Obstacles to participation in the Iowa soil conservation districts program

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UMI®
OBSTACLES TO PARTICIPATION IN THE IOWA
SOIL CONSERVATION DISTRICTS PROGRAM

by

Loyd K. Fischer

A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of
The Requirements for the Degree of
DOCTOR OF PHILOSOPHY

Major Subject: Agricultural Economics

Approved:

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1955
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SUMMARY OF FINDINGS

The Iowa Soil Conservation Districts Program was initiated in 1939. Since that time about 17 percent of the farms in Iowa have been planned by soil conservation districts. But 83 percent of the farms have not been planned, and furthermore, satisfactory land-use practices have been applied on only part of the land in the planned farms.

This investigation attempted to discover (a) why some farmers participate in the program while others do not and (b) of those farmers who do participate to the extent of initiating farm plans, why some achieve the district objectives of erosion control while others fail to apply recommended land-use practices.

Factors existing both on and off Iowa farms were identified as affecting the progress made by the Iowa Soil Conservation Districts Program, as follows:

1. Certain characteristics of farm firms tend to impede (a) the acceptance of district farm plans and (b) compliance with district land-use recommendations.

2. Certain beliefs, customs and habits of farm operators tend to make them resist complying with district objectives.

3. Certain administrative aspects of the Districts Program do not adequately facilitate progress toward Program objectives.

In the investigation of characteristics of the farm firms, various factors were analyzed in terms of their effect on farmers' (a) acceptance of district plans and (b) application of recommended conservation treat-
ments. The data obtained indicated that district progress was impeded
significantly by (1) small size of farm, (2) tenant operatorship, (3)
cash and crop-share leasing arrangements and (4) high inherent productivity
of the land. Other factors tested were (1) the length of the operators' planningshorizons (2) the ages of the operators and (3) the types of
livestock programs being pursued. However, statistical tests of signifi-
cance of these latter factors were inconclusive.

The attainment of program objectives on any given soil usually
requires the application of not one but a combination of conservation
measures. However, the reasons why farmers apply, or fail to apply,
specific land-use practices is basic in determining courses of action
which will best encourage compliance with district recommendations. The
following are reasons, beliefs or attitudes most often expressed by farm
operators which contributed to their failure to apply recommended land-use
practices.

1. Insufficient cooperation from their landlords in arranging for
   adoption and in aiding in the carrying out of recommended
   practices.

2. Belief that the practices were not necessary because (a) they
   would not adequately control erosion or (b) erosion was not
   excessive now.

3. Operators had insufficient knowledge of the district's program
   and the land-use practices recommended.

4. Belief that application of recommended practices would increase
   capital and labor requirements without yielding commensurate
additional income.

5. Farm and/or field lay-out was such as to make recommended practices impractical.

6. Pressure of current financial obligations precluded the possibility of introducing practices which would increase current investment and/or reduce current income.

7. Operators intended to comply in the future.

In contrast to the factors listed above which have impeded the progress of the Districts Program the following are expressed reasons, attitudes or beliefs which account for farm operator's complying with district recommendations:

1. Practices were established prior to present operator's tenure.

2. Landlords initiated and/or financed the application of the practices.

3. Farm and field layouts lent themselves well to conservation farming.

4. Net incomes of farms were increased by application of the recommended practices.

5. Operators took pride in maintaining, or felt morally obligated to keep, soil productivity at high levels.

6. Land capability was such that erosion control was a minor problem.

7. Good financial position with little pressure for current income enabled operators to make investments in land.
From this investigation two of the stated reasons for not complying with district recommendations stand out as the most important. In general, farmers who had not accepted recommendations believed that (a) their present land-use practices would adequately conserve soil resources and (b) the suggested conservation measures were uneconomic. Conversely, farm operators who had applied given conservation measures had done so because they felt (a) morally obligated to maintain soil productivity and (b) that the conservation measures could be profitably applied.

The major part of the empirical analysis of this study was concerned with the identification of on-the-farm impediments to districts' progress. The primary objective of this study, however, is to devise means whereby the Districts Program might be improved. Therefore, the Program has been analyzed in light of (a) on-the-farm obstacles indicated above and (b) suggested principles of public administration. Adjustments necessary to correct hypothetical weaknesses in the Districts Program are suggested, as follows:

1. What the Districts Program is expected, or is attempting, to accomplish should be clearly established by law or by administrative decision.

2. A system of priority or precedence should be assigned the various objectives of the Program according to their urgency and/or the extent of public interest therein.

3. To serve as guides for allocating resources and for directing the efforts of district personnel, methods of evaluating district accomplishments should reveal the actual progress
being made toward Program objectives.

4. In order to maximize progress, within the limits of the resources available, toward the specified objectives of the Districts Program, criteria must be carefully developed to guide the allocation of the Program's resources.
   a. Between the various districts
   b. Between the farms within districts
   c. Between practices within farms
   d. Between the various aspects of the districts' programs (e.g., between educational and promotional efforts and technical assistance, between maintenance of old plans and writing of new plans).

5. The Districts Program should be coordinated with the programs of other public and private organizations having related goals so that the various activities do not conflict but rather complement each other.

6. The Districts Program should have (a) resources to provide aid and incentive sufficient to induce individuals to use recommended erosion-control practices and/or (b) power to require certain minimum standards of land-use.

7. The objectives and operating procedures of the Districts Program should be constantly reviewed and adjusted in the light of the dynamic environment in which the Program operates.
Strong features of the Districts Program and characteristics common to those farm firms which have attained specified district objectives provide the foundations for further progress. Conversely weak features of the Districts Program and characteristics common to farm firms which have failed to attain specified district objectives suggest adjustments in the interest of furthering progress toward objectives of soil conservation.
INTRODUCTION

Background and Nature of the Problem

For several decades there has been increasing public interest in the land-use practices applied on the agricultural land of Iowa. A high rate of soil erosion on many Iowa farms has resulted in the reduction, and sometimes the destruction, of soil productivity. Many people, both in and out of government, have expressed concern over the past and present rate of soil deterioration. In response to this concern, public measures have been enacted and public agencies created for the purpose of restraining the wasteful use of soil resources.

In Iowa, one of the major approaches to providing public guidance to individual users of soil resources is the Soil Conservation Districts Program. This program represents a relatively new experiment in the coordination and integration of the various levels of government. Through this device, federal, state and local agencies cooperate with farm owners and operators for the purpose of improving the present and future productivity of soil resources.

As used in this study, soil deterioration refers to irreversible exploitation of soil resulting primarily from excessive rates of erosion loss. More precisely, the term implies any disinvestment of soil which permanently lowers land rent defined as net value productivity.

Wasteful use is defined as the expenditure of soil resources without a commensurate yield of want satisfying goods and services over time.
Since its inception in 1939, the Iowa Soil Conservation Districts Program has made substantial progress in gaining farmer participation. However, by Program standards, the rate of soil erosion loss is still excessive on much of Iowa's land. Why haven't the conservation objectives been achieved? More specifically, why have some farmers participated and others remained outside of the Program? Also, of the farmers who have initiated farm plans with the various districts, why have some carried out the recommendations while others have not applied acceptable land-use practices? Why have other farmers, once in the program, dropped out?

These are questions which gave rise to this study. Adjustments in the Conservation Districts Program necessary to assure continued progress toward program objectives should be indicated by the answers to these questions. Some of these answers and their implications for the program have been developed in this study.

Although other studies have provided helpful information as a basis for conducting this inquiry, no previous investigation has dealt specifically with the above questions. Because of the dearth of information on possible answers to these questions, and because of limited funds available, this investigation has been restricted to one Soil Conservation District, the Jasper District in central Iowa. The information provided by this study should prove useful in furthering the districts' progress toward their objectives. Also, the procedures developed in this initial study should serve as guides for subsequent investigations and analyses.
Development of the Soil Conservation Districts Program

The farmer and each level of government, having an interest in the productivity of the land, also have a responsibility in soil conservation. Each has something to offer and something to gain. National action is deemed necessary because of several aspects of the problem, as follows: (a) the importance of erosion control to future national strength and well-being, (b) the geographic character of the problems of water-control, which are not limited by state boundaries, (c) the inability or reluctance of state and local units of government to assume full responsibility for overcoming the problem, (d) the necessity of integrating soil conservation programs into other national programs for agriculture (e.g. production control, storage and price support) and (e) the desirability of maintaining uniformly high standards for conservation work throughout the United States.

Local action is equally necessary, because: (a) with few exceptions, the districts programs provide for neither legal coercion nor direct monetary subsidization of farm owners and operators. Therefore, the effectiveness of the program is largely dependent upon the voluntary participation of agricultural land users, (b) to gain the essential active participation of farm people, national programs must be adjusted to fit varying local conditions and the needs and wishes of individual farmers, and (c) the promotion of democratic government resulting from local parti-

1The problem of soil conservation is that of determining desirable rates of utilization of soil resources.
in national programs is often considered an end value in itself.\(^1\)

The necessary role of state action is presented in the following topic with special reference to Iowa. Recognizing the desirability of federal, state and local participation in soil conservation programs, President Roosevelt on February 26, 1937, sought the cooperation of all the states. He asked that the state legislatures pass enabling acts permitting, but not forcing, farm owners and operators to join together into soil conservation districts as a prerequisite for Federal assistance through the Soil Conservation Service. He also submitted to the states "A Standard State Soil Conservation Districts Law". None of the states passed the standard law verbatim. Modifications were made to suit local conditions and preferences, and many of the state laws have been amended since their enactment. However, by 1945 the 48 states, Alaska, Hawaii, and Puerto Rico had all passed enabling legislation which the national government deemed satisfactory as bases for cooperation between the United States Soil Conservation Service and the individual soil conservation districts.

**Organization of the Iowa Soil Conservation District Program**

In 1939 the Iowa legislature passed the law\(^2\) under which local soil conservation districts are organized. The first Iowa district was

\(^1\)For further development of this viewpoint see; Herman Walker, Jr. and W. Robert Parks. Soil conservation districts: local democracy in a national program. *Journal of Politics*, Volume 8, Number 4, November, 1946. pp. 538-49.

\(^2\)Iowa. Code, 1942. Sections 467A.1 to 467A.12.
organized in April, 1940. By February, 1952 the rural areas of the
state were completely covered by soil conservation districts. Each dis-

trick was organized on a county-boundary basis, except for East and West
Pottowattamie Districts, which together encompass Pottowattamie County.

This makes a total of 100 soil conservation districts in Iowa.

The governing body of the individual district in Iowa consists of
tree "commissioners"\(^1\) nominated by petition and elected by the farm
owners and operators\(^2\) of the district to six-year terms of office. This
is in line with the Iowa State Soil Conservation Districts Law which
places the responsibility for the management of the soil conservation
program upon local people. District commissioners, as representatives
of their district, have considerable authority to achieve the prevention
and control of soil erosion and the conservation of soil resources.

Among the powers of the district commissioners is the right to enter
into "memoranda of understanding" with other governmental agencies for the
promotion of soil conservation.\(^3\) Each district has in this manner entered
into working agreements with the Iowa Extension Service, the Iowa Agricul-
tural Experiment Station and with the United States Soil Conservation

\(^1\)Assistant district commissioners may be designated by the three
elected commissioners as necessary to carry out the district program.

\(^2\)As set out in the original act of 1939, only land-owners were per-
mitted to vote in these elections. However, in 1953 the legislature
modified the act permitting tenant farm operators to vote. Iowa. Code,
1954. Section 467A. 5.

\(^3\)Ibid., Section 467A. 7.
the composition, powers and duties of this Committee. In general, after a soil conservation district has been organized, the duties of the State Committee are to offer such assistance as may be appropriate to the commissioners of the districts in the carrying out of any of their powers and programs. Such assistance includes coordination of the program of all of the districts in Iowa so far as this may be done by advice and consultation. The State Committee also acts as the intermediary through which the individual districts obtain the cooperation and assistance of the agencies of the United States government and the agencies of the state of Iowa. The Law also designates the State Committee as the body responsible for the allocation, to the various districts, of funds appropriated for this purpose by the State General Assembly.

Problems to Be Investigated

The need for research studies springs from existing or anticipated problematic situations. Research problems¹, in turn, arise from confusions, uncertainties, doubts and conflicts surrounding the outcome or consequences of a particular course of action. When consequences fall short of goals, the gap between consequence and goal defines the problematic situation within which the problem for study is delimited. If the consequence of a particular action is in agreement with the purpose, no problem exists. On the other hand, if the results of action (ex post) or the anticipated

¹The concept of a research problem, as presented here, has been formulated in some detail by John F. Timmons. Philosophy and methods of inquiry into land problems. Typewritten manuscript. Iowa State College. Ames, Iowa.
results of contemplated action (ex ante) fall short of the desired objective, a problem is posed.

Each problematic situation has two critical elements (1) an end or purpose to be achieved and (2) an experienced or anticipated consequence which falls short of the end to be achieved. Objectives perform a two-fold function in inquiry. First, they set the norm from which may be determined the problematic situation as the gap between the norm and the present situation. Second, ends serve as criteria for evaluating means in terms of the degree to which they yield expected consequences in line with the ends.

**Objectives of the Iowa Soil Conservation District Program**

In the Soil Conservation Districts Law of Iowa it is

...declared to be the policy of the legislature to provide for the restoration and conservation of the soil resources of this State, and for the control and prevention of soil erosion and thereby to preserve natural resources, control floods, prevent impairment of dams and reservoirs, assist and maintain the navigability of rivers and harbors, preserve wildlife, protect the tax base, protect public lands, and promote the health, safety and public welfare of the people of this state.

The Soil Conservation Districts Program is conceived by the legislature to be one of the means by which these goals may be achieved. It should be pointed out, however, that these broad ends are subject to continual modification as the definitions of various terms (e.g. public welfare) change. Furthermore, this passage states the objectives only in relative

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1Iowa. Code, 1954, Section 467A. 1.
terms (i.e. restore, conserve, control, prevent, maintain, preserve, protect and promote) and does not specify to what extent or to what level the given ends shall be achieved.

The Law further specifies that districts are empowered "To develop comprehensive plans for the conservation of soil resources and for the control and prevention of soil erosion within the district, . . . ." From the Law and from discussions with administrators of the program, this study has assumed that the primary goal of the Districts program is the attainment of what has been termed a "safe level of erosion loss" on all agricultural land. This end is thought to be consistent with, and a means of approaching, the general objectives presented in the District Law.

There is, however, no unanimity of opinion on what constitutes a safe level of erosion loss; estimates for the various soil types in Iowa usually range from 2 to 8 tons soil loss per acre per year as a maximum. No attempt has been made in this study to establish the maximum permissible rate of soil loss for each field nor the average rate of soil loss presently obtaining. Instead, in recognition of the fact that a district's objectives as applied to each farm are set out by the district farm planner as he devises the farm plans, the land-use practices re-

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1 Ibid., Section 467A. 7.

2 This end-in-view was given by the Jasper District Commissioners as the most important and most urgent objective of their District's program.
commended in the farm plans, as revised for this study, serve as the norm. It is assumed that the average rates of soil loss will not exceed the district's goal on planned farms if the recommended land use practices are applied since the District governing body approves these practices as the necessary means to accomplish its goals.

The use of specific optima rates of soil loss as the operational norm for this study was not considered practicable for several reasons, as follows: (1) no general agreement has been reached on what constitutes a "safe" rate of soil loss; (2) considering the great variability of soil between, and even within soil types, of weather, and of the quality of application of practices on various farms, even reasonably accurate estimates of average soil loss rates would be exceedingly difficult to obtain; (3) it was considered, for the purposes of this study, that the reasons why a farmer had not accepted district recommendations was more important than the measurement (in "tons soil loss" per acre) of the effect of his failure to apply the suggested practices. Consequently, the emphasis of this study is on discovering and analyzing factors which impede and those which encourage the application of land-use practices considered acceptable by the district.

The "norm to be achieved" for this study for each field is, then, the application of the recommended combinations of land-use practices found in the farm plan devised by the district farm planner for that

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1 As explained in some detail in Chapter II, the land-use plans of all the sample farms were adjusted by the District Farm Planner so that the application of the practices recommended for each farm would, presumably, just attain the erosion-control norm of the district.
particular field. The application of an alternative combination of practices on a given field will not be construed as a departure from the district norm unless the substituted combination of practices results in an average soil loss considered by the district to be in excess of the maximum permissible.

An operational objective, or end-in-view, of the district program is, as was stated earlier, the desire that all agricultural land and land-users be brought into and under the program. This end is viewed by the district governing body as a means of approaching the more ultimate goal of gaining acceptance of the land-use practices which will adequately control erosion. Land-use practices, other than those recommended in the farm plans, being applied on soils of a given land capability class were compared with the alternative land-use practices set out in the "Conservation Farm Guide" of the Soil Conservation Service. The combination of land-use practices being applied on any field was considered acceptable if the resultant soil loss would not exceed the rate associated with practices recommended in the "Guide" for soil of the same capability.

Existing situation relative to the objectives of the program

As of January 1, 1955, Iowa soil conservation districts had developed basic land-use plans for 33,613 farms which represent 16.5 percent of all Iowa farms encompassing 6,057,185 acres representing 17.7 percent of Iowa's farm land. Furthermore, nearly all farmers, whether or not they are parti—

They constitute the existing problem have not been applied. These are interpreted as the existing elements in
interspersed and (b) areas of land on which acceptable land-use practices
presumed in terms of (a) farms on which district plans have not been
participating. In this study, the problem has been defined, detected, and

Districts Program, but also on those farms which are presumed to participate
from district objectives are common not only on the farms outside the
exposition and consequent deterioration of soil resources. Departures
deeded necessary by the district to prevent excessive rates of soil
between the land-use practices being applied and the land-use practices
jayer Districts, and presumably in other districts, a more detailed
areas of 85.3 percent of Iowa's farm land. Furthermore, these is in
not participating in the program. Included in these farms are 28,207,554
January 1, 1951, 169,466, or 83.5 percent, of Iowa's farm acres were
the objectives of the program have not been fully achieved, as of
Despite the elements of success set forth in the previous section,

Specified problems detected in study

Promoting further progress

of success has been achieved, should provide base for determining mean of
considerable accomplishment in a very high proportion of Iowa's farm acres. These figures are
words, the situation relative to achieving district objectives are
areas of adequate contribution exposition on all of their land. In other
practices (e.g., permanent meadow) on at least part of their land. Some
existing in the districts program have applied some acceptable land-use

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Objectives of the Study

The conservation of soil and soil resources is not a task capable of being completed for all time, at least not with current cultural practices or even with full application of the most modern technology. Soil deterioration is a continuing problem. However, there has been considerable progress in gaining compliance with recommended land-use practices in Iowa during the 16 years of operation of the Districts Program as evidenced by the number of farmer participants. But, in view of continued substantial public contributions for soil conservation districts it is, apparently, an objective of society to encourage further farmer compliance with district recommendations.

Because of the size and persistence of the problem of soil erosion, the State Soil Conservation Committee came to the conclusion that an appraisal of the Districts Program, with the objective of possible improvement of the Program, should be undertaken. As a consequence, in 1952 the Committee entered into a cooperative agreement with the Iowa Agricultural Experiment Station for the purpose of analyzing the strong and weak features of the SCD Program in terms of (1) why farm owners and/or operators do or do not participate, (2) why cooperators (farmer participants in the program) do or do not carry out farm plans and (3) how participation of both cooperators and non-cooperators may be furthered.

This initial study will attempt to (1) ascertain and analyze the principal obstacles and resistances which have impeded the work of the soil conservation districts program, (2) discover and develop means for the removal or mitigation of these obstacles and resistances, (3) suggest
measures for implementing the conclusions and recommendations revealed and developed in the first two parts of this report and (4) provide information for further study, particularly in the area of district administration.
It does not, however, in the same manner, follow that universal participation in the Districts Program (i.e. basic district plans on all farms in the state) ensures complete compliance with district land-use recommendations. Nor, conversely, does failure to participate in the Districts Program preclude the possibility of farmers applying acceptable land-use practices. Cooperation in the Districts Program and compliance with district recommendations are obviously not completely interdependent. Therefore, these two objectives must be treated separately, at least to some extent. Consequently, this analysis has been divided into two segments. Samples of farms were drawn from cooperating farms (i.e. those having basic farm plans) and from non-cooperating farms (i.e. those farms which had not previously been planned by the district). These sample farms have been carefully investigated to determine if special differentiating characteristics exist between (a) non-cooperating and cooperating farms and (b) cooperating farms from three different levels of compliance with district recommendations. Also, the operators of all of the sample farms were asked to give their reasons for complying or for not complying with district recommendations.

Formulation of Hypotheses of Inquiry

The nature and purpose of hypotheses

Certain hypotheses concerning the nature and effect of impediments and resistances to district progress have been developed to serve as guides in this investigation. Hypotheses, as directors of inquiry, may
be considered as being of three kinds: (1) problem delimiting hypotheses, which serve to demarcate specific problems to be investigated by delineating the gap between the objective and the present level of achievement, (2) diagnostic hypotheses which, after the problem is delimited, provide, not only tentative explanations of why the problem exists, but also, seek to identify the means by which progress has been made to the present level of achievement, and (3) remedial hypotheses which suggest means for overcoming the problem previously delimited and diagnosed. These remedial hypotheses constitute the means for bringing about a more complete achievement of the particular end-in-view.

**Review of other studies**

As previously stated, no prior study has dealt specifically with the problems confronting soil conservation districts. However, a great many investigations have been made of obstacles to soil erosion control in general. One of the more recent studies by John C. Frey\(^1\) has brought together and tested many of the obstacles identified in earlier investigations.

A study by Lee and Aull\(^2\) deserves special mention, because it is one of very few conducted within the framework of a soil conservation district.

\(^1\) The purpose of hypotheses in research as presented here is essentially as developed by Timmons, op. cit.


However, as in other investigations, this inquiry was an attempt to
determine adjustments necessary to increase the use of soil conserva-
tion practices and did not specifically attempt to provide guidance for
administrators in the conduct of district programs.

A later chapter sets out certain administrative adjustments which
might facilitate progress toward district objectives. This part of the
investigation has drawn heavily on a comprehensive analysis made by Parks¹
of the soil conservation districts program. This reference has been
particularly useful in the formulation of remedial hypotheses, that is,
suggested means by which district administrators might improve their
program.

Hypotheses for this study

The problem. The Jasper Soil Conservation District has two objec-
tives which are being considered in this study. As previously stated, it
is desired by the Jasper District governing body (1) that all Jasper agri-
cultural land users be in and under the district program and (2) that all
agricultural land be farmed under combinations of land-use practices deemed
by the district commissioners to be acceptable. As was also mentioned
earlier, these two goals are neither mutually inclusive nor exclusive. The
achievement on a farm of either objective does not ensure the attainment
of the other, nor does the failure to attain one preclude the achievement
of the other.

¹ W. Robert Parks. Soil conservation districts in action. Ames,
Iowa, Iowa State College Press. 1952.
As a result of the dual objective of the Jasper district program, we have, in this study, two problems which may be delimited by the following hypotheses:

1. Not all farmers in Jasper District have entered into working agreements (i.e. basic farm plans) with the Soil Conservation District.

2. On the farms in Jasper District, both of non-cooperators and of cooperators, are fields on which the land-use practices being applied are not adequate in erosion-controlling ability, according to the standards set by the District.

The first of these two hypotheses has been tested by determining the cumulative number of basic farm plans signed by Jasper District farm owners and operators as compared to the total number of farms in Jasper County. The second of these two hypotheses has been tested by comparing the land-use practices being applied on the fields of a sample of farms with the practices recommended by the technicians of the Jasper Soil Conservation District. In these ways the extent of achievement of District objectives are determined.

Explanations for the failure of the district program to achieve its objectives. In attempting to explain or diagnose the problems delimited above, the second set of hypotheses propose that:

1. Certain characteristics of farm firms tend to impede
   (a) the acceptance of District farm plans and (b) compliance with District land-use recommendations.
2. Certain beliefs, customs and habits of farm operators tend to make them resist complying with District objectives.

3. Certain legal and administrative aspects of the Districts Program do not adequately facilitate progress toward District objectives.

Characteristics of the sample farm firms were analyzed to determine their effect on the attainment of District objectives. Relationships, between (a) the extent of achievement and (b) farm characteristics, relative to the following factors were tested:

1. Farm sizes in acres.
2. Ownership-interest of the farm operators.
3. Leasing arrangements on rented farms.
4. Potential crop productivity of the farms.
5. Livestock programs.

In addition to the correlation analysis mentioned above, another approach to explaining the existence and extent of the problems confronting the districts was the questioning of the operators of the sample farms as to their reasons for complying or not complying with district objectives. From their stated reasons, an indication was obtained of the relative importance of various factors which might promote or impede district progress.

The following are hypothetical reasons, beliefs or attitudes of farm operators\(^1\) which may have prevented their achieving district

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\(^1\) These interviews were restricted to farm operators, therefore, the views of landlords are not represented.
objectives:

1. Lack of cooperation from landlords in arranging for adoption and in aiding in carrying out recommended practices.

2. A leasing arrangement which the tenant believes does not provide for him an equitable share of the costs and benefits.

3. Belief that the practice is not necessary because (a) it will not adequately control erosion or (b) erosion is not excessive now.

4. Operator does not wish to depart from customary practices.

5. Belief that the application of recommended practices will reduce net income within the planning horizon of the operator.

6. Operator has insufficient knowledge of the district's program and the land-use practices recommended.

7. Belief that application of recommended practices would increase capital and labor requirements without yielding commensurate additional production.

8. Time-interest in farm is too short to realize full benefits from the practices.

9. Farm and/or field lay-out is such as to make recommended practices impractical.

10. Pressure of current financial obligations precludes the possibility of introducing practices which would increase current investment and/or reduce current income.

11. Operator intends to comply in the future.
Explanations for the present level of success of the District Program.
In contrast to the factors listed above which may impede the progress of the Districts Program the following are possible reasons, attitudes or beliefs which might account for farm operators complying with district recommendations:

1. Practices were established prior to present operators tenure.
2. Landlord initiated and/or financed the application of the practice.
3. The leasing arrangement is such that the tenant’s share of the benefits promise to exceed his share of the costs.
4. Farm and field layouts lend themselves well to conservation farming.
5. Net income of farm is increased by the application of recommended practices.
6. Operator takes pride in maintaining, or feels morally obligated to keep, farm productivity at a high level.
7. Operator prefers the enterprises which serve to promote conservation farming.
8. Land capability is such that erosion control is a minor problem.
9. Good financial position with little pressure for current income enables operator to make investments in land.

Administrative failure and success elements. Obstacles and resistances at the farm level, undoubtedly, account for much of the problem presently confronting the Districts Program. However, weaknesses in
legal and administrative aspects of the program may account, partially, for the disparity between Program accomplishments and objectives. Factors of this nature which might affect district progress are, as follows:

1. Are the objectives of the Districts Program clearly established and soundly based?

2. Has a system of priority or precedence been assigned to the various objectives of the program?

3. Are the resources available to the districts adequate to attain public objectives of soil conservation?

4. Do current methods of evaluating district accomplishments reveal the actual progress being made towards program objectives?

5. Are the resources available to the Districts Program being properly allocated?

6. Are the objectives and operating procedures of the Districts Program periodically reviewed and adjusted?

7. Are the programs of the districts coordinated with the activities of other organizations with related goals?

8. Can a program based entirely on voluntary participation of agricultural land users achieve social objectives of soil conservation?

The major part of the empirical analysis of this study was concerned with the identification of on-the-farm impediments to district progress. The primary objective of this study, however, is to devise means whereby the Districts Program might be improved. Therefore, the Program has been analyzed in light of (a) on-the-farm obstacles indicated above and (b)
suggested principles of public administration. Adjustments necessary to
correct hypothetical weaknesses in the Districts Program are suggested, as follows:

1. What the programs of the various districts are expected, or are attempting, to accomplish should be clearly established by law or by administrative decision.

2. A system of priority or precedence should be assigned the various objectives of the Program according to their urgency and/or the extent of public interest therein.

3. To serve as guides for allocating resources and for directing the efforts of district personnel, methods of evaluating district accomplishments should reveal the actual progress being made toward Program objectives.

4. In order to maximize progress, within the limits of the resources available, toward the specified objectives of the Districts Program, criteria must be carefully developed to guide the allocation of the Program's resources.
   a. Between the various districts.
   b. Between farms within districts.
   c. Between practices within farms.
   d. Between the various aspects of the districts' programs (e.g. between educational and promotional efforts and technical assistance, between maintenance of old plans and writing of new plans).

5. The Districts Program should be coordinated with the programs
of other public and private organizations having related goals so that the various activities do not conflict but rather complement each other.

6. The Districts Program should have (a) resources to provide aid and incentive sufficient to induce individuals to use recommended erosion-control practices and/or (b) power to require certain minimum standards of land-use.

7. The objectives and operating procedures of the districts should be constantly reviewed and adjusted in the light of the dynamic environment in which the programs operate.

Strong features of the Districts Program and characteristics common to those farm firms which have attained specified district objectives provide the foundations for further progress. Conversely weak features of the Districts Program and characteristics common to farm firms which have failed to attain specified district objectives suggest adjustments in the interest of furthering progress toward objectives of soil conservation.

**Procedures for Testing Hypotheses**

The delimiting hypothesis relative to the failure of all farmers to accept basic farm plans is readily tested. Table 1 gives the cumulative numbers and percentages of Jasper farms which have been planned for each year since the inception of the program. The table also gives the numbers and percentages of acres encompassed. Although these data appear accurate and precise, their significance is somewhat indeterminate because
Table 1. Cumulative numbers and percentages of Jasper County farms planned by the SCD and numbers and percentages of acres encompassed by plans at the end of each fiscal year, 1942-55

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of farms planned&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Percent of all farms&lt;sup&gt;b&lt;/sup&gt;</th>
<th>No. of acres encompassed&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Percent of all agr. land&lt;sup&gt;d&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1942</td>
<td>9</td>
<td>0.3</td>
<td>3,567</td>
<td>0.8</td>
</tr>
<tr>
<td>1943</td>
<td>34</td>
<td>1.3</td>
<td>8,240</td>
<td>1.8</td>
</tr>
<tr>
<td>1944</td>
<td>93</td>
<td>3.4</td>
<td>9,677</td>
<td>2.2</td>
</tr>
<tr>
<td>1945</td>
<td>163</td>
<td>6.0</td>
<td>27,592</td>
<td>6.2</td>
</tr>
<tr>
<td>1946</td>
<td>214</td>
<td>7.9</td>
<td>36,060</td>
<td>8.1</td>
</tr>
<tr>
<td>1947</td>
<td>277</td>
<td>10.3</td>
<td>46,724</td>
<td>10.5</td>
</tr>
<tr>
<td>1948</td>
<td>332</td>
<td>12.3</td>
<td>58,792</td>
<td>13.2</td>
</tr>
<tr>
<td>1949</td>
<td>378</td>
<td>14.0</td>
<td>65,880</td>
<td>14.8</td>
</tr>
<tr>
<td>1950</td>
<td>447</td>
<td>16.6</td>
<td>77,077</td>
<td>17.3</td>
</tr>
<tr>
<td>1951</td>
<td>481</td>
<td>17.8</td>
<td>82,048</td>
<td>18.4</td>
</tr>
<tr>
<td>1952</td>
<td>529</td>
<td>19.6</td>
<td>89,725</td>
<td>20.1</td>
</tr>
<tr>
<td>1953</td>
<td>508&lt;sup&gt;e&lt;/sup&gt;</td>
<td>18.8</td>
<td>79,087</td>
<td>17.7</td>
</tr>
<tr>
<td>1954</td>
<td>580</td>
<td>21.5</td>
<td>90,871</td>
<td>20.4</td>
</tr>
<tr>
<td>1955</td>
<td>616</td>
<td>22.8</td>
<td>97,079</td>
<td>21.8</td>
</tr>
</tbody>
</table>

<sup>a</sup>Excluding plans cancelled for any reason.

<sup>b</sup>Based on U. S. Census of Agriculture. Preliminary report, Jasper County. 1954. Land in farms, 445,689 acres.

<sup>c</sup>Additional acres have been incorporated into the planned farms, by rental or purchase, of which the district has no record.


<sup>e</sup>In 1953 farm plans were categorized as initial, advanced and basic. The adoption of this system involved changes in figures which accounts for the discontinuity. Since that time the system has changed again and only district cooperators with basic plans are reported.
(a) planned farms represent all degrees of seriousness of erosion problems (b) the level of planning is not uniform between farms and (c) the extent to which recommended practices were applied varies from none to all on the planned farms. In short, devising a basic plan for a farm is significant to the extent that it is the first step in gaining compliance with district land-use recommendations.

The general procedure for testing the delimiting hypothesis, relative to the application of land-use practices and the diagnostic hypotheses relative to on-the-farm obstacles, was to select a stratified random sample of farms from one soil conservation district. Information regarding the problematic situation on the sample farms has been assembled and analyzed for the purpose of testing factors which are hypothesized to be (a) important obstacles to participation in the district program and/or to the acceptance of land-use practices which are compatible with district goals or (b) reasons for the continuance of land-use practices which are incompatible with district goals.

In this study the testing of these hypotheses has been performed in two ways, as follows: (1) the procurement and analysis of data relative to specified farm characteristics for the purpose of investigating the possibility of correlation between such characteristics and the extent of compliance with district objectives within such farms and (2) an inquiry into the stated reasons of farm operators for complying or failing to comply with district recommendations.

In proceeding with this investigation, it was necessary to devise a means for delineating the specific problems, relative to the objectives
of the district program, existing on individual farms. Since the objectives of the program for any farm have been presented in terms of recommended land-use practices, departures from this norm in terms of the application of unacceptable\(^1\) land-use practices, serve to delimit the problematic situation on each farm.

As a practical operational matter, districts often enter into working agreements (i.e. basic farm plans) which specify land-use practices the application of which will not achieve the district objective of a safe level of erosion loss. Such plans are viewed by the district as "opening wedges" through which adequate conservation plans may eventually be worked out. In order to provide for this study a uniform and meaningful norm, the plans for all the sample farms of cooperators were reviewed by the district farm planner. He made adjustments in the recommended land-use practices necessary to attain (a) uniformity in the level of planning between farms and (b) compatibility of the plans with district objectives. In addition, from soil maps provided by the SCS, the farm planner devised comparable plans for a sample of farms drawn at random from the non-cooperating farms of the district.

In this investigation, the land-use practices applied by the farmers on each field\(^2\) of tillable\(^3\) land were compared with practices recommended

\(^1\) Combinations of land-use practices not as effective in controlling erosion as the recommended combinations of practices.

\(^2\) Defined as a contiguous tract which is homogeneous as to district recommendations and as to land-use practices being applied. Practices recommended and practices applied may or may not be the same.

\(^3\) Land defined as tillable if the cropping sequence being applied contained row crops or if recommended for row crops in the farm plan.
in the farm plans. The application on a given field of the practices recommended was considered to be the attainment of the "norm" of the district relative to achieving a "safe level of erosion loss" for that field. Conversely the application of combinations of land-use practices, not as effective in erosion-control as the recommended practices, was considered as below the district norm. No particular merit nor significance was attached to restricting rates of soil loss to levels below permissible maximums because (a) the value to society of such action is indeterminate and may be negative¹ and (b) such action on some land would not compensate for the use of practices which would result in excessive erosion on other land².

Land which was not tillable, as defined above, was excluded from this measurement because the maintenance of permanent vegetation on a tract was of itself considered to be an acceptable use of land. Consequently, a farm having large acreages of land incapable of being tilled under prevailing cultural practices would tend to rate high in compliance with the district norms regardless of the extent to which the farm's tillable land was abused.

¹The failure of farm operator to use his land to the extent of its capabilities, commensurate with maximum productivity over time, would reduce the net value of product over time.

²If, for two fields, the maximum permissible annual rate of soil loss is 5 tons per acre, a loss rate of, say, 2 tons on one field will not compensate for the rapid deterioration of the second field undergoing a loss rate of, say, 30 tons per acre.
In this way, we estimate the degree of true variance and of measurement.

The testable hypothesis from the sample of cases were examined

The control of the investigated

... which are comparatively in the effect of action tend to correct and

and finally, factors which are hypothesized to be the factor in the

dependent and which independently they may, in fact, be interdependent.

If it is not always evident which of the variables under consideration

may be dependent on another factor not being considered.

Punishment, the correlation may not be causal (i.e., variables under consideration

the hypothesis that certain causal order is not the case.

Among the elements of the sample, part correlation with many others. Also,

are zero or negative correlation may be chance alone, exact

existence positive or negative correlation may be present in the approach. In the first place,

certain weaknesses inherent to some extent in most correlation are

Contradiction evidence.

Inverse hypotheses are to be evidence substantiating the hypotheses.

Direct relationship between dependent variables and hypothesis

correlation between variables are hypothesized to certain factors were hypothesized

In the first of the two primary aspects of this investigation the
fidence which might be placed in the answers obtained.

The number of times a sample may be subdivided and still yield statistically significant answers is very definitely limited by the size of the sample. Due to limitations on the size of the sample, confounding factors were a difficult problem. Where statistically significant results supporting the hypotheses were obtained despite the tendency of coexistence of factors hypothesized to be competitive\(^1\) in their effect, such results would seem to provide additional verification. Where test results failed to support the hypothesis when competitive factors were confounded, an acceptable test has not been made since the effects of competing factors would tend to cancel out. The limited size of the sample did not permit further subdivisions which would allow separate testing of the factors\(^2\) in question. Where complementary factors\(^3\) tend to coexist, significant results give little indication of the relative effects of each factor but do indicate that one or more of the factors being considered is important.

**Testing hypotheses relative to stated reasons**

The second aspect of this investigation, concerning the stated reasons of farm operators for accepting or rejecting district recommendations, has, like the first part, weaknesses which must be circumvented,\(^4\)

\(^1\)e.g. owner-operated farms tended to be small in size.

\(^2\)e.g. owner-operated farms according to size of farm.

\(^3\)e.g. owner-operatorship and long planning horizon.
mitigated or at least recognized. This approach must be pursued with considerable caution because: (a) reasons given by respondents may not be their real motivating factors; (b) the information possessed by respondents on which they base their decisions may or may not be correct and a test of the validity of such information (and consequently the validity of the reason given) is not always available; (c) the course of action recommended in the farm plan is subject to error and thus may not be compatible with society's goals.¹

Despite these limitations, it was assumed that an analysis of the reasons given farm operators for their decisions, relative to the recommendations in the plans for their farms, constituted the best method available for discovering the factors which motivated their actions. A great deal of care was exercised during the interrogations to avoid respondents' rationalizations. Farm operators seemed prone to defend, or justify their noncompliance with recommendations, rather than merely to explain how, or why, they came to decisions which varied from the land-use practices specified.

In addition to the possibility of respondents not giving their actual reasons, another hazard of this approach is that many management decisions,¹

¹Since the district goal for an individual farm, as presented to the operator in the farm plan, is taken as the norm for this study, no attempt has here been made to test these recommendations. In considering the reasons stated by farm operators for accepting or rejecting recommendations, it has been presumed that the application of the land-use practices found in the farm plan is in the public interest. That is, such practices are compatible with the goals as set forth in the Soil Conservation Districts Law. On the other hand, widespread rejection of specific district recommendations might indicate the desirability of a review of the recommendations in light of the criticisms and objections received.
and particularly negative decisions, are made by default. In other words, the farm operator has never rationally considered alternative courses of action, weighing one against the other, and arriving at the one which in his judgement will maximize his welfare. Or quite often, the course of action recommended in the farm plan, particularly for farm operators who are not cooperating in the district program, was not among those alternatives which had been considered. In cases such as these there is a very real possibility of the interrogator putting an answer into the respondent's mind, getting no answer at all, or at best getting a spur-of-the-moment reason which may not be valid. In such cases, where obvious, the motivation for the course of action taken was termed custom, habit, inertia or, in some cases, lack of knowledge or of management ability.

In addition to the factors mentioned above, which might result in error, there was always the possibility of a respondent claiming compliance with recommendations when in actuality he had not applied the practice; or the quality and/or extent of his application\(^1\) was such as to reduce the erosion control effects to below district norms. Erroneous claims by respondents of this nature, whether by design or through lack of knowledge, would tend to compromise the results from both approaches mentioned above unless (a) the extent of such false claims are evenly distributed throughout all sample strata or (b) the quality and the extent of application of recommended land-use practices are directly correlated. In other words, if the operators who accept the highest proportion

\(^1\)For example, an operator may have stated that he was contouring a field when he was merely tilling crosswise of the prevailing slope.
of the district recommendations also tend to excel in the quality of application of the practices accepted, as appeared to be the case, then the differences between the success elements and failure elements, relative to attaining district norms, is further widened and consequently become more distinct. In any case, no attempt was made in this study to measure the qualitative aspects of the application of recommended land-use practices. The statement by a farmer that he had applied a specified practice to a specified field was accepted without further investigation.

This study was set-up to measure district progress in terms of achieving erosion-control objectives on tilled fields. However, it does not necessarily follow that those farm operators who have made the most progress toward the district goal in terms of applying recommended practices, are the operators of the farms on which this objective has been attained. On the contrary in an abstract sense, the extent of progress toward any objective is limited by the original distance from the goal. As a consequence, farm operators having severe and extensive soil erosion problems on their farms may make a great deal of progress without attaining the objective, and conversely those operators having only minor erosion problems on their farms could achieve the district goal with very little progress in an absolute sense.

**Testing hypotheses relative to administration**

In a previous section of this chapter, certain principles of public administration, as applied to the Districts Program, were suggested.
The extent to which the Districts Program departs from the principles suggested has not, for the most part, been determined. Further research in this area is needed\(^1\) to determine (a) if there are significant departures in the Districts Program from the administrative principles suggested and (b) to what extent changes in these aspects of the Program would actually promote progress toward district and social objectives.

However, in recognition of the inadequacy of the available empirical data on current administrative procedures and practices, a conceptual analysis of off-the-farm aspects of the program has been made primarily in terms of hypothetical situations. Possible consequences of departures from the suggested principles will be examined logically. Possible adjustments in the program will be suggested where deviations from the logical ideal might be expected and where such departures would be expected to have adverse effects on district progress.

**Survey Design**

**Selection of area**

The area selected for this investigation was the Jasper Soil Conservation District. The study was restricted to one district because of the limited resources available and because of the great amount of cooperation and assistance required from the district administrative and technical staffs. Furthermore, it was considered essential that the

\(^1\)A survey schedule (see Appendix) was designed to obtain the data necessary for a statistical analysis of the administration of the districts program.
level of farm planning be consistent\(^1\) throughout the sample. Such consistency could best be attained by having the farm plans be, to as large an extent as possible, the product of one man.

Jasper District was chosen for the following reasons: (a) only farms planned prior to June 30, 1950 were included in the sample to allow the operators time to apply recommended practices. Jasper District was established in April, 1942 and thus had a large number of farms planned prior to 1950, (b) the District is centrally located and consequently is readily accessible for study and also has climatic conditions tending to be average for the State (c) the physical conditions are diverse, representing four of the major soil association areas in the state (see Figure 1). As a consequence, problems of a physical nature encountered on the sample farms have implications over much of the state, and (d) the Jasper District Commissioners and Farm Planner were willing to cooperate in the planning and conduct of the study.

It is recognized that conclusions reached from information obtained in one district can be generalized to other districts only within limits and with considerable caution. But, in view of the considerations mentioned above, this initial study was restricted to one district with the hope of devising means by which other district administrative and technical staffs might conduct self-analyzing studies. In this way the specific problems confronting each district can be recognized and action

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\(^1\)The application of the practices recommended in each sample farm plan would, ideally, just attain the erosion-control objectives of the district.
can be taken to overcome the obstacles discovered.

Selection of population and sample

Among the objectives of this study is the analysis of the strong and weak features (success and failure elements) of the Districts Program in relation to farmers who are participating\(^1\) and also those who are not. As a consequence, the scope of the study encompasses both cooperating and non-cooperating farms.

Cooperators. The population of cooperators is a total of 465 farms having basic farm plans initiated prior to July 1, 1950.\(^2\) This number excludes 52 farms on which the plan was cancelled due to change in ownership. These 52 farms were not included because the present owners were not principals in the agreements signed with the district. If any of the 52 farms have been replanned, the new plans, if initiated prior to July 1, 1950, had an equal opportunity of falling into the sample. If a new plan was initiated after June 30, 1950, the farm would not be in the population as defined. These 52 farms are, however, indicative of the dynamic setting in which the program operates, a factor to be discussed in a later chapter.

From the population of 465 cooperators a stratified random sample of 60 was drawn. The stratification was accomplished by having the

\(^1\)Farm operators whose farms have been planned by the district will, hereafter, be referred to as "cooperators" and all others referred to as "non-cooperators".

\(^2\)It was considered that operators whose farms were planned after 1950 would not, in many instances, have had time to establish all land-use practices recommended despite their full intentions to do so.
the present operator was not even aware of the present operator, and in some cases, the present operator was not even aware of

instances, the names had been planned prior to the tenure of the present

next were they utilizing district-level or personal. In several

they were not making use of the farm plane

stratus III farms are cooperators only in the sense that their farms had

termed stratus III. It should be pointed out that the farm operators of

were canceled due to reasons other than change of ownership. These were
district and had plans on which no progress was being made or plans which

The third category, comprising 44 farms, were below the norm of the

expected as stratus II.

than expected, toward the district norm. These farms were de-

judgment of the district farm planner making progress, which was less

among the 46 cooperators in the population, 199 were in the

status of 19 elements in this part of the sample.

bined during the process of selecting into one unit (unit) leaning a

category. Of the 20 farms selected from this stratus, two farms came

I, two-hundred and thirty-five of the 46 farms were placed in the

which expected progress was being made, were designated stratus

that had, in the judgment of the farm planner, been achieved, or to

planned farms on which the district norm relative to extension can-

expected control. A sample of 20 farms was drawn from each of the 3

according to the relative progress toward the district objective of

ten of the district in 1942, separate the farm into 3 categories

District Farm Planners, who have held that position since the organi-


Table 2. Populations and samples from Jasper Soil Conservation District

<table>
<thead>
<tr>
<th>Group</th>
<th>Number in population</th>
<th>Number in sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total farms (1954 U.S. Census)</td>
<td>2696</td>
<td>---</td>
</tr>
<tr>
<td>Cooperators in S.C.D. (all, to June 30, 1954)</td>
<td>623(^a)</td>
<td>---</td>
</tr>
<tr>
<td>Cooperators in S.C.D. (all, to June 30, 1950)</td>
<td>465(^b)</td>
<td>59</td>
</tr>
<tr>
<td>Status I</td>
<td>232(^c)</td>
<td>19</td>
</tr>
<tr>
<td>Status II</td>
<td>189(^d)</td>
<td>20</td>
</tr>
<tr>
<td>Status III</td>
<td>44(^e)</td>
<td>20</td>
</tr>
<tr>
<td>Status IV (non-cooperators)</td>
<td>1648(^f)</td>
<td>34</td>
</tr>
</tbody>
</table>

\(^a\)Number of agreements signed prior to July 1, 1954, a few of which were the second agreement for a given farm.

\(^b\)Farms (50 acres of larger) planned by the District prior to July 1, 1950.

\(^c\)Planned farms on which the recommended (or equivalent) conservation practices have been established or on which satisfactory progress toward these objectives is being made, as judged by the District Farm Planner.

\(^d\)Planned farms on which the District objectives have not been attained and on which progress is being made toward the norm at less than a satisfactory rate.

\(^e\)Planned farms which are below the norm and on which no progress is being made toward the district objectives or on which the plan has been cancelled.

\(^f\)Farms (over 50 acres in size) which had not been planned by the District prior to July 1, 1954. Number derived from U.S. Census of Agriculture. Preliminary report. Jasper County. 1954.
the plan. This group constitutes a failure element in that the recommended practices deemed necessary by the District to adequately control soil loss have not been applied despite the district resources expended on the farms.

As stated previously the categorization of the cooperating farm firms was performed by the District Farm Planner. These classes were established by him on the basis of his inspection, records, knowledge and judgement as to their relative progress toward district objectives. Empirical analysis of the farms selected from the three categories strongly support the stratification as established. The data in Table 3 in the following section indicate that on Status I farms district objectives have been substantially achieved. The operators of Status II farms have been much less successful. They have achieved district objectives of erosion control on only 23 percent of their tillable acres. Status III farmers, having attained the erosion control norm on only 11 percent of their tillable acres, have made even less progress.

The stratification of the population of cooperators is further verified by the data in Tables 11 and 14 in a later chapter. These data compare the average land-use practices applied with practices recommended. As would be expected meadow crops and mechanical erosion-control practices are being applied freely on Status I farms, less freely on farms of Status II and III.

Non-cooperators. For non-cooperators, who have been designated Status IV, the population includes 1648 farms in Jasper District, 50
acres or larger in size, whose owners have not entered into an agreement with the Soil Conservation District. The sample of non-cooperators was obtained from 60 quarter sections selected, 3 at random from each of the 20 survey townships in Jasper District, for a statewide soil survey. All farms from the population, as defined above, whose farmsteads lay in the 60 quarter sections comprised the sample of 34 farms.

Farms smaller than 50 acres in size were excluded from the sample of non-cooperators because (a) many of these small places are not bona fide farms but are instead rural residences and (b) small size of the farm in these cases is likely to be such an overriding consideration that the effect of other characteristics would be seriously confounded. This is evidenced by the fact that none of the farms in the "cooperator" population were smaller than 50 acres.

Measurement of Performance

Table 3 presents a measurement of the average problematic gap\(^1\) on the farms in each of the categories. The measurement is ordinal in the sense that the amount, by which the average rate of soil loss per acre on any given field exceeds the maximum permissible, is not calculated. This lack of a quantitative measurement would not bias the results from this study if the loss to society from the failure of farm operators to attain the district norm (i.e. on fields designated "below" norm).

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\(^1\)The measurement of the "problem" on each farm is in terms of acres of tillable land on which the land-use practices being applied are not equivalent in erosion - controlling ability to the practices recommended by the district.
Table 3. Status of sample farms as related to the attainment of the district objective of erosion-control on tillable land

<table>
<thead>
<tr>
<th>Sample categories</th>
<th>Farms in the size of sample farms</th>
<th>Tillable land in sample farms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Acres</td>
</tr>
<tr>
<td>Status I</td>
<td>232</td>
<td>208</td>
</tr>
<tr>
<td>Status II</td>
<td>189</td>
<td>224</td>
</tr>
<tr>
<td>Status III</td>
<td>44</td>
<td>216</td>
</tr>
<tr>
<td>All coops</td>
<td>465</td>
<td>216</td>
</tr>
<tr>
<td>Status IV</td>
<td>1648&lt;sup&gt;a&lt;/sup&gt;</td>
<td>172</td>
</tr>
</tbody>
</table>

<sup>a</sup>Estimated.

<sup>b</sup>Acceptable land-use practices being applied.

<sup>c</sup>Unacceptable land-use practices being applied.

Averaged the same per acre throughout all sample categories. Although such does not appear to be the case, further consideration indicates that this difference does not invalidate but rather reinforces the evidence obtained. A subjective analysis of the data indicates that the fields, in category I which have been designated "below norm"; are on the average substantially nearer the norm than are similarly designated fields in category III. Consequently, the rate of soil deterioration would probably average much higher on "below norm" acres of the latter category of farms. In making comparisons between the average performances of the
farm operators in the various categories of cooperators, the tendency of Status I farms to be nearer the district objectives than Status III farms both in terms of proportion of acres up to the norm and also as to proximity to the goal on "below norm" acres makes more distinct the differences between these categories. Therefore, comparisons of the data in Table 3 relative to the various categories of cooperators is more meaningful than would otherwise be true.

On the other hand, the data for Status IV (i.e. non-cooperating) farms are not strictly comparable to the information for farms in categories I, II, and III (i.e. district cooperators). This is true because the farm plans for Status IV farms were devised from the land-capability maps of the respective farms without consultation with the farm operator. Furthermore, the farms were planned on a very intensive basis, and as a consequence, large acres of land recommended for crop rotations are presently in permanent vegetation and are thus automatically up to the district norm.\(^1\) A further weakness of the cumulative data for Status IV farms is that there is no homogeneity among the farms within this category as to progress toward or attainment of the district norm of a "safe level of erosion control". Variations between farms within this stratum are as great as the variations between farms of this and other strata. In other words, some of the operators of the non-cooperating farms have reached the district norm on their entire farms; others are far below the norm on most of their farms.

\(^1\)Permanent vegetation is, of itself, considered to be, in most cases, a sufficient practice to attain the erosion-control objectives of the district.
Since the data in Table 3 for Status IV farms is subject to the limitations above, no attempt will be made in this study to classify these farms, as a group, relative to their attainment of the district objectives. Non-cooperating farms are treated as homogeneous only in the sense that on none of them has a district farm plan been initiated. Consequently, characteristics hypothesized to be favorable to plan initiation would be expected to occur more frequently on cooperating farms.
FARM CHARACTERISTICS AND THEIR EFFECT ON THE ATTAINMENT OF DISTRICT OBJECTIVES

This investigation has been conducted along three lines of approach. The first approach, to be discussed in this chapter, is the assembly and analysis of information relative to specified farm characteristics. This analysis attempts to determine the effects of certain characteristics of farms on their operators' participation in the districts program and compliance with district land-use recommendations. It has been hypothesized that some characteristics of farms tend to inhibit and others to facilitate the progress of the Districts Program in terms of both (a) the number of farms planned and (b) the extent of application of recommended practices on the farms of cooperators.

The factors tested in this chapter are (a) farm size in acres, (b) ownership interest of operator, (c) leasing arrangement on rented farms, (d) potential farm productivity, (e) livestock program, (f) age of operator and (g) planning horizon of operator. Information, relative to these factors, has been obtained from the farm operators by means of personal interviews. The data from these schedules have been analyzed and reveal special differentiation characteristics between those farms on which District objectives have been achieved when compared with other farms in the District.

The characteristics tested were selected on the basis of previous knowledge and preliminary investigation because they were deemed to be relevant and capable of being tested with considerable precision with the
sample selected. These characteristics are not, however, considered to be the only factors influencing farmers' decisions. Others may be of equal or greater importance. Furthermore, determination on the part of a farmer to carry out a conservation program may well succeed despite the existence on his farm of any or all of the hypothetical obstacles tested. Conversely, the absence of any or all of the tentative impediments does not ensure compliance with district recommendations.

Farm Size in Acres

Among the characteristics of farms which apparently influence the owners' and operators' decisions relative to compliance with district objectives is the factor of "size of farm in acres". It was hypothesized that farms, relatively large in acres, would lend themselves to a soil conservation program more readily than would smaller farms.

There are a number of possible reasons why owners and operators of large farms might more readily accept and carry out a district farm plan. In the first place, larger farms tend to have larger fields which are more readily adaptable to mechanical conservation practices (e.g. contour and strip-crop farming). Furthermore, owners and operators of large farms may be in a stronger financial position\(^1\) and thus be better able to (a) sacrifice some current income and/or (b) finance investments in land.

\(^1\)The initiation of any change in farming operations which requires (a) additional investment or (b) reduced current income, is, undoubtedly, influenced by the financial position of the owner and/or operator of the farm. This factor has been investigated in other studies (see Frey, op. cit., p. 48) but was not specifically treated herein.
Also, large farms are apt to have roughage-consuming livestock, machinery, buildings and equipment which are more adequate and better adapted to conservation farming. Finally, large acreages may permit the attainment of adequate erosion control largely by a more extensive use of land\(^1\) (e.g. by reducing the proportion of row-crops in the cropping sequence) and thus minimizing the use of mechanical practices, such as terraces, which seem to encounter more resistance from farm operators. On the other hand, small farms may tend to be more severely depleted and eroded from previous exploitation and, as a consequence, require more extensive and effective erosion-control measures.

**Effect of farm size on plan initiation**

The data in Table 4, concerning status of farms as related to farm size, indicate that size of farms in acres has a rather pronounced effect on the initiation of farm plans. The average size of sample farms in categories I, II, and III (i.e. district cooperators) is 216, or 44 acres larger than the average of 172 acres for the farms in Status IV (i.e. non-cooperators).

A statistical test of independence\(^2\) (chi square, test of interdependence) of the data in Table 4 indicates that we can be 97 percent

---

\(^1\)Relatively large inputs of land as compared to other resources such as labor, capital and management.

Table 4. Status of farms as related to farm size and size distribution

<table>
<thead>
<tr>
<th>Category</th>
<th>Average size of farm in acres</th>
<th>Distribution of farms by size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 to 99</td>
<td>100 to 179</td>
</tr>
<tr>
<td>Status I</td>
<td>208</td>
<td>3 16</td>
</tr>
<tr>
<td>Status II</td>
<td>224</td>
<td>0 0</td>
</tr>
<tr>
<td>Status III</td>
<td>216</td>
<td>3 15</td>
</tr>
<tr>
<td>All coops</td>
<td>216</td>
<td>6 10</td>
</tr>
<tr>
<td>Status IV</td>
<td>172</td>
<td>6 18</td>
</tr>
</tbody>
</table>

confident that cooperation in the soil conservation district is not independent of size of farm in acres. In other words, these data indicate that farms of district cooperators have a very definite tendency to be larger in acreage than the farms of non-cooperators. Apparently, the operators of small acreages are discouraged by this fact from entering into working agreements with the district. Other associated factors (e.g. financial position, adapted machinery and equipment, etc.) may contribute to this reluctance but were not tested in this study.

These findings indicate that the Districts Program should give special attention to smaller farms. Not only does the district encounter resistances on small farms peculiar to them but also the extent of soil
concentrating plan details and size of farm are to some extent confounded

Stratified tests of the data in Table 4 of the previous section

Ownership-Interest of the Farm Operator

(d) Recommendations are being carried out.

But with account both for the facts that (a) the farms were planned and
may well account both for the facts that (a) the farms were planned and
spite of and not because of their size. Other influences in these cases
were recommendations have been compiled within, may well have been planned in
cooperatives. The 3 farms under 100 acres in size on which district land-
acres in size, 3 or 50 percent are from category III, the most satisfactory
within this group. It might be noted that of these 6 farms, under 100
not surprising that acreage ceased to be an important limiting factor.

cent of the cooperative farms are over 100 acres in size, it is perhaps
cent of the cooperative farms are over 100 acres in size, it is only perhaps
in Jasper District are under 50 acres in size and all but 6, or 10 per-
categories of cooperatives. However, since none of the cooperative farms
significantly different in the average acres of the farms in the three
with district land-use recommendations. In other words, there is no
farm size is not shown by these data to influence cooperative compliance

Despite the apparent strong effect on the utilization of farm plans,

Effect of farm size on application of recommended practices

discussed in the final chapter.
by a second factor, "ownership-interest of operator"\(^1\). Farms operated by persons having an ownership-interest are apparently more apt to be planned than are farms operated by tenants unrelated to their landlords. On the other hand, tenant-operated farms tend, on the average, to be large in acreage\(^2\), a factor which seems to favor participation in the Districts Program.

The following are possible reasons why the objectives of the district are more likely to be achieved on a farm in which the operator has an ownership interest. Where the farm is owner-operated, management decisions are made by one person who is agriculturally oriented and a local resident, factors which make district educational and promotional efforts more effective. On such farms, the problem of dissociation of costs and benefits (interpersonally or intertemporally) is minimized because current expenses and returns are not shared and the owner-operator tends to have a long time-interest in the farm. Also, owner-operators often have a personal interest in maintaining farm productivity beyond the expectation of financial return. Such personal interests reflect values which are sometimes expressed as "obligation to posterity" or "love of the land". Where the farm is operated by a part-owner, (a) the factors just mentioned relative to owners would be equally applicable to the owned part of these farms; and (b) the operators may

\(^1\)Included in this classification are farms operated by owners, part-owners and sons or son-in-laws of the owner.

maintain current income by disinvesting rented land and investing in the owned part of the farm.

As with owners and part-owners, related-tenant operators tend to have a long-time interest in their farms and consequently are more certain of realizing benefits from long-term investments in land (e.g. lime, terraces, tile, grassed waterways, timber, etc.). Possible inequities in the sharing of the costs and benefits of applying recommended practices would tend to be of small concern in agreements involving parents and sons or sons-in-law.\(^1\) Since the owners of such farms have, in many cases, operated the farm they tend to have a personal interest, not only in the present operator, but also, in the farm itself. The owners of farms operated by related tenants tend to be agriculturally oriented and local residents. Furthermore, related tenants are often allowed to make major decisions on these farms relative to investments in land, or at least are able to exert a large measure of influence on the owner relative to such decisions.

Effect of ownership interest on plan initiation

A statistical test of significance of the data in Table 5 indicates that we can be 92 percent confident that ownership-interest on the part of the operator is not independent of the initiation of a farm plan. Whereas 81 percent of the cooperators in the sample were owners, part-owners or related tenants, only 63 percent of the sample of non-

\(^1\)In many cases, the parent-owner is assisting the operator in becoming established in business; in others the tenant is contributing to the support of the owner. In either case, transfers of income are being made intentionally and voluntarily.
Table 5. Plan status of sample farms as related to tenure

<table>
<thead>
<tr>
<th>Sample categories</th>
<th>Owner-oper.</th>
<th>Part-owner oper.</th>
<th>Relative ten. oper. &amp; rel. ten. tenant</th>
<th>All tenants</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Percent</td>
<td>No.</td>
<td>Percent</td>
<td>No.</td>
</tr>
<tr>
<td>Status I</td>
<td>6</td>
<td>32</td>
<td>7</td>
<td>37</td>
<td>2</td>
</tr>
<tr>
<td>Status II</td>
<td>10</td>
<td>50</td>
<td>3</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>Status III</td>
<td>10</td>
<td>50</td>
<td>3</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>All coops</td>
<td>26</td>
<td>44</td>
<td>13</td>
<td>22</td>
<td>9</td>
</tr>
<tr>
<td>Status IV</td>
<td>10</td>
<td>29</td>
<td>7</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>All Jasper farms</td>
<td>1254</td>
<td>44</td>
<td>419</td>
<td>15</td>
<td>-</td>
</tr>
</tbody>
</table>

*Includes 11 manager-operated farms*
cooperators had an ownership-interest in their farms. Conversely, tenant-operated farms comprised 34 percent of the sample cooperating farms, 50 percent of the sample non-cooperating farms and 41 percent of all farms in Jasper County.¹

That the Program is not reaching tenant-operated farms with the same consistency as it reaches owner-operated farms is of considerable significance to the district. Nearly 50 percent of all farms in Iowa are tenant operated; over 50 percent of the land is operated by non-owners. Achieving the objectives of the Districts Program will, apparently, necessitate measures which will increase tenant participation. Measures which might facilitate progress on tenant-operated farms will be discussed in the final chapter.

Effect of ownership interest on application of recommended practices

Despite a significant difference between cooperating and non-cooperating farms relative to ownership interest, no similar differentiation exists between the various categories of cooperators. The extent to which plans were carried out on the farms of cooperators is not shown, by the data in Table 5, to be dependent on the ownership-interest of the operator. Apparently, the fact that a district plan has been initiated on a farm operated by a non-related tenant, is evidence that on that farm serious obstacles to compliance with district recommendations did not exist or have been overcome. The initiation of the farm plan indicates

(a) that both the owner and the operator have some interest in soil conservation, (b) that the owner and the operator are determined to improve the land-use practices on the farm, and (c) that the owner and tenant do, in some sense, consider the problem to be a mutual one. In view of these considerations, little difference could be expected in the extent to which district plans are carried out on planned farms whether operated by persons having an ownership interest in the farm or by tenants unrelated to the owner.

Leasing Arrangements on Rented Farms

As shown previously, tenant-operated farms are less likely to be planned by the district than are farms operated by owners or part-owners. However, after plans have been initiated, the application of the land-use recommendations appears to be as great on rented farms as on farms operated by owners or part-owners.

The data in Table 6 indicate that the type of leasing arrangement on rented farms has a very definite effect on the decisions of the entrepreneurs relative to the initiation of farm plans and also the application of the recommended practices. Toussaint\(^1\) concluded that

Where the costs of any inputs are borne by the tenant or landlord and returns are not shared in the same proportion, inefficiency of resource use is fostered, and there is a tendency to avoid making farm improvements.

Conversely then, a leasing arrangement which provides for proportional sharing of the costs and benefits of the recommended land-use practices

### Table 6. Status of rented farms as related to leasing arrangement

<table>
<thead>
<tr>
<th>Category</th>
<th>All farms in sample</th>
<th>All ten, oper. farms</th>
<th>Cash crop-share &amp; share-cash leases</th>
<th>Cash leases</th>
<th>Crop-share leases</th>
<th>Share-cash leases</th>
<th>Livestock-share leases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Percent</td>
<td>No.</td>
<td>Percent</td>
<td>No.</td>
<td>Percent</td>
<td>No.</td>
</tr>
<tr>
<td>Status I</td>
<td>19</td>
<td>32%</td>
<td>2</td>
<td>33%</td>
<td>0</td>
<td>0%</td>
<td>1</td>
</tr>
<tr>
<td>Status II</td>
<td>20</td>
<td>30%</td>
<td>1</td>
<td>17%</td>
<td>0</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>Status III</td>
<td>20</td>
<td>35%</td>
<td>6</td>
<td>86%</td>
<td>1</td>
<td>14%</td>
<td>1</td>
</tr>
<tr>
<td>All coops</td>
<td>39</td>
<td>52%</td>
<td>9</td>
<td>45%</td>
<td>1</td>
<td>5%</td>
<td>2</td>
</tr>
<tr>
<td>Status IV</td>
<td>34</td>
<td>50%</td>
<td>14</td>
<td>82%</td>
<td>1</td>
<td>5%</td>
<td>3</td>
</tr>
<tr>
<td>All Jasper farms</td>
<td>2824</td>
<td>1141</td>
<td>40</td>
<td>698</td>
<td>61</td>
<td>125</td>
<td>11</td>
</tr>
</tbody>
</table>
between the owner and the operator of a rented farm would provide the necessary economic incentives\(^1\) for working out an optimum conservation plan for a farm. Such a mutually satisfactory sharing of costs and benefits can most easily be attained in leases which approach full partnerships.

Cash leases could provide an economic climate similar to owner-operatorship if terms mutually satisfactory to tenant and owner could be reached. However, the risk element of high fixed cost for the tenant with a cash lease probably tends to encourage short-run exploitation of land and inhibit the acceptance of recommended land-use practices.

It has been hypothesized in this study that a stock-share lease would be the rental arrangement most likely to encourage compliance with the Districts Program. Possibly the most important, but unmeasurable, reason for this is that the owner and operator are already working together in the operation of the farm and are, as a consequence, amenable to a cooperative agreement with the district. Another reason might be that the pooling of two sources of capital permits the acquisition of adequate livestock and machinery. Since the landlord shares in the income from the livestock he would be more likely to provide the necessary fencing, buildings and equipment for livestock enterprises. Also stock-share leases tend to be long-term compared to other types of leases. The fact that landlords of these farms are generally local residents and agriculturally oriented might have an important bearing on compliance. They

can be reached personally by the educational and promotional activities of the district. Furthermore, they tend to have a personal as well as a financial interest in the farm and consequently, take pride in keeping it attractive and productive. Another relevant factor might be that a large proportion of the income of such a farm is usually derived from livestock enterprises; and therefore, the pressure to maintain current income by heavy cash cropping is considerably lessened. Also, as a result of the livestock enterprises, roughage feeds from grass and legume crops find ready use and large quantities of manure are generally available as an aid in the reclamation and maintenance of soil resources.

**Effect of leasing arrangements on plan initiation**

As previously pointed out, tenancy, in total, seems to be an impediment to participation in the district program. However, this general statement does not hold, apparently, for tenant-operated farms having livestock-share leases. According to the 1950 U.S. Census of Agriculture, 355, or 13 percent, of the farms in Jasper County have stock-share leases. In the sample of 34 non-cooperating farms three, or 9 percent, had stock-share leases. On the other hand, among the 59 farms from the sample of district cooperators, 11, or 19 percent, have stock-share leases.

A test of independence of the data in Table 6 indicates that we can be 98 percent confident that cooperation in the district program and leasing arrangement are not independent. These data provide evidence that rented farms with stock-share leases are more apt to be planned than
are tenant-operated farms with other types of leases. To be discussed in the final chapter are measures by which the district might encourage leasing arrangements which will facilitate participation in the program.

**Effect of leasing arrangements on application of recommended practices**

The data in Table 6 were further tested to determine the effect of the leasing arrangement on the extent of compliance with district recommendations on planned farms. These tests indicate that we can be 98 percent confident that the application of recommended land-use practices is not independent of leasing arrangements.

As shown previously, a relatively large proportion of the sample planned farms are tenant-operated under a stock-share lease. Furthermore, these planned farms, operating under stock-share leases, with only one exception, have made substantial progress in implementing their farm plans. On the other hand, a relatively small proportion of the farms with other types of leases have been planned by the district, and on these planned farms little progress had been made, on the average, toward applying acceptable land-use practices.

**Potential Farm Productivity**

An attempt is made in this section to determine the effect of the inherent productiveness of farms on owners' and operators' decisions relative to complying with district objectives. It has been hypothesized that the owner and/or operator of a farm having a relatively low inherent productivity will be more likely to accept and carry-out a farm plan
than will the entrepreneurs of highly productive farms. A possible reason why this hypothesis might be valid is that erosion-control problems tend to be readily apparent on farms of low productivity because of exposed subsoil, gullies and low yields. Because of the generally low levels of fertility on such farms, yield responses from the application of recommended land-use practices are generally prompt and strong. Furthermore, technical assistance, as offered by the district, is usually required because of the extensive erosion-control measures necessary. A final reason might be that farms of low productivity tend to be well-adapted for grass and legume crops and as a consequence their entrepreneurs often have, or willingly acquire, roughage-consuming livestock.

Effect of farm productivity on plan initiation

Taken as a group, the total sample of cooperating farms is not significantly different in productivity (as categorized in Table 7) from the sample of non-cooperating farms. From these data one might conclude that low farm productivity neither facilitates nor deters the initiation of farm plans. However, such is probably not the case. More likely other factors associated with "poor" farms often tend to obstruct cooperation; and thus balance out the over-all effect of the facilitating factors mentioned previously relative to carrying out recommendations on planned farms of low-productivity. Conditions which might exist on such farms would tend to obstruct a conservation program. For instance, such farms have often been severely damaged by past erosion and consequently require extensive and costly erosion control measures. Then too, the entrepreneurs
Table 7. Status of sample farms as related to the potential productivity

<table>
<thead>
<tr>
<th>Sample</th>
<th>Sample farms</th>
<th>Potential productivity of farms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>High</td>
</tr>
<tr>
<td>Status I</td>
<td>19</td>
<td>1</td>
</tr>
<tr>
<td>Status II</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>Status III</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>All coops</td>
<td>59</td>
<td>26</td>
</tr>
<tr>
<td>Status IV</td>
<td>34</td>
<td>14</td>
</tr>
</tbody>
</table>

*Potential farm productivity is here defined as the inherent ability of a farm to yield rent (i.e., outputs over inputs) under current cultural practices. The farms have been categorized as high, medium, or low in productivity by a comparison of the various land capability maps. In the process of classification, primary consideration was given to the following factors: (a) the total potential farm productivity as evidenced by land capability and farm size in acres, (b) the extent and severity of erosion control problems and to a lesser extent (c) the adaptability of the farm to the use of mechanical erosion-control practices.

of these farms may be in a poor financial position making it difficult for them to (a) forego current income and/or (b) finance investments in land. Also there may be some tendency for "poor" farms to have entrepreneurs who are poor managers, the implication being that a superior farmer would possess a more productive farm.
Effect of farm productivity on the application of recommended practices

An examination of the data in Table 7 shows that the sample farms from the three strata of cooperators vary widely in their potential productivity. Whereas 63 percent of the farms in Status I fall in the "low" productivity rating only 15 percent of the Status III farms are so classified. On the other hand, 80 percent of Status III farms are "high" in potential productivity as contrasted to only one farm\(^1\), or approximately 5 percent, of Status I farms.

As previously pointed out "progress toward" and "attainment of" the district objectives on farms are two quite different concepts. However, it is of considerable significance if, as is indicated by the data in Table 7 the planned farms which have most nearly attained the district norm had, originally, the greatest problem to overcome. As is stated in the footnote to Table 7, the criteria by which the farm productivity was rated were (a) size in acres, (b) land capability, (c) extent and severity of erosion problems and (d) adaptability to the use of mechanical erosion-control practices.

A statistical test of independence of the data in Table 7, relative to extent of cooperation on planned farms and their rating as to farm productivity, indicates that we can be 99 percent confident that these two factors are not independent. There is no significant difference in the average acreage of farms in the various sample categories of cooperators; (see Table 4) therefore, the very pronounced differences in farm

\(^1\)It is interesting to note that this particular farm is owned by a former district commissioner.
productivity among these categories is, presumably, the result of differences in land capability and the closely related factors of extent and severity of erosion-control problems.

In summary, the data in Table 7 indicate that the potential productivity of farms is a consideration of importance in influencing the extent to which the recommendations in the farm plan of a cooperating farm will be carried out. On the other hand, these data provide no evidence that farm productivity affects plan initiation. Factors other than low farm productivity, but associated with it, (e.g., poor financial position and small acreage), may obstruct participation in the district programs on some of these farms.

Livestock Program

In general, there are two methods of achieving the land-use objectives of the district on any given farm: (1) make intensive use of mechanical erosion-control measures and commercial fertilizers while maintaining a high proportion of tilled crops in the cropping sequences or (2) reduce the proportion of tilled crops in the cropping sequence and increase the proportion of meadow crops. With very few exceptions, in actual practice, a combination of these two methods is used. However, farm operators seem to accept recommended changes in cropping sequences much more readily than they accept mechanical erosion-control practices. Consequently, the adoption of a conservation program on a farm almost invariably results in a very large increase in the production of roughage feeds resulting both from increased acreages of meadow
crops, and also from increased per acre yields from improved land-use practices.

In view of the increased production of roughage resulting from the application of recommended land-use practices, the entrepreneurs of cooperating farms are faced with the problem of economically disposing of the additional meadow crops. It was hypothesized that farmers would be more likely to accept and implement a farm plan if they had adequate roughage-consuming livestock. It is recognized, of course, that direct feeding to his own livestock, either as pasture or hay, is not the only way in which a farmer can dispose of his roughage. He might sell hay for cash, or contract to have his hay harvested for cash or shares. He may rent out his meadows for pasture or contract to pasture livestock. Another alternative might be to harvest seed from the grasses or legume. A final possibility is to plow under the growth as green manure.

**Effect of livestock program on plan initiation**

Table 8 shows the average number of units of livestock per farm and per acre for each of the four categories. Although, the non-cooperating farms have, on the average, substantially fewer units of livestock than do the three categories of cooperators, this difference is not statistically significant.¹

¹Analysis of variance tests of significance were not adequate because of the large variation of values within each category.
Table 8. Status of sample farms as related to livestock program

<table>
<thead>
<tr>
<th>Sample categories</th>
<th>Grain-consuming livestock</th>
<th>Roughage-consuming livestock</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units²/ acre</td>
<td>Units/farm</td>
</tr>
<tr>
<td>Status I</td>
<td>0.74</td>
<td>153.5</td>
</tr>
<tr>
<td>Status II</td>
<td>1.30</td>
<td>290.9</td>
</tr>
<tr>
<td>Status III</td>
<td>0.81</td>
<td>177.6</td>
</tr>
<tr>
<td>Status IV</td>
<td>0.70</td>
<td>120.4</td>
</tr>
</tbody>
</table>

²Various livestock were assigned "unit" values as in, animal units of livestock fed annually, 1919-20 to 1948-49. U.S.D.A. B.A.E. Washington, D.C. Oct, 1949.

Effect of livestock program on the application of recommended practices

The data in Table 8 provide no evidence that implementation of district land-use recommendations is dependent on the livestock programs on farms. There is no significant correlation between the number of units of roughage-consuming livestock and the extent of compliance, on planned farms, with district recommendations.

Apparently, farm operators do not consider the feeding of roughage to their own livestock as being the only practicable utilization for meadow crops. In many cases, farmers consider meadow crops to be complementary to tilled crops and grow them only for their soil-conserving effects and increases in yields of subsequent grain crops. In such cases roughage, not needed for hay or pasture, is not harvested but instead is
In summary, the data analyzed in this section do not provide con-
stant evidence that row crop production is always more efficient or efficient than meadow production. However, the data indicate that meadow production may be more efficient under certain conditions. For example, in wetter, more humid areas, meadow production may be more efficient than row crop production. On the other hand, some farmers consider the meadow crops to be

formed under for humus and nitrogen.
Other Factors

Factors for which the data indicated no significant effect

Hypotheses relating to possible adverse effects on district progress of (a) advanced age of farm operators and (b) short planning horizons were neither supported nor refuted by the data collected. The average age of all of the operators of the farms was approximately 48 years; the mean age of the operators of the various categories varied less than 3 years from this overall mean. With few exceptions planning horizons of the operators were for longer than five years. Each respondent was asked how many years he was reasonably certain of having a personal or financial interest in his farm; only 9 from the total of 93 operators were planning on the basis of less than 5 years. These 9 were distributed throughout all categories. In short, no significant difference between the various categories was revealed relative to these factors.

Factors not tested

There are, undoubtedly, factors, other than those investigated herein, which influence, to a greater or lesser extent, the decisions of farm operators relative to participation in the district program. Among the factors which might be relevant but which have not been investigated in this study are: (1) financial position of the owner and operator, (2) sex, age, occupation and place of residence of the owner and (3) formal educational level attained by the owner and operator. Other factors may be equally or more important.
Situations existing on any farm relative to the considerations treated in this chapter will neither ensure nor preclude full participation in the district program. Farm operators who are convinced that soil conservation as advocated by the district program is profitable or morally obligatory will probably achieve district objectives. On the other hand, in the case of individuals who feel that such action is neither necessary nor profitable, no combination of favorable circumstances is apt to induce complete compliance with district objectives.
REASONS FOR COMPLYING, AND FOR NOT COMPLYING, WITH SPECIFIED LAND-USE PRACTICES

The component parts of the basic farm plans are the specific land-use practices which, when applied in the recommended combinations, will achieve the district objectives of erosion control. Although the rate of soil loss on a tilled field having an erosion hazard is rarely dependent on the operator's application of one particular land-use practice, the attainment of the district objectives of erosion control on such a field does require the application of some combination of erosion-control practices.

As explained in the previous chapter, the operator of each sample farm was questioned as to the land-use practices applied by him on each of the fields on his farm. If a farmer stated that he applied the basic land-use practices on a particular field as specified in his farm plan, it was assumed that he had achieved the district objective of erosion control for that field. On the other hand, if practices other than those specified in the farm plan were being used, the practices applied were compared with the recommendations in the "Conservation Farming Guide" of the SCS. The substituted practices were not considered to be departures from district objectives unless they were not equivalent in erosion-controlling ability to the practices recommended in the "Guide" for soils of similar capability.

No attempt was made in this investigation to (a) corroborate the farmers' statements of compliance, (b) determine the quality of applica-
tion of the practices used or (c) qualify the effectiveness of the basic erosion-control practices¹ according to a farm operator’s concurrent use of practices associated² with soil conservation. That these factors were not taken into account in measuring farmers’ progress toward district objectives is not to imply their lack of importance but reflects instead an inability to accurately measure, with the data available, the effect of these factors on the attainment of the district objective. Some of these associated practices and the operators’ attitudes toward them are discussed later in this chapter.

For the purpose of rating farmers’ use of their land it was assumed for this study that the rate of soil loss in a field is dependent on (a) the mechanical erosion-control measures applied and (b) the relative proportions of intertilled row crops, solid-drilled annual crops and meadow crops in the cropping sequence.

Which of the three basic mechanical practices, (terracing, strip-cropping and contouring) is recommended for a given field is dependent on (a) the proportion of intertilled crops in the rotation and (b) the severity of the soil erosion hazard. Terracing, where applicable, is considered to be the most effective of the three mechanical practices in reducing soil loss. Contour-strip-cropping is somewhat less effective than terracing but provides better erosion control than does solid contouring. On the other hand, contour tillage, on soils having an

¹ i.e. cropping sequence, contour, strip-crop and terrace.
² e.g. grassed waterways, commercial fertilizer, lime, barnyard manure, green manure, tilling, pasture renovation and controlled grazing.
erosion hazard, results in lower rates of soil loss than does straight farming, particularly in the production of intertilled crops. In Jasper District, permanent vegetation is considered, with few exceptions, to be a sufficient practice\(^1\) to adequately control soil loss. However, on soils having an erosion hazard, the introduction of tilled crops, particularly intertilled row crops, into the cropping sequence usually entails the concurrent use of mechanical erosion-control practices for the achievement of district objectives. In like manner, increases in the proportion of tilled crops and/or decreases in the proportion of meadow crops in a cropping sequence require the application of compensatory mechanical erosion-control measures to prevent higher rates of soil loss.

For example, a soil of some hypothetical land-capability class might require, for the maintenance of a safe level of erosion loss, any one of several combinations of land-use practices, as follows:

<table>
<thead>
<tr>
<th>Conservation practices</th>
<th>Rotations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Terraces with contouring</td>
<td>C-C-O-M-M(^2)</td>
</tr>
<tr>
<td>2. Contour strip-crop</td>
<td>C-C-O-M-M</td>
</tr>
<tr>
<td>3. Contouring only</td>
<td>C-O-M-M</td>
</tr>
<tr>
<td>4. No practices</td>
<td>No row crops</td>
</tr>
</tbody>
</table>

Each of these four combinations of land-use practices would, presumably,

\(^1\)At least one soil type, Clarion sandy loam, encompassing a small area in Jasper district, requires terraces on steep slopes used for permanent meadow.

\(^2\)"C" refers to any intertilled row crop, "O" refers to any solid-drilled annual crop and "M" refers to grasses and legumes.
keep average soil loss rates below the maximum permissible. Therefore, any of the four would be equally acceptable to the district as a means of achieving district objectives.

Tables 11 and 14 in later sections of this chapter present cumulative data concerning recommendations and application of the basic erosion-control practices on the farms of the four sample categories. The data in these tables for the farms of categories I, II, and III (i.e. district cooperators) are comparable since they are in reference to farm plans made with the cooperation of the owners and/or operators. However, as previously stated, the plans for Status IV farms (i.e. non-cooperators) were made from land-capability maps without the cooperation of the entrepreneurs and without the farm planner going onto the farms. These farms were, apparently, planned at a somewhat more intensive level than were the farms of the other categories. This is evidenced by the fact that 84 percent of the land in the Status IV farms is classified as tillable (i.e. recommended or used for row crops) as compared to 52 to 63 percent tillable for the other categories. This disparity in proportions of tillable land is not due to differences in land capability (see Table 7) between the farms of the various categories.

In the following sections of this chapter, the specific reasons given by farm operators for applying, and for not applying, the component parts of their farm plans are discussed. In the summary tables all of the 93 operators of the farms of the 4 sample categories are

1Because of the additional tillage, seeding, harvest, and erosion-control operations required in the production of intertilled crops as compared to meadow crops, row crops are considered to represent a more intensive use of land.
treated as a group. It is, of course, recognized that widely varying proportions of the recommendations have been accepted by the operators of different sample categories. However, it is assumed that the operators who have accepted (or have not accepted) a particular practice have made these decisions for reasons which are independent of the extent of their compliance with district objectives. A subjective analysis of the reasons given, revealed no significantly different motivations among the farmers of the different categories.

Farm operators were questioned about their compliance, or non-compliance, with district objectives of erosion control for each field on their farms. It was not unusual for a farmer to have accepted a particular practice (e.g. contouring) on one field and to have rejected it on another. Furthermore, the reasons given by an operator for accepting (or not accepting) any particular practice quite often differed between fields because of differences in tenure or physical conditions.

It should be pointed out that almost all of the farmers had attained the objectives of the district, as defined herein, on at least part of their farms. On the other hand, very few farmers had applied acceptable combinations of land-use practice on their entire farms. Consequently, with few exceptions each respondent was questioned relative to both his acceptance and his non-acceptance of recommended land-use practices.

Inquiry into the reasons for complying or not complying with specific recommendations was made, as follows: (1) if the operator accepted the erosion-control measures as specified in the farm plan he was asked to explain why he used the land-use practices recommended,
(2) if he used an acceptable alternative combination of practices he was asked why he used the substituted practices and (3) if he used a combination of practices which were not acceptable he was asked to give his reasons for not modifying his use of the soil by (a) reducing the proportion of row crops in the cropping sequence and/or (b) applying additional (or more effective) mechanical erosion-control practices, so as to achieve district objectives.

Field-layout

The manner in which the fields are laid-out on a farm does not in itself affect the rate of soil loss. However, field lay-out often has, indirectly, a very real effect on the level of conservation attained on a farm. The farm planner, in laying out field boundaries strives to have the fields of a farm (a) readily accessible from the farmstead, (b) uniform in size, (c) homogeneous as to land capability, (d) adaptable to the use of mechanical erosion-control measures and (e) conform to the preferences of the owner and operator. These goals are rarely complementary and often directly competitive, and as a consequence, the final pattern of fields recommended in the farm plan is usually a compromise between these various objectives.

From the standpoint of gaining acceptance by the entrepreneurs, the recommended field lay-out cannot depart radically from their preferences. On the other hand, in relation to erosion-control a very important objective in laying-out fields is the attainment of homogeneity as to land capability within the boundaries of each field. Soil
homogeneity permits the application, throughout each field, of a uniform set of land-use practices which will utilize the soil of the entire area to the extent of its capabilities without exceeding the capacity of any part. Such a field can readily be farmed so as to maximize productivity over time. However, in Jasper District, and many other areas of the state, soils on any farm are quite heterogeneous as to capability, and as a consequence, contiguous tracts of homogeneous land tend to be relatively small and odd-shaped. Operators then have the alternatives of (a) fields which are small, irregular in shape and of diverse sizes or (b) fields which are larger, regular in shape and uniform as to size but more or less heterogeneous as to land capability. However, if a field is heterogeneous as to land capability, the operator must (a) disinvest the soil of low capability and/or under-farm the soil of high capability or (b) use more intensive mechanical practices (e.g. terraces or strip-cropping) on the poorer part of the heterogeneous area, but treat the whole as a unit from the standpoint of cropping sequences.

Since the farm plans for the non-cooperators were made solely from land capability maps without the planner going on the farm or consulting the owner or operator, no attempt was made to lay-out the field boundaries on Status IV farms. Consequently, the views of the non-cooperating operators relative to field-layout recommendations were not obtained.

Reasons for complying with recommendations relative to field-layout

In Table 9 is a list of the more frequently mentioned reasons, given by the operators of the three categories of cooperating farms,
for complying with the recommendations relative to field boundary arrangements. The reasons, as stated in the table, are necessarily brief and are, in fact, an aggregation of a number of related factors.

On many of the farms, on which the fields had been laid-out according to recommendations, were operators who had had no part in making the decision. Oftentimes, the field boundaries were established before the present operator moved to the farm. In other instances on tenant-operated farms, the landlord relocated field boundaries, so as to correspond to the recommendations, without consulting the tenant. In very few instances, did a tenant relocate field boundaries without the full cooperation of the land-owner. Generally speaking, tenants seem to feel that the moving of a field boundary, at least where fencing is involved, is the responsibility of the landlord. Few tenants seemed to feel strongly enough about the problem to finance or even initiate such a change. Exceptions were noted when the new field arrangement resulted in larger fields. Also some tenants who farmed on the contour were quite eager to have contour fencing where applicable.

The reason given in Table 9 relating to complementarity between recommended field layout and other practices, refers primarily to contour farming. Since the capability of land is greatly influenced by slope, there is a strong tendency for the boundaries of land-capability classes to correspond closely to contour lines. Consequently, the establishment of fields on the basis of land capability often, with only minor modifications, results in field boundaries laid-out on the contour. Such an
Table 9. Reasons given by 38 farm operators for complying with recommendations relative to field-layout

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Operators expressing each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number(^a)</td>
</tr>
<tr>
<td>Established by landlord or previous owner</td>
<td>11</td>
</tr>
<tr>
<td>Complements practice of contouring</td>
<td>15</td>
</tr>
<tr>
<td>Reduces labor and machinery cost</td>
<td>19</td>
</tr>
<tr>
<td>Increases net income from farm</td>
<td>12</td>
</tr>
</tbody>
</table>

\(^a\) Some operators expressed more than one reason.

\(^b\) Field-layout recommendations were available for only the 59 farms in sample categories I, II, and III (i.e. cooperators).

Arrangement of field boundaries usually results in a substantial reduction in the number of point rows in a contour-farmed field; which in turn reduces the time required to till a given area. The result is a saving in labor and machinery cost on contour-farmed fields. There is, as a consequence, a strong tendency on the part of the operator toward accepting the recommended field boundary arrangements where the soil is tilled on the contour.

One other reason often given by farm operators for accepting recommended field boundary arrangements is that the practice increased net farm income. Apart from the factor of reduced tillage costs such a statement would appear, on the face of it, to be quite insupportable.
However, as mentioned earlier in this section, homogeneity within a field, relative to land capability, is a necessary condition for maximizing productivity over time. A great many fields in Jasper County farms are extremely heterogeneous as to land capability. It is not unusual to find up to five soil types and three land capability class in one field as presently operated. It is physically impossible to farm such a heterogeneous area as a unit and utilize each soil up to, but not beyond, its capabilities. Most often neither the good land, nor the poor, in such a field, is producing up to its full capabilities.

Reasons for not complying with recommendations relative to field-layout

What appears to be one of the most important reasons for accepting the recommended arrangements of field boundaries is the complementarity between this practice and contour cultivation. Conversely, the practice of contour fencing in no way contributes to the ease of straight-farming and in fact would usually be inconvenient. Consequently, compliance with recommendations relative to the placement of field boundaries is restricted almost exclusively to farms on which contour tillage is practiced.

As indicated in Table 10 there is a quite strong feeling among tenants that the landlord should take responsibility for and finance the relocation of field boundaries where fencing is involved. The farm operators who gave this as a reason had accepted, in principle, the recommendations but, with one exception, were not willing to implement the practice. The excepted tenant had been refused permission by the
Table 10. Reasons given by 36 farm operators for not complying with recommendations relative to field-layout

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Farm operators expressing each</th>
<th>Number a</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landlords responsibility</td>
<td></td>
<td>12</td>
<td>33</td>
</tr>
<tr>
<td>Unnecessary for erosion-control</td>
<td></td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>Cost too high for the benefits</td>
<td></td>
<td>21</td>
<td>58</td>
</tr>
<tr>
<td>Requires too much labor</td>
<td></td>
<td>13</td>
<td>36</td>
</tr>
<tr>
<td>Fields are too small</td>
<td></td>
<td>8</td>
<td>22</td>
</tr>
</tbody>
</table>

a Some operators expressed more than one reason.

landlord to make the change.

Another rather large group, mostly of owner-operators, agreed that the recommendations were valid and desirable, but were not willing to go to the work and expense of moving the fences. Such changes, if at all extensive, call for a quite radical reorganization of the farm business, particularly in relation to cropping sequences. Many farmers are, understandably, reluctant to make such changes. Other operators closely associated with, and in many instances, including operators from the group just discussed, were willing to grant that the recommendations had some merit, but were not convinced that the benefits from such a re-organization would justify the labor and other costs involved.

A number of farmers voiced quite strenuous objection to the small size of fields recommended. Such an objection would be more likely to
the average scores recommended and applied. For some crops and for temporary cropping sequences recommended for each of the fertilizers table II presents possibly the most basic part of the land-use plan for a farm to the use of land-use practices.

Land-use practices.

Controlled grazing on the farm's terms of controlling the use of soil-erosion control operations laid out in the plan that they and the extent that they achieve the objectives of soil conservation are not necessarily the objectives of soil conservation. It is, however, gen-

eral agreement that these practices do not result in serious soil deterioration. Conversely, another operator who follows these recommendations and still pursue land-use practices which follow the objectives of soil-erosion control operations, may, a factor which a few farmers mentioned that obvious fact that following the length of some is not strictly to be avoided by controlled cropping. Therefore, expected either to small effects is due to the resulting short row of crops an operator who was not contingently since the practiced preanly expected.
Table 11. Status of sample farms as related to application of recommended cropping practice

<table>
<thead>
<tr>
<th>Sample categories</th>
<th>Ave. size farm in acres</th>
<th>Ave. tillable acres</th>
<th>Tillable land as % of total</th>
<th>Acreage row crops Ave. recom.</th>
<th>Acreage row crops Ave. applied as % of recom.</th>
<th>Acreage meadow crops Ave. recom.</th>
<th>Acreage meadow crops Applied as % of recom.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status I</td>
<td>208</td>
<td>109</td>
<td>52</td>
<td>38</td>
<td>40</td>
<td>96</td>
<td>83</td>
</tr>
<tr>
<td>Status II</td>
<td>224</td>
<td>140</td>
<td>63</td>
<td>48</td>
<td>61</td>
<td>80</td>
<td>106</td>
</tr>
<tr>
<td>Status III</td>
<td>216</td>
<td>118</td>
<td>55</td>
<td>39</td>
<td>52</td>
<td>76</td>
<td>114</td>
</tr>
<tr>
<td>Status IV</td>
<td>172</td>
<td>145</td>
<td>84</td>
<td>59</td>
<td>57</td>
<td>102</td>
<td>70</td>
</tr>
</tbody>
</table>

*Land was defined as tillable if used for row crops by operator or recommended in farm plan for a rotation containing row crops.*
and permanent meadow on the farms of each of the sample categories. Direct comparisons of the data between categories of farms tend to be misleading since the achievement of the objectives of the district on a farm requires the application not only of the suggested cropping sequence but also of the recommended mechanical erosion-control practices. Farms of Status I and Status IV have, on the average, acreages of the various types of crops substantially as recommended. However, investigation of the data in Table II indicates that whereas the farmers of Status I and Status II have, in most cases, applied mechanical practices where recommended, Status IV farmers have applied such practices only rarely.

Although "sequence of crops" is generally considered to be a single land-use practice, it is, in fact, not one, but a set of practices. The many possible crop rotations, varying from permanent vegetation to continuous row crops, have widely differing effects on erosion loss and consequent maintenance of soil productivity. Furthermore, as was pointed out previously in this chapter, the rate of soil loss resulting from the application of a particular cropping sequence depends, also, on the mechanical erosion-control practices used concurrently. This is true except with rotations having a low proportion of intertilled crops and/or on soil having little or no erosion hazard. Consequently, the recommendation of a given cropping sequence for a given field presupposes the application of the accompanying mechanical practices. Therefore, failure to apply the necessary mechanical practices on a given field, invalidates the cropping sequence recommended in the farm
plan for that field. In other words, the operator who uses a crop rotation in straight farming, which was recommended with contouring, is not complying with district objectives. On the other hand, his failure to apply contouring where recommended, if compensated for by a reduction in row crops, is not considered to be a departure from the objectives of the district.

Reasons for complying with recommendations relative to cropping sequences

As stated previously, the operators of each of the sample farms, having fields on which district objectives of erosion-control were being complied with, were questioned as to their reasons for using the land-use practices applied. Table 12 presents the reasons most frequently given by farm operators for accepting the recommended cropping sequences.

The factor which apparently influenced to the greatest extent the operators' acceptance of recommended rotations was the belief that to do so would maximize net incomes from their farms. These farmers felt that the increase in per-acre yield of grain crops more than compensated for the recommended reduction in acreage of such crops. Furthermore, respondents were quick to point out the very large yields of high quality roughages and the value of these crops both as feed and for sale. Meadow crops were cited as being: (a) very dependable as to yield (b) supplementary to corn in labor requirements (c) of high value as compared to small grains and (d) highly effective in controlling soil erosion loss, particularly when used in contour strips.
Table 12. Reasons given by 41 farm operators for complying with recommendations relative to cropping sequences

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Operators expressing each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>Landlord favors</td>
<td>12</td>
</tr>
<tr>
<td>Increase net income</td>
<td>39</td>
</tr>
<tr>
<td>Personal satisfaction in keeping farm productive</td>
<td>16</td>
</tr>
<tr>
<td>Saves labor and machinery costs</td>
<td>24</td>
</tr>
<tr>
<td>Complements other practices</td>
<td>18</td>
</tr>
</tbody>
</table>

aSome operators gave more than one reason.

In general, the recommendations in the farm plan called for an increase in the number of acres of meadow crops and conversely a decrease in row crops. Solid-drilled grain crops (e.g., oats) are not as conducive to soil erosion as are intertilled crops; on the other hand, they do not hold the soil as well as do meadow crops. Small grains are, apparently, not as profitable as either row crops or meadow crops and, therefore, are economically justified primarily because of their supplementarity to meadow crops. A crop of oats taken off a meadow seeding does not materially reduce the chances of getting a good stand of grasses and legumes.
Reasons for not complying with recommendations relative to cropping sequences

As presented in Table 13 a very large proportion of those operators who rejected the suggested rotations stated that the recommended cropping sequences were not necessary for conservation. These operators usually insisted that erosion loss was not excessive with their present cropping practices.

A large proportion of the operators claimed that to follow the recommended rotation would seriously reduce their income. Probably the landlords who objected to the recommendations also felt that the "plan" rotations would reduce the rent.

Table 13. Reasons given by 62 farm operators for not complying with recommendations relative to cropping sequences

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Operators expressing each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>Landlord objects</td>
<td>4</td>
</tr>
<tr>
<td>Reduce farm income</td>
<td>35</td>
</tr>
<tr>
<td>Too short time-interest</td>
<td>2</td>
</tr>
<tr>
<td>Not effective in controlling erosion</td>
<td>4</td>
</tr>
<tr>
<td>Not necessary for maintenance of productivity</td>
<td>28</td>
</tr>
<tr>
<td>Increased labor and machinery costs</td>
<td>4</td>
</tr>
</tbody>
</table>

*aSome operators gave more than one reason.*
A few farmers considered the cropping sequences, as recommended, to be conducive to excessive soil loss. In general, they felt that the second successive year of corn on a field resulted in high erosion rates despite a low proportion of corn in the rotation. Experimental data do not support this contention.

Because of lack of the necessary information little attempt has been made in this study to appraise the validity of the reasons given for not following these and other recommendations. Some of the reasons were almost certainly invalid but others may be, to some extent at least, an accurate appraisal of the particular situation.

**Mechanical Erosion-control Practices**

In Table 14 is presented the average acres per farm, recommended and applied, of the 3 principal mechanical erosion-control practices, contouring, strip-cropping and terracing. In general these data indicate that in sample categories I and II the practices of contouring and strip-cropping have been applied largely as recommended. In fact, Status I farmers had applied strip-cropping on an average of 26 acres per farm above the recommended acreages. However, the farmers in sample categories III and IV had applied the specified mechanical erosion-control measures on only a small proportion of the acres where recommended. The practice of terracing was quite generally rejected by the farmers of all categories.
Table 14. Status of sample farms as related to application of some recommended mechanical conservation practices

<table>
<thead>
<tr>
<th>Sample categories</th>
<th>Avg. total acres per farm</th>
<th>Acres of contouring</th>
<th>Acres of strip-cropping</th>
<th>Acres of terracing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Average</td>
<td>Applied as % recom.</td>
<td>Average</td>
</tr>
<tr>
<td></td>
<td></td>
<td>acres per farm</td>
<td></td>
<td>acres per farm</td>
</tr>
<tr>
<td>Status I</td>
<td>208</td>
<td>93.3</td>
<td>94.7</td>
<td>101</td>
</tr>
<tr>
<td>Status II</td>
<td>224</td>
<td>119.1</td>
<td>109.3</td>
<td>92</td>
</tr>
<tr>
<td>Status III</td>
<td>216</td>
<td>98.7</td>
<td>19.4</td>
<td>22</td>
</tr>
<tr>
<td>Status IV</td>
<td>172</td>
<td>110.0</td>
<td>13.9</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The significance of these cumulative data are rather difficult to interpret. The failure of a group of farmers to apply one particular practice to the extent recommended does not itself necessarily result in excessive erosion on their farms. Not only are the land-use practices recommended in combinations rather than singly but the combinations of practices are recommended for specified fields. As a consequence, summation of acreages of the various practices, recommended and applied, has few clear implications. However, two important inferences can be drawn from the data in Table 14, as follows: (1) farmers who are participating actively in the district program (i.e., categories I and II) use mechanical erosion-control practices to a much greater extent than do farmers who are not participating, and (2) the farmers in all of the categories have, for the most part, rejected the practice of terracing.

Contouring

Tilling the soil on the contour is apparently for many farmers a quite radical departure from the straight rows in which they have long taken pride. Many farmers seem to find it difficult to consider the merits and demerits of contour farming in a rational manner. Rejection appeared often to be on the basis of a general aversion to the whole idea rather than being the result of specific objections as to the benefits and costs of contouring.
Reasons for complying with recommendations relative to contouring.

Contouring is not a popular practice among farm operators. In only two cases, among the 93 respondents, did farmers state that they preferred contouring to straight farming. Among those operators who were farming on the contour, acceptance was, for the most part, on the basis of profitability or necessity.

Table 15 presents the reasons given by farmers for accepting the practice of contour farming. The preponderate majority of the farmers who had accepted contouring had in effect two main reasons (a) they felt that contouring would increase their net income over time and (b) they

Table 15. Reasons given by 50 farm operators for complying with recommendations relative to contouring

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Operators expressing each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>Landlord favors</td>
<td>9</td>
</tr>
<tr>
<td>Increases net income</td>
<td>46</td>
</tr>
<tr>
<td>Feel obligated to maintain farm productivity</td>
<td>20</td>
</tr>
<tr>
<td>Saves labor and machinery cost</td>
<td>9</td>
</tr>
</tbody>
</table>

*aSome operators expressed more than one reason.*
took pride in maintaining their farms at high levels of productivity. Many of the farmers considered themselves to be morally obligated to avoid soil deterioration to the best of their ability. Oftentimes both (a) and (b) were given as reasons for farming on the contour. In several cases, the landlord had insisted that the land be farmed on the contour, and in these cases one could probably conclude that the landlords' reasons were similar to (a) and (b) above.

Reasons for not complying with recommendations relative to contouring. The most commonly stated reason for rejecting contouring as presented in Table 16 was that the practice is not necessary for conservation. Four farmers voiced the opinion that contouring increased, rather than reduced, the rate of soil loss. In most instances, the farmers who gave such an answer qualified it by specifying the necessity of maintaining what they considered to be a "good" rotation of crops. However, the cropping sequence applied by these farmers was rarely any less intensive than the one recommended (with contouring) in the farm plan.

Another important reason for not farming on the contour was the belief that the practice would reduce net income primarily by (a) increasing costs of labor and machinery resulting from point rows and (b) reducing production from smaller yields and wasted ground. Many farmers voiced the more explicit objection that contouring made weed control difficult if not impossible. This also may affect costs and yields.

A few operators had accepted the practice as being desirable and were (a) prevented from using contouring tillage by their landlords or
Table 16. Reasons given by 53 operators for not complying with recommendations relative to contouring

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Operators expressing each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>Landlord objects</td>
<td>9</td>
</tr>
<tr>
<td>Not necessary</td>
<td>32</td>
</tr>
<tr>
<td>Not effective erosion-control measure</td>
<td>4</td>
</tr>
<tr>
<td>Reduces net income</td>
<td>17</td>
</tr>
<tr>
<td>Makes weed control difficult</td>
<td>14</td>
</tr>
<tr>
<td>Increases labor and machinery cost</td>
<td>13</td>
</tr>
<tr>
<td>Intend to apply the practice</td>
<td>4</td>
</tr>
</tbody>
</table>

Some operators expressed more than one reason.

(b) intending to apply the practice the next crop year.

Another small group admitted the desirability of contour tillage but insisted that the size and lay of their fields were such that contouring was not practicable.

It should be pointed out that, only in very rare cases, had those who rejected contouring ever had any experience with the practice.

One would suspect that many of the reasons given were merely rationalizations. The respondent had, it appeared, often rejected the practice and then searched for reasons to justify his non-compliance. On the other
In the case of many parameters there are very strong reasons to accept the contour. In the case of the parameters of the contour, contour and contour, the reasons for accepting the contour. The reasons for accepting the contour are not as strong as the reasons for accepting the contour.

A practice closely associated with contouring is that of strip-cropping. Although fields may be and often are, conditioned and not strip-cropping. A practice closely associated with contouring is that of strip-cropping. A parameter to test the viability of any of the reasons given and then only would they also reason on the contour. Many of the reasons developed because of the parameter were conditioned, thereby yielding dropped below those of the contour. Several of these parameters stated uncorrected that whenever they were maintained high crops yielded over a period of many years would control (usually with only moderately excessive land) have

Experimeterial data do not support the better except under control

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.

Hort. & M. C. O. M. 0. O.
Some operators expressed more than one reason.

<table>
<thead>
<tr>
<th>Number</th>
<th>Percentage</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>70</td>
<td>Compressing to contouring</td>
</tr>
<tr>
<td>14</td>
<td>42</td>
<td>Productive pride in keeping farm attractive and</td>
</tr>
<tr>
<td>31</td>
<td>94</td>
<td>Increase net income</td>
</tr>
<tr>
<td>9</td>
<td>18</td>
<td>Landlord relief</td>
</tr>
</tbody>
</table>

Table 17. Reasons given by 39 farm operators for complying with

Recommendations relating to strip-cropping.
increasing the acreage of permanent meadow to take care of their pasture needs, or (b) using temporary fencing to separate the meadow and grain crops. Possibly part of this difficulty stems from their failure to adopt a 6-year cropping sequence (i.e. C-C-O-M-M-M) which permits the meadow strips to remain three years, minimizing not only the seeding but also changes in fencing.

Generally speaking, contour strip-cropping is a very popular practice and is apparently gaining in popularity. Almost all of the farmers interviewed credited the practice with being highly effective

Table 18. Reasons given by 55 farm operators for not complying with recommendations relative to strip-cropping

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Operators expressing each</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landlord objects</td>
<td></td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>Not necessary for erosion-control</td>
<td></td>
<td>21</td>
<td>38</td>
</tr>
<tr>
<td>Increase labor and machinery requirements</td>
<td></td>
<td>29</td>
<td>53</td>
</tr>
<tr>
<td>Inconvenient for pasture</td>
<td></td>
<td>19</td>
<td>35</td>
</tr>
<tr>
<td>Intend to apply</td>
<td></td>
<td>6</td>
<td>11</td>
</tr>
</tbody>
</table>

aSome operators expressed more than one reason.
in controlling erosion. Nearly all of the respondents conceded that the practice was necessary at least on farms other than their own. A number of farmers not now using the practice were contemplating the establishment of strips in the very near future.

**Terracing**

Possibly the most unpopular of all the recommended land-use practices is that of terracing. Again, as in contouring, the rejection of terracing as a means of controlling soil erosion appears to be quite irrational. Many farmers would resist even discussing the practice. Terracing like strip-cropping requires the previous or concurrent application of contouring. As a consequence, the practice is subject to all of the real or fancied disadvantages of farming on the contour in addition to the objections to terracing *per se*.

**Reasons for complying with recommendations relative to terracing.**

Among the 93 operators of the sample farms from Jasper District, only eight were using terraces, and of these, two were terracing because the practice was initiated by their landlords. Six of the farmers who had terraces felt that the practice increased yields and profits over a period of years. (see Table 19) They were unanimously of the opinion that properly constructed terraces were very effective in controlling erosion. Only two of them expressed any real difficulty in tilling terraced fields.
Table 19. Reasons given by eight farm operators for complying with recommendations relative to terracing

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Operators expressing each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>Landlord requires</td>
<td>2</td>
</tr>
<tr>
<td>Increase net income</td>
<td>6</td>
</tr>
<tr>
<td>Pride in keeping farm productive</td>
<td>2</td>
</tr>
<tr>
<td>Complementarity to other erosion-control measures</td>
<td>3</td>
</tr>
</tbody>
</table>

*a Some operators expressed more than one reason.

Reasons for not complying with recommendations relative to terracing.

In contrast to the opinion of the farmers who are using terraces, those who are not were convinced that the practice was neither necessary nor profitable (see Table 20). Almost all of these farmers stated that terracing was not necessary because of the fact that their present land-use practices were maintaining or increasing soil productivity, and/or terracing would not reduce soil erosion below the rate presently obtaining. They were further convinced that the increased costs resulting from (a) construction and maintenance of the terrace structures (b) additional time required to till terraced fields (c) damage to machinery, and (d) reduced yields caused by baring subsoils, would reduce their net income. In fact, some were certain that terraces reduced yields and...
consequently gross income over time in addition to increasing costs.

It should be pointed out that, with possibly one or two exceptions, the farm operators who voiced the objections in Table 20 have had no personal experience with terraces. Few of them had ever actually seriously considered using the practice. As a result, some of the reasons for rejecting terracing are undoubtedly based on misconceptions resulting from a lack, or misinterpretation, of facts. On the other hand, a number of farmers were using contour strip-cropping in place of the recommended terraces and in so doing were below district standards of erosion control. However, because of the arbitrary nature of the soil-loss norm, it is possible that the rate of soil loss on such fields is within socially desirable limits.

Table 20. Reasons given by 37 farm operators for not complying with recommendations relative to terracing

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Operators expressing each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>Landlord objects</td>
<td>11</td>
</tr>
<tr>
<td>Not necessary for adequate erosion control</td>
<td>6</td>
</tr>
<tr>
<td>Reduce net farm income</td>
<td>9</td>
</tr>
<tr>
<td>Increase labor and machinery costs</td>
<td>4</td>
</tr>
<tr>
<td>Intend to apply</td>
<td>2</td>
</tr>
</tbody>
</table>

\*Some operators expressed more than one reason.
Associated Land-use Practices

In the previous sections of this chapter, the land-use practices of cropping sequence, contouring, contour strip-cropping and terracing have been discussed. A number of other land-use practices associated with, and used in conjunction with, these basic erosion-control measures are recommended in every farm plan. In this section the following associated practices will be treated: (a) grassed waterways, (b) green manure, (c) commercial fertilizer, (d) lime and (e) manure. Other practices, similar in nature but not treated herein, are farm ponds, tiling, ditching, wildlife preservation and pasture renovation. The effect of these measures on the attainment of district objectives varies greatly between the various practices and according to the extent and quality of their application and the physical conditions of soil on which they are applied.

Grassed waterways

Among the operators of the sample farms, the most widely accepted of all district land-use recommendations is that of controlling gully erosion by establishing sod in waterways. In fact only two of the 93 respondents stated that the practice was unnecessary and wasteful of land. Although grassing waterways is, in this study, classified as an associated, rather than a basic, conservation practice, it is, on many soils, a critical factor in preventing rapid soil deterioration. However, as with the other practices treated in this section, only general re-
commendations are made relative to controlling waterways. In other words, the farm plans do not specify control measures for each waterway but instead recommend that all waterways be shaped and sodded.

During the interrogation each farm operator was asked if all of the waterways, excluding streams and drainage ditches, on his farm were under control (i.e. not cutting out). The farms in the sample were categorized, according to the extent of their operators' stated compliance with recommended waterway control measures, into 3 groups on which recommendations were (a) being complied with, (b) being partially complied with, (c) not being complied with. Table 21 gives the number and percentages of farms from each of the sample categories falling into each of the 3 groups.

Reasons for complying with recommendations relative to grassed-waterways. Table 22 presents the reasons given by farmers for applying the practice of grassed waterways. A very large proportion of the farmers who accepted the practice did so at least partly because of the greater speed with which they could till their ground. Along this same line many of the farmers mentioned the obvious fact that gullies were destructive of machinery and consequently well-shaped grassed waterways protected investments in corn pickers, combines and other expensive machinery.

One of the reasons given by a very considerable number of the sample operators was that grassed waterways improved the appearance of their farms. A remark often made with obvious pride by the farm operators was that an automobile could go anywhere on their farms.
Table 21. Status of sample farms according to extent of operators' compliance with recommendations relative to grassed waterways

<table>
<thead>
<tr>
<th>Sample category</th>
<th>Practice applied as recom.(^a)</th>
<th>Practice applied, but not as recom.(^b)</th>
<th>Practice not applied(^c)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of operators</td>
<td>%</td>
<td>No. of operators</td>
</tr>
<tr>
<td>Status I</td>
<td>16</td>
<td>84</td>
<td>3</td>
</tr>
<tr>
<td>Status II</td>
<td>17</td>
<td>85</td>
<td>2</td>
</tr>
<tr>
<td>Status III</td>
<td>14</td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>Status IV</td>
<td>24</td>
<td>70</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>71</td>
<td>76</td>
<td>15</td>
</tr>
</tbody>
</table>

\(^a\) All waterways under control.

\(^b\) Attempts being made to shape and sod uncontrolled gullies.

\(^c\) Uncontrolled gullies, with no effective attempts being made to shape and establish sod.

Another substantial group, mostly from farms with a severe erosion hazard, were convinced that gully erosion, if not controlled, would in a very few years make at least part of their land unfit for tillage.

Reasons for not complying with recommendations relative to grassed waterways. The reasons farmers gave for not controlling waterways on their farms varied considerably. However, in all but two instances,
Table 22. Reasons given by 88 farm operators for complying with recommendations relative to grassed waterways

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Operators expressing each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Established prior to present operators</td>
<td>Number</td>
</tr>
<tr>
<td>occupancy or by landlord</td>
<td>8</td>
</tr>
<tr>
<td>Saves machinery</td>
<td>43</td>
</tr>
<tr>
<td>Improves appearance of farm</td>
<td>43</td>
</tr>
<tr>
<td>Saves time during tillage operations</td>
<td>84</td>
</tr>
<tr>
<td>Prevents destruction of land</td>
<td>28</td>
</tr>
</tbody>
</table>

Some operators expressed more than one reason.

The respondents conceded that grassed waterways were desirable. Two operators considered the grassed strips to be unnecessary and a waste of land. Table 23 presents the number and proportion of farmers giving the various reasons for not having all of their waterways under control.

Commercial fertilizer

A list of general recommendations accompanying every farm plan suggests that commercial fertilizer be applied to all soils as indicated by soil test. Table 24 gives the number and proportion of farmers in each sample category who (a) apply fertilizer according to recommendations (b) apply fertilizer but not according to recommendations and (c) do not apply commercial fertilizer.
Table 23. Reasons given by 15 farm operators for not complying with recommendations relative to grassed waterways

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Operators expressing each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>Landlord's responsibility</td>
<td>6</td>
</tr>
<tr>
<td>Wastes land</td>
<td>2</td>
</tr>
<tr>
<td>Cost is too great</td>
<td>6</td>
</tr>
<tr>
<td>Haven't been able to establish sod</td>
<td>12</td>
</tr>
<tr>
<td>Too much water from neighbor's farm</td>
<td>3</td>
</tr>
<tr>
<td>Intend to comply</td>
<td>10</td>
</tr>
</tbody>
</table>

*a Some operators expressed more than one reason.

Commercial fertilizer is apparently gaining acceptance very rapidly. A large proportion of those operators who are now using fertilizer have only recently accepted the practice. Furthermore, most of those who do not apply fertilizer, at present, indicated considerable interest in its use. Many of them intend to apply some fertilizer on a trial basis in the near future.

Reasons for complying with recommendations relative to commercial fertilizer. Table 25 presents the reasons given by farm operators for using commercial fertilizer. As would be expected the reason most often given is that fertilizer increases production and net income.
Table 24. Status of sample farms according to operators' compliance with recommendations relative to commercial fertilizer

<table>
<thead>
<tr>
<th>Sample category</th>
<th>Practice applied as recommended&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Practice applied but not as recommended&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Practice not applied&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status I</td>
<td>10 53</td>
<td>4 21</td>
<td>5 26</td>
</tr>
<tr>
<td>Status II</td>
<td>5 25</td>
<td>13 65</td>
<td>2 10</td>
</tr>
<tr>
<td>Status III</td>
<td>2 10</td>
<td>6 30</td>
<td>12 60</td>
</tr>
<tr>
<td>Status IV</td>
<td>10 29</td>
<td>7 21</td>
<td>17 50</td>
</tr>
<tr>
<td>Total</td>
<td>27 29</td>
<td>30 32</td>
<td>36 39</td>
</tr>
</tbody>
</table>

<sup>a</sup>Fertilizer applied on all tilled soil as specified by a complete soil test made at least once each cropping sequence.

<sup>b</sup>Some fertilizer applied but (a) not according to soil test and/or (b) not on all tilled ground.

<sup>c</sup>No fertilizer applied.

However, a very large proportion of the respondents who used fertilizer also mentioned factors having to do with complementarity to other erosion control practices. Farmers often stressed the fact that the extensive root systems and heavy plant growth engendered by fertilizer greatly improved soil permeability, water-holding capacity and resistance to erosion loss.
Table 25. Reasons given by 35 farm operators for complying with recommendations relative to commercial fertilizer

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Operators expressing each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>Landlord shares cost</td>
<td>7</td>
</tr>
<tr>
<td>Increases net income</td>
<td>34</td>
</tr>
<tr>
<td>Aids in controlling erosion</td>
<td>23</td>
</tr>
</tbody>
</table>

*aSome operators expressed more than one reason.*

Reasons for not complying with recommendations relative to commercial fertilizer. The two principal reasons given for applying commercial fertilizer were that the practice (a) increased income and (b) decreased soil loss. Paradoxically, the two most frequently mentioned reasons for not applying fertilizer are that the practice (a) reduces net farm income or does not increase income enough to justify the added cost and (b) is not necessary for, or does not contribute to, erosion control.

This divergence of opinion might be accounted for in two ways, as a result of the (a) dissimilar situations on different farms or (b) conceptions of the farm operators. In reference to the effect on net income, it is difficult to conceive of a situation on any of the sample farms in which the judicious use of commercial fertilizers would not result in some increase in net farm income. It may, however, be true
that a farmer in a particularly tight financial position might have alternative uses for his limited capital which would yield a higher marginal revenue than would fertilizer.

Relative to the effect of fertilizer use on the rate of soil loss, generalizations are of little value. The situation obtaining on each field relative to soil type, slope, present condition (i.e. topsoil remaining, amount of organic matter and level of fertility) and present use all greatly influence the effect that fertilizer use has on rate of soil loss. However, again as with most other land-use practices, those farmers who are most critical of fertilizer use have had little or no

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Operators expressing each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>Landlord will not cooperate</td>
<td>13</td>
</tr>
<tr>
<td>Not necessary for erosion-control</td>
<td>19</td>
</tr>
<tr>
<td>Would reduce net income</td>
<td>31</td>
</tr>
<tr>
<td>Fertilizer is too costly</td>
<td>24</td>
</tr>
<tr>
<td>Intend to comply in future</td>
<td>13</td>
</tr>
</tbody>
</table>

aSome operators expressed more than one reason.
personal experience with the practice. Oftentimes, farm operators, who had used fertilizer to a very limited extent, knew neither the amount per acre nor the chemical analysis of the fertilizer they had applied. In general, improper use, rather than failure to use fertilizer, is the problem that will be of most concern in the future.

Agricultural lime

As in the case of commercial fertilizer, the general recommendations in the farm plans call for the application of lime on all soils as indicated by soil tests. The practice of liming has, apparently, very wide acceptance. Of all farm operators (see Table 27), only 9, or 10 percent, did not lime their soils. Of these 9 farmers, 4 stated intentions of applying lime in the future, and 2 others did not use lime because they were unable to gain the cooperation of their landlords.

Reasons for complying with recommendations relative to agricultural lime. As shown in Table 28, the two most frequently expressed reasons for applying lime are (a) increased income and (b) complementarity to establishing meadow seedings. These two reasons are closely associated in that the maintenance of a planned cropping sequences is dependent on consistently successful attempts in seeding grasses and legumes. These cropping sequences aid in maintaining soil tilth and fertility which contribute, not only to the yields of the meadow crops, but also to the yields of subsequent grain crops.
Table 27. Status of sample farms according to operators' compliance with recommendations relative to liming

<table>
<thead>
<tr>
<th>Sample categories</th>
<th>Practice applied as recommended</th>
<th>Practice applied but not recommended</th>
<th>Practice not applied</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Status I</td>
<td>16</td>
<td>84</td>
<td>3</td>
</tr>
<tr>
<td>Status II</td>
<td>13</td>
<td>65</td>
<td>7</td>
</tr>
<tr>
<td>Status III</td>
<td>13</td>
<td>65</td>
<td>5</td>
</tr>
<tr>
<td>Status IV</td>
<td>19</td>
<td>56</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>66</td>
<td>23</td>
</tr>
</tbody>
</table>

aAgricultural lime applied on all tilled soil as specified by soil test.

bSome lime applied but (a) not according to soil test and/or (b) not on all tilled ground.

cNo fertilizer applied.

Although Agricultural Conservation Payments did not appear to be an important reason for using lime, the current specification, that applications to qualify for payment must be made according to soil test, is presently having a very strong effect in inducing farmers to have their soils tested. Most farmers collected the incentive payments for liming but only 4 gave the subsidy as a determining factor in the use of agricultural lime.
Table 28. Reasons given by 65 farm operators for complying with recommendations relative to agricultural lime

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Operators expressing each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>Landlord bears the cost</td>
<td>12</td>
</tr>
<tr>
<td>Increases net farm income</td>
<td>63</td>
</tr>
<tr>
<td>Complementary to cropping sequence</td>
<td>47</td>
</tr>
<tr>
<td>Agricultural conservation payments</td>
<td>4</td>
</tr>
</tbody>
</table>

*Some operators expressed more than one reason.

Reasons for not complying with recommendations relative to agricultural lime. A rather small proportion of the farmers interviewed failed to use lime to some extent. A few tenant-operators had not applied lime to their soil because they felt that the landlord should pay for the cost and he had refused. In one instance, the tenant had offered to pay for half the lime but the offer was not accepted by the landlord.

On most farms, where the practice was rejected, the operators stated that no lime was needed on their farms, because they had no difficulty in establishing legume seedings and had seen no other evidence of hyperacidity. In some soils where tests were made no lime was recommended even though the field had not previously been limed. Such a test was in itself considered as full compliance with the recommendations.
Table 29. Reasons given by 26 farm operators for not complying with recommendations relative to agricultural lime

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Operators expressing each</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>landlord's responsibility</td>
<td>5</td>
</tr>
<tr>
<td>not necessary for conservation</td>
<td>14</td>
</tr>
<tr>
<td>reduce net farm income</td>
<td>8</td>
</tr>
<tr>
<td>cost is too high</td>
<td>4</td>
</tr>
<tr>
<td>intend to apply practice</td>
<td>4</td>
</tr>
</tbody>
</table>

*Some operators expressed more than one reason.*

**Barnyard manure**

Farmers generally are aware of the value of barnyard manure, particularly as an aid to increasing current production. Many farm operators also consider manure as having considerable value as an aid in controlling erosion on infertile, erosive soils. District recommendations as to the use of manure are the same for all farms. It is specified that all manure shall be spread on corn stalk ground before plowing or on permanent or temporary meadow at any time, except when muddy.

Reasons for complying with recommendations relative to barnyard manure. All farmers contacted reported that they spread all available
manure on their fields. As would be expected the major reasons for spreading the manure were (a) the increased production and income resulting from the practice and (b) complementarity to other erosion-control practices.

The yield-response from manure was considered by most farmers to be very good. This was particularly true on those farms on which commercial fertilizer is not used. Many of the respondents concentrated the use of manure on their poorer and most erosive soils; others attempted to cover all of their land at least once during each crop rotation. Either method was considered to be acceptable.

Reasons for not complying with recommendations relative to barnyard manure. Four of the farmers contacted had no livestock; these operators were not using the practice for the obvious reason that they had no manure to spread. The remaining three operators who were not following recommendations, hauled out their manure primarily to get rid of it. They spread the manure on the nearest field they could get into and occasionally resorted to the practice of dumping it into a ditch under the guise of controlling gully erosion.

Green manure

The general recommendations included with every farm plan direct that the last growth on temporary meadows be plowed under as green manure, if the hay or pasture is not needed for feed. Since a farmer's need for feed is a highly subjective thing, compliance or non-compliance
Table 30. Status of sample farms according to operators' compliance with recommendations relative to barnyard manure

<table>
<thead>
<tr>
<th>Sample category</th>
<th>Extent of compliance with recommendations&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Practice applied as recommended&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>No. of farms</td>
</tr>
<tr>
<td>Status I</td>
<td>16</td>
</tr>
<tr>
<td>Status II</td>
<td>16</td>
</tr>
<tr>
<td>Status III</td>
<td>17</td>
</tr>
<tr>
<td>Status IV</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
</tr>
</tbody>
</table>

<sup>a</sup>Data is for 89 farms; 4 of the 93 sample farms had no livestock and no manure.

<sup>b</sup>All available manure spread on cornstalk ground before plowing or on meadow at any time except when muddy.

<sup>c</sup>Available manure spread, but not according to recommendations, usually on nearest field.

<sup>d</sup>Manure allowed to accumulate or dumped in ditches.

With this recommendation was difficult to ascertain. For instance, a farmer's need for hay or pasture may be the result of his having sold hay or rented-out pasture. It can only be stated in general terms, that most of the farmers contacted stated that they did plow under green
manure when it was practicable to do so. However, further inquiry usually revealed that situations rarely arose in which such action was deemed to be practicable. It should be pointed out that feeding the crop, either as hay or pasture, and returning the manure to the soil in no way prejudices the soil-conservation program on a farm.
ADMINISTRATION OF THE DISTRICTS PROGRAM

The analyses in the previous chapters have indicated a number of factors existing on farms which, apparently, tend to inhibit the attainment of the objectives of the Soil Conservation Districts Program. The mitigation or removal of the impediments and resistances revealed is, to some extent, dependent on the nature of the organization, financing and administration of the Districts Program. In this chapter, an attempt has been made to (a) ascertain and analyze, conceptually, impediments to district progress which might arise in the administration of the Program and (b) devise means for the removal or mitigation of these hypothetical obstacles. As previously stated, this study has not thoroughly investigated the prevailing administrative practices and procedures. Therefore, the analyses in this chapter should be construed as neither an indictment of, nor support for, the program as presently administered.

For the purpose of analyzing the management activities of the Districts Program, the administrative processes have been divided, somewhat arbitrarily, into three stages (a) policy formulation, (b) policy execution and (c) policy control. It is recognized that, in the operation of an active program, all stages of administration are being carried on simultaneously. Substantive and procedural activities are inextricably intertwined. The break-down as presented above is only for convenience of analysis.
Under policy formulation has been considered basic substantive policies. These policies include determination of the objectives of the Program and their relative importance. Under policy execution has been considered management decisions of a more routine nature. That is, the establishment of procedures necessary to implement the more basic policies previously established. Finally, those administrative activities concerned primarily with the measurement of district accomplishments, the review of program objectives and procedures, and the guidance of district activities have been classified as policy control.

Policy Formulation

The Districts Program is conceived to be essentially a local responsibility. However, the initial motivations for the Program were not local. It was, instead, a product of the opinion held by national and state governments that soil conservation could best be promoted by local people organized into units of local government. Federal and state agricultural agencies have, therefore, felt it their responsibility to aid districts in becoming genuinely local concerns.¹

In line with the concept of districts as local units of government the Districts Law provides that "The governing body of the district shall consist of three commissioners who shall reside within the district ...."². General responsibilities assigned by law to the district com-

missioners are (1) to cooperate, or enter into agreements, with any agency, governmental or otherwise, or any owner or occupier of land within the district, as may be deemed necessary to further the purposes of the program; (2) to conduct surveys, investigations and research, relating to the character and control of soil erosion, in cooperation with the Iowa Agricultural Experiment Station; and (3) in cooperation with Iowa Agricultural Extension Service, to conduct demonstrational, promotional and educational activities for the purpose of increasing the participation of agricultural land users in the program of erosion control.

Although the district commissioners' functions of promoting and coordinating conservation efforts are of great, and perhaps crucial, importance to the program, their role as governors of the district will be of primary concern to us here. As cited above, the law specifically identifies the board of commissioners as the governing body of the district. However, provision is also made whereby "The commissioners may delegate... to one or more agents, or employees, such powers and duties as they may deem proper."¹ What administrative activities must be performed by the commissioners personally, if they are actually to initiate, supervise and control conservation activity? Conversely, to what extent should S.C.S. technicians advise and guide governing bodies in carrying on each of these activities, in the interest of maintaining minimum standards of adequacy in conservation treatments, and economy and

¹Iowa Code, op. cit., Section 467A. 6.
efficiency in the operation of the district administration?

In his discussion of these issues, Parks\(^1\) attempts to point-up aspects of the Program which are, theoretically at least, the personal responsibility of commissioners and administrative functions which may well be delegated to others (e.g. Service technicians). Are the governing functions of the district commissioners to be confined to policy making, or should they also carry on the routine management activities of the district? In setting district policies should the commissioners develop substantive policies, procedural policies, or both?

In the Districts Program, substantive policies consist of setting-up objectives, establishing emphases, and defining the bases for working agreements between farmer cooperators and the district. Procedural policies involve the development of the working processes for carrying the substantive policies into effect. Parks\(^2\) concluded that it is in the determination of what the nature of the districts' conservation programs are to be that farmer judgements will likely be of the greatest value.

The SCS has worked out various combinations of conservation measures and practices which are deemed technically satisfactory for the treatment of soil of each capability class. The Service is equipped to prepare land capability maps of the farms in the district and is technically capable of devising conservation farm plans specifying measures necessary to preserve the soil. There are, however, for each land class, several

\(^1\)Iowa. Code, op. cit., Section 467A. 6.
\(^2\)Parks, op. cit., p. 55.
alternative methods of achieving the objectives of erosion control. The farmer commissioners are, perhaps, in a better position than Service technicians to judge the palatability of various conservation measures in terms of the habits, attitudes and desires of local farmers.

Defining objectives

In a previous chapter it was suggested that the objectives (end-in-view) of the Districts Program should be clearly established as bases for planning and administration. The formulation of objectives of a public program involves primarily an interpretation of the enabling legislation to determine as precisely as possible, the purposes for which the program was established. Such a task must, it would seem, be performed by members of the governing body and cannot logically be delegated to others.

Discussions with administrators of the districts program, at both the State and district levels, revealed a two-phased objective of the program as conceived by them, as follows: (a) participation of all agricultural land-users in the district program (i.e. a basic conservation plan on all farms) and (b) the attainment of a safe level of erosion loss on all agricultural land. This objective is essentially as presented in the Districts Law which empowers districts and commissioners "To develop comprehensive plans for the conservation of soil resources and for the control and prevention of soil erosion..."

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1Iowa. Code, op. cit., Section 467A. 7.
Setting Emphases

Rarely have public programs a single purpose, and the Districts Program is no exception. However, multiple objectives are not necessarily detrimental to a program. In fact, where complementarity exists between objectives, integration of efforts toward attaining the complementary goals\(^1\) may increase returns from a given input of resources. If, however, all efforts toward multiple objectives are not completely complementary, and they rarely are, an order of priority or precedence should be assigned the various goals according to (a) the urgency of their attainment from the standpoint of society, (b) the extent of the public interest therein and (c) the social benefits expected from a given expenditure of public resources (i.e. the benefit/cost ratio). In this way, aspects of the program which contribute most to progress toward district objectives can be emphasized, and conversely, measures which promise to yield little in the way of such progress can be deemphasized.

In addition to the task of interpreting and defining the goals of the district, the commissioners are responsible for the determination of an order of precedence among the various objectives of the Program. The setting of major emphasis of the Districts Program is a fundamental policy decision which can properly be performed only by the governing body. Among the objectives of the Program specified in the Districts

\(^1\) An example of two objectives of the districts program which are largely complementary are (a) water-runoff control and (b) soil erosion control. The attainment of a safe level of erosion loss, on soils having an erosion hazard, entails control of water runoff. In turn, the prevention of excessive, or too rapid, water-runoff requires the application of mechanical erosion-control structures and/or the maintenance of vegetative cover.
Law are those of developing and restoring wildlife, water and soil resources. These are, in the long run, important goals. However, their attainment is, perhaps, of less urgency than the achievement of adequate erosion control. It is, of course, true that partial restoration of a badly eroded hillside is usually essential to the control of erosion on such a soil. Also the development of a marshy area on a farm might permit the shifting of exploitative crops from erosive soil. If, however, the prime objective of the Program is to prevent excessive erosion loss, then district resources should be utilized for other ends only to the extent that such activities complement the attainment of this principal end. In this chapter, district administrative policies and procedures will be evaluated in terms of their effect on the achievement of a "safe level of erosion loss" on agricultural land.

In Jasper District the commissioners selected the objectives which they considered the most urgent.

We feel it unwise to develop more land for agricultural purposes until population warrants it. Let us use the manpower to salvage our abused land and maintain our fertile soil.1 Assuming that the prime end-in-view of the Districts Program is the attainment of a safe level of erosion loss on every acre of agricultural land, it follows that the district programs should be organized and administered so as to maximize progress toward that end. Corollary benefits should, of course, be recognized as desirable but their attainment should be allowed to influence the administration of the

the latter situation exists whenever no economic problem exists on a farm or when the operator is willing and able to contract for a
and the land-use objectives of the district have already been achieved.

Equally wasteful of resources is the trend expenditure on a farm on which
promoting a conservation plan for a farm it would seem "when expended in developing a conservation plan for a farm"
they are practiced because districts resources are poorly allocated.
use practiced will be applied only when farm operators are convinced that
are effective only to the extent that they are applied to the soil.

Emphasis on the light of local attitudes. Exclusion-contour measures
are not in a good position to modify "correctly effective" SC5 measures
in carrying out recommended practices on their land. Farmer commitments
depend on the will of local farmers to expand_Iabor and other resources
the economic benefits of a district. Since the districts program is based upon the voluntary participation
soil on the farm is being shielded to recommended land-use practices.

a means of maintaining a farmer's current income while the exported
production rather than to resources conservation might also serve as
participation rather than to resources conservation might also serve as
participation rather than to resources conservation might also serve as
head in which farmer interest in the program might be heightened
a "compartent farm plan which might be worked out", or (b) on a "farming, "or "a plan which
conceptualized as an "exposing model" e) on a plan which
no exception problems or on practices which conflict with nothing to exception
is not unduly compromised. The use of district resources on land having
pragem only to the extent that the attainment of the primary objective

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quately without district assistance.

Policy Execution

The determination of basic district policy is clearly the prerogative, and the responsibility, of district commissioners. The execution of the policy formulated is much less clearly the duty of the board. Policy execution, as conceived here, involves administrative activities concerned with guiding operational activities, establishing working priorities and balancing the various phases of conservation activity. On the other hand, the fact that the commissioners do not make management decisions relative to deciding precisely where, or on what task, SCS technicians shall work on any given day, does not relieve them of the responsibility of ensuring that such decisions are made in the light of emphases laid down in setting major policies.

Guiding operational activities

In Jasper District the basis for district land-use recommendations for soils of various capabilities is the "Conservation Farming Guide" of the United States Soil Conservation Service. This study has not attempted to appraise the recommendations in the "Conservation Farming Guide" relative to their compatibility with public objectives of resource use. The various alternative combinations of land-use practices are presented as means of utilizing all types of soils "up to their capacities but within their capabilities." Whether the land-use practices
specified in the "Guide", and consequently in district farm plans, represent economic levels of conservation (i.e. maximization of net returns over time)\(^1\) has not been investigated in this study\(^2\). No attempt has been made to appraise the measures recommended. It has instead been assumed that the application of an acceptable combination of land-use practices and the consequent attainment of what is termed a "safe level or erosion loss" is in the public interest.

Although the recommendations in the "Guide" may, or may not, be economically optimum, some such device is essential. It is clearly necessary that the program have an operationally meaningful standard of land-use. Indispensable to the district administrators is a uniform guide for the day-to-day determination of conservation objectives for each acre of land within the district.

**Establishing working priorities**

The resources available to the Districts Program are definitely limited. Reports from Iowa districts indicate, in all cases, large backlogs of unserviced applications for assistance. The order in which such applicants are serviced has a great effect on district progress. A common method of assigning priority to requests for district assistance

\(^1\)Arthur C. Bunce. The economics of soil conservation. Ames, Iowa, the Iowa State College Press. 1942. p. 3.

\(^2\)Determination of the optimum rate of use of soil resources is limited (a) by the accuracy of society's prediction of future needs for agricultural products and future progress in agricultural technology and (b) by the accuracy of prediction of what society's time-preference is at any given time.
assistance. Presumably, such decisions would be made on the basis of
what other possible applications might be feasible with technical
means. The amount of assistance necessary for the effective appli-
cation of various measures is also important. Second, the district
must decide the effectiveness of each measure in the context of the
district objectives. Such a decision involves considering not only
on the basis of which measures would contribute most to progress toward
the treatment to emphasize. This decision should be made, presumably,
in the first place, the district should decide which particular con-
ceptual systems or family of practices should be established.
In contrast to the bases mentioned above, it would seem appropriate
apparent on the face of it, to be a quite different issue from group planning.
A few cases, the conduct of group meetings for education and promotion
and conservation plans as being for individual farms, not groups.
the final analysis, practices are recommended for farms, most of
for determining priority. Other bases would seem more appropriate. In
farm plans nor the number of applications in a group are essential criteria
However, it would seem that neither the completeness of commercial
are given preference over indument.
instances, groups of farmers to single-practice applications. In other instances,
are required. Some farmers are middle to the extent that farmers
In the simple procedure of selecting applications on a "first come, first

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(a) the urgency of the action contemplated (b) the readiness of the applicant to act on technically adequate recommendations and (c) the quantity of district resources required.

**Balancing conservation activities**

The task of administering a district's program is that of directing and encouraging conservation activities. Although the direction of district efforts is affected by all management decisions, maintaining the proper balance among the various phases of district activity requires a conscious effort on the part of district administrators. It is, for instance, readily apparent that efforts spent on devising farm plans yield benefits only to the extent that the recommended conservation treatments are applied. Consequently, planning must be balanced with application. Also, it is true that the establishment of conservation treatments on fields where erosion has not previously been adequately controlled is an important phase of a district's program. Of equal importance, however, is the maintenance of recommended land-use practices, once these measures have been established. Therefore, "new" planning should be balanced with maintenance of established plans.

The program's operational phases of farm planning, practice application and maintenance of erosion control measures are activities for which the districts organization was designed. But the major expenditures of capital and labor in conservation activity are made by individual farm owners and operators. Consequently, the progress made toward district
objectives will, in a large measure, be determined by the effectiveness of educational and promotional activities relative to the conservation of soil resources. The success of the program depends not on farmers' tacit acceptance of recommendations but on their active participation in applying conservation treatments.

In the operational aspects of a district's program, the administrators must balance farm planning with the application of conservation treatments. The Soil Conservation Service has believed that the most effective way of promoting soil conservation was by covering the districts as rapidly as possible with complete farm plans. On the other hand, district commissioners and individual SCS technicians appear to be much less enthusiastic about this approach.¹ In Jasper District, the administrators have wanted to increase the number of farm plans developed and accepted only to the extent that such action would increase the application of conservation treatments.

The technicians' time should be used as efficiently as possible in order to spread the effective conservation practices rapidly over a large number of acres. Simplification and brevity of procedure is necessary so that more time can be spent in the field.²

The responsibility of determining the time spent by Service technicians in planning, in application, and in maintenance is that of the district governing body.

¹Parks, op. cit., p. 71.

In 1945 the commissioners of Jasper District pointed to the need for an increased emphasis on maintenance work.

With the number of cooperative-agreement farms mounting in number, we see need for an SP-6 technician whose time will be used chiefly in follow-up work to rearrange plans for more or better conservation practices.¹

The optimum division of efforts between new plans and maintenance of old plans undoubtedly varies greatly between districts. Therefore, logic would indicate that the maintaining of proper balance between these two activities should be left largely to local discretion.

Local disinclination to permit farm planning to push too far ahead of application is soundly based. However, a similar inclination for slowing down education until operations catch up, if allowed to dominate, would probably result in retarding all conservation activity. Parks² concluded, and discussions with commissioners indicated, that in many instances, local incentive to push educational and promotional activities is not strong. The large backlog in the districts of unserviced applications for technical assistance has apparently discouraged educational work. Commissioners report that farmers who apply for assistance are impatient when there is a considerable delay before their application is serviced.

In view of their backlog of work, it is understandable that commissioners are reluctant to take action which would increase pressure for technical assistance. However, attempts to mitigate this situation by failing to develop educational and promotional activities seems ill-

²Ibid., p. 75.
advised. During the interrogation some indication was obtained of the extent of knowledge possessed by farmers of the conservation program in Jasper District. Only about 13 percent of the farm operators contacted were well acquainted with the program. Among farm operators not cooperating with the District, 80 percent had little or no knowledge of the program. It should be pointed out that Jasper was one of the early districts to be organized and has had an active program for over 13 years. Apparently, knowledge of, and interest in, soil conservation programs is confined to a relatively small percentage of farmers. Without continued educational work to develop interest among other agricultural land-users, sooner or later, conservation programs are likely to stalemate. Furthermore, educational efforts will, undoubtedly, result in some improvement in land use (e.g. by encouraging the use of less exploitive cropping sequences) without technical assistance from the district.

As mentioned previously, the Iowa Districts Program is based on the voluntary participation of agricultural land-users. Therefore, making farm people conservation conscious is, in the long run, of vital importance to the Program. Instead of reducing their educational efforts to alleviate the pressure for technical services, the districts might better be more discriminating in their acceptance of applications. District attitude on this proposal seems to follow this line of reasoning. Districts are public agencies, therefore, each and every farm operator has an equal right to the services of the district. Such reasoning probably is the justification for the "first come, first served" method of assigning
priority to applications for assistance. However, this rationale appears invalid. Although the districts are public agencies, they were not organized to serve only agricultural land-users. They were established to serve the public in general by aiding and encouraging the development, restoration and conservation of soil resources. If, as we have assumed, the most urgent of the district objectives is the conservation of soil resources, then priority should be assigned the various applications on this basis. District resources should be allocated to restoring and developing soil resources only when such action is the most opportune method of promoting soil conservation (i.e. reducing rates of soil erosion).

The district's program should concentrate its efforts on achieving its primary goal. Perhaps technical assistance should be restricted to assisting in the application of, say, mechanical erosion-control practices until such requests are all serviced. Even among such requests, an order of precedence might be assigned according to the seriousness of the erosion problem.

That applicants for assistance in constructing a farm pond or tiling-out a marshy area become impatient and lose interest is perhaps not of crucial importance at the present stage of progress of the Districts Program. On the other hand, it is recognized that the Program's progress is almost totally dependent on the good-will of local farmers. Apparently, the "first come, first served" basis for allocating priority fits the standards of equity of farm people. Changing to a different basis could result in the Program incurring the ill will of
present and prospective cooperators. The transition cannot be profitably made on the basis of an administrative edict but must be made gradually in conjunction with considerable educational effort.

Policy Control

The board of commissioners is, legally, the policy-making body of a district. If the districts are to be genuine local agencies, as they were originally envisaged, the commissioners must not only make basic policy decisions but must also make certain that the policies established by them are carried out. Furthermore, in the interest of improving with experience and of making shifts in the program in response to changing environment, administrators must strive always to determine the effectiveness of the district policies and procedures instituted.

Measuring district accomplishments

To intelligently guide conservation activities, the State Committee and district commissioners must have means for appraising their program. A measurement of district accomplishments in achieving program objectives is essential to the district administrators. This study has assumed that the primary purpose of the districts program is to achieve adequate erosion control on all agricultural land. If this assumption is valid, a report of district performance, to be most useful, should provide information on actual progress being made toward that end. Commissioners can easily determine the time spent by district personnel on various activities and the specific tasks performed by the district. On the other
progress report of the district's efforts in an account of the various

In addition to an enumeration of farm plans developed, the annual

treatment to be applied

Of equal importance is the answer to, when and how well, are the conse-

duced adequate to reduce soil loss rates to permissible maximums
what "level" was the farm planted? In other words, were the practices

heaved on the farm? Were soil test rates excessive prior to plant-

be obtained to a number of questions. For instance, what is the es-

are encompassed. Because any estimate can be made of the effec-

straightforward depends upon a number of factors beside the number of

as already noted, the planning of a farm may have greater or lesser

the district objective.

It does not, however, reveal the entire picture of progress made toward

treaty. It shows how district and SCS personnel are spending their time

all of the information is of interest to adapt-

and (c) number of acres

its own reports, recommendations recommended and

are encompassed by the plan? (d) the number of farm plans developed, (e) number of

The general procedure is to sum of reporting district accomplishments

this latter type which actually measures district progress.

In terms of soil loss is much more difficult. Yet, it is information of

hand, to accurately ascertain the effects of such activity upon

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tion treatments applied. However, the figures reported are gross, not net. For instance, the number of acres on which contouring is established is given; but the number of acres on which contouring was abandoned is not reported. Conceivably, abandonment could exceed establishment.

One other major weakness of information regarding the application of specified measures is that erosion-control practices are generally applied in combinations, not singly. Furthermore, they are applied to specified fields not just to soil, in general. A given application of an erosion control measure, say contouring, may or may not result in a lowered rate of soil loss on a field. If, for instance, a meadow is plowed and planted to an intertilled row-crop, such tillage, even if on the contour, would quite likely result in a higher loss rate than obtained prior to plowing and contouring. There is no way to determine, from the information given, whether the application of mechanical erosion-control measures are, or are not, accompanied by more intensive cropping sequences. In short, a summation of practices applied provides an indication, but only an indication, of district progress.

Allocation of resources

Since the Districts Program is an integration of federal, state and local governmental agencies, resources are available from all three levels. The federal government through the SCS provides the Districts Program with technical personnel and the equipment used by them. In fiscal 1954, and again in 1955, expenditures of the Service in support
of the Iowa Districts Program have been approximately $1,700,000.¹

These resources are allocated directly to the individual districts, at
the discretion of State and Area Conservationists of the SCS, pre-
sumably on the basis of the relative needs of the districts.

State funds are allocated to the various districts by the State
Committee. The first State appropriation for allotment to individual
districts was $500,000 for the 1949-51 biennium. This fund has been
increased $100,000 by each succeeding legislature and is $600,000 for
the current (1955-57) biennium. Of these funds, $50,000 per year
($500 per district) are earmarked for the payment of district commis-
sioners' mileage and expenses when on official business, and for other
items used in promoting soil conservation within the districts. The
remainder of the money is allotted to districts by the State Committee
and is used by the district commissioners for employing additional
personnel to help in the district programs.

In addition to the funds mentioned above, the State Committee,
itsel£, has received an appropriation for the administration of the
program each year since its organization in 1939. The original appro-
priation for the 1939-41 biennium was $5,000. The administrative fund
has expanded with the program to $45,000 for the current (1955-57) biennium.
This money is used for salaries of state office personnel, per diem and
travel of State Committee members and for other necessary expenditures

¹This figure was estimated by the Iowa Office of the SCS and is
an approximation only. Excluded are expenditures in support of the ACP
and watersheds programs (e.g. Little Sioux project).
for administering and promoting this Program as authorized by State Law.

No local unit of government makes direct monetary contributions to the Iowa Districts Program. However, local governmental and private agencies and individuals do assist materially in the promotion of the district programs. Moreover, extremely important contributions are made by local farmers. As previously mentioned, farmer commissioners administer the program. They receive remuneration only for travel and expenses incurred in the conduct of district business. Furthermore, in almost all Iowa districts, other farmers, designated as assistant commissioners and group leaders, render valuable assistance at the neighborhood levels. Finally, the contribution which undoubtedly exceeds all others in magnitude is that made by the farmer cooperators. Equipment, money and labor necessary to apply conservation treatments is provided, for the most part, by the individual land-users. Of course, to the extent that Agricultural Conservation Incentive Payments go to district cooperators, the expense of the treatments are borne partially by the Federal government. However, on a proportional basis such contributions are relatively small. Only in the case of lime application did any of the farmer respondents in Jasper District give such payments as being the deciding factor in the application of a conservation treatment.

The allocation of resources between and within districts is probably the most effective administrative tool available for the guidance and
control of Program activities\(^1\). However, the major portion of the public resources of the Program are allocated to the districts by individuals other than the administrators of the Districts Program. As noted previously, the largest public contribution is controlled by the SCS. Furthermore, incentive payments for conservation treatments are administered by ACP. The ASC establishes criteria for the assignment of acreage quotas in production control programs. In none of these areas is the State Committee or the district administration given a primary policy-determining role.

Few would argue that district activities are not influenced, and in some cases predetermined, by the decisions of these other agencies. To illustrate, the ACP makes incentive payments for tiling. The SCS is charged with the responsibility of furnishing technical assistance to farmers in the application of land-use practices for which payments are made. As a result, the SCS is required to keep a large staff of technicians in districts which have poorly-drained soils. Such soils (e.g. Webster series) are oftentimes level or gently rolling with only minor erosion hazards. Consequently, district farm plans are devised and established primarily for the purpose of increasing the productivity of these poorly-drained soils. As a result, district resources of federal, state, and local origin are committed to areas having minor

\(^1\)Within-district allocation of resources is determined by district policies relative to the assignment of priorities and setting of emphases. Since these factors have been discussed, this section will be restricted to problems associated with allocating resources between districts.
erosion-hazards.

It is not the purpose of this illustration to disparage such an allocation, but instead to point up the fact that district resources are in effect allocated to a large extent by persons other than district administrators.

**Reviewing objectives and procedures**

The agricultural industry is, perhaps more than any other, subject to unpredictable and uncontrollable variables. A conservation program, no matter how well conceived, will not long remain effective unless continuous adjustments are made in the light of changes in the agricultural environment. Because of such changes farm plans which were satisfactory to all concerned when devised will, in time, become obsolete or otherwise unsuitable. Conversely, recommended land-use practices which were at the time of planning unacceptable to a farm operator may, because of changes in the environment, become acceptable.

Dynamic factors in the agricultural environment which would tend to affect the Districts Program are: (a) natural phenomena, (b) technology, (c) price relationships, (d) tenure and (e) knowledge and preferences of agricultural land-users.

Natural phenomena such as adverse weather, noxious weeds, insects and plant diseases quite often disrupt a farmer’s schedule of land-use practices. For instance, the loss of a legume seeding, by whatever cause, will oftentimes divert a field from the recommended cropping sequence. Particularly with contour strip-cropping such a diversion
may necessitate a quite comprehensive readjustment of cropping practices
to maintain the effectiveness of the practice.

Another variable in agriculture is that of technological advances.
The influence of new developments generally vary greatly in their
effect on different farm enterprises. An example would be the develop-
ment of a higher yielding variety of a plant or of tillage or weed-control
practices peculiarly adapted to one crop. Such developments will, like
changing price relationships, alter the combinations of enterprises which
will be economically optimum. Similar in effect will be the acquisition
of new knowledge by farm entrepreneurs. Changing preferences of farm
operators are of equal importance. Many times, when a plan is initiated,
a farm operator will accept only part of the recommended land-use prac-
tices. As his knowledge and appreciation of conservation farming in-
creases, he may be willing to apply more and more of the measures re-
commended if encouragement and technical assistance are forthcoming.

Among the dynamic factors in agriculture, changes in tenure are
perhaps the most crucial to the Districts Program. As mentioned pre-
viously, uncertain or short expectancy of tenure would be expected to
discourage investment in land and encourage exploitation of soil re-
sources. This, in itself, would tend to impede district progress.
Furthermore, changes in operatorship or ownership on a planned farm
constitutes a time of crisis for the conservation plan. Land-use prac-
tices applied by one operator may be unacceptable to another. Only in
rare instances would the conservation plan devised for a landlord and
tenant be completely satisfactory to a subsequent owner or operator. Also,
the new entrepreneur may not be familiar with the land-use practices presently being applied. Almost certainly a change in either the owner or the operator of a planned farm will entail considerable activity by district personnel to ensure continued acceptable land use.

Although the rate of change in operatorship and ownership of farms varies over time, some indication can be gained of the size of this problem. In Jasper District, from 1942 to 1950, 52 farm plans were cancelled as a result of changes in farm ownership. This represents approximately one year's output of new plans and indicates a substantial problem which becomes increasingly critical to the district as more and more of the farms are planned. During the last decade, an annual average of 63 farms, per 1000 of all farms in the West North Central states, changed ownership.\(^1\) Assuming that this rate of turnover occurred in the 2696\(^2\) farms of Jasper County, approximately 170 farm transfers would have taken place per year in this one district.

The above figures deal with only one aspect of the problem of changing tenure. Quite often on rented farms, operators change without a change in ownership. In some respects such a change may be more crucial to a conservation plan than is a change in owner. It is the operator who must, in most instances, actually apply the recommended

\(^1\) Agricultural Statistics. U.S.D.A. 1954. p. 435. Farm ownership changes in this area, which includes Iowa, varied, during the 10 year period 1945-54, from a high in 1947 of 82.7, per 1000 of all farms, to a low of 42.7 in 1954.

practices. It is he who must, for instance, till the soil on the contour and lift his plow out of the ground as he crosses the grassed waterways. Furthermore, as compared to a new owner, a new tenant, because of generally shorter time-interest and shorter planning horizon, may be more inclined to exploit investments in land made by previous entrepreneurs.

No completely reliable figures are available as to the rate of change of operators on Iowa farms. Data available relative to stability of tenure are, for the most part presented in terms of years of occupancy to date. However, the U.S. Census of Agriculture does report the number of farm operators who have occupied their present farm for one year or less. Approximately 7 percent of all farms in the State had had a change in operator within the 12 month period prior to the 1950 census.¹ In Economic Area 5 which includes Jasper District the percent of all farms undergoing such a change was 6.8 percent. On farms operated by full owners the percentage turnover was 4.3 percent, for part-owners 3.1 percent, and for tenants 10.1 percent. If these percentages were applied to Jasper District, they would indicate that 115 of the 1141 tenant-operated farms had a change of operator in 1949. On the same basis the turnover of operators on all Jasper farms would have numbered 193.

That changes in tenure constitute a serious problem at the present level of progress in the district program is readily demonstrated.

¹As compared to data from previous censuses this was a year of relatively high stability of tenure. Comparable figures from 1920, 1930 and 1945 are 7.7 percent, 11.9 percent and 14.4 percent respectively.
As of June 30, 1955 Jasper District had 612 basic farm plans. This excludes plans which were accepted but subsequently cancelled. Using, for illustrative purposes, the percentage changes for 1949, which as previously mentioned, was a year of considerable stability as compared to others of the last 30 years, an expected annual turnover of entrepreneurs can be shown. Assuming that the State figures, previously presented, apply to the planned farms in Jasper County\(^1\), this District could expect a change of operator on about 42 planned farms per year. The significance of these figures becomes evident when compared with the annual output of basic farm plans, which averages about 50 per district. As the program progresses, the time will quite likely arrive when the prevention of retrogression in the district's program, resulting from changes in tenure alone, will entail the expenditure of more resources than is used in devising plans for farms not previously planned.

\(^1\)It is recognized that stability of tenure is probably high on planned farms as compared to all farms but this difference will become progressively smaller as larger and larger proportions of the farms are planned.
CONCLUSIONS AND RECOMMENDATIONS

This study has attempted to (1) ascertain and analyze the principal obstacles and resistances which have impeded the work of the Iowa Soil Conservation Districts Program, (2) discover and develop means for the removal or mitigation of these obstacles and resistance, (3) suggest measures for implementing the conclusions and recommendations revealed and developed in the first two parts, and (4) provide information for further study, particularly in the area of district administration.

In this investigation answers to two questions were sought: Why do some farmers participate in the Program while others do not? And of those farmers who do participate to the extent of initiating a district plan on their farms, why do some achieve the district objectives of erosion control while others fail to apply acceptable land-use practices? To pursue both phases of this study, it was necessary to draw samples of farms from two populations. One population, from which 34 farms were drawn, was defined as all farms in Jasper District over 50 acres in size which had not been planned by the District. A second population includes all farms planned by the SCD prior to June 30, 1950. This latter population was stratified into the three categories, according to the extent of progress which had been made toward district objectives. A random sample of 20 farms was drawn from each stratum. Analyses were made of data, concerning the farm operators and the farm businesses, which were obtained by personal interview from the farm operators. The owners of rented farms were not interviewed.
the response to instruction plane on small frame in due to macrocephas

than measures recommended. If these results are representative, perhaps one from larger frame test will from the extent of application of consumers 100 acres which were planned were not shown to be statistically dixter under the same frame of cooperators. However, the small frame (under non-cooperators were on the average 44 acres of 25 percent smaller determinent to progress toward program objectives. The same frame of the data obtained indicated that small size of farm is a strong

crop productivity and (b) Investrook programs.

farms operated, (2) leading to improvement on rented farms, (3) potential
farm operated, (1) farm size in acres, (2) ownership-interested of the make Investrook. The characteristic of frame test is the following factors. The characteristic of frame test is the following factors. D/category of application of recommended conservation treat. Factors were analyzed in terms of the effect on farm size, (a) acceptance.

In the investigation of characteristic of the farm frame, various

Program objectives

with the direct action program do not adequately facilitate progress toward

hypothesized that certain of the administrative practices and procedures meetenence to comply with direct action objectives. Initially, it was as well as their preferences and habits, are attentive many insured by

the program. Secondly, the present level of knowledge of farm operators, first place, certain characteristics of farm businesses tend to impede

direct programs were considered to stem from these sources. In the the program. Finally, state conservation district's program, obstacles to

factors occurring both on and off farm frame affect the progress.
on the part of farmers. In other words, the effect on costs and net income
of implementing the recommended practices may not be as unfavorable as
the operators of small farms are inclined to believe.

The districts have not the means to launch a concerted effort toward
enlarging farm enterprises. On the other hand, where farm size is a
problem district officials can point out to prospective cooperators means
by which farm operations might be enlarged. In some instances enlarge-
ment can be accomplished by acquisition of additional land by rental or
purchase. Or the land presently in the farm might be used more inten-
sively. Mechanical erosion control practices, tilling and commercial
fertilizers permit more intensive use of land without causing soil deteri-
oration. One other common way of increasing the size of operations on a
farm is to shift from cash-grain to emphasis on livestock enterprises.
The method by which any particular farmer might acquire or maintain an
adequate income from his farm depends, of course, on his preferences,
abilities and opportunities. These are factors which farm planners must
take into account when devising farm plans.

Much of the responsibility for public action aimed at encouraging
the acquisition by farmers of adequate-sized units must be assumed by
agencies other than the district. The solutions for problems of this
nature lie primarily in the realm of education and credit. But it might
be profitable for the program if district personnel acted as intermedia-
tories between their present and prospective clients and the Extension
Service, public schools and private and public credit agencies. The
operators of small farms could best be served by a combination of educa-
tional efforts and adapted credit coordinated with farm plans tailored explicitly for each individual situation.

All farm operators hold some rights in the land which they occupy. None has rights which are absolute. The extent of the rights held by farm operators range from a fee simple title, through a life estate, a long-term lease and down to a one-year rental agreement. In general, it can be assumed that the length of an individual's planning horizon on a farm is closely associated with the extent and permanence of his rights in the land. Investments in land which are expected to yield benefits over a period of years are not likely to be financed by an individual with a planning horizon of one year. Furthermore, individuals are likely to be reluctant to pay the entire cost of an investment from which they can expect to receive, for whatever reason, only a fraction of the returns. For these reasons, obstacles to the districts program are likely to occur wherever the costs and benefits of recommended land-use practices are to be divided between individuals (e.g., owners and operators).

Therefore, it is not surprising that owner-operated farms appear more likely to be planned than do tenant-operated farms. Much of the problem of determining equitable shares of costs and benefits of land-use practices is avoided under owner-operatorship. Whereas 81 percent of the sample cooperators are owners, part-owners or related tenants, only 63 percent of the non-cooperators have an ownership-interest in their farms. Conversely, tenant-operated farms comprise 34 percent of the sample cooperating farms, 41 percent of all Jasper County farms and 50 percent of the sample non-cooperating farms.
In general, if the application of a particular land-use practice is profitable to the firm, knowledge of that fact would be sufficient to gain its adoption on an owner-operated farm. However, on a rented farm, before any major change in land use if initiated, the owner and operator must arrive at a mutually acceptable arrangement for sharing the costs and benefits of such a reorganization. Where the tenant and landlord are closely related, the resolution of such problems may be simplified to the extent that personal considerations tend to transcend those of a financial nature.

On rented farms, the leasing arrangement is apparently a critical factor in determining the extent of compliance with district objectives. Leasing arrangements tend to be set by custom established over many years. Consequently leases are generally very rigid. They are not readily adaptable to reorganizations such as are often recommended in conservation farm plans.

Generally speaking, leases would be expected to impede district progress less and less as they approach business partnerships. In the prevailing livestock share arrangements, most costs and returns are shared equally. The financial interests of a farm owner and tenant are identical with the interest of their firm to the degree that costs and returns are shared alike. However, a different situation arises when the tenant or the landlord bears the cost of any input and the returns are not shared in the same proportion. Under such a set of conditions the best interests of the firm might be quite different from the interest of each individual involved. A tenant-operator would be inclined to minimize inputs from
which the proportion of the costs incurred by him were greater than the proportion of benefits received by him. The landlord would be expected to act in like manner. In other words each would attempt to make management decisions on the basis of his own instead of the firm's benefit/cost ratio.

As indicated above, the common type of leasing arrangement which most nearly approaches the equal sharing of costs and income is the stock-share lease. Considerable evidence was provided by this investigation that such leases do provide good bases for achieving district objectives on rented farms. Over half of the sample cooperating farms which were tenant-operated had stock-share leases. By way of contrast, only 18 percent of the non-cooperating farms were being operated under stock-share leases. Generally with this type of leasing arrangement the tenant's labor, and sometimes his machinery, is balanced against the owner's land. After this initial agreement is reached it is customary on farms having such leases that all, or nearly all, of the enterprises on the farm are joint endeavors of the tenant and landlord. Furthermore, the two parties usually share both expenses and income of all enterprises on a 50/50 basis.

From the standpoint of a conservation program the crucial decisions under such an arrangement concern the determination of which of the recommended measures are investments in land and which are production practices. Such a distinction is essential. Since the landlord furnishes the land he would logically be expected to pay in full for investments in land. On the other hand, the cost of production practices would be shared by the tenant. No clear criteria have been developed for determining which
inputs are purely investments in land and which are purely production practices. In the long run, any expenditure on land which has the effect of increasing the net product of the land can logically be considered to be a production practice. Following this line of reasoning, tiling is a production practice which yields returns over a period of perhaps 50 years. Applications of terraces, agricultural limestone, rock phosphate, commercial nitrogen, and hybrid seed corn yield the major portion of their benefits over progressively shorter periods of time. Methods of determining which inputs are considered to be production practices are arbitrary. Commonly so classified are those practices which yield the major portion of their benefits during (a) one crop year or (b) one complete crop rotation. A third method which might be more applicable to conservation farming would be to consider as production practices all inputs whose major benefits would be realized within the planned horizon of the tenant. As a supplement to this method, compensatory clauses could be included in the lease. In this way the tenant could be assured of prorated reimbursement for expenditures from which substantial benefits are realized subsequent to his period of tenure.

Research is being conducted to determine the carry-over effects of inputs of commercial fertilizer. Similar data would be useful as aids in prorating the effects of other practices such as contour tillage, strip cropping, terracing, tiling, green manure and barnyard manure. The principle means by which the obstacles inherent in tenant operation might be overcome would appear to be in research and education. Agricultural land-users must be provided with information from which they can make
the basic soil material, particularly on shallow soils, often results in
the other hand, excessive soil loss is subject to permanent damage. Less
exceed the cost of maintaining the soil in the optimum productivity state
and fertility of such a soil, the cost of conservation would probably not
practices may affect adversely the structure, organic matter content,
not deter by under any system of land use, while excessive use
accounts for in general, land which is not subject to erosion does
of land being properly utilized is numerous precautionary measures of
development of surface water. A mention of precautionary measures
will set deter the process in some useful practice from erosion caused by
agreements as necessary step in achieving desired objectives
consider the lease as an integral part of the farm plan at least, adequate
which such agreements are reached, the discretion should, it would seem,
with the leasing agreement is the tenant's<br>
and benefits. Since the leasing arrangement is the<br>
agreements can in certain circumstances be done deliberately, the tenant
should not agree to change in the farm organization. Second, after
unique on tenant-operated farms. In the strict place, two or more inviting.
In summary, these are implement program, which are
specify cooperative effort to identify and<br>
instances, encouragement and assistance will need to be provided to pro-
many of these cooperative efforts. Learning experience and practical experience in
agreed upon an extension of the amount and timing of<br>
reasonable estimates of the amount and timing of benefits realized from
146
in a permanent reduction in soil productivity. Where complete restoration is possible (e.g. in very deep loess) the cost of rejuvenating severely eroded soils is likely to greatly exceed the cost of maintaining a desired level of productivity.

If, as we have assumed, the problem of the district is primarily one of preventing excessive soil loss, the kind of soil being brought under approved land use is as important as the number of acres treated. The data indicate no significant difference on the average between the soils on planned and unplanned farms. But considering only the planned farms, those on which district objectives were most nearly achieved tended to be low in inherent productivity and have highly erosive soils. Over 60 percent of the Status I cooperators operated farms of low capability while only 15 percent of the Status III cooperators were on low-capability farms. On the other hand, 80 percent of the Status III farms were classified as being highly productive as contrasted to only 5 percent of the Status I farms so classified.

Apparently district farm plans are practical and workable on farms having low inherent productivity and serious erosion problems. In view of the very real contribution made by such a plan when implemented, considerable effort is justified in gaining the initiation of plans on such farms. Applications for assistance on erosive soils should be given high priority by the district.

Not only should every effort be made to gain the initiation of conservation plans on farms with highly erosive soil, but also, once initiated,
to some extent, are detected in the age of owners and operators, as well as
instance, the length of the planning horizon or maturity, which are,
important but were not adequately tested in the investment.
For factors other than those mentioned above underlaid of considerable
extent the land-use practices,


...
From this investigation, two reasons stand out as the most important:

action which will best encourage compliance with district recommendations
apply, especially land-use practices. Its basic in determining course of
reservation measures. However, the reasons my Farm Bill apply, do fall to
be a general rule, the application of not one but a combination of con-

The attainment of program objectives on any given soil requires:

- Attitude of conservation programs on their farms

Another factor not listed directly is that of the place of residence

- needs to be done in this regard

a great deal more

try to encourage conservation measures. Therefore a great deal more

of the financial position of the water and operator. Public and private
versely, farmers who had not accepted district recommendations believed that (a) their present land-use practices would adequately conserve soil resources and (b) the suggested conservation measures were uneconomic.

Among the recommendations investigated in this study were those related to field boundary layout. The manner in which the fields on a farm are laid out does not in itself affect the rate of soil loss. Also, from the standpoint of gaining acceptance, the recommended layout cannot depart radically from the owner's and operator's preferences. On the other hand, in relation to field layout a very important objective in erosion control is the attainment of homogeneity as to land capability within the boundaries of each field. Soil homogeneity permits the application, throughout each field, of a uniform set of land-use practices which will utilize the soil of the entire area to the extent of its capabilities without exceeding the capacity of any part.

Oftentimes homogeneous soil areas on a farm are smaller than a farm operator is willing to till as separate fields. In such cases, the farm planner may need to lay out larger fields which are more or less heterogeneous as to land capability. He may then compensate in the farm plan for the soil heterogeneity by recommending proportions of tilled crops or intensity of mechanical practices for the entire field which will safeguard the most erosive soils in the field. In some fields, a better alternative might be the application of more intensive mechanical practices (e.g. terracing in addition to contouring) on the more erosive soils but treat the entire area as a unit relative to cropping sequences.
Since capability of soil tends to conform rather closely to the percent of slope, the boundary between two land capability classes often times lies on the contour. Consequently, the application of recommended field boundary arrangements is usually complementary to contour tillage. Separation of fields on the contour tends to minimize point rows with contour tillage but increase point rows with straight farming. Consequently, few operators who are not farming on the contour will accept district field-layout recommendations. Information of a promotional and educational nature should stress the complementarity of contour tillage and contour fencing.

Basic to the conservation of land resources is the nature of the cropping sequences being applied on the various soils. In general, increases in the proportion of meadow crops and decreases in the proportions of row crops on erosive land will result in a reduced rate of soil loss. Cropping sequences which aid in erosion control and are also productive income-wise should be encouraged. Long rotations (e.g. C-C-C-M instead of C-M) minimize (a) meadow seeding costs and (b) acreages of low-income but erosive small grain crops. At the same time acreages of corn are not reduced. The 6-year sequence of crops, given as an example above, lends itself well to conservation farming (e.g. strip cropping) and yet is highly productive on erosive soils.

Recent experiments have indicated that high-capability soils can be cropped much more intensively (e.g. continuous row crops), without damage to the soil than had previously been concluded. Further investigation of this possibility is indicated. On many farms excessive erosion might
Many times the reasons given by costs and benefits of a given practice seem to be incorrect or at least not supported by clear evidence. For example, operators appear often to reject conservation measures to the extent to the use of mechanized conservation equipment seems to such sweeping changes seems not supporting but inadvertent. Still, such action of the crops produced that there should be resistance to such further necessary change in tillage equipment for efficient use.

Any consequent good tillage but also often entails quite considerable by a farmer increases not only a basic change in the deep tillage to what acceptance and application of such mechanized conservation practices the application of contouring, contour-stripe, or terracing or terracing. The farmers seem to resist strongly changes in tillage practice such as the consequent with recommended contouring sequences and the production and utilization of wheat crops will add the district in grain—any information provided to farmers relate to the economic potential increase in grain crops the perception will be to increase of current extensive and costly public programs designed to the farmers operators seem to be reluctant to apply mechanized equipment not evident or changed by shifting how crops from extensive to non-intensive
farm operators for failing to apply land-use practices are in complete variance with experimental data and the experiences of other farmers who have applied the practice under similar conditions.

The contention that many farmers reject recommendations on an irrational basis is not to imply that there are not valid reasons for some individuals' failure to apply specific land-use recommendations. Perhaps they have no assurance of receiving the benefits from such an investment. Or, other alternatives might promise a higher return. In fact, some of the recommended land-use practices may not be profitable to the firm. In such a situation, if society wants the practice applied, public subsidization would seem to be the answer.

In some cases, the application of a conservation measure promises to be profitable for an individual and he is fully cognizant of that fact; but because of limited capital he is prevented from applying the practices. Obstacles of this kind can best be overcome by the provision of appropriate credit. If the capital rationing is internal (i.e., failure of an individual to invest capital available on appropriate terms) improved credit facilities will not remove this impediment.

Education of agricultural land users relative to the consequences of continued excessive erosion loss and the benefits to be derived from sound land-use practices is essential. Continued search for improved methods of controlling erosion and wide dissemination of such information will contribute materially to the districts' progress.

Many previous investigations have studied problems relating to on-the-farm impediments and resistances to the application of conservation
The district's program is conceived to be essentially a local

The appendix contains a schedule detailing the details of the program at the school district level.

The growth of the program at the school district level should be based on:

- An evaluation of the effectiveness of the program at the school district level.
- An analysis of the effectiveness of the program at the school district level.
- An analysis of the effectiveness of the program at the school district level.
- An analysis of the effectiveness of the program at the school district level.

The study has attempted to do this, for the most part.
In general, it would seem that district components should be con-

section 5. Previous to the proceedings, establishing emphasis and attitude
of substance, policy and practice to the activities set up goals, as

the establishment of specific policies and procedures to the extent neces-

guaranteed and control of district activities to the extent necessary to

certified primarily with the setting of basic substantive policies and the

or necessary, do the components perceive the district program,

use in the district to assist and advertise the components their expec-

posed by their own components, do the components perceive

meetings? Does the chairman have an agenda for each meeting which is

to the components attend and conduct frequent regularity scheduled

to the components' activities from answers to the following questions:

the means. Moreover, a good interaction can be obtained of the com-

tions as a rector which cannot be measured in a competency

the extent to which district components actually make policy de-

components are implemented as prescribed.

components of the responsibilities of the deputy to-day management decisions are made by others does not reflect the

e.g., the district components of the SC(5). Therefore, the fact that

processes for carrying the substantive policies into effect and could

use of processence to the objectives, establishing emphasis and attitude

of substantive policies concern or setting up goals, as

ensure that the established policies are implemented. The establish-

sent of substantive policies concern or setting up goals, as

In general, it would seem that district components should be con-

work plans, annual plans of work and annual reports and in so dota-

be the components perceive the district program,

use in the district to assist and advertise the components their expec-

posed by their own components, do the components perceive

meetings? Does the chairman have an agenda for each meeting which is

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In general, it would seem that district components should be con-

work plans, annual plans of work and annual reports and in so dota-

be the components perceive the district program,

use in the district to assist and advertise the components their expec-

posed by their own components, do the components perceive
in the light of new knowledge and changing environment? Unless districts' commissioners are performing these functions local control is more fiction than fact.

Policy might be defined as the direction and guidance of efforts toward consciously determined goals. As policy makers the first order of business for district administrators would seem to be the determination of the goals of the program. All other policy decisions will be influenced to a greater or lesser degree by what the program is attempting to accomplish. The objectives of any public program are presumably set out in the enabling legislation. However, goals as set out in legislative acts are usually of a general nature. It is necessary for the program administrators to carefully interpret these social goals and to devise more specific ends which will provide guidance for policy decisions. In principle, it is immaterial whether the primary objective of the Districts Program is the attainment of a safe level of erosion loss on all agricultural land, as assumed by this study, or is some other end. It is important, however, that a primary objective be carefully chosen and that policy decisions are made in the light of such a goal. A clear understanding of the purposes of the Districts Program on the part of the administrators, present and potential cooperators and the public in general is essential to continued progress.

In addition to a primary objective, the Districts Program has secondary goals. In the interest of rational decision-making the objectives of the program should be assigned an order of precedence. Priority should be assigned various activities according to (a) the urgency of
their attainment from the standpoint of society, (b) the extent of the 
public interest therein and (c) the social benefits expected from a 
given expenditure of public resources (i.e. the benefit/cost ratio). In 
this way, aspects of the Program which promise to make important con-
tributions to district progress can be emphasized, and conversely, 
measures which promise to yield little in the way of such progress can 
be deemphasized.

It is recognized that the work loads in Iowa soil conservation 
districts are very heavy. Most, if not all, of the districts have a 
large backlog of unserviced applications for assistance. Consequently, 
if one aspect of the program is to receive additional emphasis, unless 
additional resources are forthcoming another must be deemphasized. 
However, any agency's case for more resources is strengthened if maximum 
benefits are being derived from the resources presently available. Maxi-
mum progress is achieved whenever a program's resources are optimally 
allocated. Questions which represent tests of resource allocation often 
seem unanswerable; however, they are answered - correctly or incorrectly, 
consciously or unconsciously - every time a policy decision is made. It 
is of paramount importance to the Districts Program that available re-
sources are expended in such a way as to maximize progress toward Program 
and social objectives.

In general, the resources of a district will be allocated by admin-
istrative decisions of four types. In the first place, the administra-
tors must decide the relative emphasis to be placed on the various district 
activities. They must balance activities of an operational nature with
education and promotion. Second, within the area of operations, decisions must be made as to which conservation measures are to be given precedence and in what order applicants for assistance are to be serviced. Third, the district administrators must decide the relative proportions of district resources to be spent on planning and on application of land-use practices. And finally operational efforts must be divided between the establishment of new farm plans and the maintenance of plans already established. Further investigation is needed to develop criteria for guiding district commissioners in the balancing of the various district activities and the assignment of working priorities.

Of fundamental importance to the administration of the districts program is a means of accurately measuring the progress made toward the program objectives. Various activities, practices and procedures can best be judged in the light of their contributions to such progress. It is beyond the scope of this study to devise specific means for reporting districts’ progress. However, reports based on net gain in conservation would seem to be indicated. Not only should progress reports give the recommended land-use practices newly established but they should also report the discontinuance or retrogression of previously established conservation measures. Furthermore, land-use practices which are applied should be categorized in the reports as to their adequacy in erosion control. Such a categorization should take into account (a) the other land-use practices with which the reported conservation measure is applied and (b) the extent of the erosion hazard on the particular soil being treated.
The compilation of reports as described above will necessitate at least an annual personal contact with each district co-operator. However, this function can be performed in conjunction with another perhaps even more important activity, plan maintenance or follow-up.

Continual revision of plans to meet changing circumstances and fuller knowledge of the situation is an important part of the planning process. A sound concept of conservation is one which equates it with efficient management, that is, efficient use of resources. Agriculture operates in a dynamic environment, as a consequence the bases on which farm management decisions are made are constantly changing. For instance, natural phenomena such as adverse weather, plant diseases or insects may destroy new seedings and disrupt cropping sequences. Or a conservation plan might be made obsolete by technological advancements and other factors which result in changing price and cost relationships. Other factors which are likely, after a time, to make a farm plan unsatisfactory are changes in the knowledge and preferences of the owner and operator. And finally changes in tenure on a planned farm will almost surely necessitate adjustments in the farm plan to fit new tenure arrangements or to suit the preferences of the new owner and operator.

Changes of the owner or operator on a planned farm are particularly crucial for the conservation farm plan and for the district program. The establishment of recommended land-use practices on a farm usually entails a considerable expenditure of time and money on the part of both the district and the owner and operator. Conservation measures, such as terraces, grassed waterways, permanent meadows, contour fencing, etc.,
are oftentimes applied at considerable cost only to be abandoned or destroyed in one simple operation by new farm operators.

As a result of the instability of the agricultural environment, no conservation farm plan, regardless of how well conceived, will serve indefinitely as an adequate guide to a farm operator unless adjusted in the light of current developments. Whether or not districts "follow-up" their farm plans, adjustments will be made by farm owners and operators whenever the recommended land-use practices cease to fit the current situation. However, the adjustments are not likely to be made with due regard to Program objectives unless district technicians participate in the adjustment, at least in an advisory capacity.

As more and more conservation plans are initiated, a larger and larger proportion of district resources must be utilized in the maintenance of established plans. In 1954, there was a change of operator on an estimated 183 Jasper County farms. Assuming the same rate of change on planned farms, the district had 42 new operators to contend with in 1954. Other farms had a change in ownership with no change in operator.

An annual contact with the operator of each planned farm would seem to be essential for a continuing sound districts program. A special effort should be made to reach every new operator prior to the start of spring field work. Although present progress reports do not give proper credit for such activity, the saving of a farm plan which would otherwise be abandoned is an important contribution to the program. In fact, the saving of a farm plan is no less important than the establishment of a
new conservation plan of equal effectiveness.

Follow-up or plan maintenance as described here would be a major activity of the district. A very substantial amount of time and effort on the part of the district staff would be required to service established plans. However, as previously suggested, the two functions of (a) determining the "level" of conservation being attained on each farm and (b) providing advice and guidance in the application and adjustment of conservation recommendations could be combined into one visit by district technicians.

In light of the limited empirical data available, recommendations from this study relative to the administration of the districts program are of a tentative nature. There is much evidence that the program as presently conceived is basically sound and administratively workable. Certainly, a great deal of progress in erosion control has been made in the nation and in Iowa. On the other hand, Program objectives have not been fully achieved. It is not surprising, however, that much remains to be accomplished in light of the magnitude and persistence of the problem of soil deterioration and the limited resources available to the Districts Program.
ACKNOWLEDGMENTS

The author is indebted to the Iowa State Soil Conservation Committee which initiated and supported this study, and in particular to Frank Wagner, Committee Chairman, and Othie R. McMurry, Executive Secretary, who rendered invaluable assistance throughout the investigation.

The contributions of the United States Soil Conservation Service were substantial. Frank Mendell, State Conservationist, arranged for the soil mapping of several thousand acres of land in the farms of non-cooperators. Ivan Salmons, Assistant District Conservationist for Jasper District, devised conservation plans for the farms of the sample non-cooperators and also made adjustments in the plans of the sample cooperators in order to attain a uniform level of planning throughout all sample farms. John Wilson, Jasper District Conservationist, cooperated in the design and conduct of this study and made a valuable contribution to the investigation.

A special debt of gratitude is owed to the Jasper District Commissioners who not only readily permitted the study to be conducted in their district, but also were most cooperative in providing advice and assistance and in making district records freely available.

The author is particularly grateful to Professors John F. Timmons and W. Robert Parks who gave generously of their time and efforts in guiding the conceptual analysis and the conduct of the investigation as well as assisting with constructive criticisms in the preparation of this manuscript.
APPENDIX

District Administration

District __________________________ Office Held ____________

Name ______________________________ Address __________________________

Location of residence ______________________________

1. What is your age? ____________ years

2. How long have you been a farm operator? ____________ years

3. How long have you operated a farm in Jasper County? ____________ years

4. How much land do you have:
   a) own? ________________ acres
   b) operate? ________________ acres
   c) rent in? ________________ acres
   d) rent out? ________________ acres

5. Average number of livestock per year:
   a) dairy cows ________________
   b) beef cows ________________
   c) other cattle ________________
   d) hogs ________________
   e) sheep ________________
   f) chickens ________________

6. Average cropping program
   corn ________________ acres
   oats ________________ acres
   wheat ________________ acres
soybeans ___________ acres
permanent pasture _______ acres
temporary pasture _______ acres
other ________________ acres

7. Sales or purchases of feed, average per year

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<thead>
<tr>
<th>Feed</th>
<th>Sale</th>
<th>Purchase</th>
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<tbody>
<tr>
<td>corn (bu.)</td>
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<td>oats (bu.)</td>
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<td>roughage (tons)</td>
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<tr>
<td>pasture (unit months)</td>
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</tbody>
</table>

8. What business interests, other than farming, have you?

9. Participation in community activities.

<table>
<thead>
<tr>
<th>Organization</th>
<th>Office Held</th>
<th>Term</th>
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<tbody>
<tr>
<td>co-op</td>
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<tr>
<td>Grange</td>
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<td>Farm Bureau</td>
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<td>Church</td>
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<td>Church organization</td>
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<td>School Board</td>
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<td>PMA</td>
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<td>Issak Walton League</td>
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<td>County</td>
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<tr>
<td>Township</td>
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</tbody>
</table>
10. What are the District goals
   a) for the whole district?
   b) for any individual cooperator, farm, or acre of land?

11. How are you going to be able to tell when the goals have been reached?
   a) for the District?
   b) for an individual unit?

12. What are the advantages to a farmer of being a district cooperator rather than merely working through the PMA program?

13. Are there any conflicts between the goals of the District and the goals of other public or private organizations?

<table>
<thead>
<tr>
<th>Organization</th>
<th>Conflict</th>
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<tr>
<td>SCS</td>
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<td>PMA</td>
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<td>FSA</td>
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<td>Extension</td>
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<td>Farm Bureau</td>
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<tr>
<td>Co-op</td>
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<td>Farmers Union</td>
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<td>Grange</td>
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<td>Voc. Agr.</td>
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<tr>
<td>Civic Groups</td>
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</table>

14. Is there duplication of effort among any of the above organizations?
   a) If so, which organizations?
b) In what way do they duplicate each other?

15. What have been the effects of production controls on the district program?
   a) on planned farms?
   b) on getting new cooperators?

16. How should production controls be designed and administered so that they correlate with soil conservation programs?

17. In your opinion what responsibilities do District Commissioners have to help non-cooperators with conservation?

18. How are you helping non-cooperators?

POLICY MAKING

We have attempted in this questionnaire to divide the work of the Commissioners into two categories, policy-making and administration. First, I'd like to find out something about your work in setting District policies; we'll discuss your administrative duties a little later.

PROGRAM EMPHASIS

19. Which specific conservation practices are being emphasized in this District?
   a) List (Rank as to importance)

       ____________________________

       ____________________________

       ____________________________

   b) How does this emphasis differ for "single-practice" cooperators?

20. Who selected these practices?

21. What were the bases for their selection?
22. How is this emphasis
   a) put into practice?
   b) enforced?

23. In what ways have the Districts policies relative to emphasis changed
during the life of the District?
   a) as to which practices are emphasized?
   b) as to the method of enforcing the emphasis?
   c) why were the changes made?

Minimum Requirements

24. What policies have been established in the way of minimum requirements
    which farmers must meet before receiving District assistance?

25. How were these policies developed?

26. How does the District enforce compliance with minimum obligations
    of cooperators?

27. What other types of enforcement measures would you advocate?

28. Would you favor the Districts’
    a) requiring cooperators to maintain permanent practices
       established with government assistance?
    b) requiring all farmers (including non-cooperators) to
       maintain certain minimum standards of land use?

29. What minimum standards should be set?

30. How could such requirements be enforced?

WORKING PRIORITIES

31. What are the bases for determining which applicants for assistance
    are to be served first?
32. Who determines working priorities in the District? 

33. Is this priority system written out or is it just an understanding between the commissioners and the technicians? If written out, where? 

34. Do the District Commissioners take an active part in making priority decisions in cases? If so, how? 

35. What changes have been made in priority policies during the life of the District? 

<table>
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<th>Date</th>
<th>Policy Change</th>
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36. Why were the above changes made? 

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37. What are the requirements for a conservation group, as to 

a) Number of farms in the group? _____________
44. How much of a "breakthrough" (i.e., unexpected application) does the

BACKING

derivative have

a) from old cooperators

b) in the

Determine the following:

(1) explain your answer

(c) about equal

(d) less valuable

(e) more valuable

maintenance work compared with the time spent on writing new plans

As relevant to encountering sound land use, how does the time spent on

(1) rated to encountering sound and by whom

(c) what else is done in the respect and by whom

(b) with respect to action taken by civic personnel

(e) with respect to action taken by community

plane already in effect

Al. Describe the direct program for follow-up work or maintenance of

Follow-up and maintenance

approach

Al. In what way has the "single-practice" policy affected the group

Al. In what order are "single-practice" cooperatives received

99. How is it supported

which is supported, the development of the group approach

(2) the overall standard of getting the cooperation job done

(3) exceeded by the

(c) Exceeded head

(b) are
(3) Fve years ago?
(a) Did you receive technology assistance?
(b) New computer-farm-plan cooperators
(c) New single-practice cooperators
(d) New cooperative-farm-plan cooperators
(e) Did you receive technology assistance?

50. Who directs the educational program?
59. Who formulates the educational program?
49. Of what does the district's educational program consist?

definition of education

47. From the standpoint of a full conservation district, what is your

Education and Promotion

b) Five years ago?
(a) Five years ago?

46. How does this matter compare with the

weeks
weeks
weeks
weeks
weeks

expect to receive technical assistance?

46. How long from the time a farmer applies to the district can he

(d) From new cooperative-farm-plan cooperators
(c) From new single-practice cooperators
(b) From new single-practice cooperators

52. How are the educational activities of the District coordinated with the educational programs of other public agencies and private groups in the District?

53. How are the educational activities of the District coordinated with each other and with the District's operations?

54. Is the amount and type of education determined in relation to the stage of operational "progress" and operational "backlog"?
   a) No? Why not?
   b) Yes? Explain
   c) Partly? Explain

55. In your opinion has the overall District program ever become unbalanced as to:
   a) education and promotion with planning?
   b) maintenance of old plans with writing of new plans?
   c) conservation planning with application of practices?

56. What was, or should be, done to bring the program back into balance?

57. Do you think it necessary that District Commissioners make a conscious effort to balance the various phases of District work?

58. What is now being done to keep the program in balance?

59. What else should be done?

Equipment Policies

60. What equipment does the District now own?

61. What other equipment has it owned in the past?

62. How was the equipment procured?
   a) Outright District purchase?
If so, where did the District get the money?

b) SCS grant

c) ________________________________

63. What is the procedure for disposing of equipment?

64. What is done with the money obtained:

a) from rental of equipment?

b) from sale of equipment?

65. Has the District used any Federal, State, or County equipment?

a) on what terms?

b) who negotiates for the use of such equipment?

66. Does the District contract for private equipment?

67. Is the proper equipment privately available in sufficient quantity to carry out the District work?

68. What steps have the commissioners taken to ensure that private contractors do acceptable work at reasonable prices?

69. Does the District have, or has it ever had, planting stock available for distribution? __________

If so, what is, or was, the basis for distribution?

MANAGEMENT ACTIVITIES

Work Load

70. Approximately how much time per year do you spend on each of the following commissioner duties:

a) Board meetings? ________________ hours.

b) Maintenance work? ________________ hours.

c) Working with new cooperators? ________ hours.
d) Working with non-cooperators? __________ hours.
e) ____________________? __________ hours.
f) Total?

71. How much of this time is spent in each season?
   a) Winter? ________ hours
   b) Spring? ________ hours
   c) Summer? ________ hours
   d) Fall? ________ hours

72. Have you found it necessary to curtail your other community and personal activities because of your commissioner duties? If so, explain?

73. On which of your commissioner duties would you like to spend additional time?

<table>
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<tr>
<th>Duty</th>
<th>Additional Time</th>
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<tr>
<td>a) _____________________</td>
<td>________ hours</td>
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<td>b) _____________________</td>
<td>________ hours</td>
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<tr>
<td>c) _____________________</td>
<td>________ hours</td>
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74. Would you be in favor of increasing the number of commissioners?
75. To what numbers? ________________

76. What would be the advantages of such an increase?
   a) Better representation of farmers of the District?
   b) Reduce the work load of the present commissioners?
   c) ________________________________
   d) ________________________________

77. Would you favor increasing the number of assistant commissioners?
   Why or why not?
78. Is the District staff adequate?
   a) Technical
   
<table>
<thead>
<tr>
<th>Type of worker needed</th>
<th>Number</th>
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   b) Clerical
   
<table>
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<tr>
<th>Type of worker needed</th>
<th>Number</th>
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79. Is the administrative work of the District divided among the Commissioners:
   a) on the basis of geography? How?
   b) on the basis of function? How?

80. What specific responsibilities and duties have been assigned to you?

81. How often does the District board meet?

82. What would you estimate the percentage attendance of commissioners at the board meetings?

83. Who else normally attends these meetings?
   a) Vocational agricultural instructors? No. ______
   b) County agent?
   c) Farm Planner?
   d) ____________

84. Who else is invited to attend?
94. How has the new single-payment assisted plan-exempting
funds been used?
93. What is the procedure for periodic review of plans already in effect?
92. What is the procedure for reviewing integral agreements from cooperative agreements?
91. What is the procedure for reviewing applications to the district?
90. What is the procedure followed in the preparation of the annual report of the district?
89. What is the procedure followed in the preparation of the annual district documents?
88. Who prepares the agenda for the meetings?
87. Do you have an agenda for each meeting?

86. Are any of the board meetings open to the public?
85. Are any of the district meetings open to the public?
84. Where does the board meet?
83. At the specific meeting?
82. Regularly
81. Regularly
95. What, in your opinion, are the most important limiting factors on District progress?

(Rank them in order of importance.)

a) _______________________________

b) _______________________________

c) _______________________________

d) _______________________________

e) _______________________________

96. Explain your answer to the above question?