, Mr. Huseman stated it was his understanding that since 1952, the big operations have been considered industrial not domestic users. The Association became concerned about questions of legality because of the new proposed rules and regulations. He noted the Supreme Court ruled in a Workmens Compensation case that a feedlot is a farm and had all the privileges of farm exemptions. An IRS ruling stated that High Plains Enterprise is a farm. So this is the first time, to the Association's knowledge that feedlots are being considered anything but agriculture.

Questions were raised about the justification of saying that an operation which uses as much or more water than an irrigator does should be exempt. Concerns were expressed about what happens when there is not enough water.

Mr. Huseman noted that feedlots are where they are because of water and the tremendous grain crop. Even with a shortage of water there will be some dryland farming. Because of this and the fact the weather is favorable for feeding out cattle, the feedlots will stay where they are even if they have to import water. One concern of the Association is to protect the water right for the feedlot too. The Association feels that feedlots should have a preferred use. They are concerned about being classified as an industrial or commercial use and so far have successfully argued feedlots should be classified as farming. Staff noted that domestic use is the only preferred use. After that, rights are determined on the basis of the time of filing.

Paul Fleenor, Kansas Farm Bureau, stated they had sent a questionnaire to their membership which included seven questions relating to water laws. He emphasized that a policy statement has not been developed but answers to one question indicate that Farm Bureau members want stronger state laws in relation to water use and appropriation and want the state to have a stronger voice in these matters. Further questions will be asked to clarify if this response means members favor one agency instead of the multiple agencies we now have. Mr. Fleenor indicated cooperation and coordination between agencies is good at the present time. It was noted that the response from the members might reflect a growing concern about water shortages. In answer to a question, Mr. Fleenor stated his constituency would probably be concerned about removing the Division of Water Resources from the Board of Agriculture.

Don Christy presented a written statement relative to water issued (Attachment F).

In answer to a question, Mr. Christy stated his concern was that the implication of any change in the water laws, even something of not too much importance, be studied thoroughly before such change is recommended.

Committee Report

Staff distributed copies of H.B. 2605 calling attention to New Section 1 which creates a new fee fund to be called the conservation fee fund and authorizes the transfer to this fund of monies and liabilities in the separate fee funds being abolished. This would enable the Corporation Commission to transfer personnel within its various divisions without going through the firing and hiring procedures now required. By consensus the Committee Report is too show that the Committee endorses the concept set forth in New Section 1 of H.B. 2605 and the reasons for this endorsement as set out in previous Committee meetings.

Including a recommendation for a statutory change spelling out how a critical water area is to be determined was discussed. Staff stated the Water Appropriation Act gives the Chief Engineer the authority to determine and establish a critical area. The Committee noted interest in making sure a groundwater management district has the authority to make a recommendation for the formation of a critical management area to the Chief Engineer, using its own criteria. Staff stated they were not sure the districts had this authority. Staff noted further that in discussing critical water areas, the Committee had talked about two things - stopping the establishment of additional water rights and reducing existing rights. No matter what is in the statute relative to these points, a court would make it's decisions based on the reasonableness or unreasonableness of the action. Reference was also made to voluntary agreements to reduce water use. Further consideration is to be given to establishing critical water areas and the implications this may have before finalizing the Committee Report.

The need to look at all statutes setting forth responsibilities relative to water was discussed. The consensus seemed to be that such a study, with proper staffing to carry it out, should be initiated. There is a need to look at how responsibilities are spelled out in existing statutes, if these responsibilities are still being carried out in this way, and whether or not changes are needed. It was noted this Committee had found this task too large for the time allotted to it. Further consideration is to be given to including this recommendation in the Committee Report. The report is to include a brief review of water laws enacted since 1911 noting that new agencies were created and new responsibilities were assigned to agencies without consideration to what other water laws said.

Another suggestion made was to recommend to the administrative branch that all agencies having responsibilities relating to water, submit the portion of their budget relating to water activities to the Water Resources Board for review and coordination. Budget coordination would mean coordination of activities and responsibilities. It was emphasized that this was not to be construed as meaning the Water Resources Board was to have the right to approve or disapprove budgets of the agencies involved. Agencies to be included are the Geological Survey, Conservation Commission, Division of Water Resources, Forestry, Fish and Game, Department of Health and Environment, Kansas State University, University of Kansas, and the State Highway Department.

Another question raised for consideration was whether or not a statutory change was needed to make groundwater management district's rules and regulations subject to review by the legislature. It was noted that the Chief Engineer is reviewing these for consistency between districts and consistency with the statutes. A technical problem is that if these rules and regulations are filed with the Revisor of Statutes Office, they have to be printed in Kansas Administrative Regulations although they would be applicable to only a portion of the state. It was noted that the Board of Agriculture now has some rules and regulations which are not printed in this volume. Further consideration is to be given to this question at the next meeting.

The next meeting of the Committee will be October 31, 1977.

The meeting was adjourned.

Prepared by Emalene Correll

Approved by Committee on:

10/31/77
(Date)

Attachment A

BIG BEND
GROUNDWATER MANAGEMENT DISTRICT NO. 5
Box 125, 206 North Main
St. John, Kansas 67576
Phone (316) 549-3891

September 20, 1977

Senator Fred A. Kerr
P. O. Box 92
Coats, Kansas 67028

Dear Fred:

I appreciate the opportunity to further comment about the situation encountered when computing assessments for this year.

I sincerely believe that the time-consuming problems were as much a product of the embryonic nature of our District as were the diverse systems utilized by each county. We do feel confident that our sum experiences gained with each county and subsequent growth will expedite this somewhat arduous process in the future.

Truly, the greatness of our country and our state ultimately lie in the spiritual resources of its people. During the brief period I have occupied this position, much has been accomplished in this District. With His continued grace, much more shall be fulfilled.

I deeply appreciate the concern and support expressed for the Groundwater Management Districts during the committee hearing of September 6; likewise for the opportunity to discuss our mutual interests with you. I'm eagerly looking forward to cooperating with you in solving problems of common concern.

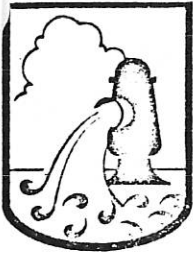
Sincerely yours,



Richard F. Sloan
District Manager

RFS/meg

Atch. A



Southwest Kansas Groundwater Management District No. 3

120 East Laurel

Garden City, Kansas 67846

Phone 316-275-7147

September 23, 1977

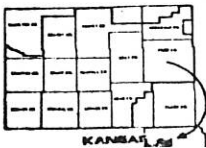
Senator Fred A. Kerr
P. O. Box 92
Coats, Kansas 67028

Dear Senator Kerr,

Thank you for your interest in Groundwater Management Districts and the problem that we have encountered when making assessments.

The assessment procedure in the Southwest Kansas Groundwater Management District No. 3 has worked relatively well in nearly all counties, but it has taken a considerable amount of time. The amount of time required is almost entirely dependent upon the amount of land which was excluded from the district assessment. Approximately 250,000 acres of land was excluded from the 1976 assessment in our district and another 400,000 acres was excluded from the 1977 assessment for a total of approximately 650,000 acres. This required a considerable amount of time to compile a list of landowners and tracts to be excluded and provide the information to the individual county clerks. Approximately 450,000 acres of the land which was excluded came from Ford and Morton Counties. I am hopeful that the amount of exclusions in the future will be relatively small since most of the people who intended to exclude land have probably done so.

I am not sure why so much land was excluded from the two counties mentioned above, but I suspect there are several reasons. In Morton County, a large amount of land is owned by out-of-state persons and it is also a county with a relatively small amount of irrigation. Most of the out-of-state landowners are not familiar with the district and are less aware of the current water problems also. In Ford County, irrigation is also relatively small as compared to the rest of the district. In addition, groundwater depletion problems are in general less acute at this time than they are in other parts of the district. However, it is interesting to note that water is just as controversial in Ford County and the long range projections are no better than many other portions of the district.



FINNEY, FORD, GRANT, GRAY, HAMILTON, HASKELL, HODGEMAN, KEARNY, MEADE, MORTON, SEWARD,

STANTON AND STEVENS COUNTIES

Senator Fred A. Kerr
September 23, 1977
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I also feel the people in Ford County were made more aware of the exclusion provisions by virtue of having been sent special notices by the County Agent and the ASCS Office. I do not feel these persons intended to hurt the district but their notice was such that it encouraged people to exclude land without explaining the potential benefits of the district. Exclusion forms were sent directly to landowners in Morton County by the County Treasurer along with their tax statement. This seemed to encourage exclusion of land.

The overall problem of time required is a difficult one to solve. A considerable amount of time was required by our district to correspond with landowners who had made requests for exclusion and did not understand the system. Some of these were not able to exclude land since they did not meet the 640 acre requirement if they were a water user. Joint ownership of land and land owned in more than one county makes it difficult to determine whether some people can qualify for that provision. Also, some individuals asked to exclude land that is covered by an application for the appropriation of water. Some of this land was included on the application for permit but was never developed for irrigation or at least had not been at the time of assessment. It does take time to determine if the land is actually irrigated since just filing an application does not prohibit them from excluding the land in accordance with the law. Time is also required to cross reference exclusion requests with all the applications for water rights.

In summary, the procedure for making assessments is complex and cumbersome. It requires information that is not readily available to the districts since we do not have a complete set of files like the counties do on each landowner. We are using ownership maps to plot land that has been excluded and have also obtained a list of landowners for Ford and Morton Counties to help determine ownership since a surprising number of people list the wrong legal description or fail to indicate the full description or owner of record.

I do feel the time required and problems with the system will decrease in future years and we do have our system pretty well set-up at this time. However, I would not object to your committee investigating the possibility of revising the system somewhat. It might be beneficial to clarify the matter of whether or not land covered by applications for permit to appropriate water should be allowed to be excluded. We also had a few complaints from water users who did not have 640 acres of dryland and could consequently not exclude any of their land. They felt this particularly discriminated against the small farmer. A non-water user can exclude land in any amount, so it is not a problem for them.

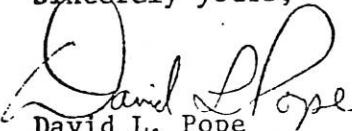
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I do think it would be unpopular if the provisions for exclusion of land were totally omitted. Some landowners did not get their land excluded in time for the first assessment in 1976 and complained about having to pay even one year.

There might be some advantage to investigating the possibility of financing the district on an advalorem tax on land outside the limits of municipalities rather than on an acreage basis. This would eliminate the time required to calculate the acreage of the numerous tracts of land and would also be easier for the counties since all their other taxes are based on that system. It would also allow the dryland to pay less than irrigated because of valuation differences.

I hope this commentary helps answer your questions concerning the assessment procedure. I really cannot say that the procedure did not work well in any particular county; however, it was simply a matter of the larger number of exclusions from the two particular counties mentioned above. Thank you very much for your help. Please let me know if I can be of additional assistance.

Sincerely yours,


David L. Pope
Manager

DLP:cf

BILL NO. _____

By Special Committee on Natural Resources

AN ACT repealing K.S.A. 42-401 to 42-420, inclusive, and K.S.A. 42-222 to 42-429, inclusive, relating to artesian wells.

Be it enacted by the Legislature of the State of Kansas:

Section 1. K.S.A. 42-401 to 42-420, inclusive, and K.S.A. 42-222 to 42-429, inclusive, are hereby repealed.

Sec. 2. This act shall take effect and be in force from and after its publication in the statute book.

Atch. B

_____ BILL NO. _____

By Special Committee on Natural Resources

AN ACT concerning water; relating to the claiming of vested rights for beneficial use of water; repealing K.S.A. 82a-704.

Be it enacted by the Legislature of the State of Kansas:

Section 1. (a) All persons claiming a vested right not heretofore determined pursuant to K.S.A. 82a-704 for the beneficial use of water, other than for domestic use, shall file by July 1, 1980, with the chief engineer a verified claim for such vested right. Such verified claim shall be upon forms provided therefor by the chief engineer and shall set forth:

- (1) The name and post office address of the claimant;
- (2) the source to which the claim relates;
- (3) the amount of water claimed;
- (4) the location of the works for the diversion and use of

the claimed water;

- (5) the dates of the beneficial use made; and
- (6) any additional information the chief engineer may require.

(b) Upon receipt of any such verified claim for a vested right to the beneficial use of water, the chief engineer shall investigate the same and shall conduct a hearing thereon. Such hearing shall be noticed by registered mail to the claimant and to other known interested persons at least thirty (30) days prior to the date set for the hearing. Notice shall also be given by publication in a newspaper of general circulation in the county wherein the claimed vested right has been exercised at least once each week for three (3) consecutive weeks prior to the hearing. Such published notice shall contain the date and place of hearing and a general description of the area affected by the claimed

vested right and shall be directed to all persons interested and concerned. At the hearing, the chief engineer shall take evidence of all persons interested and concerned and the same shall be considered in the determination of the existence of a vested right to beneficial use of water. As soon as possible thereafter the chief engineer shall make an order determining the existence of the classified vested right and shall notify the claimant and contestants thereof as to the contents of such order. Service of such notice shall be deemed complete upon depositing such notice in the post office as registered mail addressed to the vested right claimant and any contestant thereto whose address is known to the chief engineer, and upon the publication of an abstract of such order once each week for three (3) consecutive weeks in a newspaper of general circulation in the county wherein the claimed vested right is determined.

(c) Any claimant of a vested right or person contesting the same who considers himself or herself aggrieved by the order of determination of a vested right may appeal to the district court in the manner prescribed by K.S.A. 82a-724.

(d) The order of determination of a vested right of the chief engineer shall be in full force and effect from the date of its entry in the records of his or her office unless and until its operation shall be stayed by an appeal therefrom by the claimant thereof or a contestant thereto in accordance with the provisions of K.S.A. 82a-724 except that no such determination shall be deemed an adjudication of the relation between any vested right holders with respect to the operation or exercise of their vested rights.

Sec. 2. The provisions of section 1 of this act shall be a part of and supplemental to the Kansas water appropriation act.

Sec. 3. K.S.A. 82a-704 is hereby repealed.

Sec. 4. This act shall take effect and be in force from and after its publication in the statute book.

ALC h. c

October 3, 1977

TESTIMONY FOR THE
LEGISLATIVE INTERIM STUDY COMMITTEE
ON NATURAL RESOURCES

My name is Jack Pearson. I am Executive Director of the Industry Division of the Kansas Association of Commerce and Industry.

At your Committee's request, we are appearing here today on Proposal Number 57 concerning the cooperation and coordination of state agencies having water related activities.

Our policy on this subject reads as follows:

"The Kansas Association of Commerce and Industry urges the full coordination of the operations of the local, state and federal agencies concerned with water resources planning, conservation, and development. Such coordination must exist at all levels of operation of these agencies."

There are four sources that we rely on for data concerning water in Kansas: the Water Resources Board in forecasting and development, the Department of Health and Environment, relating to rules and regulations, the Division of Water Resources, Department of Agriculture, which in prior years has aided us in developing policy in reference to basic water laws in the State of Kansas, and as needed, the Kansas Geological Survey.

All four of these agencies are 100% cooperative and, from time to time, provide our Association with appropriate updating. Specific requests are handled promptly and efficiently.

Atch. D

In addition, representatives of these agencies are "consultants" on our KACI Natural Resources and Environment Council in order to provide us with the most current information available. At a recent meeting of our Council on September 16, Wayne Haas of the Water Resources Board, Dwight Metzler and Mel Gray of the Department of Health and Environment and Bill Hambleton of the Geological Survey, all provided us with excellent reports on water use, availability, projected needs, pending rules and regulations and forecasts in the future.

This type of support and cooperation from state agencies in supplying us with the facts, aids our Association in determining final basic policy decisions.

We would like to take this opportunity to thank the agencies mentioned above for their assistance in keeping us fully informed on the total water situation in Kansas.

Statement to the Special Committee on Natural Resources
on Coordination of Water Resources

By E. A. Mosher, Executive Director
League of Kansas Municipalities

October 3, 1977

The purpose of this discussion on your agenda, I understand, is to determine the existence or absence of coordination between those state agencies which directly affect the use of Kansas water resources. My purpose is to discuss this matter from the municipal viewpoint. To determine the attitudes and experiences of municipal officials, members of the League staff discussed this general matter with 13 officers of 12 cities throughout the state.

The consensus derived from these individual discussions are consistent with observations made at general discussions of this subject at meetings of city officials I have attended in the past.

The consensus appears to be as follows:

- (1) The existence of three major and separate state agencies dealing with water does cause some confusion among municipal officials as to who is responsible for what. However, it is notable that those who have been involved in water for more than a few years seem to understand the "system" and can work within it.
- (2) No major problems were reported in recent years as to the coordination among these three agencies. Reports as to problems in the past indicate that things are working better than they used to.
- (3) Putting observations (1) and (2) together, one gathers that once a city official understands the "system" (who does what), it works.
- (4) Those who have had experience on the matter note that there is a definite lack of coordination between the state and federal agencies. This appears notably true where water is sought for municipal purposes from reservoirs which were funded in part from federal moneys.

A. E. Mosher

he number of actors appear to be so many that there is both confusion and an absence of coordination.

(5) There are a few officials who support a combination of all three agencies into a one-stop service. There are a few more who think that it is appropriate to combine the Water Resources Board and the Division of Water Resources, with the continuation of KDHE as a logically separate agency. There appear to be fewer local officials now than in the past who think that a regulatory agency like the division should be separated from a research and planning agency like the board.

Finally, two individuals suggest that the Division of Water Resources should be removed from the Department of Agriculture. They argue that, in light of the future competition for water resources among a variety of users, the location of the division within the Department of Agriculture raises a serious question as to its objectivity.

On balance, it appears that there is general acceptance of the separate existence of the three agencies, that the coordination has improved and is reasonably adequate, but something needs to be done to promote understanding of how the system works. For example, one of our new city managers in this state found the situation totally confusing by reading state laws. But his problem was solved by simply asking someone with experience how the Kansas system works in practice. Perhaps some more cross-references in the statutes, or even in a single statute which outlines the overall authority and responsibility of each agency, would be helpful.

Finally, following further discussions with other officials, I would suggest that the concern about the impartiality of the Division of Water Resources within an agricultural department does need examination. We suspect that an apparent setting of clear objectivity will be increasingly important in the future.

COMMITTEE ON NATURAL RESOURCES

PREPARED BY

DONALD CHRISTY

FOR DELIVERY

OCTOBER 3, 1977

INTRODUCTION

The Kansas Water Law is a good law. It was the product of two intensive studies. The first in the mid 1940's after Kansas' modified Riparian Doctrine was declared unconstitutional. Then in 1957 the law was again reviewed with the idea of correcting the deficiencies noted in the 1945 law. Again, outstanding legal authorities such as Wells Hutchins of U. S. D. A. and others were used. The creation of the Water Resources Board in 1955 completed the recommendations of Mr. Hutchins. Namely, that there be two boards. One board as non-political as possible such as the Division of Water Resources to handle the water rights and the approval of designs and plans. Another board that would be the political arm of the State, the Kansas Water Resources Board.

The 1957 law transferred to the Water Resources Board the responsibility of coordinating the State's efforts so far as coordinating the many facets of State involvement in water. That coordinating effort was first given to the Fish and Game Department, later to the Division of Water Resources and finally to the Water Resources Board. In the general principal of law the specific takes precedence over the general and the latter takes precedence over the earlier. I believe that the coordinating power resides in the Water Resources Board. Early in the history of the Water Resources Board, we began the coordination between the agencies that were involved in, or affected by water policy. We met once a year, or on call, and were briefed by each and every agency that might be involved as to their planning and operations. If there were opportunities to coordinate planning and construction such as the policy for combining of highway fills with water supply dams, they were encouraged and in fact implemented.

In general the Ad Hoc Coordinating group was made up of the Executive Secretary or his designee and a member of the Board.

The same authority was granted the Division of Water Resources when it was formed in 1945 but as Wells Hutchins said, historically when all functions resided in one board the press for the property rights and the technical approval of projects generally meant the neglect of the functions now residing in the Kansas Water Resources Board. How true that was in Kansas.

RETAIN THE APPROPRIATION DOCTRINE

Historically a water right has been a Riparian right known as the Roman law or the English law and the Appropriation Doctrine which is known as the Egyptian law or the California law.

The Appropriation Doctrine has developed as a means of allocation of scarce water supplies between users and would be users. The doctrine is based on the need to reward those who through expenditures and efforts develop a use beneficial to the public. It is similar to wild game, it belongs to those who capture it for beneficial use.

An Appropriation Right is a property right that should be retained as the means of allocating a limited resource. There are a number of reasons for retaining the Appropriation concept.

1. It has stood the test of time and has been the more successful means for the allocation of water in limited water supply areas.

2. It has been recognized by the United States Congress. When Congress approved the charters of the Desert Land Act States, they granted the definition of a property right in water to the States. Hence, when Congress ratified their charters the property rights of the States were spelled out. The U. S. Constitution grants to the states those rights not spelled out in the constitution. The U. S. Constitution is silent on the issue of property rights, hence water law does not become an enforceable water code until court cases have made the interpretation of the law. The Appropriation Doctrine has many, many court interpretations. Each of the court cases has established a precedence that makes for stability in the law. These cases also channel wild schemes to the grave yard.

The court cases of this country are based on one or the other philosophy. It takes years and years to check the fundamentals through court. Thus a new concept would essentially be equivalent to locking the barn after the horse was stolen.

The Federal Government has been attempting to take over the ownership of the waters of this nation. Step by step they are gaining ground. So far as I can tell, Kansas has fared quite well in the protection of her citizens. Kansas did not grant ownership to the waters stored in reservoirs but rather grants a valid water right holder the right to provide storage that can be used to maintain that right.

GROUNDWATER MANAGEMENT DISTRICT LAW

The Groundwater Management District concept was brought on by what happened in Oklahoma. When I went on the State Board of Agriculture in 1951, Oklahoma had a water law very similar to that of Kansas. The State Office was sure that they knew what was best for Western Oklahoma and tried to carry out a management philosophy similar to those being proposed by the urban news papers. Stop the added use of groundwater.

The result was that the law and the department was years ahead of Kansas when we implemented the Kansas - Oklahoma compact negotiations. They were then thrown out and they started over again. In our early Kansas - Oklahoma water compact negotiations I had the feeling that they were 5 to 10 years ahead of Kansas in their understanding of the potential compact. The upheavel ended with Kansas obtaining a very favorable compact.

I decided at that time that the district concept should be the means of solving the problems and sold the idea to a few key men of the Southwest Kansas Irrigation Association. The result was the development of the concept of the Groundwater Management District Law. The law has not been tested yet to the point where I feel that we can say it needs to be changed. I would warn against a philosophy of a little change here and a little change there. Whenever a committee such as this one makes such a recommendation the whole law is up for grabs. Since the change is apparently minor the preparatory work that was carried on to pass the law is slighted. During my 25 years association with legislation I have noted that often a proposed minor change proposed by a board ended in some real problems.

1. One of the comments that I hear is that the District should be able to develop rules and regulations. Rules and regulations are in effect law, subject to the court tests as is law. If their rules and regulations are subject to legislative review equivalent to that now required by state rules and regulations, I am sure that there will be many expensive court cases which do not materially contribute to a sound water code. On the other hand if they are recommended to the Division of Water Resources to become state rules and regulations the experience of that body plus the review by the Attorney General, and the legislature, will help develop a sound water code. The State Lead Agency should coordinate those rules and regulations within reasonable limits. However an attempt to make all districts wear the same shoe regardless - is just as assinine as many of our federal rules and regulations.

2. One of the sound concepts of agricultural district law, that have stood the test of time, has been that the tax is based on the benefits received. Hence dryland agriculture that does not have water under it should be relieved of the tax unless weather modification, and other groundwater management district activities creates a benefit to that land. I have paid and offered to pay 5¢ per acre as land manager or operator for weather modification in south Logan County.

3. I paid my tax on irrigation water based on the allocated acre feet. Some years we use more. Paying on our allocation tends to give stable tax base that does not have to be recalculated each year. Further, it is a property right that should allow the capture over a period of time rather than on an annual basis where fluctuations of 2 to 1 are not unusual. I can't believe that we want to threaten a water right by under use. However, based on the Colorado experience we cannot afford to allow the dog in the manger philosophy to prevent logical development and use of our resources. In Colorado a water right could be owned unused for years and years. It has created some real problems.

GROUNDWATER MANAGEMENT

Can we afford to save the groundwater for the future for an unknown use at an unknown time by an unknown person or persons. I believe that if you will put a value on the water in the ground, a value that someone is willing to pay for it for some future use and then carry the costs forward, you will find that we should use it when we can.

We are going to end up using the recharge at either extreme of usage. We could start now and use the water no faster than the recharge (a political solution) that does not allow the use of the reserves to give us time to improve crop production capabilities, or we could allow unrestricted use in which case it is only a matter of time until we are again using the recharge.

If we can continue the last 35 year pace of development increasing food production per acre in the high plains during the next 35 years, we should be able to produce as much dryland as we do now with the combined irrigation and dryland.

I am thoroughly convinced that we can make material contribution by weather modification. I have studied weather modification since the mid 1930's and taken an active role in weather modification since the year 1949. I am thoroughly convinced that we should be able to increase rainfall by at least 10 percent.

Stan Changnon's research shows that cities cause an increase of some 15 percent. He says lets get on with weather modification. My 9 year experiment indicated a 10 percent increase in the target area and a 4 bu. per acre wheat yield increase. There are two many competent research men who believe that the 10 percent to 20 percent increase is available, to ignore the opportunities.

In the area of hail suppression I am convinced that a 30 to 35 percent reduction is probable. My nine year experiment indicated 32 percent.

The corn breeding program along with fertilization and insect control has increased corn yield 3 1/2 times per acre in the last 35 years. The milo production per acre has increased 3 times and wheat yields have doubled. Yes, even the old cow produces more. The pounds of beef produced per head of cattle has doubled in that period.

A Colorado experiment showed that milo yields could be increased materially by shaping and rolling the ridges between rows so that rainfall runs to the row. The Garden City Experiment Station has obtained a summerfallow milo yield on continuous milo by covering the ridge with black plastic.

If hybrid wheat materializes I believe that we can expect a 30 to 35 percent increase in yield.

I bring this information because I see a bright future for the high plains. When the economic freaks and the ignorant saddle up their pollution jackass they will complete driving the livestock feeding industry to the high plains. In fact Morrison, in his Feeds and Feeding book of the 1920's said that cattle in feed lots of the plains did better with nothing but a windbreak as shelter than they did in the corn belt with all the shelter facilities available. If all the feed and grain had to be produced dryland the roughage and grain production would be sufficient to feed more cattle and hogs than now being fed. True, we would need to increase the silage storage facilities so that silage reserve could be maintained.

Further the high plains dryland grain production is highly energy efficient. The dryland wheat and milo produces about 10 to 15 BTU of energy for each BTU of input.

WATER IMPORT

Water import is a false promise. The federal policy is cheap food and there is no possibility of allowing food prices to go

high enough to bear the burden of import. One of the more logical would be Milford Reservoir. If the water were moved in a 38" pipe line we might supply one acre foot of water to the irrigated acres of 2 counties, 300,000 acres. It would take ten 38" lines and by present standards the water would cost in the neighborhood of \$300 per acre foot. The federal handling of the energy problem in crisis is a good example of federal participation in helping to finance water import. Further the political implications are staggering.

RECHARGE

Recharge is a false promise. Very little water of the high plains ever reaches any stream. A little reaches the lagoons that dot the prairies. I have checked the capacity of a number of these playa lakes and few when running over full have more than 1/2" to 1" of water from their drainage areas. There are years and years when there is no water in them. A few of us can profit from recharge or water harvest but the overall impact is small.

Natural recharge is small. I have studied a lot of well logs back to the 1930's and had come to the conclusion that the natural recharge was about 1". But that like the 1/4" assigned by the Water Resources Board is only an estimate. Recently I worked out a method for estimating recharge from the lowering of the water level of a number of livestock and household wells that were located about one mile from an irrigation well. That rate of natural recharge was about 3/4 of an inch. In counties like Lane, Scott, Wichita and Greeley we should have an annual recharge of some 28,000 acre feet per year. Less than half that could be anticipated to be useable for irrigation or city use.

Mr. Meyer who was working on recharge rates in the Finney County area told me that he thought the rate was about 2 1/2" per year. I didn't see his work hence could not evaluate it. I made another rough analysis in the irrigated areas that the effect of rainfall was the equivalent of 1 to 2" per year for 3" additional rainfall. That included the effect of reduced pumping and recharge.

MEASURING THE WATER

We don't even know how much water we have. In the early days of the Water Resources Board the Kansas Geological Survey stated that there was 150 million acre feet in storage in Western Kansas based on the then used .16 storage coefficient. I commented that I thought the Niobrara formation weight about 100# per cubic foot and that the specific gravity of the mineral component was 2 1/2 times that of water or 150# per cubic foot - what went with the rest of the water. The next report carried the figure 300 million acre feet in the western third of Kansas.

Now they are reporting 200 million acre feet. In other words the estimates vary from a lake 10' deep to 20 ' deep over the western third of Kansas if the water was on the surface. I do not see measurement as a tool of special merit that requires the use of an expensive meter. There is real merit in using the metering of energy to the pump. If the groundwater management personnel would spend the same amount of time measuring the flow during the pumping season, get the energy meter readings for a time long enough to establish energy use water relationship and at the same time measure the depth to water while pumping. Three things could be accomplished:

1. The rate in gallons per minute would be established.
2. The annual energy consumption could be used to determine the amount of water used.
3. The pumping lift, the energy use, and the gallons per minute would indicate the operating efficiency of the installation.

I believe this to be a much more effective way to handle the use estimate. I do not believe that it would take as large a police force and it would at the same time give the operator a measure of the efficiency of his plant.

The farmers here are well educated. Many highly educated, who have spent a life time at the game of agriculture and always willing to learn if the material supplied is valid. Some of the farmers of this area has been using the winter irrigation practice five years when the Bushland Experiment Station had proved that for milo a one foot mid-winter irrigation plus a 3" application at head emergence and 3" at soft dough gave the same yield as using 30" in a preplant irrigation and then pumping all summer.

SUBSTITUTE MILO FOR CORN

I would like to see the research that shows that milo is a more efficient irrigated crop than corn. Using the last ten years ending with 1975, irrigated milo has yielded 79.3 Bushels per acre in the western third of Kansas. Corn during the same period yielded 106. Further I had asked a tenant on my land to try milo on the basis that it was a more efficient water use crop. I let him stay with corn on the land I managed. The milo was a disappointing substitute for corn. Further using the Kansas State Board of Agriculture reports, dryland milo and dryland corn for Western Kansas, I find the yields about equal. Corn acreage is limited by the fact that the time of watering is rather critical.

TAIL WATER PITS

Water saver or water waster?

Scott county was one of the early counties to install tailwater pits. They cost \$1,000 and up. Many of them do not have a pump to pump water back on the field. Yet they have had very little water in them. These farmers in general use a ridge along the lower end of the field and start the irrigation of the high side of the side slip slope. The surplus water breaks over the row ridges and flows back up the rows to be irrigated. The result is the tail water pit actually catches a little water off the last set.

Some irrigators that shoot for the top yields, make heavy application of fertilizers use the tailwater pit to catch the water that comes from continuing the flow of water down the row until the row is thoroughly irrigated. In this case the tailwater pit is a necessity but I asked the question, isn't over irrigation for the last bushel more wasteful of both water and energy than the careful irrigator that uses water and fertilizer for its most efficient use. One of my tenants reported 150 bushels per acre. All he used was a berm at the lower end of the field. I did not see any water in the road ditch at the end of the row. A heavy rain occurred during the irrigation season. We have one irrigator above a dryland quarter that has caused problems through the years. This year the lagoon after the heavy rains was about as full as it used to be when the drainage area was in grass.

WELL SPACING

Is not a valid solution to the problem of groundwater depletion. It should be used only as a means of preventing squabbles between land owner when one well materially interferes with the well of a neighbor. Actually only in the case of vested rights or where a common water right is divided by a sale of a part of the land and the corresponding water right goes with it.

In most of the cases one or the other has a prior right which is a property right. That owner has that property right just as surely as when a Junior right pumps from a stream which interferes with a senior right.

When a water right is established the approval states subject to existing rights. Then it seems to me that so long as a man has that property right he should be able to protect that right by both additional wells and replacement wells so long as he does not exceed the maximum pumping rate and the established use per year.

If a stream was involved, reduction in use would be reduced by shutting off junior rights in times of water shortage. The present well spacing philosophy is one of taking property without the due process of law. Shutting down junior rights on a state wide basis or even on a county wide basis is not valid. A critical area should be outlined, the radius of influence established and the more junior rights restricted in that area of influence. I have a strong feeling that we must maintain a water right as a property right.

If it is in the public interest to reduce water use then the state should institute the restrictions. If the Groundwater Management Districts patrons cares to institute restrictions then it should be their responsibility.

If I feel that my senior right is being impaired by a junior right then that is my responsibility just as surely as it is my responsibility to bring action against a neighbor that tries to fence some of my land into his pasture.

SUMMARY

Coordination of State Agencies involved. During the administration of Robert L. Smith and Dwight Metzler, the Water Resources Board called an Ad Hoc meeting of the Executive Secretary, the agency citizen representative selected by the agency to an annual meeting (oftener if necessary) of those agencies that were involved in water. At the meeting each agency reviewed their plans and operations that involved water.

The coordination was effective and produced material savings in State funds. I believe the Groundwater Management Districts are doing a wonderful job of trying to work out consistent rules and regulations for recommendation to the Division of Water Resources for making them official State Rules and Regulations, that has added review of the Attorney General and Legislature protection.

Water is a highly emotional issue and the history of water law is that it bring a law suit at the drop of a drop of water. I believe that an attempt to enforce the present well spacing concept to be in that category. I have a strong feeling that a court ruling can be obtained that when the wells are in the same aquifier that spacing rules will be found to be arbitrary and capricious.

DON CHRISTY

SENATOR THIRTY-NINTH DISTRICT

OX 278

SCOT KANSAS 67871



TOPEKA

SENATE CHAMBER

February 19, 1976

Gentlemen:

This report is a combination of experience, up-to-date research and reports from many sources. It is selected parts of a much more comprehensive report being prepared. A report which could not be prepared in time for the February 19 meeting.

I am sorry that I cannot attend this planning meeting but feel that immediate legislative duties must prevail.

I want you to know that I am deeply interested in planning if that planning is positively oriented toward the development of an efficient long-term irrigated agriculture.

I would appreciate the proceedings of the last meeting, this meeting and the coming meetings.

Very truly yours,

Donald Christy

Don Christy, Senator
Thirty-ninth District.

DC:gr
Enc.

Economic Development

GROUNDWATER AQUIFER LIFE
WHEN USED FOR IRRIGATION

The life of a groundwater irrigation area is forever if the rate of use is equal to or less than the rate of recharge. It is also forever as an irrigated area if irrigation is not rationed. If irrigation is not rationed the irrigation will develop beyond the aquifer capacity. There will be a decline in the water level until the thickness of the supply becomes so thin that the cost of the water exceeds its value. Then the pumping will continue at the rate of recharge. The question is, when and over how many years should the reserve be used.

As the water level declines first one unprofitable irrigation well then another will be abandoned. The process is going on now not only in Texas and New Mexico but in Kansas.

One of the main limiting factors is the fact that when about 30% of the water is gone, it will require two irrigation wells to produce the same amount of water per minute as the first well did originally. In a 100-foot aquifer that would be when the water level had dropped from its original 100 feet to 70 feet. This first 30-foot decline can be handled by pumping more hours per year. If the lowering is at 1-1/3 feet per year this means that the second well will need to be installed in about 20-25 years.

With only 70 feet of water left, how long will it be before another well will be needed?

Using the 30% decline from 70 feet of water with the same useage it takes only 15 years until two more wells will be needed. In other words, when half the water is gone it will take four times as many wells to maintain full irrigation. Further, each time a new well is drilled, the best available location is used.

When 30% of the last half of the aquifer water supply is gone, some 10 years later, it will take 8 wells, if they can be found, to produce the original supply. It becomes obvious that there is a strong economic force tending to reduce use.

At the present time there are numerous areas where the second well is now being installed.

In 1965 there was prediction that by 1975 there would be one-third of the original groundwater supply left in Scott County. Factually, the water level in Scott County is down about 30% in about one half the irrigation wells that have a continuous measured history beginning in 1950. The halves selected are those that have a lowered water level of 20 feet or more. Those with a decline of less than 20 feet may or may not be irrigation wells. (Data for

the analysis came from "Water-Level Changes in West-Central Kansas 1950-1974," Kansas Geological Survey Journal 1974).

The Texas high plains developed earlier than did Southwest Kansas. It seemed reasonable to ask them for information about heavy irrigation useage of water from the Ogallala formation.

The following pages from "Ogallala Aquifer, Water Data Interpretation 1965-1974," High Plains Under Groundwater Conservation District No. 1. (See attached pages)

High costs of fuel, equipment, repairs and low prices of farm products should reduce the amount of irrigation early. Thus establish irrigation use equal to the recharge rate. This would leave more water in reserve. On the otherhand, if the cost of fuel, equipment and repairs goes down and product prices go up, a longer overuse would result, thus leaving less water in reserve before equilibrium between use and recharge is established.

There is opportunity for substantial additional irrigation development in Kansas. There is a lot of groundwater in South Central Kansas. The recharge rate is high and the water requirement is relatively low. As the need for agricultural products grows, this area should be and is being developed. There are thousands of acres in the sandhills of Southwest Kansas under which there is adequate water. That land can be put under irrigation by using modern bulldozers to smooth the land enough for the modern center pivot sprinkler systems. The water from the rough sandhills could be piped to suitable land. There is opportunity for substantial development even in or adjacent to the presently fully developed groundwater irrigated areas. The water level changes in the Ogallala has dropped so little in wells one mile from or more from the nearest irrigation well that areas a mile and one half or two miles from the nearest irrigation well can and should be considered for development.

The question of when and over how long a period should the use of the reserves be used.

1. The water use efficiency has improved materially. The early reports of use in Scott County were that the normal use of water was about 1.75 acre feet per year. The 1973 report was that 1 foot per year was being used. The Water Resources Board in their first report on water use in S.W.Kansas indicated that about 2 acre feet per year was being used. The Texas high plains reports seem to indicate a useage of about 13½ inches which they expect to decline to about 8 inches per year.

2. Winter irrigation as practiced in the Scott and Wichita County area indicates that applying water during cold weather gets depth of penetration. This coupled with low evaporation produces more crop for a given amount of water.

The results obtained at the Bushland, Texas, Agricultural Experiment Station indicated that 1 foot of water applied in the winter and two 3-inch waterings during the summer, using 18" of water, gave milo yields comparable to preplant irrigation and then heavy irrigation all summer. This used 30" of water, a 40% reduction in water use.

The Kansas Agricultural Experiment stations are finding potentials of even greater possibilities for increasing the water use efficiencies.

3. The development of hybrid crops can contribute. For instance, when the hybrid milo developed during the 1950s, it became obvious that the hybrids produced about 30% more grain when the same amount of water was used. In fact, the milo yields of this country have increased about three times in the last 30 years. The corn yield has increased about three and one half times. The wheat yield has doubled with a potential for a successful hybrid probable.

4. The Garden City Agricultural Experiment Station made a 7-year experiment on dryland milo production. The continuous crop milo production was compared to summer fallow milo production and to continuous crop milo production with the ridges covered with plastic. The plastic covered ridge milo produced about 40 bushels per acre acreage. Considering summer fallow as using only half the land needed, the plastic covered ridges produced twice as much as did the summer fallow or the regularly planted continuous crop milo.

The Colorado Experiment Station showed material dryland milo yield increases by carefully shaping and then rolling the ridge hard and smooth so that the water from the showers ran down to the row where the plant could use it.

Eventually a plastic foam made from a fertilizer may be used to cover the ridges, the foam breaking down into a fertilizer for the next year's crop.

5. The present know-how could increase dryland production by 50%. At present the typical dryland grain production is half wheat and half fallow. If a rotation of fallow, wheat and corn or milo were used, the total grain production should equal about 1½ times the production. This rotation was forced on the western Kansas agriculture

by the U. S. government crop production controls. This period of some 10 years established the know-how.

The results from some of the Western Kansas Agricultural Experiment Stations, using chemical fallow, indicate a real opportunity for not only increasing the production but also saving of the fuel required to produce the grain.

In fact, if this method of production were used on all (no irrigation) the presently cultivated land, the long-term production, should be about 180,000,000 bushels of grain. The present production, using both dryland and irrigation, is about 240,000,000 bushels.

(If the foam idea were fully successful, the potential seems to be well over the 240,000,000 bushels).

6. Weather modification holds considerable possibilities. Simpson, Henderson, Krick, St.Amand and others who have actively engaged in weather modification all believe that a 10 to 20% increase in precipitation is possible. Such an increase should produce 2-4 bushels per acre increase over the present dryland yields and should materially affect the irrigation production.

Christy (Calgary W.M.A.Report) shows about 2" increase in rainfall, about 30% reduction in hail loss and a 4 bushel increase in wheat production over the period 1957-65.

The S.W.Kansas 1975 Weather Modification indicates a probable hail reduction of 30% determined by comparing the losses filed in the weather modification target area as compared to that of the surrounding counties. The rainfall was not so easy to determine but on two occasions when the weather bureau reports were not indicating precipitation they appeared to initiate and develop rains that essentially saved the wheat crop.

PREDICTING WATER-LEVEL DECLINES

Since the middle and late 1930's, there have been multitudes of projections, estimates, opinions and just rank guesses as to the fate of the Ogallala aquifer in the High Plains.

The maintenance of the area's present, comprehensive, water-level observation well network, and the annual depth-to-water-level measurements made therein, has provided the water-level history that is now making suspect many of the early projections as to the rate of the water-table decline in the Ogallala aquifer. Although we must respect those brave enough to risk making such early projections, our greatest debt of gratitude is for their establishment and persistence of maintenance of the program of annual water-level measurements that now tends to dispute their own projections as to the ultimate depletion of this aquifer. Using only the few annual water-level measurements available to them, the early projectionists saw accelerating water-level declines, and, therefore, accepted this evidence of the apparently quick depletion of the aquifer.

As an outgrowth of the vestiges of the observation well program established by the area's pioneering groundwater hydrologists, and to the nearly four decades of annual depth-to-water measurements made therein, it is apparent that we must now reevaluate our original projections, estimates, guesses, and, particularly, our opinions regarding the future rate to depletion of the Ogallala aquifer. In short, it is hindsight, not new and more farseeing scientific talent, that now makes appropriate and necessary a new look at the demise of the Ogallala aquifer.

Because of the wide range in the magnitude of the original volumes of water available in the Ogallala aquifer (the thickness of the water-saturated interval), and as a result of the well development (pumpage) in these differing hydrologic regimes, we now find the aquifer in nearly all stages of depletion within the District—from a state of depletion of less than 10 to more than 75 percent.

The machine processing of water-level data in those areas that have experienced extensive depletion (75 percent) of the aquifer first revealed the phenomenon of this aquifer's stubborn resistance to continue its former accelerating rate to ultimate depletion. It is an understanding and acceptance of the water-level history collected in the areas of extensive aquifer depletion, and the consequences of this depletion, that offers the most promise to those areas still blessed with abundant groundwater supplies.

Depletion Rate Changes

Perhaps the easiest way to explain the phenomenon of water-table declines in the Ogallala aquifer is

to briefly discuss water-level and rate-of-pumpage decline curves that were constructed as a part of the Parmer County study and discussed in the report, "Groundwater Conditions in Parmer County, Texas" (Rayner, 1971).

The water-table decline curve shown in Figure 11 was constructed by averaging the measured depth-to-water levels made in all observation wells in Parmer County. The mean depth to the base of the Ogallala formation (the base of the Ogallala aquifer), represented by the abscissa of this curve, was determined by machine digitizing an isopachous map of the Ogallala formation in Parmer County, and machine computing the mean depth to the base of the aquifer from the digitized data. Figure 11 shows the known measured history of the water-table decline in the Ogallala aquifer beneath Parmer County.

It would be a simple matter to predict the water-table decline by extending the straight line part of the Figure 11 curve to absolute exhaustion of the aquifer, as shown by Figure 12. Statistically, this does not appear inappropriate inasmuch as the measured decline (after the rate-of-decline curve stabilized from 1958 to 1972) was approximately 77 feet, or 5.5 feet, per year, while the projected decline curve shows 136 feet of water-table decline from 1972 to 1998, or 5.23 feet of decline per year. However statistically appropriate it may appear, history has shown that the hydraulics of the Ogallala aquifer will not permit the realization of straight-line depletion.

Declines Stabilize

As a part of the Parmer County study, hydrographs were constructed using water-level measurements made in observation wells located in other areas of the District, wherein the Ogallala aquifer has experienced extensive depletion. These hydrographs showed that the convex part of the hydrograph—at the start of the accelerated decline of the water table—was followed by a period of nearly steady decline, until about 50 percent of the aquifer had been depleted (see Figure 12). At this point, the decline curves began to take a concave configuration—the magnitude of the concavity being several orders of magnitude less than the transition to convexity.

Assuming that the future rate of water-level decline in Parmer County will reflect that as measured in the much more thinly saturated sections of the aquifer to the south, the average water-level decline curve shown on Figure 13 was extrapolated to the year 2000. Segment A of the water-level decline curve shown in Figure 13 represents the period of water-level records (mid 1930's and early 1940's) before large-scale development of irrigation.

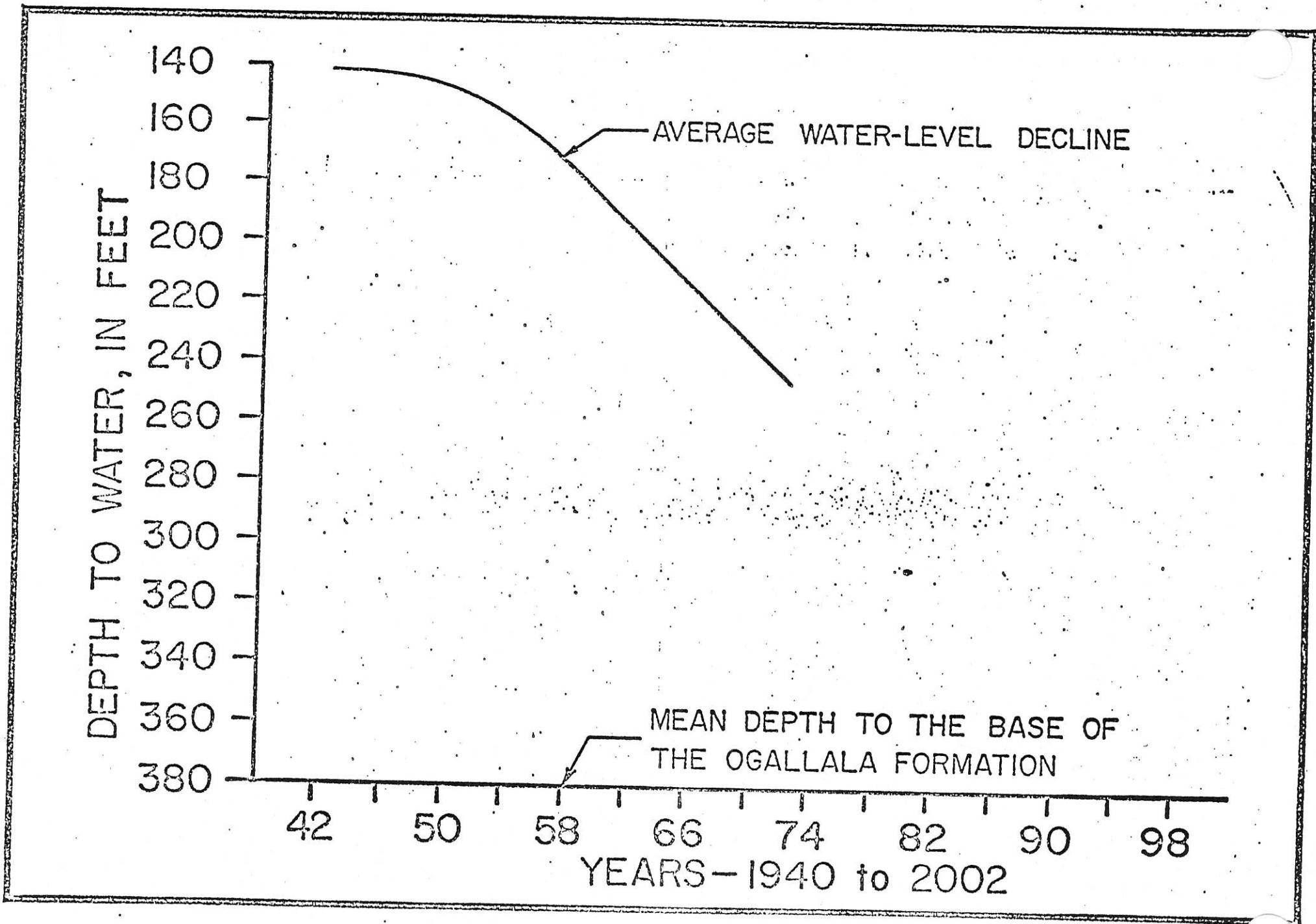


FIGURE 11—AVERAGE DECLINE OF THE WATER TABLE IN THE OGALLALA FORMATION, PARMER COUNTY, TEXAS.

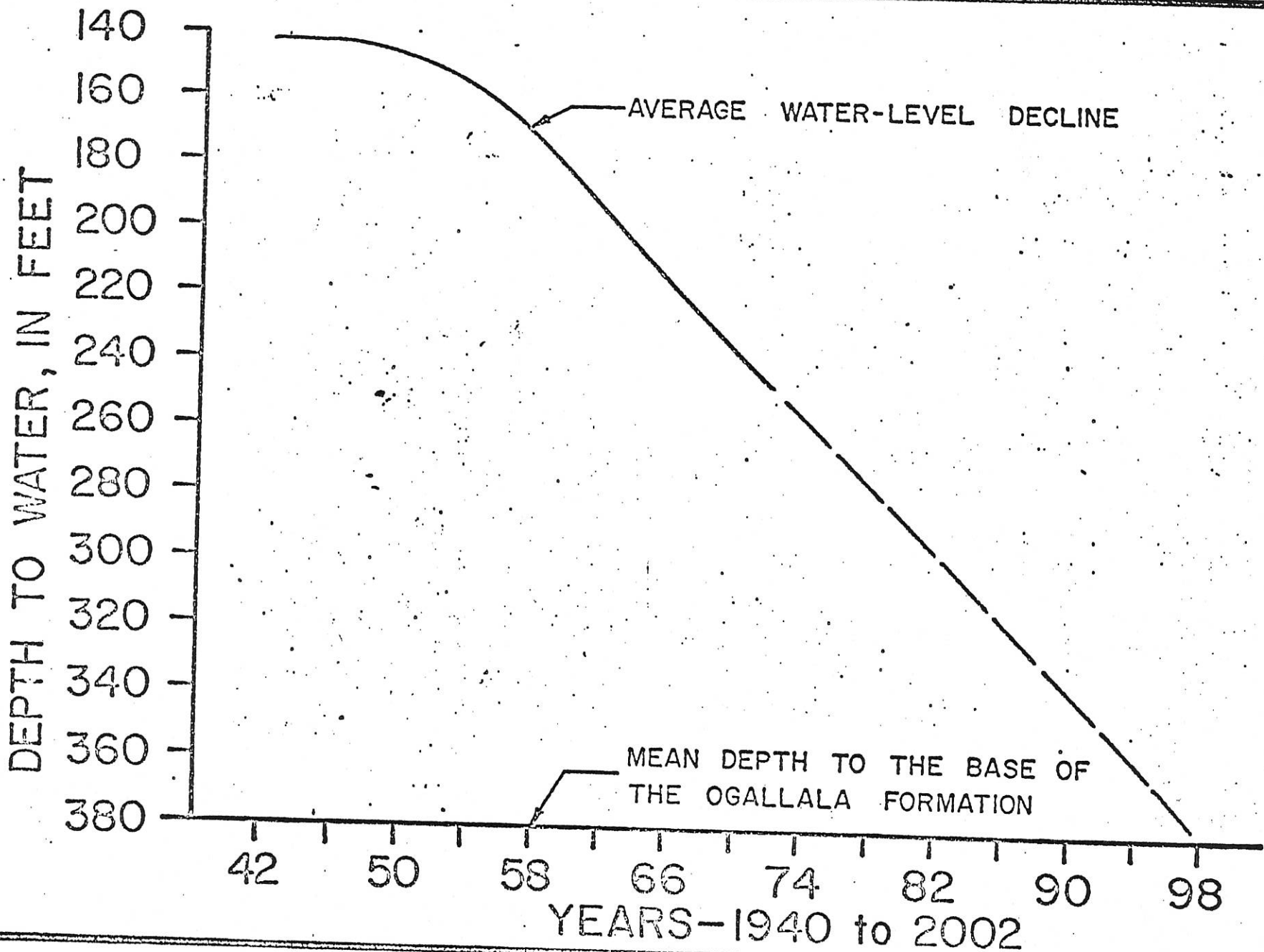


FIGURE 12—AVERAGE DECLINE OF THE WATER TABLE IN THE OGALLALA FORMATION AS EXTRAPOLATED TO THE YEAR 1998, PARMER COUNTY, TEXAS.

Segment B shows the response of the water table during the advent of large-scale development of irrigation wells. The pronounced concavity of this part of the curve is probably caused by the magnitude of the pace of developing irrigation. Well casing and other equipment were in short supply until the close of World War II. The irrigation wells developed before the war had widely demonstrated the advantages and even necessity for irrigation. Hence, when the equipment for well development again became available, there were many wells drilled in a very short time interval. However, it must be noted that the magnitude (number and location of observation wells) of the water-level records available during this time, and part of the time interval represented by Segment B, could also highly influence the values found by the averaging of such data.

Segment C of the decline curve shown in Figure 13 was and is the period of great concern to the energy suppliers, the entire agribusiness community, municipal and county governments and to the individual landowner. It is apparent that, during this period, any predictions, and there were and are many, would reflect a short life span for the aquifer. It should be noted

that most of Parmer County, in addition to several other counties within this District, are still in the stage of aquifer change represented by Segment C. Fortunately, the history of water-level measurements made in other parts of the District has shown that the slope of this part of the curve (Segment C) does not continue to ultimate exhaustion of the aquifer, as may have been apparent to the early hydrologists.

Segment D of the water-level decline curve is the segment that is drawing the attention of the new hydrologic predictors. It is this period of water-level history—as recorded in an area of relatively shallow depth to the base of the aquifer—that now appears to offer some of the answers to the continued economic use of the Ogallala aquifer for many more decades. Further, since the projected decline curve for Parmer County was based upon a history of depth-to-water measurements made in wells in an area of relatively thin initial saturated thickness, the assumed projected trend to asymptote of the decline curve with a relatively thick saturated section remaining in Parmer County is probably conservative. For this reason the decline curve represented by Segment C may extend beyond the point where Segment D commences in Figure 13.

DEPTH TO WATER, IN FEET

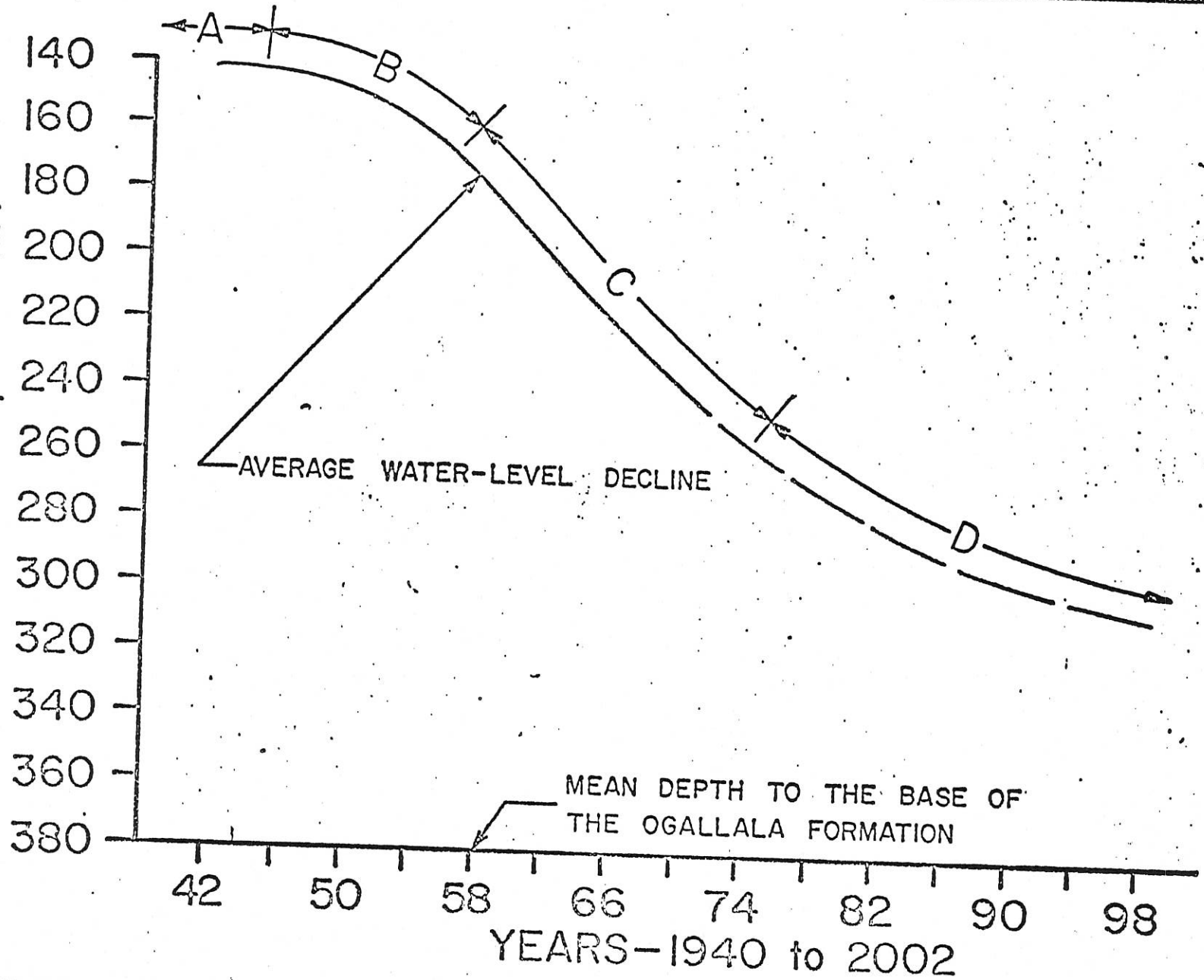


FIGURE 13—AVERAGE DECLINE OF THE WATER TABLE IN THE OGALLALA FORMATION AS EXTRAPOLATED TO THE YEAR 2000, PARMER COUNTY, TEXAS.

PREDICTING WELL CAPACITIES

As noted, it is expected that the economic life of the aquifer will now extend beyond the earlier predictions of its demise. However, the life expectancy of the Ogallala aquifer is governed primarily by economic factors, not hydrologic law; so hydrologic predictions such as these must be taken in light of past, present and future economic variables. Yet, there is one hydrologic parameter that is a major controller of the economic level of use of an aquifer, that being the rate at which a well can produce water. For elastic (sand and gravel) water-table aquifers—the Ogallala aquifer—this rate is, in time, governed by the decline of the water table. Therefore, although the new predictions of the lessening of the rate of water-level decline are heartening, the major reason for this reduction in the rate of decline is the resultant corresponding decline in the individual well's capacity to produce water.

The statistics of the annual rate of the depletion of the aquifer are not of paramount interest to the irrigator, as would be an appraisal of the expected decline in well capacities.

The effect of pumpage on the depletion of the Ogallala aquifer is self-canceling. At the onset of irrigation well development, the then "full" aquifer would support large capacity wells; however, as these wells increased in number, their load on the aquifer was manifest in the accelerated decline of the water table—the reduction in the thickness of the aquifer. This decline in the water table, in turn, reduces the well's capacity to produce water. After a certain state of depletion of the aquifer, as discussed previously, the lessening of the load on the aquifer results in the progressive reduction in the rate of the decline of the water table.

Studies by Hughes and Harman (1969) have shown some agreement to the decline in well capacities with the depletion of the Ogallala aquifer, as expressed by the equation:

$$\text{Present Well Capacity} = (\text{Original Well Capacity}) \left(\frac{\text{Present Aquifer Thickness}}{\text{Original Aquifer Thickness}} \right)^2$$

Using this equation, the theoretical expected decline in well capacity, with the known and postulated decline of the averaged water table in Parmer County, is shown by Figure 14.

Estimating Future Well Capacity

A review of the well-completion records of Parmer County indicates the overwhelming predominance of reported well capacities in this county was 1,000 gallons per minute (gpm). The 1971 field survey made as a part of the Parmer County study revealed that it

is evident that most wells in Parmer County, with an original reported capacity of 1,000 gpm, have not declined to 36 percent (360 gpm) of their original capacity. Therefore, if the curves shown on Figure 14 have any authenticity, then it is reasonable to assume that most wells in the county did not fully penetrate the entire aquifer and/or were not equipped to pump the maximum amount of water the aquifer was originally capable of yielding at the time the wells were drilled. The Parmer County study also showed that a very large number of the wells in this county do not penetrate the entire aquifer, and, even in 1971, approximately 17 percent of the wells completed did not penetrate the entire aquifer.

Even, though a well was not equipped to produce at the maximum capacity of the aquifer to yield water to the well, the curves in Figure 14 can be used to get a general estimate of the well's future capacity, provided the aquifer is isotropic, the well penetrates the entire aquifer and the efficiency of its pump remains unchanged with time.

To predict a well's future capacity, first find the point on the decline curve corresponding to a given depth to water in the aquifer in a year when the pumping capacity of the well was known. As an example (see example shown in Figure 14), in an area where the present depth to the water table is 212 feet, the decline in well capacity has been 50 percent. Therefore, if the well's capacity in the year chosen (1965) was 1,000 gallons per minute, then its original capacity was $1,000 \text{ gpm} / (.50) = 2,000 \text{ gpm}$. Using this value as the well's original capacity, the decline curve can then be used to approximate the well's future capacity. The subject well, in the year 1990, would theoretically be producing at the rate of 13 percent of its original capacity, or $(.13)(2,000 \text{ gpm}) = 260 \text{ gpm}$.

A reduction in well capacity from 1,000 gpm to 260 gpm by the year 1990 may appear to the present day irrigator to be in actuality an economic exhaustion of the aquifer. However, if it is any consolation, the decline in well capacity that can be expected if the water-table decline curve continues at its present rate to ultimate exhaustion, as shown by Figure 15, is even more climactic. Given the same well capacity assumptions as set fourth in Figure 14, the subject well would have declined to a mere 60 gpm by 1990, as shown in Figure 15.

Waste Must Be Curtailed

Although it is a heartening realization that the aquifer will not deplete to ultimate exhaustion (as portrayed by Figures 12 and 15), the sobering realization is that the future pumping capacities of irrigation wells

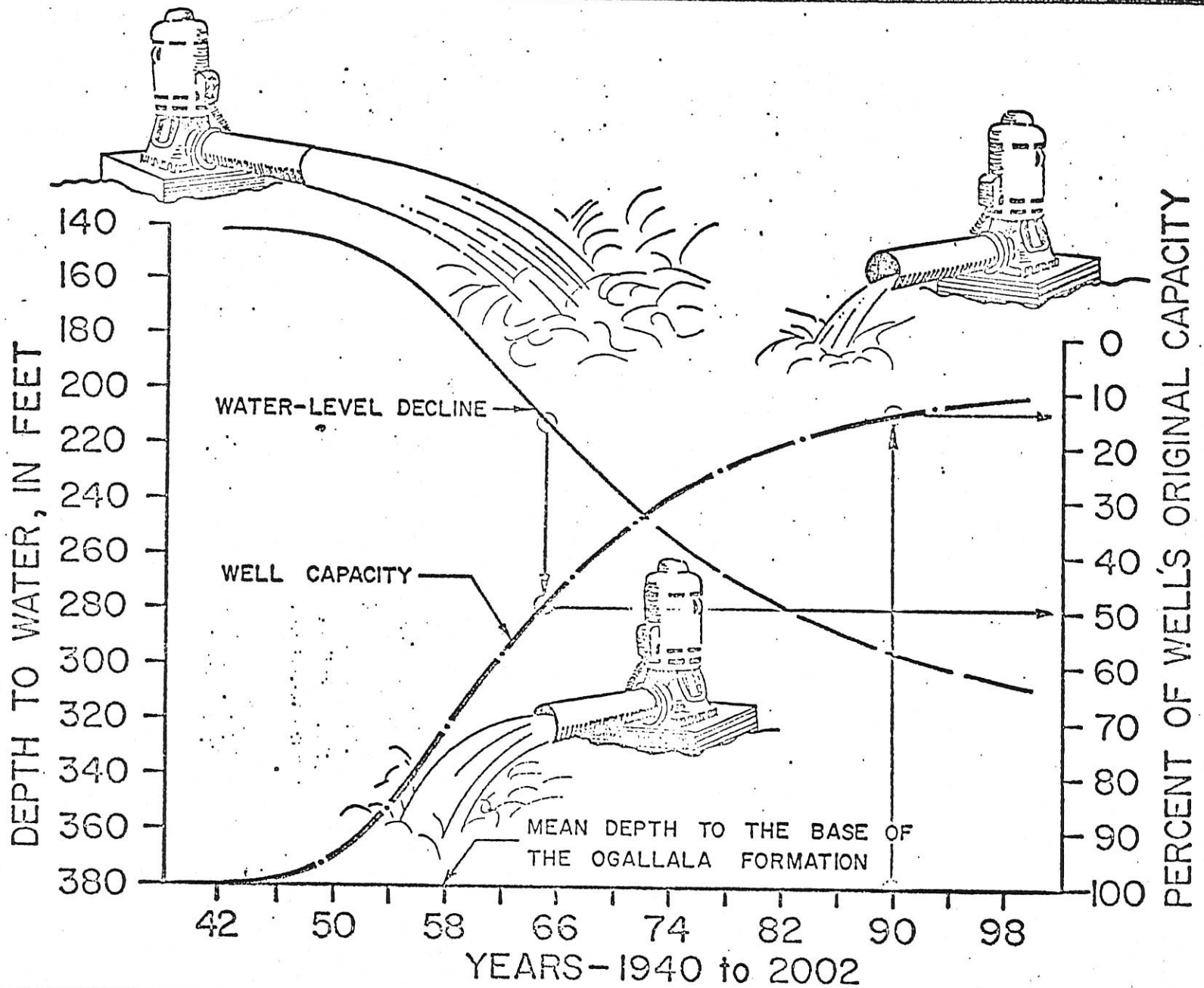


FIGURE 14—AVERAGE DECLINE OF THE WATER TABLE IN THE OGALLALA FORMATION AS EXTRAPOLATED TO THE YEAR 2000, AND THE RESULTANT THEORETICAL DECLINE IN WELL CAPACITY, PARMER COUNTY, TEXAS.

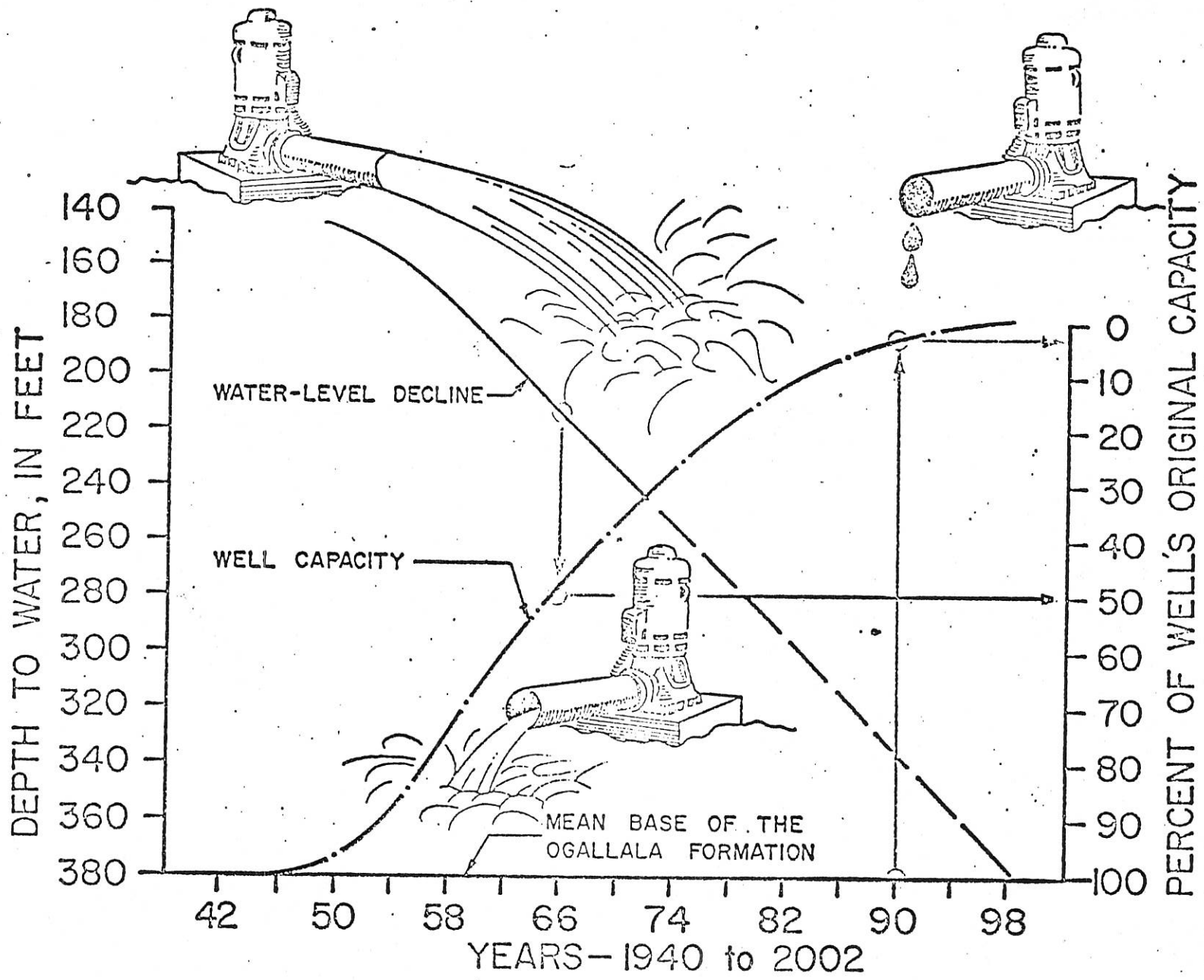
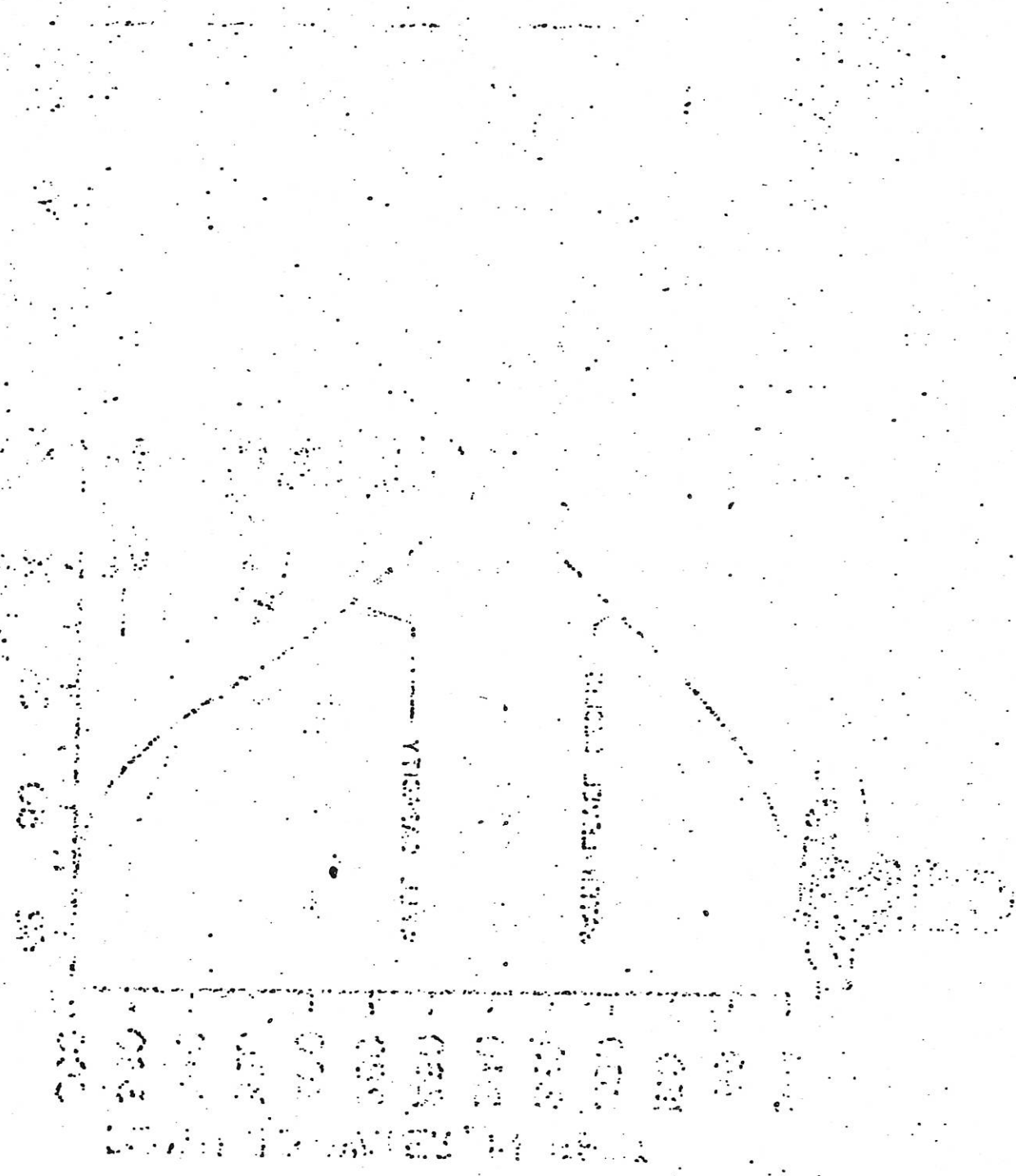


FIGURE 15—AVERAGE DECLINE OF THE WATER TABLE IN THE OGALLALA FORMATION AS EXTRAPOLATED TO THE YEAR 1998, AND THE RESULTANT THEORETICAL DECLINE IN WELL CAPACITY, FARMER COUNTY, TEXAS.

are going to be drastically reduced. To continue irrigation using small-capacity wells will demand near total abstinence from waste and the adoption of all economically feasible methods for increased efficiency of application of irrigation water. The "ultimate fate" of the Ogallala aquifer can be delayed for several decades if those irrigators still blessed with large capacity wells heed the teachings of history, and abstain from all forms

of waste of their present groundwater supplies.

The recorded water-level history has shown us an opportunity to change the history of the rate to demise of the Ogallala aquifer if we heed history's teachings. Total abstinence from the obvious waste of our declining groundwater supplies through the elimination or reapplication of all irrigation runoff water should be, at the very least, our immediate goal.



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A Research Study of the Impact of Irrigation
to the Western Kansas Economy

Irrigation of farm crops is vital to the economy of the State, particularly in the western portion where sparse rainfall is experienced. Irrigation is responsible for the recent upturn in corn production in Western Kansas and indirectly responsible for increased beef production which has become the number one industry of the State.

Irrigation in the western one-third of Kansas represents about 79 percent of all irrigation activities in the state. Acres of land using irrigation increased from 767,600 acres in 1960 to over 2,000,000 acres in 1973.

The following three tables represent production of the three leading grain crops on irrigated and non-irrigated land in Western Kansas.

Yield per acre of Corn from Irrigated and Non-Irrigated Land in the Western One-Third of Kansas and the State Average from 1972-1974.

<u>Year</u>	<u>Irrigated</u>	<u>Non-Irrigated</u>	<u>State Average</u>
1974	104.3	31.6	76.0
1973	122.8	54.9	100.0
1972	125.1	38.3	104.0

Yield per acre of Wheat from Irrigated and Non-Irrigated Land in the Western One-Third of Kansas and the State Average from 1972-1974.

<u>Year</u>	<u>Irrigated</u>	<u>Non-Irrigated</u>	<u>State Average</u>
1974	43.0	23.6	27.5
1973	43.6	27.8	37.0
1972	37.1	19.3	33.5

Yield per acre of Grain Sorghum from Irrigated and Non-Irrigated Land
the Western One-Third of Kansas and the State Average from 1972-1974.

<u>Year</u>	<u>Irrigated</u>	<u>Non- Irrigated</u>	<u>State Average</u>
1974	71.8	27.5	40.0
1973	80.1	39.3	56.0
1972	86.1	42.1	62.0

The foregoing tables show that corn is the most receptive crop to irrigation. Irrigated corn yield more than doubled that of non-irrigated land.

Table I reflects the value of irrigation in terms of grain production to the economy in Western Kansas. During 1974, the total value of grain as a direct result from irrigation amounted to \$344,500,000. This figure represents the raw product of the grain before further processing, fed to livestock or for human consumption.

Table II shows the impact of feeding corn to cattle, which was produced through the use of irrigation. During 1974 over \$467,000,000 was attributed to irrigation from the cattle feeding industry.

By combining the total value of the aforementioned two industries, the economy was boosted by over \$811,500,000 during 1974.

Grain fed cattle marketed in the western one-third of Kansas has grown rapidly since 1963. Table III indicates that the marketing of grain fed cattle in Western Kansas increased from 304,100 in 1963 to 1,498,500 head in 1973. On the other hand, grass fed cattle for market dropped from 630,700 in 1963 to 494,400 in 1973. The table shows that more of the cattle in the western area are going to the feed lot along with cattle that are being shipped in from other states as well as the other portion of Kansas.

The illustration on table IV represents the correlation among irrigation and the production of corn and grain fed cattle. Each graph reflects similar upward movement of the three activities from 1966 through 1973.

one-third of Kansas during calendar years 1972 through 1974

<u>Crop</u>	<u>Year</u>	<u>Irrigated production</u>	<u>*Production if irrigation had not been used</u>	<u>Difference in irrigation production</u>	<u>Average yearly price</u>	<u>Value of the difference in irrigated production</u>	<u>**Output multiplier</u>	<u>Total value</u>
Wheat	1974	10,965,000	5,567,620	5,397,380	\$4.05	\$21,859,389	1.380008	\$30,165,956
	1973	10,585,000	6,806,600	3,778,400	3.75	14,169,000		19,553,220
	1972	11,220,200	5,457,600	5,762,600	1.68	9,681,168		13,359,941
Sorghum	1974	18,223,000	7,073,540	11,149,460	\$3.08	\$34,340,337	1.067126	\$36,641,140
	1973	25,419,900	12,054,660	13,365,240	2.13	28,467,961		30,375,314
	1972	35,650,800	16,936,710	18,714,090	1.39	26,012,585		27,755,428
Corn	1974	86,852,020	26,090,917	60,761,103	\$3.45	\$209,625,805	1.277570	\$267,692,152
	1973	81,996,600	46,175,847	35,820,753	2.46	88,119,052		112,528,029
	1972	59,514,600	19,046,868	40,467,732	1.52	61,510,953		78,549,487

*Production if irrigation had not been used was determined by multiplying the average yield of non-irrigated land times the acres harvested of irrigated land.

**An output multiplier is the effect of all industries as a result of a one dollar increase in output of the industry labeled. It reflects the increased output of other industries before changing grain from a raw product. Source: "The Interindustry Structure of the Kansas Economy" Kansas Department of Economic Development

Prepared by The Marketing Division, Kansas Department of Agriculture, August, 1975.

Impact of Corn Production, through the use of irrigation, used for feeding cattle purposes in the western one-third of Kansas during calendar years 1972-74

<u>Year</u>	<u>Bushels corn production as a direct result of irrigation</u>	<u>Pounds of corn produced 100 wt</u>	<u>*100 lbs of beef produced by feeding corn</u>	<u>Average price per 100 wt of beef cattle</u>	<u>Value of beef cattle produced</u>	<u>**Total impact output multiplier 3.127960</u>
1974	60,761,103	34,026,217	4,149,539	\$35.98	\$149,300,410	\$467,005,71
1973	35,820,753	20,059,621	2,446,295	43.98	107,367,890	335,842,46
1972	40,467,732	22,661,929	2,763,650	35.83	99,021,579	309,735,53

*A ration of 85 percent corn, 10 percent roughage, and 5 percent protein was used to determine that 8.2 pounds of corn is needed to produce one pound of beef.

**An output multiplier is used to show the output of all industries as a result of a one dollar increase in the industry labeled. This is the effect of other industries before cattle are slaughtered. Source: "The 1969 Kansas Input-Output Study," Kansas Department of Economic Development.

Prepared by The Marketing Division, Kansas Department of Agriculture, August, 1975.

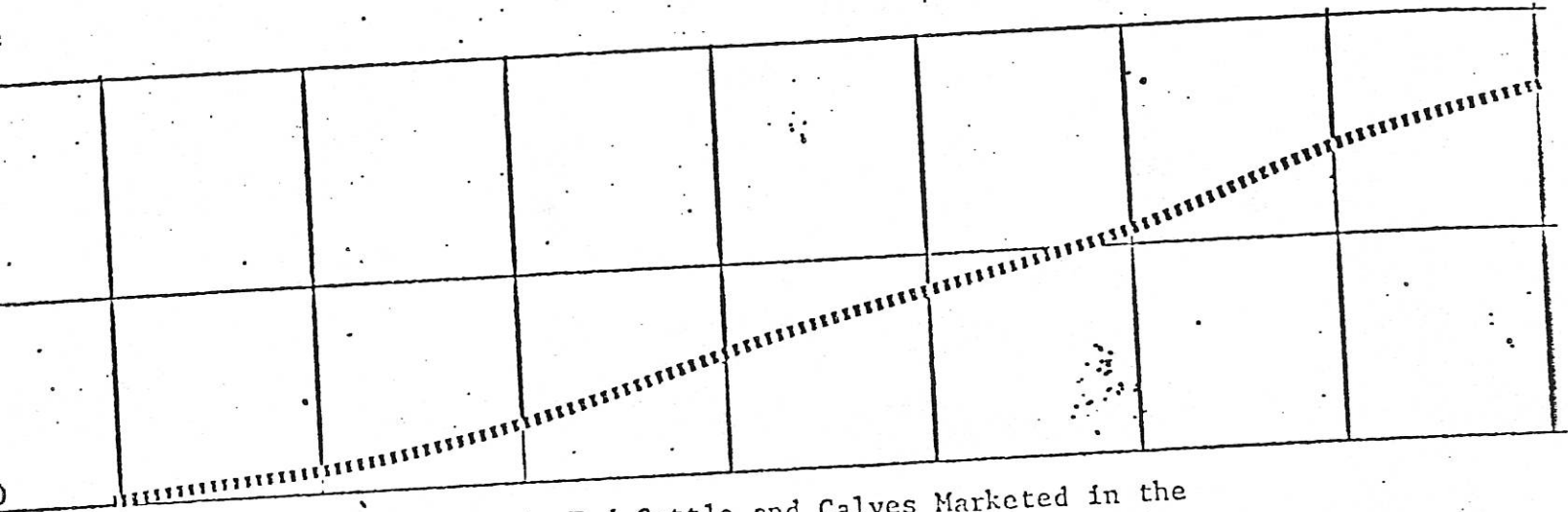
NUMBER OF GRAIN-FED AND GRASS-FED CATTLE AND CALVES
MARKETED IN THE WESTERN SECTION OF KANSAS DURING CALENDAR YEARS 1963 THROUGH 1973

District	1963		1964		1965		1966		1967		1968	
	Grain Fed	Grass Fed	Grain Fed	Grass Fed	Grain Fed	Grass Fed	Grain Fed	Grass Fed	Grain Fed	Grass Fed	Grain Fed	Grass Fed
Northwest	91,800	135,600	83,100	161,400	54,200	112,000	55,900	143,000	54,600	143,800	49,000	112,000
West Central	59,800	205,300	67,800	213,900	73,900	115,100	107,800	218,200	134,000	193,400	170,500	218,200
Southwest	152,500	289,800	167,600	302,600	157,300	214,200	231,500	298,200	239,800	246,300	223,200	298,200
Total	304,100	630,700	318,500	677,900	290,400	441,300	395,200	659,400	428,400	583,500	499,700	630,700

District	1969		1970		1971		1972		1973	
	Grain Fed	Grass Fed	Grain Fed	Grass Fed	Grain Fed	Grass Fed	Grain Fed	Grass Fed	Grain Fed	Grass Fed
Northwest	45,800	109,200	57,500	91,500	78,100	138,700	98,200	156,400	125,000	125,400
West Central	201,600	151,800	228,700	138,200	276,500	185,300	376,300	216,900	413,400	166,500
Southwest	465,700	203,900	589,500	164,500	725,500	262,700	923,700	291,300	960,100	202,500
Total	713,100	464,900	875,700	394,200	1,080,100	586,700	1,398,200	664,600	1,498,500	494,400

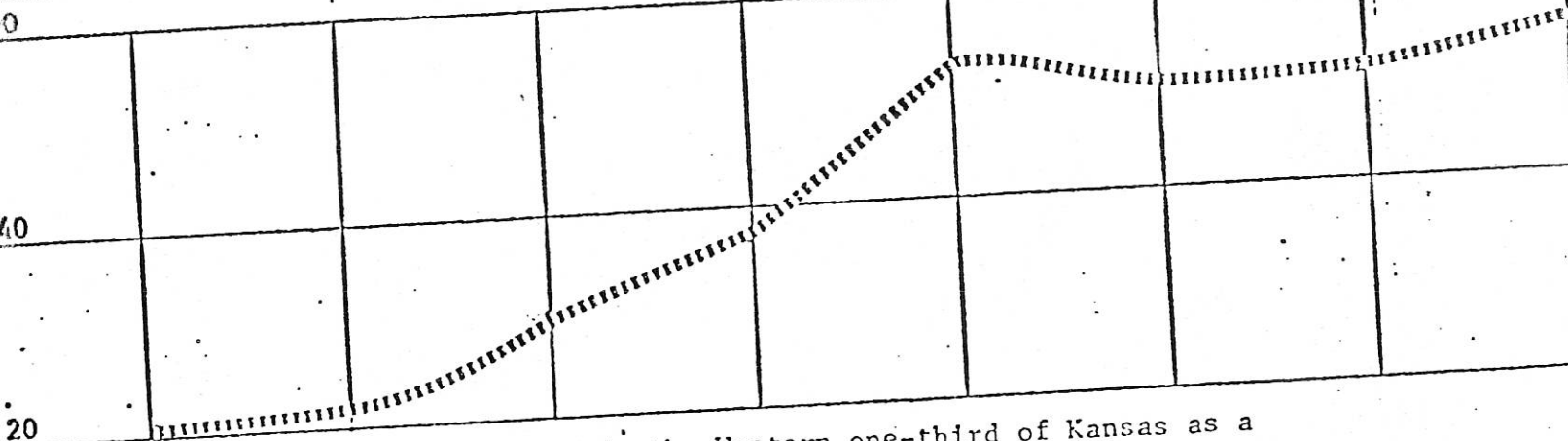
Prepared by the Marketing Division, Kansas Department of Agriculture, August, 1975.

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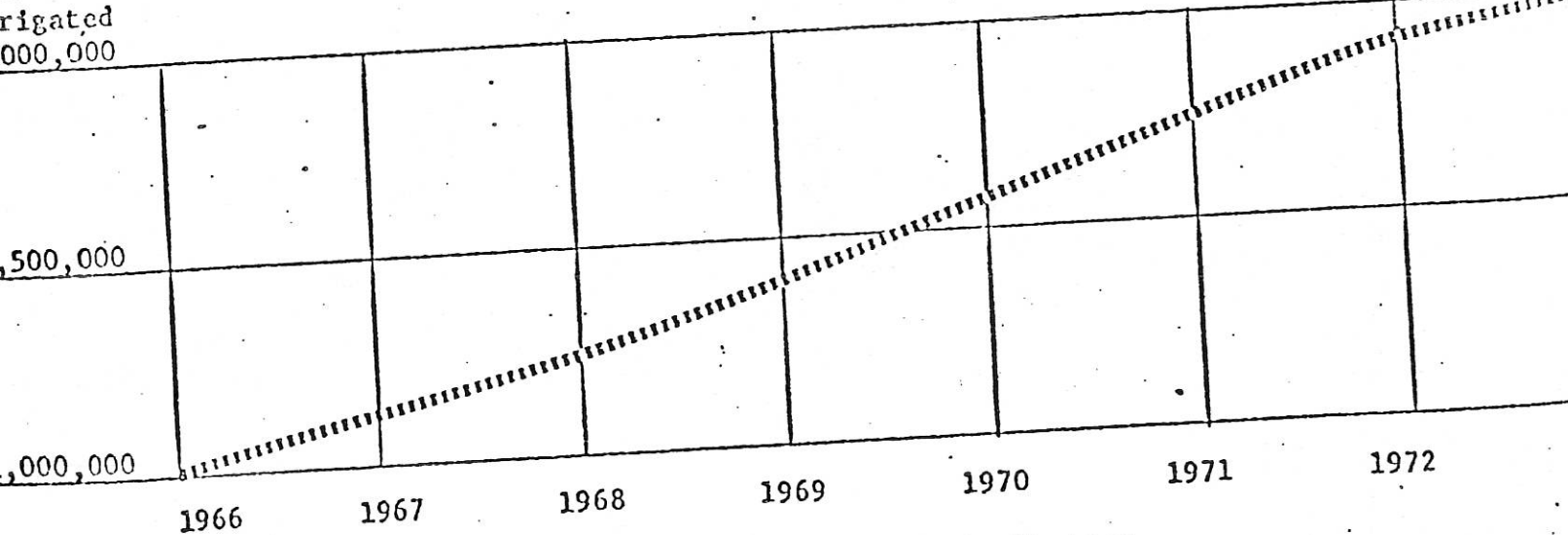
Number of Grain-Fed Cattle and Calves Marketed in the Western one-third of Kansas from 1966 through 1973.

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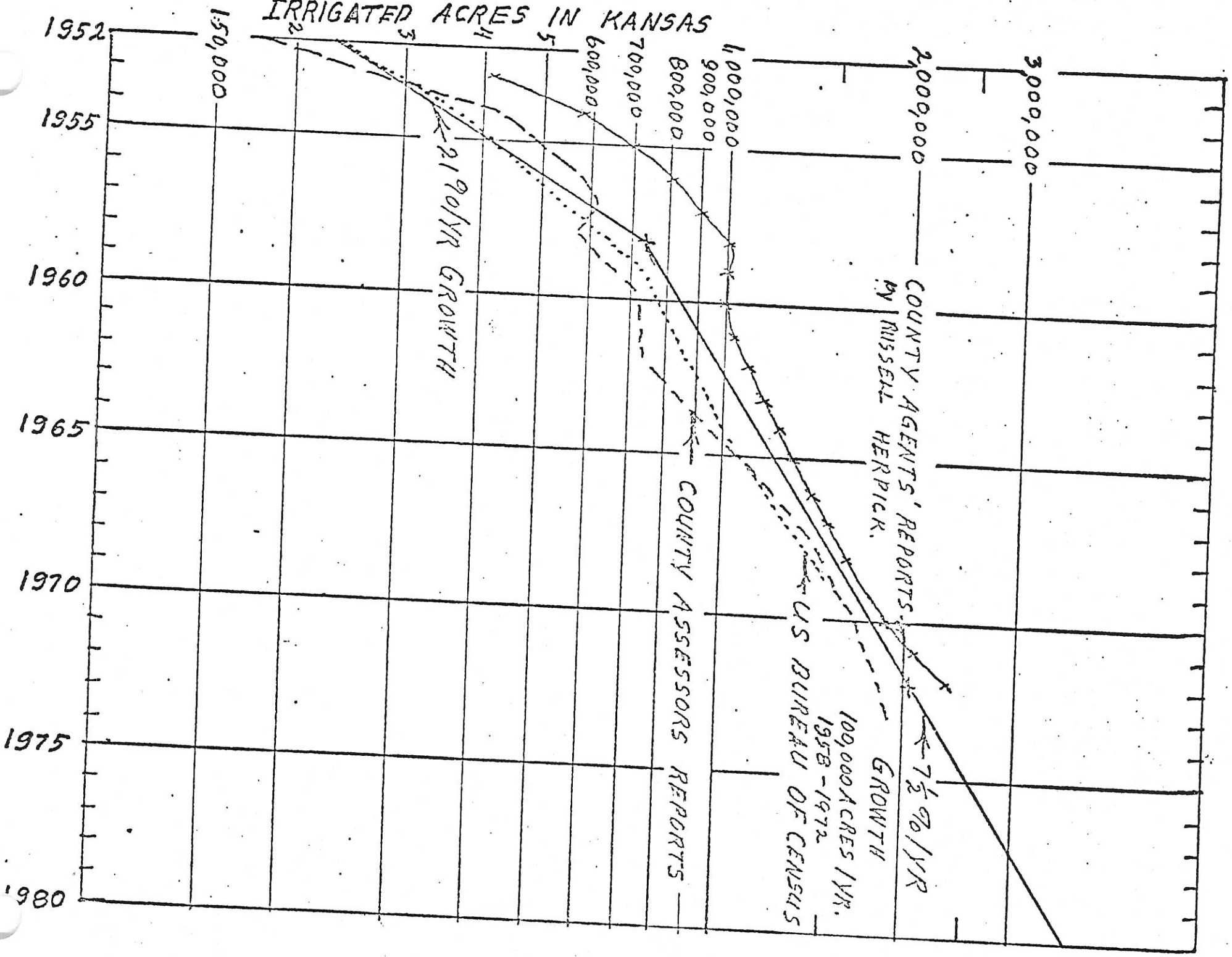
Production of Corn in the Western one-third of Kansas as a percent of total production in the state from 1966 through 1973.

res

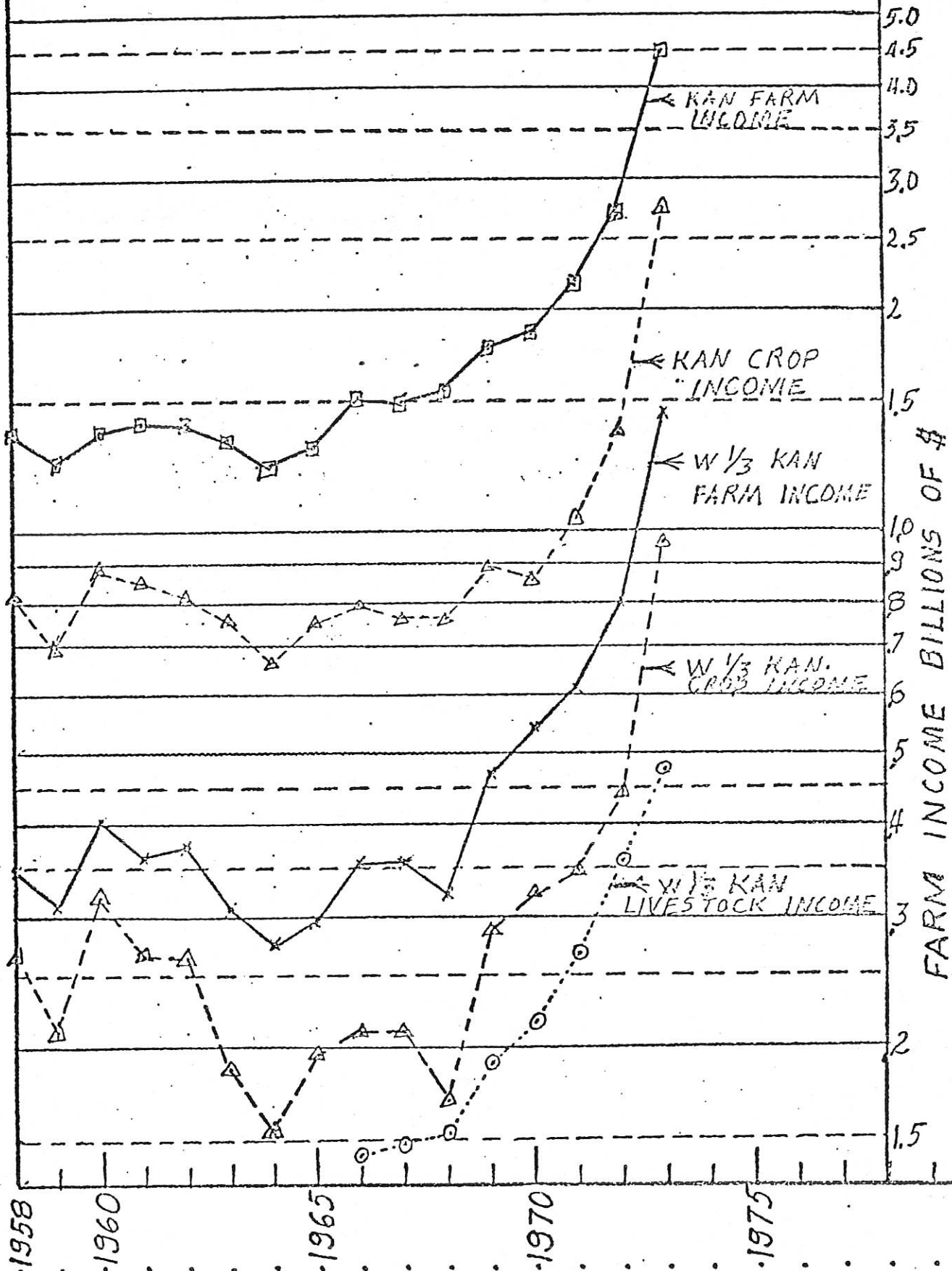


Acres of Land Irrigated in the Western one-third of Kansas from 1966 through 1973.

IRRIGATED ACRES IN KANSAS



FARM INCOME
TOTAL
IS
CROP + LIVESTOCK



MILO YIELD BU./AC.

120
110
100
90
80
70
60
50
40
30
20
20
30
40
50
60
70
80
90

1960

1965

1970

1975

CORN YIELD BU./AC.

W 1/3 KAN

← IRRIGATED

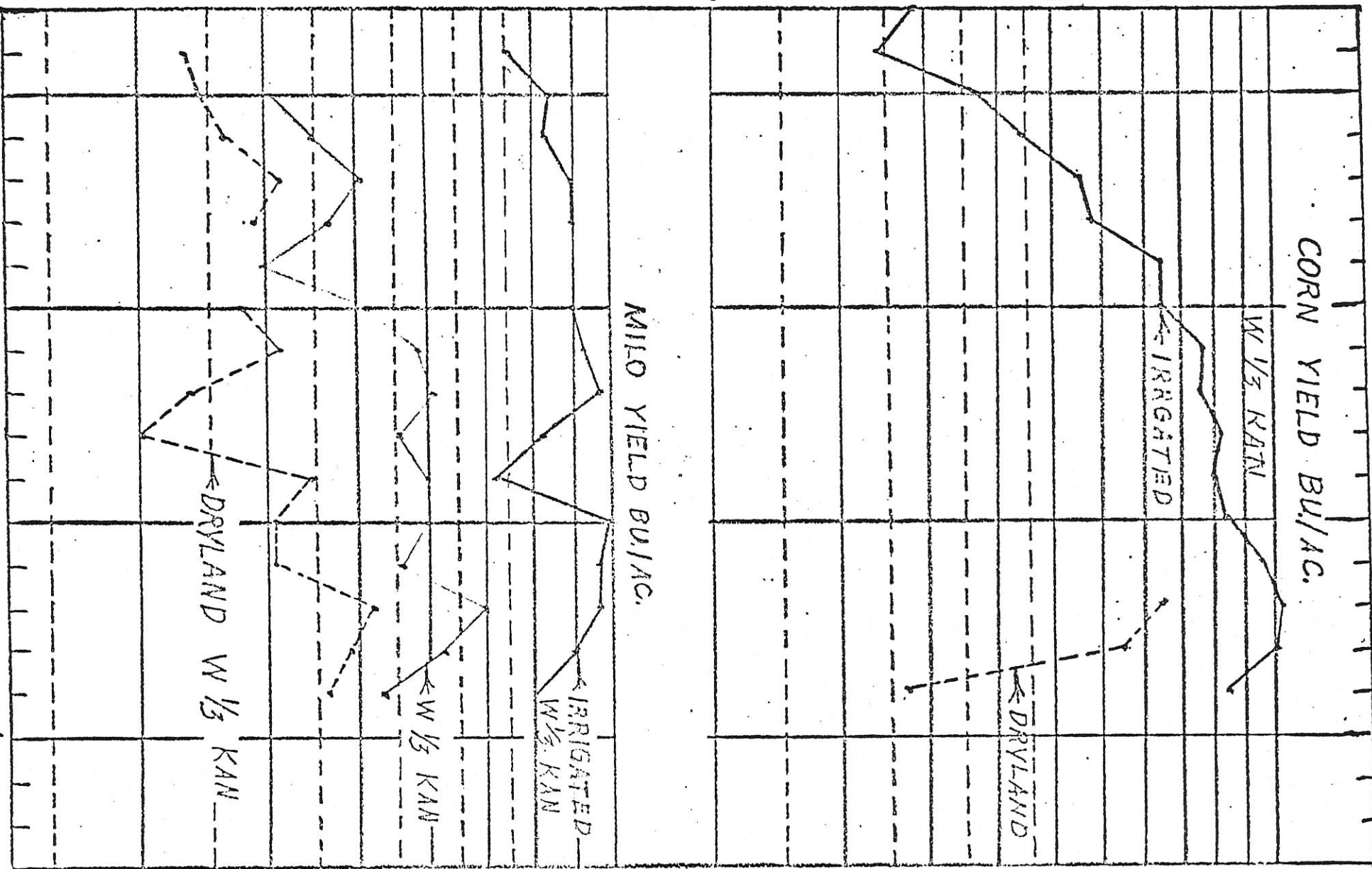
← DRYLAND

MILO YIELD BU./AC.

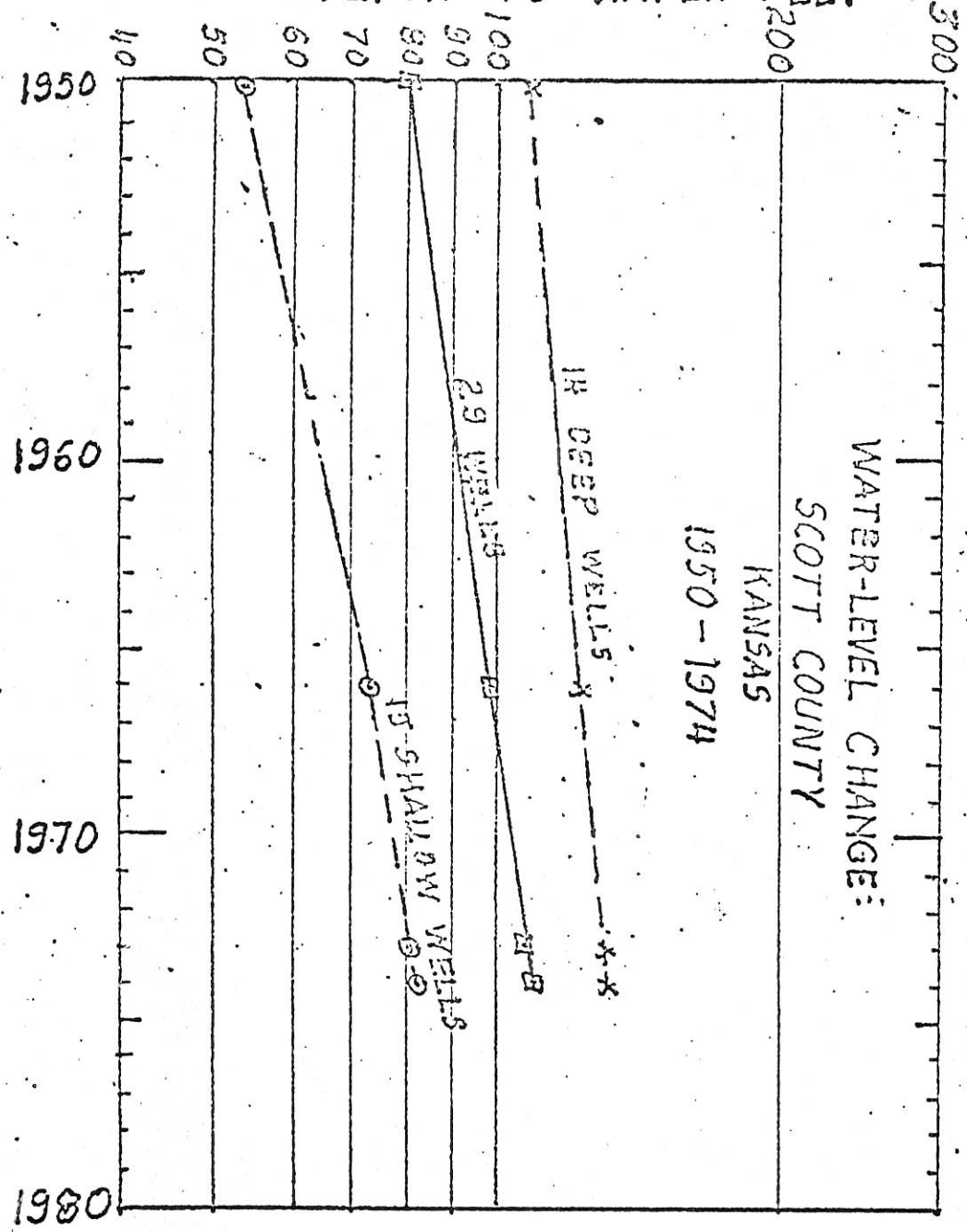
← IRRIGATED
W 1/3 KAN

← W 1/3 KAN

← DRYLAND W 1/3 KAN



DEPTH TO WATER FEET



GROUNWATER DEPRESSION
SOUTHWEST KANSAS
1940-1975

DEPTH TO WATER FEET

125
120
115
110
105
100
95
90

1940

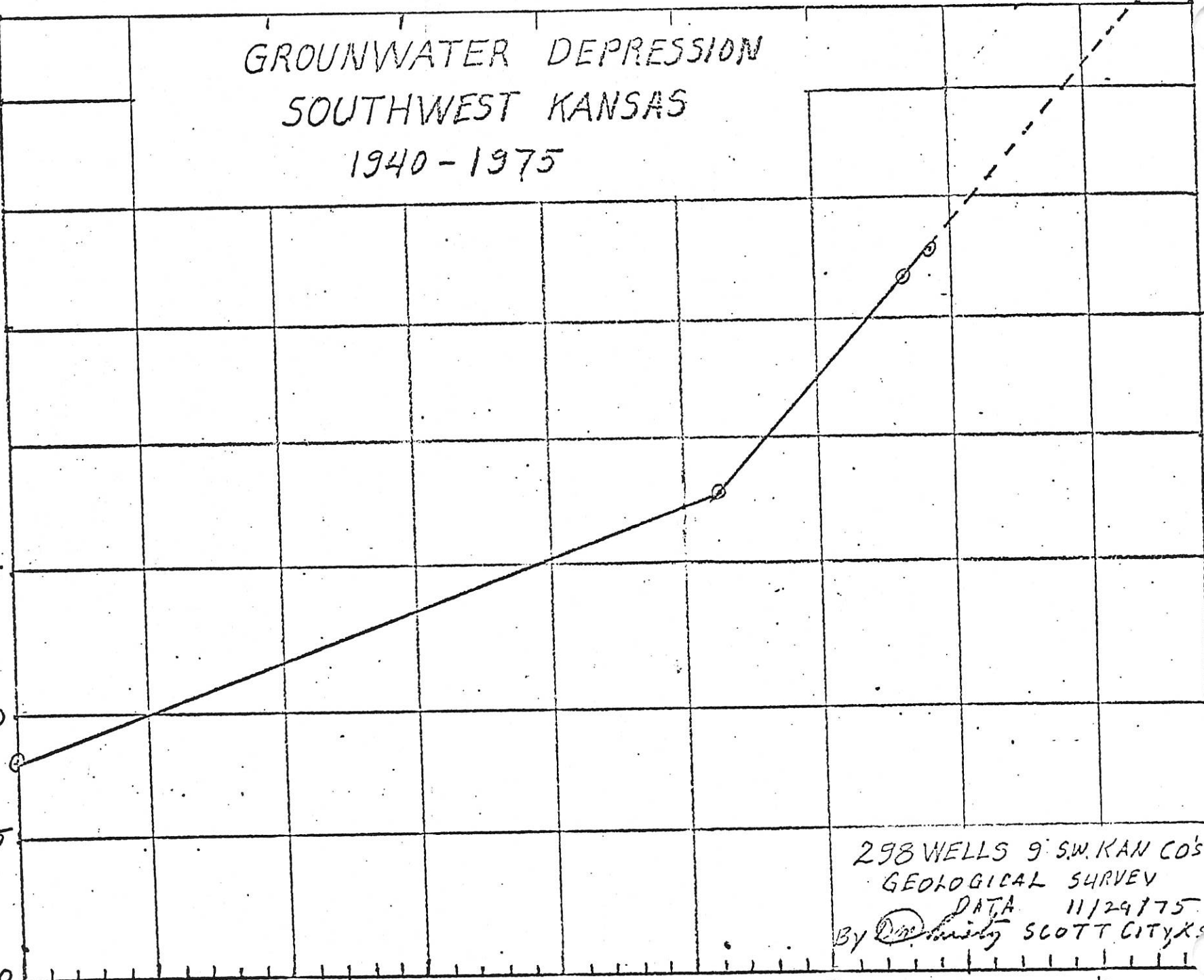
1950

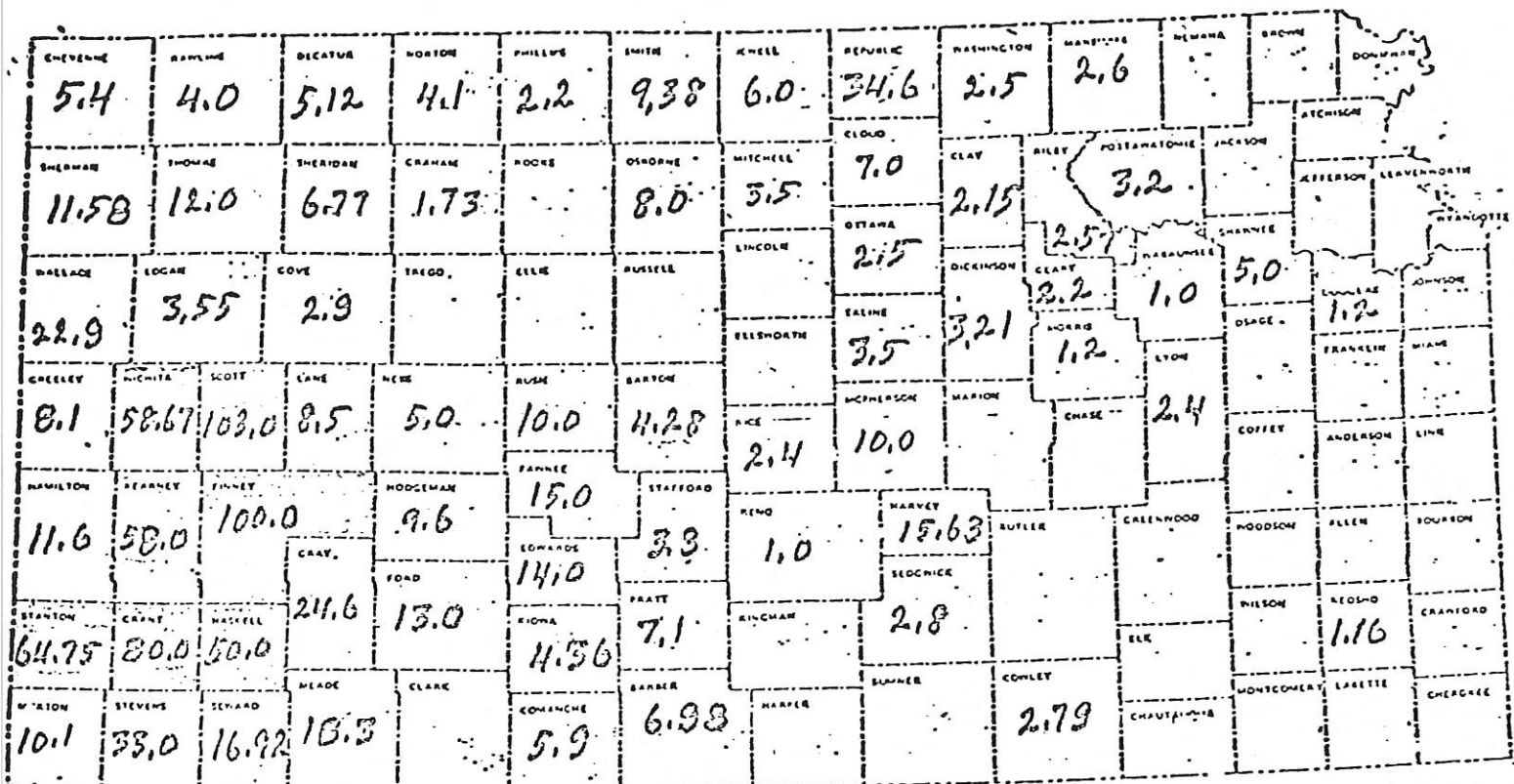
1960

1970

1975

298 WELLS 9 S.W. KAN CO'S
GEOLOGICAL SURVEY
DATA 11/29/75
BY *[Signature]* SCOTT CITY, KS

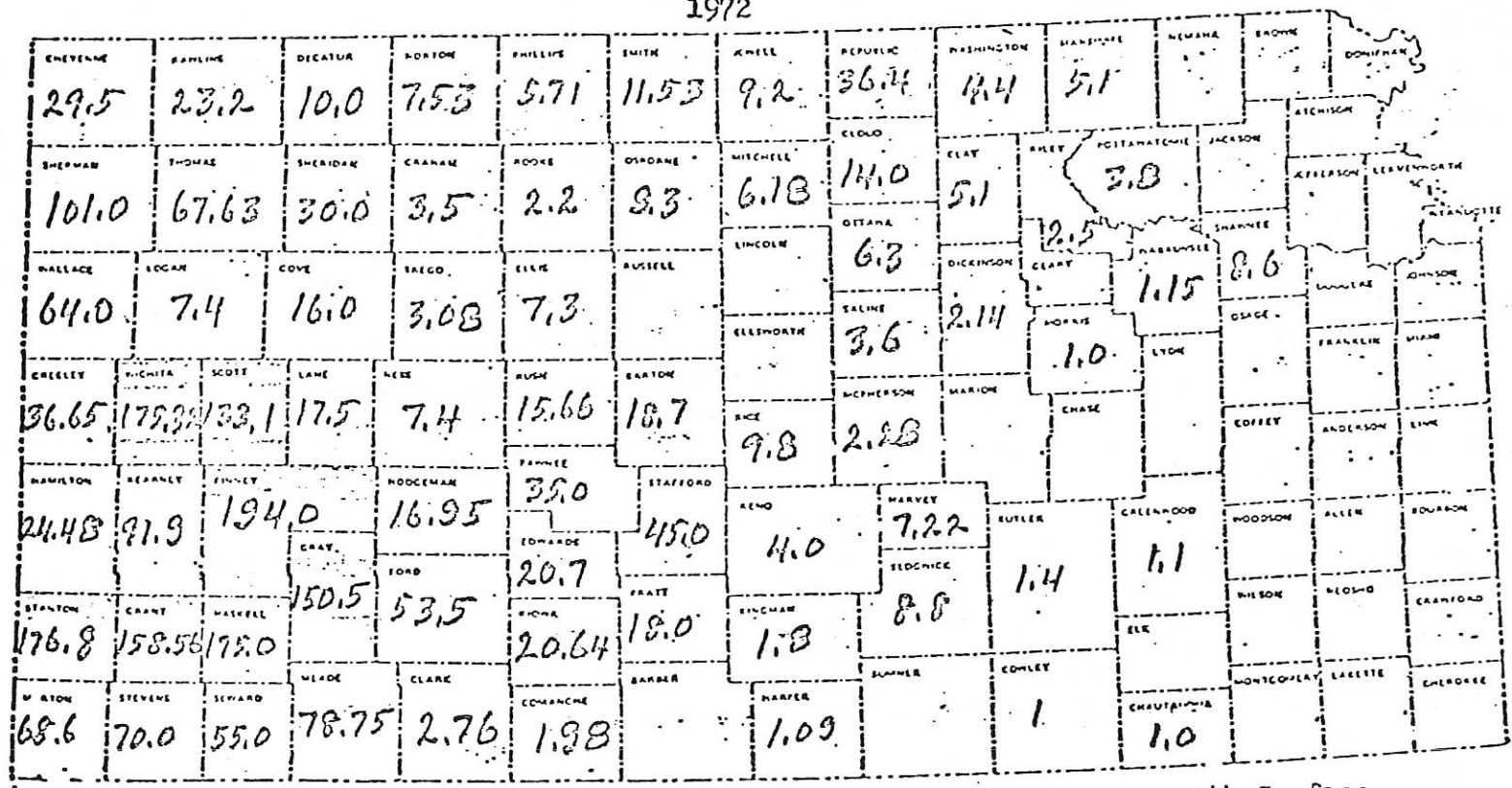




Irrigation In Thousands of Acres. The Water Being Supplied From Both Surface Water and Groundwater Sources. State Total 1,008,624.

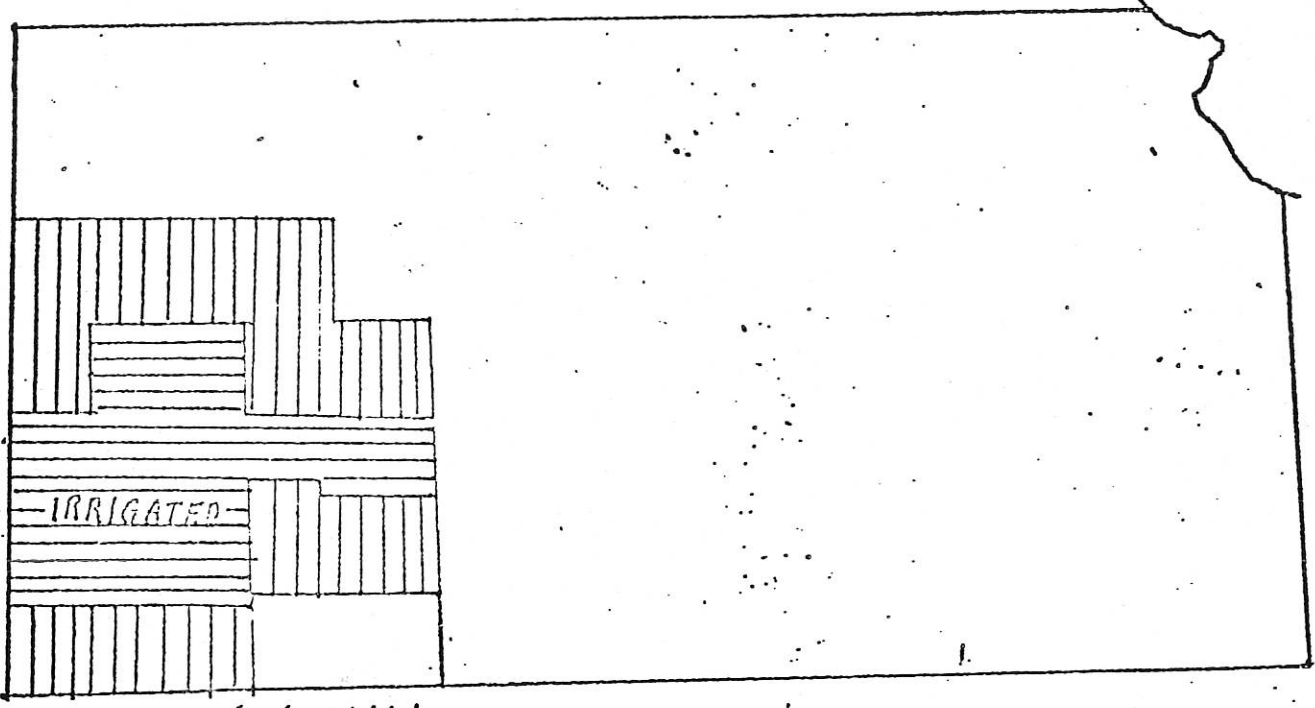
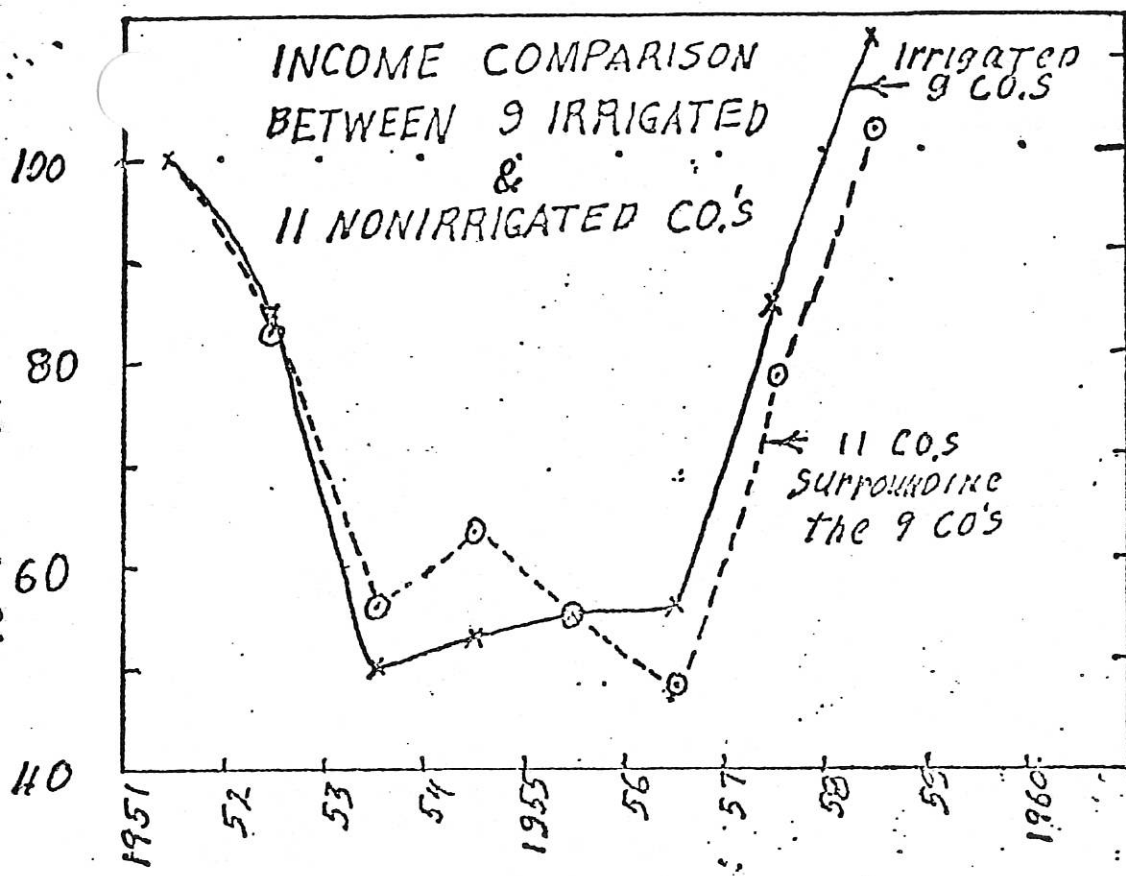
Compiled By Walter Selby, KSU Irrigation Engineer From County Agriculture Extension Reports.

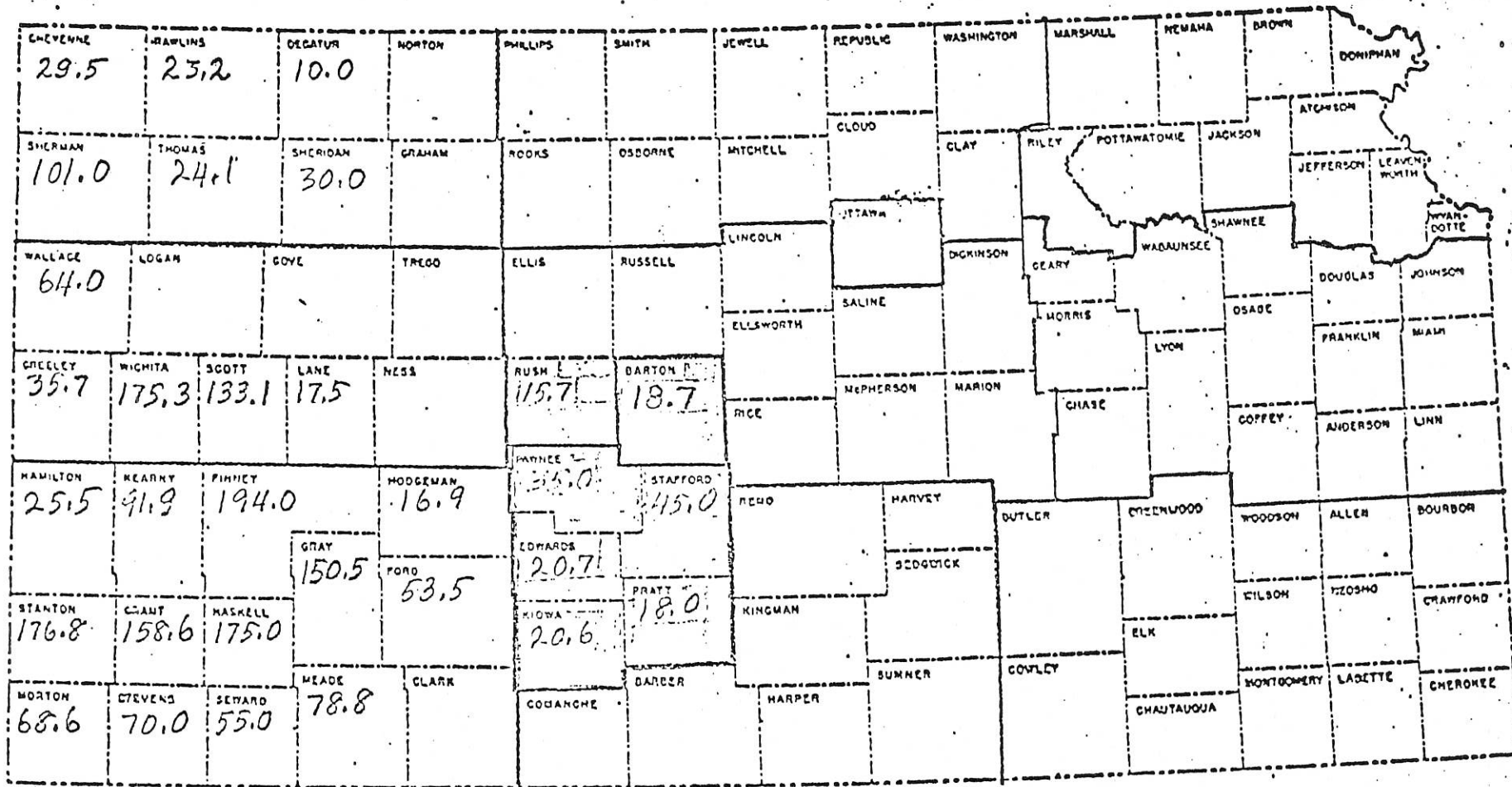
1972



Irrigation In Thousands of Acres. The Water Being Supplied By Both Surface Water and Groundwater Sources. State Total 2,422,270.

From County Agricultural Agents Reports by David L. Pope



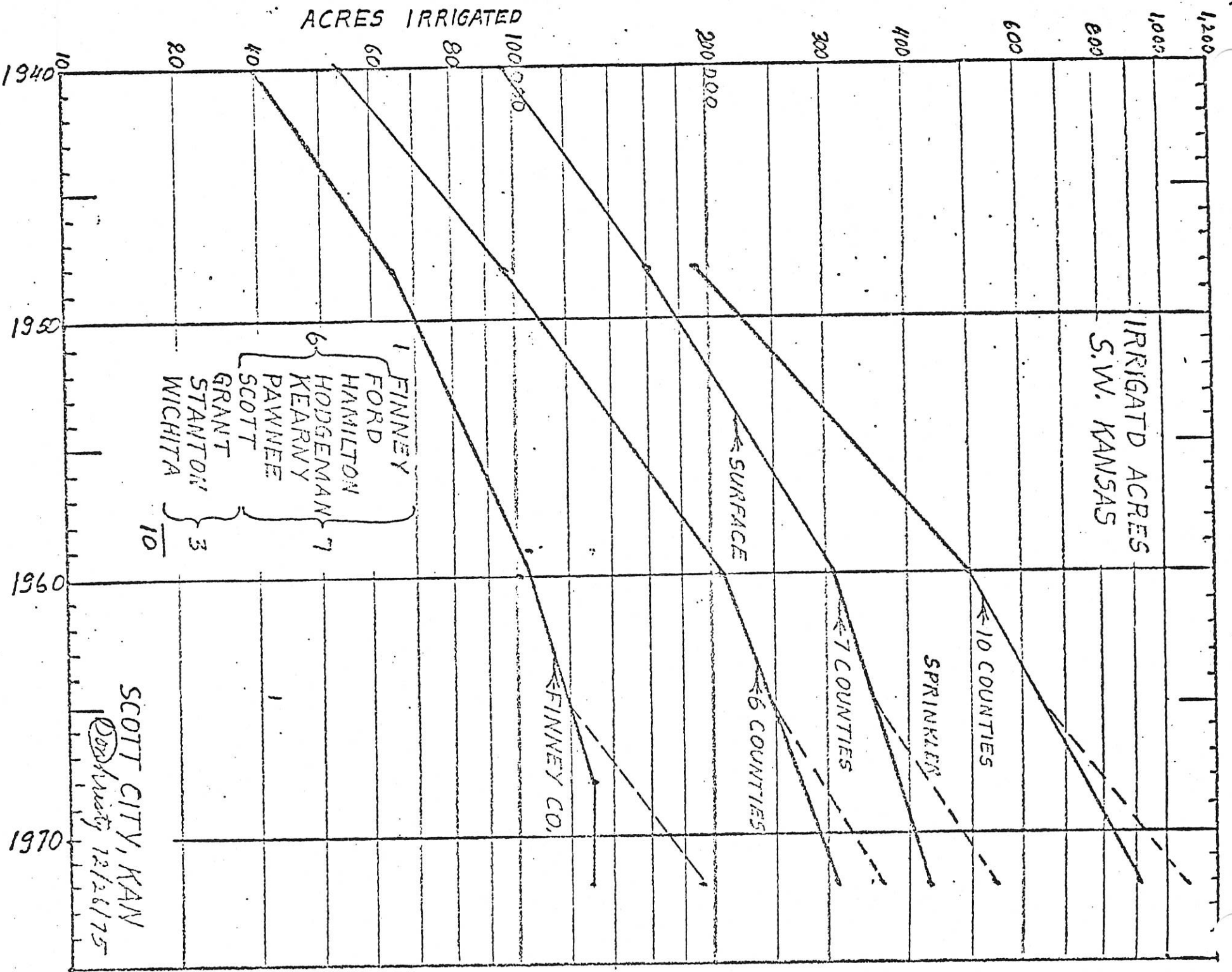


1972 IRRIGATED ACREAGE

■ CONSIDERABLE POTENTIAL GROWTH RECHARGE

11

Donald Christy
U.S. Dept. of Agr.



STATE OF KANSAS

PHILL JONES,
DIRECTOR
RICHARD W. RYAN,
ASSOCIATE DIRECTOR
MARLIN L. REIN,
CHIEF FISCAL ANALYST



STAFF—
LEGISLATIVE COORDINATING COUNCIL
INTERIM COMMITTEES
STANDING COMMITTEES
LEGISLATIVE INQUIRIES

THE LEGISLATIVE RESEARCH DEPARTMENT

ROOM 545-N, STATEHOUSE
PHONE: (913) 296-3181
TOPEKA, KANSAS 66612

September 27, 1977

Senator Fred A. Kerr
P. O. Box 92
Coats, Kansas 67028

Dear Senator Kerr:

Enclosed are two charts which show the separate agencies with responsibility for water resources in Texas prior to reorganization by the 1977 Legislature and the new agency which came into being in July of 1977.

If you have additional questions, please contact me.

Sincerely,

Emalene Correll
Emalene Correll
Research Associate

EC/dmb

Enclosures

Atch. G

TEXAS WATER AGENCIES PRIOR TO REORGANIZATION

Texas Water Development Board

6 members appointed by the Governor for 6 year terms.

Duties

Administering the Water Development Fund and the Water Quality Enhancement Fund;

Maintaining a statewide plan for the development of water resources;

Conducting data collection and technical programs related to water availability, water quality protection, reclamation and water-related services;

Cooperating in federal water resources planning, and sponsoring federal projects in the absence of local sponsors.

Texas Water Quality Commission

7 members: three appointed by the Governor and the Executive Director of the Water Development Board, the Commissioner of Health, Executive Director of the Parks and Wildlife Department, and the Chairman of the Railroad Commission.

Duties

Conducting functions mandated by the Texas Water Quality Act, the Solid Waste Disposal Act, the Disposal Well Act and other laws;

Establishing and updating water quality criteria for well waters of the state;

Monitoring water quality;

Regulating waste discharges into or adjacent to water;

Regulating the disposal of industrial solid waste and wastes to disposal wells;

Regulating private sewage facilities, subdivision facilities, and others not classified as municipal or industrial.

Texas Water Rights Commission

3 full-time members, appointed by the Governor for 6-year terms.

Duties

Granting or rejecting applications for permits to divert public water for use by river authority, political subdivisions, individuals, and private corporations;

Reviewing constructions designs and inspecting dams and reservoirs;

Creating water districts and regulating their activities;

Adjudicating water rights conflicts;

Appointing water-masters;

Determining the feasibility of federal projects;

Providing support for the Texas Commissioners on interstate commerce.

TEXAS DEPARTMENT OF WATER RESOURCES

