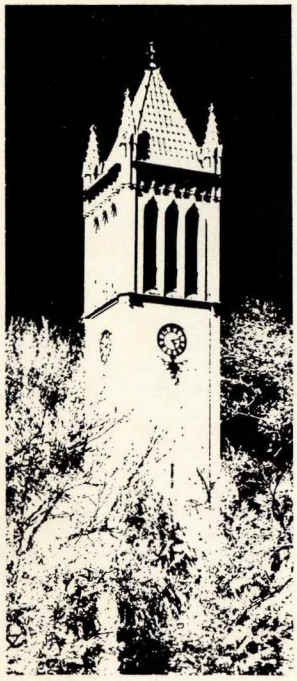

PRODUCTIVITY LEVELS OF SOME IOWA SOILS

by T.E. Fenton, E.R. Duncan, W.D. Shrader, and L.C. Dumenil

Department of Agronomy

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CONTENTS

SUMMARY

This report presents crop yield estimates for corn, soybeans, oats, and hay on 290 selected soil types and phases. These yield estimates are believed attainable as a 5-year average with the technology available in 1971 and average weather conditions.

Crop yield estimates have been established for all soil types and phases in Iowa. Because of lack of space, only about one-fourth of the total have been included here. The other estimates are on file in county extension offices, soil conservation district offices, and the Department of Agronomy, Iowa State University.

Crop yields in Iowa vary widely among soil types. Corn and soybean yields are more responsive to soil conditions, and oat yields are more responsive to weather conditions. Highest corn yields in Iowa are believed attainable on the Muscatine and nearly level Tama soils in east-central Iowa. Average attainable yields for Muscatine silty clay loam under high-level management are estimated to be 131 bushels per acre for corn, 50 bushels for soybeans, and 79 bushels for oats. Yields of all other soils are ranked below these corn and soybean yields. Crop yields may vary widely among soil types in the same year and also may vary widely on the same soil type between years. Only a few soils expected to yield less than 50 bushels of corn per acre are included in this publication.

Crop yields are influenced by many factors, such as soil type, slope, erosion, drainage, cropping pattern, fertility, crop variety, plant population, timeliness, and weather. Most of these have been taken into account in establishing the estimated crop yields.

The yield estimates are one important interpretation of the soil-survey program in Iowa. An additional interpretation is a system of rating soils based on their suitability for corn production. Each soil mapping unit is assigned a corn suitability rating, and the ratings provide an index for comparing all soil mapping units in the state. An individual corn suitability rating for a soil mapping unit reflects the integrated effects of numerous factors that influence the yield potential and use of the soil for row-crop production at a specified management level. The yield estimates and ratings basically reflect soil and weather differences and differences in response to technology. These interpretations can be used as aids in production planning, determining land prices, and the equitable assessment of agricultural land.

The assumptions used in establishing corn suitability ratings (CSR) are shown in Appendix A. The interpretation of the CSR values is based on research and best judgments from experience. Corn yields may seem somewhat low compared with reports, and soybean and oat yields may seem somewhat high. When comparable management is used on the three crops, under average weather conditions, the yields presented here seem realistic and attainable.

Productivity Levels of Some Iowa Soils[1, 2]

T.E. Fenton, E.R. Duncan, W.D. Shrader, and L.C. Dumenil[3]

Value of agricultural lands is determined, in part, by consistently attainable yields. Some soils and crops respond to modern technology more readily than others, and high-level management allows the expression of the higher yield potential.

Iowa has had an aggressive soil-survey program for more than 60 years. As research on characteristics of soils provides more information about soils, knowledge of their suitability for different crops and different uses becomes more precise. The soil surveys, with the resulting soil maps and interpretations, provide increasingly useful information to the farmer, the urban developer, the forester, the recreation planner, those responsible for determining valuations, and many other users. One of the interpretations of research and soil mapping is anticipated crop yields. This publication presents a ranking of soil types and phases within different soil areas of the state and estimated yields for selected soils.

Crop yields today are an important factor in appraising farmland values, establishing rental arrangements, determining farm sale and loan values, and making assessments for taxation.

New developments may make any estimate of yields obsolete. New and improved crop varieties, tillage methods, or fertilizer programs may make higher yields possible. New diseases, insect pests, or weeds can result in lower yield. Any development affecting yield may have about an equal effect on all soils or may have a greater effect on some soils than others.

Factors and interactions of factors that determine crop yields are difficult to isolate and understand. Consequently, any yield estimates must be considered tentative, and revision will be necessary as new information becomes available. Since some soils respond to technology better than others, it is reasonable to expect that the yield spread between the better soils and the poorer soils will continue to widen. The result will be a wider spread in selling prices of land and in taxes per unit of land. This publication should be considered a progress report; it contains the most accurate information and best interpretative judgments available in 1971.

[1] Projects 1329, 1377, 1205, and 1764 of the Iowa Agriculture and Home Economics Experiment Station.

[2] The assistance of coworkers in the Department of Agronomy and of soil scientists of the Soil Conservation Service, USDA, in developing the material in this paper is gratefully acknowledged.

[3] Associate professor of soils, professor of soils, professor of soils, and associate professor of soils, Department of Agronomy, respectively.

The report is presented in three sections. The first section contains crop yield estimates and corn suitability ratings for the major soils in Iowa. The yields presented are believed attainable over a period of years by a capable farmer using presently available technology. The second section contains information on selected basic soil properties considered to have the most influence on crop yields. Fertility levels and recent crop yield data are discussed in section 3. The Appendix contains the assumptions used to develop the corn suitability ratings.

ESTIMATED CROP YIELDS AND CORN SUITABILITY RATINGS FOR SELECTED IOWA SOILS

Presenting the Yield Estimates and Corn Suitability Ratings

Table 1 shows the yield estimates for corn, soybeans, oats, and hay for 290 selected soil types and phases. Corn suitability ratings (CSR) also are listed for the soils. Many minor soils are not included because of lack of space. Yields have not been listed for soils estimated to produce less than 50 bushels of corn per acre.

The soil type number in the left column of table 1 is the designation used in 1971. Numbers on soil maps made before 1971 may represent a different soil type than that shown in table 1. Slope and erosion phases may also have different designations than those given. Interpretation of a soil map should be made using the soil mapping legend in effect for the time and area in which the soil map was made.

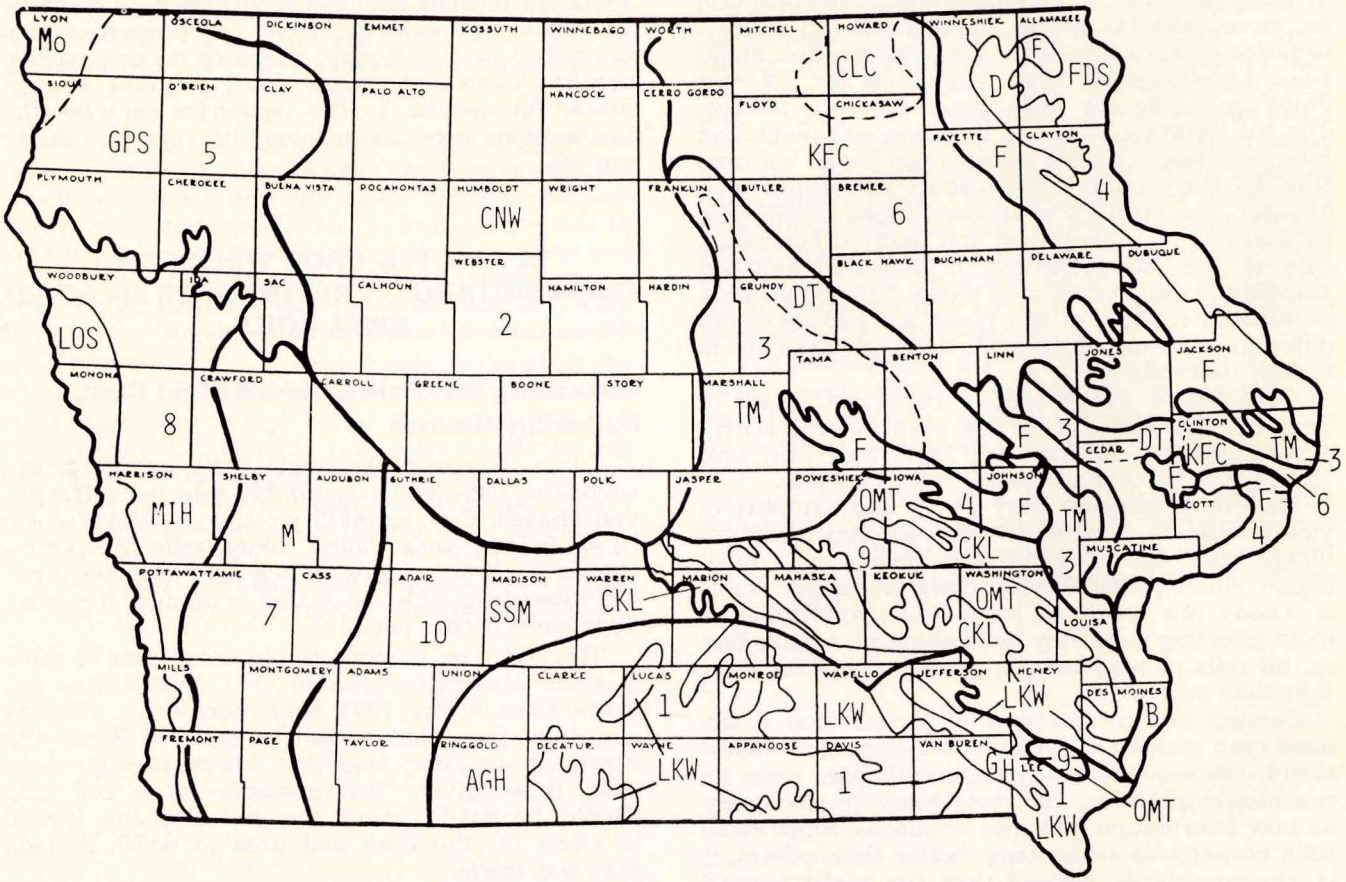
The yields presented in table 1 represent yields believed attainable with normal weather conditions for the 1971-75 period. The ratings and yields reported are for soil and weather conditions that exist near the geographic center of a particular soil-association area. Additional refinements of yields and ratings on an individual county basis have been prepared, but are not included because of lack of space. The refinements may be requested and for some soils are quite important. For example, Clarion loam, slope group A, erosion class 1, has a CSR of 87 in Webster County, near the center of the CNW association area. The same soil has a rating of 75 in Dickinson County in the northwestern part of the association area. In Polk County, the indicated soil has a rating of 91. Estimated crop yields have similar trends. These

differences in CSR's and estimated crop yields are due to the effect of weather on yield potential. Yields obtained in one year may vary considerably from the estimated yields at any or all locations and on many or all identified soils.

The yields presented require a high level of management and use of most known technology. High-level management assumes all necessary inputs or operations are near the optimum (most profitable) level. It is believed that the yields in table 1 can be surpassed appreciably in any year, but only a very small percentage of farmers is expected to achieve yields as much as 10-percent higher than those shown over a 5-year period.

In table 1, the soils are listed in alphabetical order within soil-association areas. The last section of this table shows selected soils that may occur in two or more soil-association areas. The heading for this section of the table is "Combined." Figure 1 shows the outlines of the soil-association areas. The numbers after the soil-association areas in table 1 refer to the areas outlined in fig. 1.

Figure 1. Principal soil-association areas of Iowa.



B SOILS OF MISS. BOTTOMLAND

..... TENTATIVE BOUNDARY

— GRADATIONAL BOUNDARY

___ ABRUPT BOUNDARY

AGH: ADAIR-GRUNDY-HAIG
ASE: ADAIR-SEYMOUR-EDINA
CKL: CLINTON-KESWICK-LINDLEY
CLC: CRESCO-LOURDES-CLYDE
CNW: CLARION-NICOLLET-WEBSTER
D: DOWNS
DT: DINSDALE-TAMA
F: FAYETTE
FDS: FAYETTE-DUBUQUE-STONYLAND
GPS: GALVA-PRIMGHAR-SAC
GH: GRUNDY-HAIG
KFC: KENYON-FLOYD-CLYDE
LKW: LINDLEY-KESWICK-WELLER
LOS: LUTON-ONAWA-SALIX
M: MARSHALL
MIH: MONONA-IDA-HAMBURG
Mo: MOODY
OMT: OTLEY-MAHASKA-TAINTER
SSM: SHELBY-SHARPSBURG-MACKSBURG
TM: TAMA-MUSCATINE

Discussion of Yield Estimates and Corn Suitability Ratings

The yield estimates and corn suitability ratings were developed in two phases. First, benchmark soils (soils comprising large acreages with considerable data available) were rated in terms of their suitability for producing corn and their corn yield potential. Research yields obtained from the corn yield study,[4] fertilizer and rotation studies, and the Iowa corn yield tests were considered, as was weather and farm management information. Personal knowledge of yields obtained by successful farmers was also considered. The Iowa corn yield study counties and the locations of the experimental farms are shown in figs. 2 and 3. The soil characteristics and management practices of each corn yield site have been observed for more than 10 years.

In the second phase, yields and ratings were developed for soils for which more limited data and yield information are available. Benchmark soils, a knowledge of soil characteristics and their effect on yield potential, and available data provide the basis for these estimates.

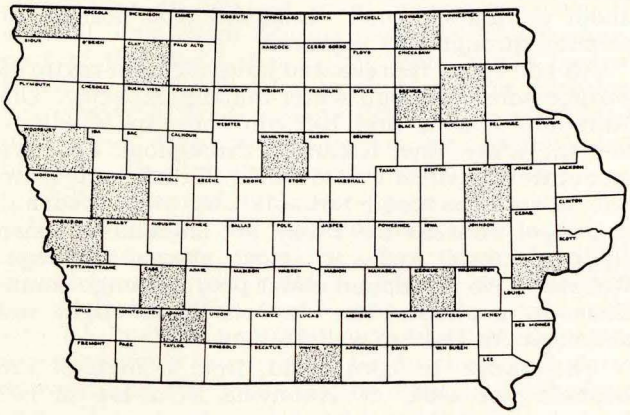


Figure 2. Iowa corn-yield-study counties.

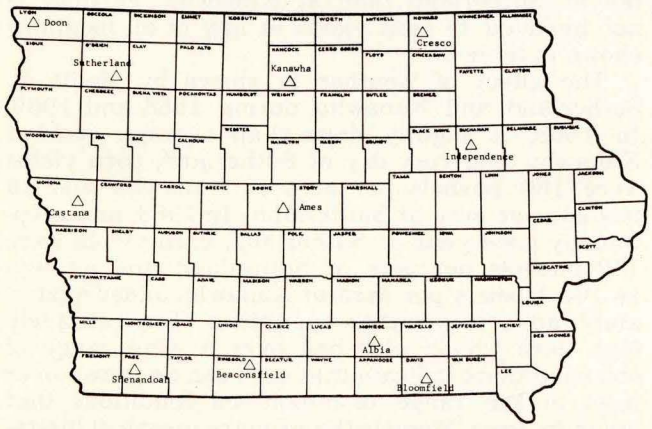


Figure 3. Locations of outlying experiment farms.

Soybean research yields for a period of years at several of the outlying experimental farms were considered. Yields from fertility and yield test sites also were considered. Again, the personal knowledge of successful soybean producers was considered. After careful study, the soybean yield estimates were established at 38 percent of the estimated corn yields. We recognize that more farmers have achieved or surpassed the estimated corn yields than have achieved or surpassed the soybean yields. Because of the success of a limited number of farmers over the state, we believe that management is generally higher for corn production than for soybean production. Technology is available, however, for achieving the estimated soybean yields. It may be somewhat more difficult to reach these yields in northern and especially northeastern Iowa than in other parts of the state.

Oat yields are more difficult to estimate because weather and diseases influence oat yields more than corn or soybean yields on the same soils. Taking into account the weather influence on oat yields, a factor of 85 percent of the corn yield was assigned to northwestern Iowa; 75 percent of corn for north-central Iowa and northeastern Iowa; 70 percent for west-central, central, and east-central Iowa; 50 percent for southwestern Iowa; and 55 percent for south-central and southeastern Iowa. The oat yield estimates thus obtained were checked against available research yields and observation of successful farmers and found reasonable and achievable.

Hay yields reported are for legume-grass mixtures, and they have somewhat less research and observations to verify their estimates. A factoring system also was used for estimating hay yields. A factor of 3.8 percent of the corn yield was used for western Iowa; 4.2 percent was used for the remainder of the state except for the poorly drained and the sandy soils. Factors of 4.0 and 3.6 percent, respectively, were used for these soils.

Estimated yields and ratings reported herein are for soil and weather conditions that exist near the geographic center of a particular soil-association area. Therefore, ratings and yields may vary within a given county and among counties within the same soil-association area. Details of the factors considered in the corn suitability ratings are shown in the Appendix.

The corn suitability rating system provides an index for ranking the soil mapping units, based upon their suitability for row-crop production in Iowa. An individual corn suitability rating for a soil mapping unit reflects the integrated effects of numerous factors that influence the yield potential and use of the soil for row-crop production at a specified management level. Soil properties and weather conditions are the dominant factors that affect yield potential. Slope characteristics are major factors that determine suitable land use. Slope gradient and slope length affect erosion rates, water infiltration, and ease and efficiency of machine

[4] L.C. Dumenil. Private communication. Project 1377, Iowa Agriculture and Home Economics Experiment Station. Ames. 1970.

operation. Guidelines used for soil-loss limits were published by Wischmeier and Smith (3). The ratings assume an adequate level of management, and, in addition, the following conditions are specified: (a) natural weather conditions (not irrigated), (b) artificial drainage has been provided where required, (c) soils on lower landscape positions are not subject to frequent damaging floods, and (d) no landleveling or terracing.

Additional factors to consider in the use of CSR's for land valuation are the size of the individual soil-mapping units and the combination of these units within a given area. For example, a small area of a soil with a high CSR may be surrounded by large areas of soils with much lower ratings. This combination tends to detract from the value of the soil area with the high rating.

Corn suitability ratings range from 5 to 100, with 100 reserved for those soils (a) located in areas of most favorable weather conditions for Iowa, (b) that have high yield potential, and (c) that can be continuously row-cropped. Muscatine silty clay loam, slope group A, erosion class 0 or 1, is an example of a soil with a CSR of 100.

Scholtes and Riecken (2) discussed the use of a corn suitability rating system for tax assessment in Taylor County, Iowa. In this system, 1 indicated the better soils for corn production.

The yields and ratings shown in table 1 are *estimates*, but the best estimates possible with the present information. Soils listed in table 1 represent about one-fourth of the soil units mapped in Iowa. County extension offices, soil conservation district offices, and the Department of Agronomy, Iowa State University, have CSR's and yield estimates for the soil units not shown in table 1. In addition, the yields and ratings are refined on a county basis as a part of the cooperative soil-survey program. (We believe that the CSR ratings will remain more or less constant in relation to one another, but estimated yields are expected to change with changing technology and weather conditions.

SOIL PROPERTIES

Some of the soil properties considered to have most influence on crop yields are shown in table 2. This information will aid in interpreting the yields shown in table 1 and, when combined with the CSR background information in Appendix, should give useful interpretative information. The soils in table 2 are listed alphabetically for the entire state.

FERTILITY LEVELS AND CROP YIELD DATA

Surface and Subsoil Fertility Levels

Fertilizer and lime applications over a period of years can alter the surface soil contents. Current methods of application for lime, P, and K, however, are not thought to alter soil-test values in the subsoil. A summary of soil-test results for surface soils by soil areas and county for the years 1964-67 has been prepared by Voss [5].

Each soil has its own inherent fertility characteristics in the subsoil. Subsoil levels of P and K have been studied in detail for many soils. Differences in subsoil fertility levels are considered in recommendations made by the Iowa State University Soil Testing Laboratory. Two soils may have similar soil-test values in the surface layer and receive different recommendations due to variations in subsoil fertility. A publication concerning the subsoil fertility levels of Iowa soils is being prepared and will be available in the near future.

Crop Yield Records from Long-Term Experiments

Ten-year average yields of corn, soybeans, oats, and hay from long-term experiments are presented in table 3. Records for corn, oats, and hay are available at 8 locations and, for soybeans, at 4 of these locations. The crops have been produced under as uniform good management as possible at all sites throughout the period.

All soil types represented have medium-textured surface soils and high water-holding capacity. The Marshall, Galva, and Kenyon soils are medium-to-moderately fine textured throughout and are moderately well to well drained. Grundy silt loam has a fine-textured subsoil and slow internal drainage, whereas the Edina silt loam has a dense claypan subsoil and very slow internal drainage. Webster soils developed under poor drainage conditions; in contrast, the Ida soils have slight soil development and are well drained.

The range in corn yield, from a high of 128 bushels per acre at Kanawha to a low of 107 bushels at Sutherland, seems closely related to weather differences for the 1960-69 period. Soil properties are favorable for growing corn on both the Galva and Webster soils, but there is less rainfall at Sutherland than at Kanawha. Fertility is not believed to limit yields at any of all locations shown in table 3.

The effect of weather is shown by yields at Sutherland and Kanawha during 1968 and 1969. In 1968, a slightly drier than average year at Kanawha and very dry at Sutherland, corn yields were 160 bushels per acre at Kanawha and 14 bushels per acre at Sutherland. In 1969, an exceptionally good year at Sutherland, corn yields were 152 bushels per acre at Sutherland and as high as 160 bushels per acre at Kanawha under moderately adverse weather conditions. The relatively high corn yields obtained over a wide range of soil conditions indicate that corn can be grown over most of the range of major soil conditions that occur in Iowa. Slope is the primary practical limitation.

The experiment on the Galva soil is the only

[5] R.E. Voss. Summary of soil test results, 1964-1967. Iowa Coop. Ext. Serv. ST-7. 1968.

one in which grain sorghum is grown. At this location, sorghum yields have averaged about the same as corn yields.

The percentage difference in soybean yields obtained on different soils is greater than is the range in corn yields. The highest average soybean yields, 43 bushels per acre, have been obtained at Ames, but almost equally high yields, 39 bushels per acre, have been obtained at Kanawha. These yields are some 60 percent higher than the 27-bushel-per-acre average yield obtained on Edina silt loam at Bloomfield. The cause of this difference in soybean yield is not understood, but it probably is related to differences in soil properties and moisture relationships.

Oat yields are related more to area or weather as it affects disease incidence or maturity than to soil properties. In general, oat yields are low in southern Iowa regardless of soil type as compared with northern Iowa. All oat yields are relatively low as compared with the yields of corn or soybeans.

Hay yields range from a high of 4.5 tons per acre on the Grundy soils at Beaconsfield to a low of 2.3 tons on Ida silt loam in western Iowa. In general, hay yields are lower in the drier western part of the state than in the more humid central sections. Edina silt loam is an exception, with low hay yields in southeastern Iowa because of frost heaving of deep-rooted legumes and stand losses because of poor drainage on the claypan soil.

Yields obtained by farmers have increased greatly for all crops, but yields of corn have increased more than have yields of other crops. In 1950, 5-year-average corn yields for Iowa were 48 bushels per acre; by 1966, the 5-year-average corn yield was 81 bushels per acre; and in 1969, the state average corn yield was 98 bushels per acre, approaching the yield on the experimental plots. Yields were sharply lower in 1970 due to unfavorable weather and disease.

Oat yields increased from 39 bushels per acre for a 5-year average in 1950 to 48 bushels per acre in 1966. This compares with a 65-bushel average yield on the experimental plots. State average soybean yields for the 5-year period ending in 1966 were 28 bushels per acre, compared with 36 bushels per acre for the 10-year average yield on the experimental plots.

County Crop-Yield Data, 1964-1968

Five-year (1964-1968) average yields by county are shown for corn, soybeans, and oats in figs. 4, 5, and 6. Figs. 7, 8, and 9 present high and low year yields for the same years. The data were compiled from the Iowa Annual Farm Census. More detailed information about the soils listed in this report can be obtained from the publication, "Principal Soils of Iowa" (1) and from soil survey reports of the various counties.

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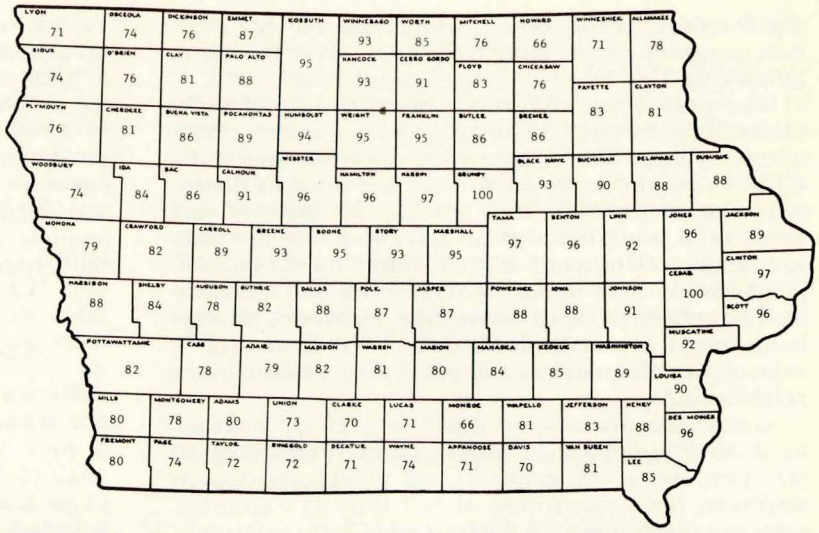

Figure 4. Mean corn yield (bu./A.) by counties for the period 1964-1968 (state mean = 86).

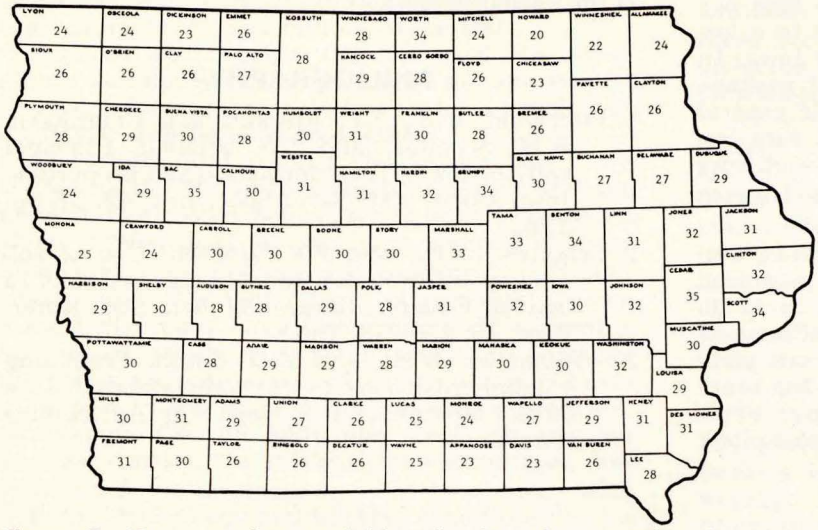

Figure 5. Mean soybean yields (bu./A.) by counties for the period 1964-1968 (state mean = 29).

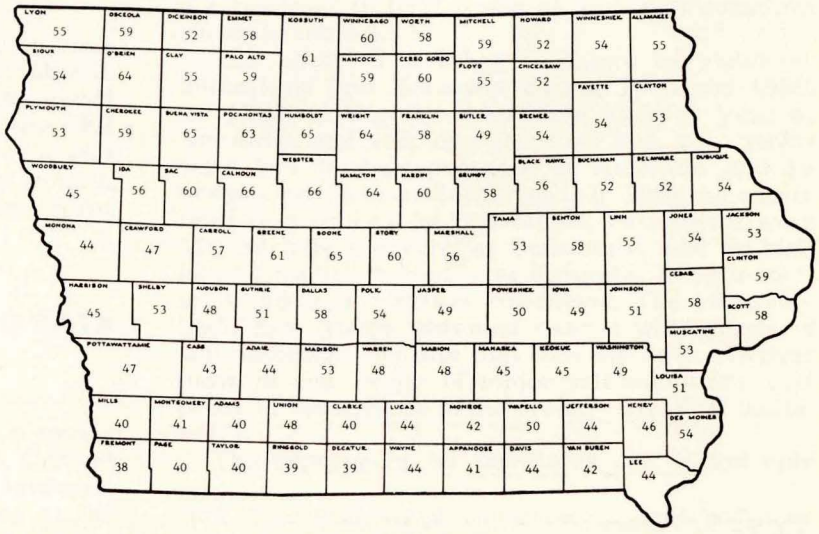

Figure 6. Mean oat yields (bu./A.) by counties for the period 1964-1968 (state mean = 53).

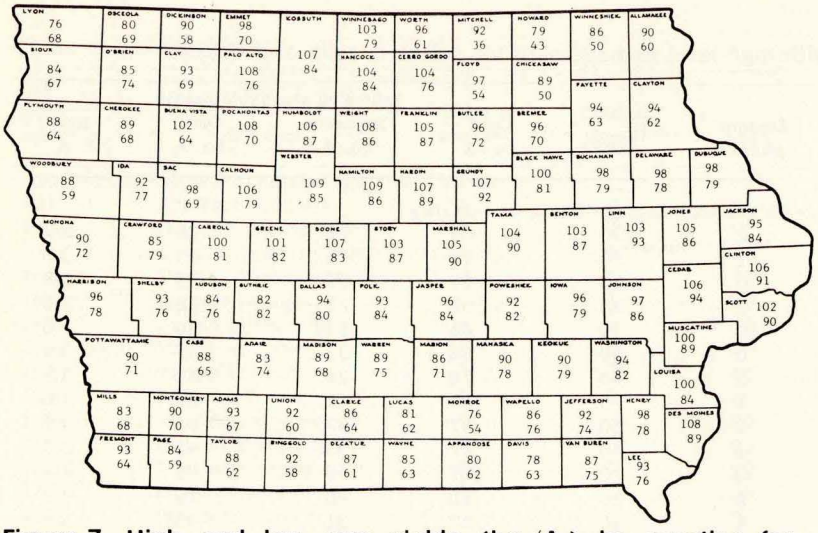

Figure 7. High and low corn yields (bu./A.) by counties for the period 1964-1968.

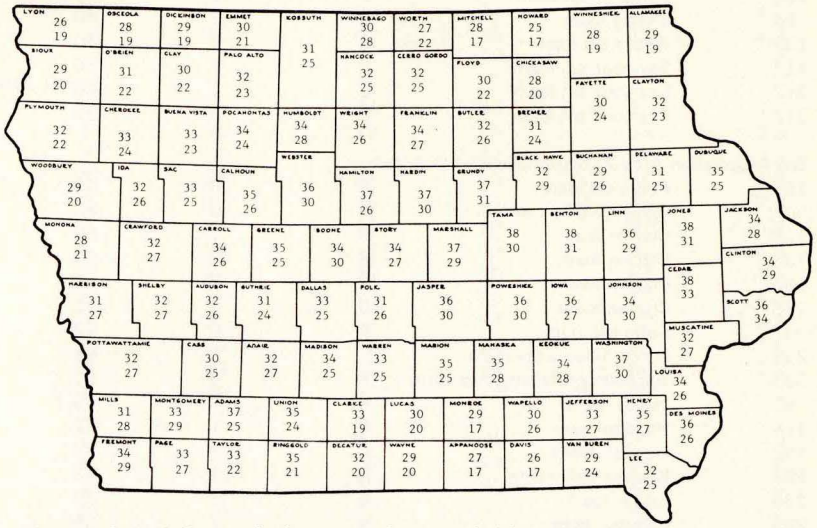

Figure 8. High and low soybean yields (bu./A.) by counties for the period 1964-1968.

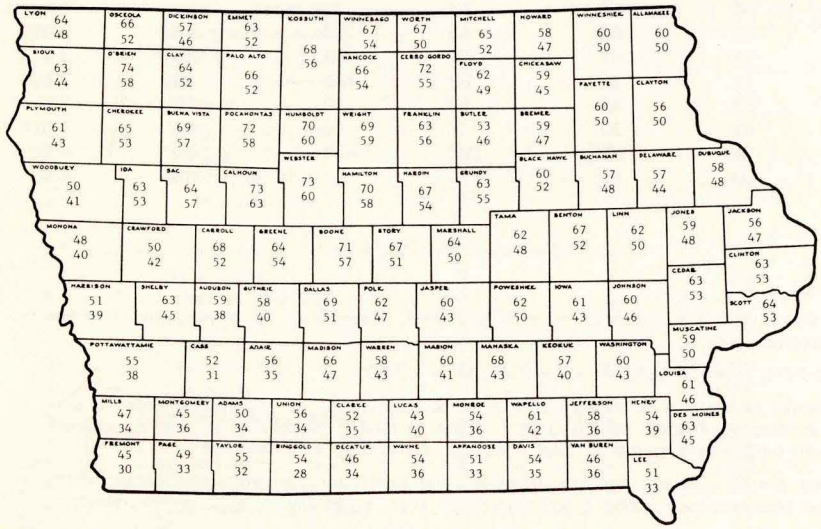

Figure 9. High and low oat yields (bu./A.) by counties for the period 1964-1968.

Table 1. Estimated attainable average yields with high-level management for selected soils and crops.

Soil type no.[a,b]	Soil type	Slope phase[c]	Erosion phase[d]	CSR[e]	Estimated attainable yields[f]			
					Corn bu./A	Soybeans bu./A	Oats bu./A	Hay T./A
Soil-Association Area 1: Adair-Grundy-Haig, Lindley-Keswick-Weller, Adair-Seymour-Edina, Grundy-Haig								
192	Adair clay loam	C	2	30	65	25	36	2.7
260	Beckwith silt loam	A	1	50	93	35	51	3.7
130	Belinda silt loam	A	0	60	97	37	53	3.9
451	Caleb loam	D	2	33	66	25	36	2.8
222	Clarinda silty clay loam	D	2	10	46	17	25	1.6
211	Edina silt loam	A	0	60	86	33	47	3.4
179	Gara loam	D	2	43	75	28	41	3.1
364	Grundy silty clay loam	B	1	75	107	41	59	4.5
364	Grundy silty clay loam	C	2	50	97	37	53	4.1
364	Grundy silty clay loam	C	3	40	87	33	48	3.7
362	Haig light silty clay loam	A	0	70	105	40	58	4.2
425	Keswick loam	C	2	10	53	20	29	2.2
531	Kniffin silt loam	B	1	50	82	31	45	3.5
592	Mystic silt loam	D	2	5	51	19	28	2.1
131	Pershing silt loam	B	1	65	101	38	56	4.2
532	Rathbun silt loam	B	1	40	76	29	42	3.2
24	Shelby loam	D	2	48	81	31	44	3.4
132	Weller silt loam	B	2	50	90	34	49	3.8
312	Seymour silt loam	B	1	60	88	33	48	3.7
312	Seymour silt loam	C	1	40	83	32	46	3.5
312	Seymour silt loam	C	3	25	68	26	37	2.8
Soil-Association Area 2: Clarion-Nicollet-Webster								
167	Ames silt loam	A	0	48	74	28	62	3.0
507	Canisteo silty clay loam	A	0	80	105	40	84	4.2
138	Clarion loam	B	1	82	110	42	88	4.6
138	Clarion loam	B	2	80	107	41	86	4.5
138	Clarion loam	C	2	65	102	39	82	4.3
138	Clarion loam	D	2	55	93	35	74	3.9
337	Cullo silt loam	A	0	72	98	37	78	4.1
253	Farrar fine sandy loam	C	2	44	78	30	62	3.3
385	Guckeen gritty silty clay loam	A	0	81	104	39	83	4.4
95	Harps loam	A	0	63	95	36	76	4.0
168	Hayden loam	B	1	72	98	37	78	4.1
168	Hayden loam	C	2	55	90	34	72	3.8
387	Kamrar clay loam	B	1	73	96	36	77	4.0
236	Lester loam	B	1	77	104	40	83	4.4
325	LeSueur loam	A	1	85	112	43	90	4.7
355	Luther loam	A	0	80	106	40	85	4.5
383	Marna silty clay	A	0	74	96	36	77	4.0
55	Nicollet loam	A	0	90	118	45	94	5.0
6	Okoboji silty clay loam	A	0	58	84	32	67	3.4
90	Okoboji silt loam	A	0	60	86	33	69	3.4
274	Rolfe loam	A	0	58	86	33	69	3.4
62	Storden loam	C	2	52	92	35	74	3.9
62	Storden loam	D	2	42	83	32	66	3.5
62	Storden loam	D	3	37	77	29	62	3.3
506	Wacousta silt loam	A	0	76	100	38	80	4.0
107	Webster silty clay loam	A	0	85	110	42	88	4.4

[a] This number designates areas of this soil type on soil maps.

[b] E and W added to mapping unit number indicates those units that occur to the east and west, respectively, of a line tangent to the eastern boundary of the Clarion-Nicollet-Webster soil-association area.

[c] Slope phase: A = 0-2%; B = 2-5%; C = 5-9%; D = 9-14%; E = 14-18%; F = 18-25%; G = 25-40%.

[d] Erosion phase: 0 = no evident erosion, usually 12 inches or more of A horizon; 1 = none to slightly eroded, no evident exposed subsoil when plowed, 7 to 12 inches of A horizon; 2 = moderately eroded, usually 3 to 7 inches of total A horizon; 3 = severely eroded. When plowed, the Ap horizon is predominantly subsoil, with only 0 to 3 inches of total A horizon remaining; 6 = catsteps.

[e] Corn suitability rating. The ratings and yields reported are for soil and weather conditions that exist near the geographic center of the indicated soil-association area. Rating and yields of a soil type may vary within a soil-association area, especially in north-central, western, and northwestern areas of the state.

[f] A dash indicates that the crop is not generally grown on that soil.

Table 1. (continued)

Soil type no.[a,b]	Soil type	Slope phase[c]	Erosion phase[d]	CSR[e]	Estimated attainable yields[f]			
					Corn bu./A	Soybeans bu./A	Oats bu./A	Hay T./A
Soil-Association Area 3: Dinsdale-Tama, Tama-Muscatine								
291	Atterberry silt loam	A	0	95	125	47	94	5.2
377	Dinsdale silty clay loam	B	1	90	119	45	89	5.0
377	Dinsdale silty clay loam	C	1	75	114	43	85	4.8
162	Downs silt loam	B	1	90	119	45	89	5.0
761	Franklin silt loam	B	1	85	117	45	89	4.9
118	Garwin silty clay loam	A	0	95	125	47	94	5.0
373	Hopper silt loam	D	2	65	98	37	74	4.1
184	Klinger silt loam	A	0	95	125	47	94	5.2
484	Lawson silt loam	A	0	90	119	45	89	5.0
119	Muscatine silty clay loam	A	0	100	131	50	98	5.5
119	Muscatine silty clay loam	B	0	95	129	49	97	5.4
382	Maxfield silty clay loam	A	0	90	119	45	89	5.0
977	Richwood silt loam	A	1	95	122	46	92	5.1
826	Rowley silt loam	A	0	95	126	48	94	5.3
120	Tama silty clay loam	A	1	100	127	48	95	5.4
120	Tama silty clay loam	B	1	95	125	47	94	5.3
120	Tama silty clay loam	C	2	78	117	44	88	4.9
120	Tama silty clay loam	D	2	68	108	41	81	4.5
120	Tama silty clay loam	D	3	65	102	39	76	4.3
Soil-Association Area 4: Fayette-Dubuque-Stonyland, Fayette, Downs								
158	Dorchester silt loam	A	0	85	104	40	83	4.4
162	Downs silt loam	B	1	90	119	45	95	5.0
162	Downs silt loam	C	2	73	111	42	89	4.7
183	Dubuque silt loam, mod. deep	C	2	28	65	25	52	2.7
183	Dubuque silt loam, mod. deep	D	2	13	56	21	45	2.3
182	Dubuque silt loam, deep	D	2	29	76	29	61	3.2
163	Fayette silt loam	B	1	85	113	43	90	4.8
163	Fayette silt loam	C	2	68	105	40	84	4.4
163	Fayette silt loam	D	2	58	96	36	77	4.0
163	Fayette silt loam	D	3	55	90	34	72	3.8
483	Frankville silt loam, mod. deep	D	2	20	67	25	54	2.8
704	Frankville silt loam, deep	D	2	34	82	31	66	3.4
512	Marlean loam	C	2	20	50	19	40	2.1
499	Nordness silt loam	C	2	5	—	—	—	1.3
480	Orwood loam	C	2	63	96	36	77	4.0
214	Rockton loam, mod. deep	B	1	58	76	29	61	3.2
663	Seaton silt loam	C	2	68	105	40	84	4.4
412	Sogn loam	C	2	5	—	—	—	1.6
478	Steep Rocky Land	G	1	5	—	—	—	—
Soil-Association Area 5: Galva-Primghar-Sac, Moody								
31	Afton silty clay loam	A	0	72	93	35	79	3.5
577	Everly clay loam	B	1	68	89	34	75	3.4
310	Galva silty clay loam	A	1	75	97	37	82	3.7
310	Galva silty clay loam	B	1	70	95	36	81	3.6
92	Marcus silty clay loam	A	0	75	99	38	84	3.8
410	Moody silty clay loam	B	1	65	85	32	72	3.2
410	Moody silty clay loam	C	2	48	77	29	65	2.9
91	Primghar silty clay loam	A	0	80	103	39	88	3.9
77	Sac silty clay loam	B	1	68	89	34	76	3.4
77	Sac silty clay loam	C	2	51	81	31	69	3.1
Soil-Association Area 6: Kenyon-Floyd-Clyde, Cresco-Lourdes-Clyde								
171	Bassett loam	B	1	80	107	41	86	4.5
84	Clyde silty clay loam	A	0	75	102	39	82	4.3
783	Cresco loam	B	1	65	88	33	70	3.7
782	Donnan loam	B	1	57	85	32	68	3.6
198	Floyd loam	A	0	80	108	41	86	4.5
198	Floyd loam	B	1	75	106	40	85	4.5
726	Hayfield loam, deep	A	1	73	94	36	75	4.0
725	Hayfield loam, mod. deep	A	1	61	79	30	63	3.3
395	Kenyon loam	B	1	85	113	43	90	4.8
226	Lawler loam, deep	A	0	78	100	38	80	4.2
225	Lawler loam, mod. deep	A	0	66	85	32	68	3.6
781	Lourdes loam	B	1	60	82	31	66	3.5
471	Oran loam	A	1	85	109	41	87	4.6

Table 1. (continued)

Soil type no.[a,b]	Soil type	Slope phase[c]	Erosion phase[d]	CSR[e]	Estimated attainable yields[f]			
					Corn bu./A	Soybeans bu./A	Oats bu./A	Hay T./A
394	Ostrander loam	B	1	85	113	43	90	4.8
798	Protivin loam	B	1	65	88	33	70	3.7
784	Riceville loam	B	1	60	82	31	66	3.5
213	Rockton loam, deep	A	0	79	98	37	78	4.1
213	Rockton loam, deep	B	1	74	96	36	77	4.0
214	Rockton loam, mod. deep	B	1	58	76	29	61	3.2
214	Rockton loam, mod. deep	C	1	38	71	27	57	3.0
399	Readlyn loam	A	1	90	115	44	92	4.8
407	Schley loam	B	1	70	100	38	80	4.2
485	Spillville loam	A	0	92	122	46	98	5.1
177	Saude loam	A	0	63	78	30	62	3.3
177	Saude loam	B	1	58	76	29	61	3.2
177	Saude loam	C	1	38	71	27	57	3.0
398	Tripoli silty clay loam	A	0	80	111	42	89	4.4
Soil-Association Area 7: Marshall								
11	Colo-Judson complex	B	0	65	105	40	60	4.0
212	Kennebec silt loam	A	0	91	118	45	67	4.5
9	Marshall silty clay loam	B	1	85	107	41	61	4.0
9	Marshall silty clay loam	C	2	68	99	38	56	3.8
60	Malvern silty clay loam	D	2	25	71	27	40	2.7
299	Minden silt loam	A	0	95	115	44	66	4.4
33	Steinauer loam	D	2	40	76	29	43	2.9
Soil-Association Area 8: Monona-Ida-Hamburg, Luton-Onawa-Salix								
156	Albaton clay	A	0	55	80	30	56	3.1
44	Blencoe silty clay	A	0	70	96	36	67	3.6
144	Blake silty clay loam	A	0	75	98	37	69	3.7
244	Blend silty clay	A	0	55	80	30	56	3.0
3	Castana silt loam	D	0	42	79	30	55	3.0
22	Dow silt loam	D	2	42	69	26	48	2.6
2	Hamburg silt loam	E	6	30	—	—	—	—
137	Haynie silt loam	A	0	70	96	36	67	3.6
1	Ida silt loam	C	2	55	83	32	58	3.1
1	Ida silt loam	D	3	40	68	26	48	2.6
46	Keg silt loam	A	0	90	118	45	83	4.5
268	Knox silt loam	B	1	75	95	36	67	3.6
436	Lakeport silty clay loam	A	0	80	105	40	74	4.0
66	Luton clay	A	0	40	65	25	45	2.5
70	McPaul silt loam	A	0	78	98	37	69	3.7
149	Modale silt loam	A	0	68	92	35	64	3.5
10	Monona silt loam	B	1	80	98	37	69	3.7
10	Monona silt loam	C	2	63	90	34	63	3.4
12	Napier silt loam	B	0	77	105	40	73	4.0
12	Napier silt loam	C	0	62	100	38	70	3.8
146	Onawa silty clay	A	0	65	90	34	63	3.4
36	Salix silty clay loam	A	0	85	114	43	80	4.3
237	Sarpy loamy fine sand	B	0	5	—	—	—	0.9
466	Solomon clay	A	0	35	60	23	42	2.3
67	Woodbury silty clay	A	0	55	80	30	56	3.0
Soil-Association Area 9: Otley-Mahaska-Taintor, Clinton-Keswick-Lindley								
192	Adair clay loam	D	2	15	56	21	31	2.4
80	Clinton silt loam	B	1	80	107	41	59	4.5
75	Givin silt loam	B	1	85	117	44	64	4.9
180	Keomah silt loam	A	1	75	113	43	62	4.8
425	Keswick loam	C	2	10	53	20	29	2.2
425	Keswick loam	D	2	5	—	—	—	1.8
76	Ladoga silt loam	B	1	85	113	43	62	4.8
65	Lindley loam	C	2	48	78	30	43	3.3
65	Lindley loam	D	2	38	69	26	38	3.9
280	Mahaska silty clay loam	A	0	95	125	48	69	5.2
570	Nira silty clay loam	B	1	87	114	43	63	4.8
570	Nira silty clay loam	C	2	67	106	40	58	4.5
281	Otley silty clay loam	B	1	90	119	45	65	5.0
281	Otley silty clay loam	C	2	70	111	42	61	4.7

Table 1. (continued)

Soil type no.[a,b]	Soil type	Slope phase[c]	Erosion phase[d]	CSR[e]	Estimated attainable yields[f]			
					Corn bu./A	Soybeans bu./A	Oats bu./A	Hay T./A
74	Rubio silt loam	A	1	70	91	35	50	3.7
57	Rushville silt loam	A	0	65	88	33	48	3.5
122	Sperry silt loam	A	0	63	97	37	53	3.9
279	Taintor silty clay loam	A	0	88	117	44	64	4.7
Soil-Association Area 10: Shelby-Sharpsburg-Macksburg								
222	Clarinda silty clay loam	D	2	10	—	—	—	1.8
69	Clearfield silty clay loam	C	1	50	91	35	47	3.6
179	Gara loam	D	2	43	75	29	39	3.1
76	Ladoga silt loam	B	1	85	113	43	59	4.8
822	Lamoni silty clay loam	D	2	15	61	23	32	2.6
368	Macksburg silty clay loam	A	0	95	121	46	63	5.1
370	Sharpsburg silty clay loam	B	1	87	113	43	59	4.7
370	Sharpsburg silty clay loam	C	2	67	105	40	55	4.4
24	Shelby loam	C	2	58	90	34	47	3.8
24	Shelby loam	D	2	48	81	31	42	3.4
369	Winterset silty clay loam	A	0	87	117	44	61	4.7
Soil-Association Area 11: Combined								
192	Adair clay loam	C	2	30	65	25	36	2.7
192	Adair clay loam	D	2	15	56	21	32	2.4
315	Alluvial land	A	0	20	40	15	28	1.4
422	Amana silt loam	A	0	85	110	42	60	4.6
136	Ankeny sandy loam	B	1	45	68	26	54	2.4
434	Arbor loam	D	2	45	85	32	44	3.6
792	Armstrong loam	C	2	25	59	22	31	2.5
792	Armstrong loam	D	2	10	50	19	26	2.1
109	Backbone loamy sand	B	1	25	—	—	—	1.5
185	Bauer silt loam	D	2	20	63	24	38	2.6
793	Bertrand silt loam	B	1	80	108	41	86	4.5
259	Biscay clay loam, deep	A	0	77	100	38	80	4.0
258	Biscay clay loam, mod. deep	A	0	65	90	34	72	3.6
43	Bremer silty clay loam	A	0	82	106	40	55	4.5
733	Calco silty clay loam	A	0	75	99	38	84	4.0
926	Canoe silt loam	A	0	90	120	46	96	5.0
534	Carlow silty clay loam	A	0	43	67	25	37	2.7
63	Chelsea loamy sand	C	2	21	50	19	37	1.8
587	Chequest silt loam	A	0	65	98	37	54	3.9
318	Clanton silt loam	D	2	15	57	22	31	2.4
222	Clarinda silty clay loam	C	2	25	55	21	30	2.2
133	Colo silty clay loam	A	0	80	104	40	88	4.2
11E	Colo-Judson complex	B	0	73	110	42	88	4.4
11W	Colo-Judson complex	B	0	70	107	41	75	4.3
201	Colo-Terril complex	A	0	69	94	36	77	3.9
201	Colo-Terril complex	B	0	64	92	35	76	3.8
520	Coppock silt loam	A	0	65	89	34	49	3.6
233	Corley silt loam	A	0	65	91	35	52	3.6
246	Curran silt loam	A	0	80	108	41	81	4.5
202	Cylinder loam, mod. deep	A	0	66	88	33	70	3.7
203	Cylinder loam, deep	A	0	78	103	39	82	4.3
175E	Dickinson fine sandy loam	B	1	55	81	31	63	2.9
175W	Dickinson fine sandy loam	B	1	40	62	24	50	2.2
204	Dodgeville silt loam, deep	B	1	79	105	40	84	4.4
428	Ely silty clay loam	A	0	93	126	48	94	5.3
72	Estherville loam	B	1	20	—	—	—	1.7
34	Estherville sandy loam	B	1	20	—	—	—	1.7
978	Festina silt loam	A	1	90	116	44	93	4.9
179	Gara loam	C	2	53	84	32	45	3.5
179	Gara loam	D	2	43	75	28	40	3.1
313	Gosport silt loam	C	2	25	58	22	43	2.4
41E	Hagener loamy sand	B	1	40	61	23	47	2.2
41E	Hagener loamy sand	C	2	25	54	21	42	2.0
41W	Hagener loamy sand	B	1	27	—	—	—	1.5
41W	Hagener loamy sand	C	2	12	—	—	—	1.2
725	Hayfield loam, mod. deep	A	1	61	79	30	63	3.3
726	Hayfield loam, deep	A	1	73	94	36	75	3.9

Table 1. (continued)

Soil type no.[a,b]	Soil type	Slope phase[c]	Erosion phase[d]	CSR[e]	Estimated attainable yields[f]			
					Corn bu./A	Soybeans bu./A	Oats bu./A	Hay T./A
269	Humeston silt loam	A	0	58	88	33	47	3.5
98	Huntsville silt loam	A	0	88	117	44	88	4.9
444	Jacwin loam	A	0	65	92	35	74	3.9
8E	Judson silty clay loam	A	0	95	126	48	94	5.3
8W	Judson silty clay loam	B	0	84	114	43	65	4.8
212E	Kennebec silt loam	A	0	95	124	47	93	5.2
212W	Kennebec silt loam	A	0	91	118	45	64	5.0
425	Keswick loam	C	2	20	53	20	29	2.2
425	Keswick loam	D	2	5	—	—	—	1.8
688	Koszta silt loam	A	0	85	108	41	74	4.5
822	Lamoni silty clay loam	D	2	15	61	23	32	2.6
110E	Lamont fine sandy loam	B	2	43	67	25	54	2.4
110W	Lamont fine sandy loam	B	2	28	—	—	—	1.7
225	Lawler loam, mod. deep	A	0	66	85	32	64	3.6
226	Lawler loam, deep	A	0	78	100	38	80	4.2
484	Lawson silt loam	A	0	90	119	45	89	5.0
65	Lindley loam	C	2	48	78	30	43	3.3
65	Lindley loam	D	2	38	69	26	38	2.9
452	Lineville silt loam	C	2	30	65	25	36	2.7
151	Marshan clay loam, mod. deep	A	0	64	91	34	73	3.6
151	Marshan clay loam, mod. deep	B	0	59	89	34	73	3.6
152	Marshan clay loam, deep	A	0	72	101	38	81	4.0
152	Marshan clay loam, deep	B	0	67	99	38	79	4.0
221	Muck, 18 to 40 inches	A	0	50	89	34	71	3.4
88	Nevin silty clay loam	A	0	90	114	43	60	4.8
220E	Nodaway silt loam	A	0	90	114	43	85	4.8
220W	Nodaway silt loam	A	0	85	108	41	58	4.5
273	Olmitz loam	B	0	72	100	38	55	4.2
489	Ossian silt loam	A	0	80	98	37	77	3.9
321	Peat, > 40 inches	A	0	15	74	28	59	3.0
467	Radford silt loam	A	0	83	106	40	85	4.2
977	Richwood silt loam	A	1	95	122	46	98	5.1
213	Rockton loam, deep	B	1	74	96	36	77	4.0
826	Rowley silt loam	A	0	95	126	48	94	5.3
73	Salida sandy loam	C	2	5	—	—	—	1.6
777	Sattre loam, mod. deep	A	1	58	72	27	58	3.0
177	Saude loam	A	0	63	78	30	62	3.3
24	Shelby loam	C	2	58	90	34	50	3.8
24	Shelby loam	D	2	48	81	31	44	3.4
93	Shelby-Adair complex	C	2	40	78	30	43	3.3
122	Sperry silt loam	A	0	63	97	37	51	3.9
485	Spillville loam	A	0	92	122	46	98	5.1
27E	Terril loam	A	0	92	120	46	96	5.0
27E	Terril loam	B	0	87	118	45	70	5.0
27W	Terril loam	A	0	87	114	43	70	4.8
27W	Terril loam	B	0	82	112	43	66	4.7
96	Turlin loam	A	0	92	120	46	90	5.0
453	Tuskeego silt loam	A	0	53	82	31	45	3.3
51	Vesser silt loam	A	0	70	95	36	52	3.8
172	Wabash silty clay	A	0	45	68	26	37	2.7
248	Wabash silty clay loam	A	0	60	86	33	45	3.4
108	Wadena loam, mod. deep	A	1	57	72	27	61	2.9
308	Wadena loam, deep	A	1	71	92	35	74	3.7
178	Waukee loam	A	0	79	98	37	78	3.9
207	Whalan loam, mod. deep	B	1	48	64	24	51	2.7
714	Winneshiek loam, mod. deep	B	1	53	70	27	56	2.9
713	Winneshiek loam, deep	B	1	69	90	34	72	3.8
7	Wiota silty clay loam	B	1	85	108	41	62	4.5
54	Zook silty clay loam	A	0	70	96	36	54	3.8
134	Zook silty clay	A	0	65	92	35	50	3.7

Table 2. Some properties of selected Iowa soils.

Soil type no.[a,b]	Soil type	Slope phase[c]	Erosion phase	Parent material[d]	Natural vegetation	Organic matter[e]	Subsoil permeability	Natural internal drainage	Erosion hazard	Subsoil[f] group
192	Adair clay loam	C	2	Loess or sediment/ reddish paleosol	Prairie	Mod. low	Very slow	Mod. well to somewhat poor	Severe	3
31	Afton silty clay loam	A	0	Loess or local alluvium	Prairie	High	Mod. slow	Poor	None	2
156	Albaton clay	A	0	Alluvium	Prairie-sedges	Mod. low	Very slow	Poor	None	3
422	Amana silt loam	A	0	Alluvium	Prairie, forest	Mod. low	Moderate	Mod. well to somewhat poor	None	1
167	Ames silt loam	A	0	T-1	Forest	Low	Slow to very slow	Poor	None	3
136	Ankeny sandy loam	B	1	Sand	Prairie	Mod. low	Rapid	Somewhat excessive	Slight, wind	1
434	Arbor loam	D	2	Local alluvium	Prairie	Mod. low	Moderate	Mod. well and well	Severe	2
792	Armstrong loam	C	2	Loess or sediment/ reddish paleosol	Prairie, forest	Mod. low	Very slow	Mod. well to somewhat poor	Severe	3
291	Atterberry silt loam	A	0	Loess	Prairie, forest	Moderate	Moderate	Somewhat poor	None	1
109	Backbone loamy fine sand	B	1	Sand/ L.S. bedrock	Prairie, forest	Low	Very rapid	Well to excessive	Slight	1
171	Bassett loam	B	1	T-2	Prairie, forest	Mod. low	Mod. to mod. slow	Mod. well	Slight to moderate	2
185	Bauer silt loam	D	2	Shale	Prairie	Mod. low	Very slow	Well	Severe	3
260	Beckwith silt loam	A	1	Loess	Forest	Low	Very slow	Poor	None	3
130	Belinda silt loam	A	0	Loess	Prairie, forest	Mod. low	Very slow	Poor	None	3
793	Bertrand silt loam	B	1	Alluvium	Forest	Mod. low	Moderate	Well to mod. well	Slight	1
259	Biscay clay loam, deep	A	0	Alluvium	Prairie-sedges	Very high	Mod. slow	Poor	None	1
258	Biscay clay loam, mod. deep	A	0	Alluvium	Prairie-sedges	Very high	Mod. slow	Poor	None	1
144	Blake silty clay loam	A	0	Alluvium	Prairie, forest	Mod. low	Moderate	Somewhat poor	None	2
44	Blencoe silty clay	A	0	Alluvium	Prairie-sedges	High	Very slow	Somewhat poor to poor	None	3
244	Blend silty clay	A	0	Alluvium	Prairie	High	Very slow	Poor	None	3
43	Bremer silty clay loam	A	0	Alluvium	Prairie	High	Mod. slow	Poor	None	2
733	Calco silty clay loam	A	0	Alluvium	Prairie	High	Mod. to mod. slow	Poor	None	1
451	Caleb loam	D	2	Alluvium	Prairie, forest	Mod. low	Mod. rapid	Mod. well	Severe	2
507	Canisteo silty clay loam	A	0	T-1 or local alluvium	Prairie	Very high	Moderate	Poor	None	1
926	Canoe silt loam	A	0	Alluvium	Prairie, forest	Mod. low	Moderate	Somewhat poor	None	1
534	Carlow silty clay loam	A	0	Alluvium	Prairie	High	Very slow	Very poor	None	3
3	Castana silt loam	D	0	Local alluvium	Prairie	Mod. low	Moderate	Well	Severe	1
63	Chelsea loamy fine sand	C	2	Eolian sand	Forest	Low	Very rapid	Excessive	Moderate, wind	1
587	Chequest silty clay loam	A	0	Alluvium	Prairie, forest	Mod. low	Mod. slow	Poor	None	2
318	Clanton silt loam	D	2	Shale	Forest	Low	Very slow	Mod. well	Severe	3
222	Clarinda silty clay loam	C	2	Gray paleosol	Prairie	Mod. low	Very slow	Poor	Severe	3
138	Clarion loam	B	1	T-1	Prairie	Moderate	Moderate	Well	Slight	1
138	Clarion loam	B	2	T-1	Prairie	Mod. low	Moderate	Well	Slight	1
138	Clarion loam	C	2	T-1	Prairie	Mod. low	Moderate	Well	Severe	1
138	Clarion loam	D	2	T-1	Prairie	Mod. low	Moderate	Well	Severe	1
69	Clearfield silty clay loam	C	1	Loess/ gray paleosol	Prairie	Mod. high	Mod. slow to slow	Poor to somewhat poor	Moderate	3

[a] This number designates areas of this soil type on soil maps.

[b] E and W added to mapping unit number indicates those units that occur to the east and west, respectively, of a line tangent to the eastern boundary of the Clarion-Nicollet-Webster soil-association area.

[c] Slope phase; A = 0-2%; B = 2-5%; C = 5-9%; D = 9-14%; E = 14-18%; F = 18-25%; G = 25-40%.

[d] Sediment = loamy material, origin not defined; L.S. = limestone; T-1 = glacial till of Wisconsin age; T-2 = glacial till of Kansan or Nebraskan age.

[e] Organic-matter level: Low = less than 1% organic matter; moderately low = 1-2% organic matter; moderate = 2-3% organic matter; moderately high = 3-4% organic matter; High = 4-5% organic matter; very high = over 5% organic matter.

[f] If subsoil is absent, the rating refers to the material beneath the topsoil: 1 = subsoil texture about the same as surface soil texture, not more than about 34% clay, subsoil favorable for crop growth; 2 = subsoil moderately unfavorable for crop growth because of slow permeability or high plasticity; 3 = subsoil very unfavorable for crop growth, silty clay and clay texture, very slow permeability and very high plasticity.

Table 2. (continued)

Soil type no.[a,b]	Soil type	Slope phase[c]	Erosion phase	Parent material[d]	Natural vegetation	Organic matter[e]	Subsoil permeability	Natural internal drainage	Erosion hazard	Subsoil[f] group
80	Clinton silt loam	C	2	Loess	Forest	Low	Mod. slow	Well to mod. well	Severe	2
84	Clyde silty clay loam	A	0	Local alluvium/ T-2	Prairie	Very high	Moderate	Poor	None	1
133	Colo silty clay loam	A	0	Alluvium	Prairie	High	Mod. to mod. slow	Poor	None	1
520	Coppock silt loam	A	0	Alluvium	Forest	Mod. low	Moderate	Somewhat poor to poor	None	1
233	Corley silt loam	A	0	Loess or local alluvium	Prairie	Mod. high	Mod. slow	Poor	None	1
783	Cresco loam	B	1	T-2	Prairie	Moderate	Slow	Mod. well	Slight	2
337	Cullo silt loam	A	0	T-1 or local alluvium	Prairie	Mod. high	Slow	Poor	None	2
246	Curran silt loam	A	0	Alluvium	Forest	Mod. low	Slow	Somewhat poor	None	2
202	Cylinder loam, mod. deep	A	0	Alluvium	Prairie	Mod. high	Moderate	Somewhat poor	None	1
203	Cylinder loam, deep	A	0	Alluvium	Prairie	Mod. high	Moderate	Somewhat poor	None	1
175E	Dickinson fine sandy loam	B	1	Eolian sand	Prairie	Mod. low	Mod. rapid to rapid	Well to somewhat excessive	Slight, wind	1
175W	Dickinson fine sandy loam	B	1	Eolian sand	Prairie	Mod. low	Mod. rapid to rapid	Well to somewhat excessive	Slight, wind	1
377	Dinsdale silty clay loam	B	1	Loess/ T-2	Prairie	Moderate	Moderate	Well	Slight	1
377	Dinsdale silty clay loam	C	1	Loess/ T-2	Prairie	Moderate	Moderate	Well	Slight	1
204	Dodgeville silt loam	B	1	Loess/ L.S. bedrock	Prairie	Moderate	Moderate	Well	Slight	1
782	Donnan loam	B	1	Sediment/ gray paleosol	Prairie, forest	Mod. low	Very slow	Somewhat poor to mod. well	Slight	3
158	Dorchester silt loam	A	0	Alluvium	Forest	Low	Moderate	Well to mod. well	None	1
22	Dow silt loam	D	2	Loess	Prairie	Mod. low	Moderate	Well	Severe	1
162	Downs silt loam	B	1	Loess	Prairie, forest	Mod. low	Moderate	Well	Slight	1
162	Downs silt loam	C	2	Loess	Prairie, forest	Mod. low	Moderate	Well	Severe	1
183	Dubuque silt loam, mod. deep	C	2	Loess/ L.S. bedrock	Forest	Low	Moderate	Well	Severe	1
183	Dubuque silt loam, mod. deep	D	2	Loess/ L.S. bedrock	Forest	Low	Moderate	Well	Severe	1
211	Edina silt loam	A	0	Loess	Prairie	Mod. low	Very slow	Poor	None	3
428	Ely silty clay loam	A	0	Local alluvium	Prairie	Mod. high	Moderate	Somewhat poor	Slight	1
72	Estherville loam	B	1	Alluvium	Prairie	Mod. low	Mod. rapid to rapid	Well	Moderate	1
34	Estherville sandy loam	B	1	Alluvium	Prairie	Mod. low	Mod. rapid to rapid	Well	Moderate	1
577	Everly clay loam	B	1	Sediment/ T-1	Prairie	Moderate	Moderate	Well	Slight	1
253	Farrar fine sandy loam	C	2	Sand/ T-1	Prairie	Mod. low	Mod. to rapid	Somewhat excessive	Moderate, wind	1
163	Fayette silt loam	B	1	Loess	Forest	Mod. low	Moderate	Well	Slight	1
163	Fayette silt loam	C	2	Loess	Forest	Low	Moderate	Well	Severe	1
163	Fayette silt loam	D	2	Loess	Forest	Low	Moderate	Well	Severe	1
163	Fayette silt loam	D	3	Loess	Forest	Low	Moderate	Well	Severe	1
978	Festina silt loam	A	1	Alluvium	Prairie, forest	Mod. low	Moderate	Well	None	1
198	Floyd loam	A	0	Local alluvium/ T-2	Prairie	Mod. high	Moderate	Somewhat poor	None	1
198	Floyd loam	B	1	Local alluvium/ T-2	Prairie	Mod. high	Moderate	Somewhat poor	Slight	1
761	Franklin silt loam	B	1	Loess/ T-2	Prairie, forest	Mod. low	Moderate	Somewhat poor	Slight	1
483	Frankville silt loam	D	2	Loess/ L.S. bedrock	Prairie, forest	Low	Moderate	Well	Severe	1
310	Galva silty clay loam	A	1	Loess	Prairie	Moderate	Moderate	Well	None	1
310	Galva silty clay loam	B	1	Loess	Prairie	Moderate	Moderate	Well	Slight	1
310	Galva silty clay loam	C	2	Loess	Prairie	Mod. low	Moderate	Well	Severe	1
179	Gara loam	C	2	T-2	Prairie, forest	Mod. low	Mod. slow	Mod. well to well	Severe	2
179	Gara loam	D	2	T-2	Prairie, forest	Mod. low	Mod. slow	Mod. well to well	Severe	2
118	Garwin silty clay loam	A	0	Loess	Prairie	High	Moderate	Poor	None	1
75	Givin silt loam	B	1	Loess	Prairie, forest	Mod. low	Mod. slow	Somewhat poor	Slight	2
313	Gosport silt loam	C	2	Shale	Forest	Low	Very slow	Mod. well	Severe	3
364	Grundy silty clay loam	B	1	Loess	Prairie	Moderate	Mod. slow to slow	Mod. well to somewhat poor	Slight	3
364	Grundy silty clay loam	C	2	Loess	Prairie	Mod. low	Mod. slow to slow	Mod. well to somewhat poor	Severe	3
364	Grundy silty clay loam	C	3	Loess	Prairie	Low	Mod. slow to slow	Mod. well to somewhat poor	Severe	3

Table 2. (continued)

Soil type no.a,b	Soil type	Slope phase[c]	Erosion phase	Parent material[d]	Natural vegetation	Organic matter[e]	Subsoil permeability	Natural internal drainage	Erosion hazard	Subsoil[f] group
385	Guckeen gritty silty clay loam	A	0	Lacustrine sediments/ T-1	Prairie	Mod. high	Mod. slow to slow	Somewhat poor	None	3
41E	Hagener loamy sand	B	1	Eolian sand	Prairie	Low	Very rapid	Excessive	Slight, wind	1
41E	Hagener loamy sand	C	2	Eolian sand	Prairie	Low	Very rapid	Excessive	Slight, wind	1
41W	Hagener loamy sand	B	1	Eolian sand	Prairie	Low	Very rapid	Excessive	Slight, wind	1
41W	Hagener loamy sand	C	2	Eolian sand	Prairie	Low	Very rapid	Excessive	Slight, wind	1
362	Haig light silty clay loam	A	0	Loess	Prairie	High	Slow to very slow	Poor	None	3
2	Hamburg silt loam	E	6	Loess	Prairie	Low	Moderate	Well	Very severe	1
95	Harps loam	A	0	T-1 or local alluvium	Prairie	High	Moderate	Poor	None	1
168	Hayden loam	B	1	T-1	Forest	Mod. low	Moderate	Well	Slight	1
168	Hayden loam	C	2	T-1	Forest	Low	Moderate	Well	Severe	1
726	Hayfield loam, deep	A	1	Alluvium	Prairie, forest	Mod. low	Moderate	Somewhat poor	None	1
725	Hayfield loam, mod. deep	A	1	Alluvium	Prairie, forest	Mod. low	Moderate	Somewhat poor	None	1
137	Haynie silt loam	A	0	Alluvium	Prairie, forest	Mod. low	Moderate	Well to mod. well	None	1
373	Hopper silt loam	D	2	Loess	Forest	Low	Moderate	Well	Severe	1
269	Humeston silt loam	A	0	Alluvium	Prairie, forest	High	Mod. slow	Poor	None	2
98	Huntsville silt loam	A	0	Alluvium	Prairie	Mod. high	Moderate	Mod. well to well	None	1
1	Ida silt loam	C	2	Loess	Prairie	Mod. low	Moderate	Well	Severe	1
1	Ida silt loam	D	3	Loess	Prairie	Low	Moderate	Well	Severe	1
444	Jacwin loam	A	0	T-2 or sediment/ shale	Prairie	Moderate	Very slow	Somewhat poor	None	3
8E	Judson silty clay loam	A	0	Local alluvium	Prairie	Moderate	Moderate	Mod. well to well	None	1
8W	Judson silty clay loam	B	0	Local alluvium	Prairie	Moderate	Moderate	Mod. well to well	Slight	1
387	Kamrar clay loam	B	1	Lacustrine sediments/ T-1	Prairie	Mod. high	Mod. slow to slow	Mod. well	Slight	3
46	Keg silt loam	A	0	Alluvium	Prairie	Moderate	Moderate	Mod. well to well	None	1
212E	Kennebec silt loam	A	0	Alluvium	Prairie	Moderate	Moderate	Mod. well to somewhat poor	None	1
212W	Kennebec silt loam	A	0	Alluvium	Prairie	Moderate	Moderate	Mod. well to somewhat poor	None	1
395	Kenyon loam	B	1	T-2	Prairie	Moderate	Moderate	Mod. well	Slight	1
180	Keomah silt loam	A	1	Loess	Forest	Mod. low	Mod. slow	Somewhat poor	Slight	2
425	Keswick loam	C	2	Loess or sediment/ reddish paleosol	Forest	Low	Very slow	Mod. well to somewhat poor	Severe	3
425	Keswick loam	D	2	Loess or sediment/ reddish paleosol	Forest	Low	Very slow	Mod. well to somewhat poor	Severe	3
184	Klinger silty clay loam	A	0	Loess/ T-2	Prairie	Mod. high	Moderate	Somewhat poor	None	1
531	Kniffin silt loam	B	1	Loess	Prairie, forest	Mod. low	Very slow	Mod. well to somewhat poor	Slight	3
268	Knox silt loam	B	1	Loess	Prairie, forest	Mod. low	Moderate	Well	Slight	1
688	Koszta silt loam	A	0	Alluvium	Prairie, forest	Mod. low	Moderate	Somewhat poor	None	1
76	Ladoga silt loam	B	1	Loess	Prairie, forest	Mod. low	Mod. to mod. slow	Well	Slight	2
436	Lakeport silty clay loam	A	0	Alluvium	Prairie	High	Mod. to mod. slow	Somewhat poor	None	2
822	Lamoni silty clay loam	D	2	Loess or sediment/ gray paleosol	Prairie	Mod. low	Slow to very slow	Somewhat poor	Severe	3
226	Lawler loam, deep	A	0	Alluvium	Prairie	Mod. high	Moderate	Somewhat poor	None	1
225	Lawler loam, mod. deep	A	0	Alluvium	Prairie	Mod. high	Moderate	Somewhat poor	None	1
484	Lawson silt loam	A	0	Alluvium	Prairie	Mod. high	Moderate	Somewhat poor	None	1
325	LeSueur loam	A	1	T-1	Prairie, forest	Mod. low	Moderate	Somewhat poor	Slight	1
236	Lester loam	B	1	T-1	Prairie, forest	Mod. low	Moderate	Well	Slight	1
65	Lindley loam	C	2	T-2	Forest	Low	Mod. slow	Mod. well	Severe	2
65	Lindley loam	D	2	T-2	Forest	Low	Mod. slow	Mod. well	Severe	2
452	Lineville silt loam	C	2	Loess and sediment/ red paleosol	Prairie, forest	Mod. low	Mod. slow to very slow	Mod. well to somewhat poor	Severe	3

Table 2. (continued)

Soil type no.[a,b]	Soil type	Slope phase[c]	Erosion phase	Parent material[d]	Natural vegetation	Organic matter[e]	Subsoil permeability	Natural internal drainage	Erosion hazard	Subsoil[f] group
781	Lourdes loam	B	1	T-2	Prairie, forest	Mod. low	Slow	Mod. well	Slight	2
355	Luther loam	A	0	T-1	Forest	Mod. low	Moderate	Somewhat poor	Slight	1
66	Luton clay	A	0	Alluvium	Prairie-sedges	High	Very slow	Poor to very poor	None	3
368	Macksburg silty clay loam	A	0	Loess	Prairie	Mod. high	Mod. to mod. slow	Somewhat poor	Slight	2
280	Mahaska silty clay loam	A	0	Loess	Prairie	Mod. high	Mod. to mod. slow	Somewhat poor	Slight or none	2
60	Malvern silty clay loam	D	2	Loess	Prairie	Mod. low	Very slow	Mod. well to somewhat poor	Severe	3
92	Marcus silty clay loam	A	0	Loess	Prairie	High	Moderate	Poor	None	1
512	Marlean loam	C	2	Sediment/soft L.S.	Prairie	Mod. low	Moderate	Well	Severe	1
383	Marna silty clay loam	A	0	Lacustrine sediment/ T-1	Prairie	Very high	Slow	Poor	None	3
9	Marshall silty clay loam	B	1	Loess	Prairie	Moderate	Moderate	Well	Slight	1
9	Marshall silty clay loam	C	2	Loess	Prairie	Mod. low	Moderate	Well	Severe	1
151	Marshan clay loam, mod. deep	A	0	Alluvium	Prairie	Very high	Mod. to mod. rapid	Poor	None	1
151	Marshan clay loam, mod.	B	0	Alluvium	Prairie	Very high	Mod. to mod. rapid	Poor	Slight	1
152	Marshan clay loam, deep	A	0	Alluvium	Prairie	Very high	Moderate	Poor	None	1
152	Marshan clay loam, deep	B	0	Alluvium	Prairie	Very high	Moderate	Poor	Slight	1
382	Maxfield silty clay loam	A	0	Loess/ T-2	Prairie	High	Moderate	Poor	None	1
70	McPaul silt loam	A	0	Alluvium	Prairie, forest	Mod. low	Moderate	Well to mod. well	None	1
299	Minden silt loam	A	0	Loess	Prairie	Mod. high	Moderate	Mod. well to somewhat poor	None	1
149	Modale silt loam	A	0	Alluvium	Prairie, forest	Mod. low	Moderate	Mod. well to somewhat poor	None	2
10	Monona silt loam	B	1	Loess	Prairie	Moderate	Moderate	Well	Slight	1
10	Monona silt loam	C	2	Loess	Prairie	Mod. low	Moderate	Well	Severe	1
410	Moody silty clay loam	B	1	Loess	Prairie	Moderate	Moderate	Well	Slight	1
410	Moody silty clay loam	C	2	Loess	Prairie	Mod. low	Moderate	Well	Severe	1
221	Muck, 18 to 40 inches	A	0	Organic matter	Swamp grasses and sedges	Very high	Moderate	Very poor	None	1
119	Muscatine silty clay loam	A	0	Loess	Prairie	Mod. high	Moderate	Somewhat poor	None	1
119	Muscatine silty clay loam	B	1	Loess	Prairie	Mod. high	Moderate	Somewhat poor	Slight	1
592	Mystic silt loam	D	2	Alluvium	Prairie, forest	Mod. low	Slow to very slow	Mod. well to somewhat poor	Severe	3
12	Napier silt loam	B	0	Local alluvium	Prairie	Moderate	Moderate	Well	Slight	1
12	Napier silt loam	C	0	Local alluvium	Prairie	Moderate	Moderate	Well	Moderate	1
88	Nevin silty clay loam	A	0	Alluvium	Prairie	Mod. high	Moderate	Somewhat poor	None	1
55	Nicollet loam	A	0	T-1	Prairie	Mod. high	Moderate	Somewhat poor	Slight	1
570	Nira silty clay loam	B	1	Loess	Prairie	Moderate	Moderate	Mod. well	Slight	2
570	Nira silty clay loam	C	2	Loess	Prairie	Mod. low	Moderate	Mod. well	Severe	2
220E	Nodaway silt loam	A	0	Alluvium	Prairie, forest	Mod. low	Moderate	Mod. well	None	1
220W	Nodaway silt loam	A	0	Alluvium	Prairie, forest	Mod. low	Moderate	Mod. well	None	1
499	Nordness silt loam	C	2	Sediment/ L.S. bedrock	Forest	Low	Moderate	Well	Severe	1
90	Okoboji silt loam	A	0	Local alluvium	Prairie-sedges	Very high	Moderate	Very poor	None	1
6	Okoboji silty clay loam (Glencoe)	A	0	Local alluvium	Prairie-sedges	Very high	Slow	Very poor	None	2
273	Olmitz loam	B	0	Local alluvium	Prairie	Moderate	Moderate	Well to mod. well	Slight	1
146	Onawa silty clay	A	0	Alluvium	Prairie, forest	Mod. low	Slow	Somewhat poor to poor	None	2
471	Oran loam	A	1	T-2	Prairie, forest	Mod. low	Mod. slow	Somewhat poor	None	2
480	Orwood loam	C	2	Eolian material	Prairie, forest	Mod. low	Moderate	Well	Severe	1
489	Ossian silt loam	A	0	Alluvium	Prairie	High	Moderate	Poor	None	1
394	Ostrander loam	B	1	T-2	Prairie	Moderate	Moderate	Well	Slight	1
281	Otley silty clay loam	B	1	Loess	Prairie	Moderate	Mod. to mod. slow	Mod. well	Slight	2
281	Otley silty clay loam	C	2	Loess	Prairie	Mod. low	Mod. to mod. slow	Mod. well	Severe	2
882	Palsgrove silt loam	D	2	Loess/ L.S. bedrock	Forest	Low	Moderate	Well	Severe	1
321	Peat, >40 inches	A	0	Organic matter	Swamp grasses & sedges	Very high	Moderate	Very poor	None	1

Table 2. (continued)

Soil type no.[a,b]	Soil type	Slope phase[c]	Erosion phase	Parent material[d]	Natural vegetation	Organic matter[e]	Subsoil permeability	Natural internal drainage	Erosion hazard	Subsoil[f] group
131	Pershing silt loam	B	1	Loess	Prairie, forest	Mod. low	Slow	Somewhat poor	Moderate	2
91	Primghar silty clay loam	A	0	Loess	Prairie	Mod. high	Mod. to mod. slow	Somewhat poor	Slight	2
798	Protivin loam	B	1	T-2	Prairie	Mod. high	Slow	Somewhat poor	Slight	2
467	Radford silt loam	A	0	Alluvium	Prairie	Moderate	Moderate	Somewhat poor	None	1
532	Rathbun silt loam	B	1	Loess	Forest	Mod. low	Very slow	Somewhat poor	Moderate	3
399	Readlyn loam	A	1	T-2	Prairie	Mod. high	Mod. to mod. slow	Somewhat poor	None	2
784	Riceville loam	B	1	T-2	Prairie, forest	Mod. low	Slow	Somewhat poor	Slight	2
977	Richwood silt loam	A	1	Alluvium	Prairie	Moderate	Moderate	Well	None	1
214	Rockton loam, mod. deep	B	1	Sediment/ L.S. bedrock	Prairie	Moderate	Moderate	Well	Moderate	1
214	Rockton loam, mod. deep	C	1	Sediment/ L.S. bedrock	Prairie	Moderate	Moderate	Well	Severe	1
274	Rolfe loam	A	0	Local alluvium and T-1	Prairie	Mod. low	Slow	Poor	None	2
805	Roseville loam	B	1	T-2 sediments/ L.S. bedrock	Forest	Mod. low	Moderate	Well	Slight	1
826	Rowley silt loam	A	0	Alluvium	Prairie	Mod. high	Moderate	Somewhat poor	None	1
74	Rubio silt loam	A	1	Loess	Prairie, forest	Mod. low	Very slow	Poor to very poor	None	2
57	Rushville silt loam	A	0	Loess	Forest	Mod. low	Very slow	Poor to very poor	None	2
77	Sac silty clay loam	B	1	Loess/ T-1	Prairie	Moderate	Moderate	Well	Moderate	1
77	Sac silty clay loam	C	2	Loess/ T-1	Prairie	Mod. low	Moderate	Well	Severe	1
73	Salida sandy laom	C	2	Alluvium	Prairie	Low	Very rapid	Excessive	Severe, wind	1
36	Salix silty clay loam	A	0	Alluvium	Prairie	Moderate	Moderate	Mod. well	None	1
237	Sarpy loamy fine sand	B	0	Alluvium	Prairie, forest	Low	Very rapid	Excessive	Severe, wind	1
177E	Saude loam	A	0	Alluvium	Prairie	Moderate	Mod. to mod. rapid	Well	None	1
177E	Saude loam	B	1	Alluvium	Prairie	Moderate	Mod. to mod. rapid	Well	Slight	1
177E	Saude loam	C	1	Alluvium	Prairie	Moderate	Mod. to mod. rapid	Well	Severe	1
177W	Saude loam	A	0	Alluvium	Prairie	Moderate	Mod. to mod. rapid	Well	None	1
407	Schley loam	B	1	Sediments/ T-2	Prairie, forest	Mod. low	Moderate	Somewhat poor	Slight	1
412	Sogn silt loam	C	2	Sediment/ L.S. bedrock	Prairie	Mod. low	Moderate	Well	Severe	1
663	Seaton silt loam	C	2	Loess	Forest	Low	Moderate	Well	Severe	1
312	Seymour silt loam	B	1	Loess	Prairie	Moderate	Very slow	Somewhat poor	Slight	3
312	Seymour silt loam	C	1	Loess	Prairie	Moderate	Very slow	Somewhat poor	Severe	3
312	Seymour silt loam	C	2	Loess	Prairie	Mod. low	Very slow	Somewhat poor	Severe	3
370	Sharpsburg silty clay loam	B	1	Loess	Prairie	Moderate	Mod. slow	Mod. well	Slight	2
370	Sharpsburg silty clay loam	C	2	Loess	Prairie	Mod. low	Mod. slow	Mod. well	Severe	2
24	Shelby loam	C	2	T-2	Prairie	Mod. low	Mod. slow	Mod. well	Severe	2
24	Shelby loam	D	2	T-2	Prairie	Mod. low	Mod. slow	Well	Severe	2
466	Solomon clay	A	0	Alluvium	Prairie-sedges	High	Very slow	Poor to very poor	None	3
122	Sperry silt loam	A	0	Loess	Prairie	Mod. low	Slow	Poor to very poor	None	2
485	Spillville loam	A	0	Alluvium	Prairie	Moderate	Moderate	Mod. well to somewhat poor	None	1
478	Steep rocky land	G	1	Sediment/ L.S. bedrock	Prairie, forest	Mod. low	—	Well	Severe	—
33	Steinauer loam	D	2	T-2	Prairie	Mod. low	Moderate	Well	Severe	1
62	Storden loam	C	2	T-1	Prairie	Mod. low	Moderate	Well	Severe	1
62	Storden loam	D	2	T-1	Prairie	Mod. low	Moderate	Well	Severe	1
62	Storden loam	D	3	T-1	Prairie	Low	Moderate	Well	Severe	1
279	Taintor silty clay loam	A	0	Loess	Prairie	High	Mod. slow	Poor	None	2
120	Tama silty clay loam	A	1	Loess	Prairie	Moderate	Moderate	Well	None	1
120	Tama silty clay loam	B	1	Loess	Prairie	Moderate	Moderate	Well	Slight	1
120	Tama silty clay loam	C	2	Loess	Prairie	Mod. low	Moderate	Well	Severe	1
120	Tama silty clay loam	D	2	Loess	Prairie	Mod. low	Moderate	Well	Severe	1
120	Tama silty clay loam	D	3	Loess	Prairie	Low	Moderate	Well	Severe	1
27E	Terril loam	A	0	Local alluvium	Prairie	Moderate	Moderate	Well	None	1
27E	Terril loam	B	0	Local alluvium	Prairie	Moderate	Moderate	Well	Slight	1
27W	Terril loam	A	0	Local alluvium	Prairie	Moderate	Moderate	Well	None	1
27W	Terril loam	B	0	Local alluvium	Prairie	Moderate	Moderate	Well	Slight	1
398	Tripoli silty clay loam	A	0	T-2	Prairie	High	Mod. to mod. slow	Poor	None	2

Table 2. (continued)

Soil type no.[a,b]	Soil type	Slope phase[c]	Erosion phase	Parent material[d]	Natural vegetation	Organic matter[e]	Subsoil permeability	Natural internal drainage	Erosion hazard	Subsoil[f] group
96	Turlin loam	A	0	Alluvium	Prairie	Mod. high	Moderate	Somewhat poor	None	1
453	Tuskeego silt loam	A	0	Alluvium	Prairie, forest	Mod. low	Very slow	Poor	None	3
51	Vesser silt loam	A	0	Alluvium	Prairie	Moderate	Moderate	Somewhat poor to poor	None	2
506	Wacousta silt loam	A	0	Lacustrine sediments	Prairie	High	Mod. to mod. slow	Poor to very poor	None	2
108	Wadena loam, mod. deep	A	1	Alluvium	Prairie	Moderate	Mod. to mod. rapid	Well	None	1
308	Wadena loam, deep	A	0	Alluvium	Prairie	Moderate	Moderate	Well	None	1
777	Wapsie loam	A	1	Alluvium	Prairie, forest	Mod. low	Mod. to mod. rapid	Well	None	1
178	Waukee loam	A	0	Alluvium	Prairie	Moderate	Moderate	Well	None	1
107	Webster silty clay loam	A	0	Local alluvium and T-1	Prairie	Very high	Moderate	Poor	Slight	1
132	Weller silt loam	B	1	Loess	Forest	Mod. low	Slow	Mod. well to somewhat poor	Slight	3
207	Whalan loam, mod. deep	B	1	T-2 or sediment/ L.S. bedrock	Forest	Low	Moderate	Well	Moderate	1
713	Winneshiek loam, deep	B	1	T-2 or sediment/ L.S. bedrock	Prairie, forest	Mod. low	Moderate	Well	Moderate	1
714	Winneshiek loam, mod. deep	B	1	T-2 or sediment/ L.S. bedrock	Prairie, forest	Mod. low	Moderate	Well	Moderate	1
369	Winterset silty clay loam	A	0	Loess	Prairie	High	Mod. slow to slow	Poor	None	2
67	Woodbury silty clay	A	0	Alluvium	Prairie	High	Slow to mod. slow	Poor to somewhat poor	None	3
134	Zook silty clay	A	0	Alluvium	Prairie	High	Slow to very slow	Poor to very poor	None	3
54	Zook silty clay loam	A	0	Alluvium	Prairie	High	Slow to very slow	Poor to very poor	None	3

Table 3. Ten-year (1960-69) average crop yields from experimental farms.

Soil type	Location	Corn bu./A.	Soybeans bu./A.	Oats bu./A.	Hay T./A.	Grain sorghum bu./A.
Webster silty clay loam	Kanawha	128	39	62	4.2	——
Nicollet-Webster complex	Ames	126	43	82	3.6	——
Kenyon loam	Independence	125	—	70	3.8	——
Galva silty clay loam	Sutherland	107	33	80	3.1	104
Grundy silt loam	Beaconsfield	125	—	48	4.5	——
Edina silt loam	Bloomfield	119	27	67	3.0	——
Ida silt loam	Castana	110	—	64	2.3	——
Marshall silty clay loam[a]	Clarinda	116	—	49	3.3	——
Average	All	120	36	65	3.5	

[a] 1956-1965 yields because experiment terminated in 1965.

APPENDIX

Guidelines Used in Establishing Corn Suitability Ratings

The information concerning factors affecting corn suitability ratings represents an initial effort in establishing criteria applicable on a statewide basis.

A. Slopes (Values listed are subtracted from CSR of same soil on A slope.)

Soil Group I

	Slope group					
	A	B	C	D	E	F	G
Well, moderately well, or somewhat poorly drained; uneroded; < 45% clay; friable or firm; > 48" solum.	Index soil	-5	-20	-30	-40	-60	-70

Soil Group II

	Slope group					
	A	B	C	D	E	F	G
Well, moderately well, or somewhat poorly drained; uneroded; > 45% clay with > 48" solum; firm; very firm < 45% clay; or 20 to 40" to bedrock, sands, or gravels.	Index soil	-5	-25	-40	-55	-75	-85

B. Erosion

	Erosion groups		
	1	2	3
1. AC profiles < 35% clay and loamy sand or sand	Index soil	Index soil	-5 < index
2. Solum > 48", < 35% clay in B	"	-2	-5
3. Solum > 48", 35-42% clay in B or very firm soils < 35% clay	"	-5	-10
4. Solum > 48", > 42% clay in B	"	-5	-15
5. Solum 20 to 40", 18-45% clay in B	"	-5	-15
6. Solum < 20", 18-45% clay in B	"	-10	-20

C. Biosequence (Prairie soils have higher CSR's than Gray-Brown Podzolic soils. Values listed are subtracted from P index soil for P/F and for F soils.)

	P	P/F	F
1. Medium and moderately fine textured soils	Index soil	-5	-10
2. Fine textured soils	Index soil	-10	-20
3. Sandy loam soils	Index soil	-4	-8
4. Loamy sand soils	Index soil	-2	-4

D. Wetness (Landscapes that contribute to wetness conditions and wet, poorly drained soils have lower CSR ratings than do somewhat poorly drained soils in a hydrosequence.)

Soils	Drainage	CSR
1. Moderately permeable; solum > 48"; < 35% clay in B	Poor < somewhat poor by	-5
2. Slowly permeable; solum > 48"; 35-42% clay in B	Poor < somewhat poor by	-7
3. Very slowly permeable; solum > 48"; > 42% clay in B except Edina is -5 < Seymour	Poor < somewhat poor by	-10
4. All depressions and Planosols except Edina, Belinda, and Beckwith soils	Depressions < poor by	-25
5. a. All concave positions vs. associated upland soils (concave level uplands)	Well and moderately well by Somewhat poor by Poor by	-3 -5 -10
b. Somewhat poor; very firm B with 30-35% clay in B and > 42% clay in B	Poor < somewhat poor by	-10
6. Moderately well or well vs. somewhat poorly drained for moderately well or well < somewhat poor		
a. Sharpsburg < Macksburg Marshall < Minden Clarion < Nicollet	Add for somewhat poor	+3
b. Galva < Primghar	Add for somewhat poor	+5
c. All other moderately well or well vs. somewhat poor	Somewhat poor - moderately well or well	0

7. Upland drainageway areas: CSR av. of soils in complex minus approximately 15 CSR's.

E. Calcareous soils (Calcareous soils have a lower CSR than associated noncalcareous soils.)

1. Poorly drained noncalcareous soils vs. poorly drained calcareous — -5 for calc.
2. Highly calcareous poorly drained vs. noncalcareous poorly drained — -20 for highly calc.
3. Calcareous upland vs. noncalcareous upland
   a. Calcareous soils: deduct 5 CSR's from comparable upland that is not calcareous
   b. Loamy sand, sand, or gravels: calcareous vs. noncalcareous, subtract 10 CSR's for calcareous soil

F. Depth phases (Soils with thin solums have a lower CSR than comparable soils with thick solums.)

1. Well or moderately well drained (medium and moderately fine textured)

Soil depth	CSR
> 48" thick	Index (upland soil)
Deep	-16 less than index soil
Moderately deep	-16 less than deep
< 20" to sand, gravel or bedrock	-25 less than moderately deep

2. Somewhat poorly drained (medium and moderately fine textured)

Soil depth	CSR
> 48" thick	Index (upland soil)
Deep	-12 less than index soil
Moderately deep	-12 less than deep
< 20" to sand, gravel or bedrock	-20 less than moderately deep

3. Poorly drained

Soil depth	CSR
> 48" thick	Index (upland soil)
Deep	-8 less than index soil
Moderately deep	-8 less than deep
< 20" to sand, gravel or bedrock	-16 less than moderately deep

4. Sandy loam over sand, gravel, or bedrock (well or moderately well drained)

Solums	CSR
> 48" thick	Index soil
Deep	-10 less than index soil
Moderately deep	-10 less than deep
< 20"	-15 less than moderately deep

5. Loamy sands over gravels or bedrock

Solums	CSR
> 48" thick	Index soil
Deep	-5 less than index soil
Moderately deep	-5 less than deep
< 20"	-10 less than moderately deep

G. Sandy or gravelly soils

1. Sandy loam profiles vs. loamy uplands > 48" thick — -35 for sandy loam
2. Loamy sand and sand profiles vs. loamy uplands > 48" thick — -50 for loamy sand and sand

H. Precipitation factors for Iowa (Index soil is Tama; well-drained soils in northwestern and western Iowa have lower CSR's than Tama soils.)

1. Southern Iowa loess soils vs. Tama soils (CSR's less than Tama)

-15	-10	-8	Index
Monona	Marshall	Sharpsburg	Tama

2. Galva vs. Tama — Galva = 0.75 x Tama
3. Tama vs. Moody — Moody = 0.70 x Tama
4. Loamy sand and sandy loam - eastern Iowa vs. western Iowa
   western Iowa 0.70 x eastern Iowa soil
5. Well and moderately well drained bottom lands
   - western Iowa 0.96 x eastern Iowa soil

I. Deposition and special soil modifiers

1. Deposition on units 133, 53, 134, 248, and 172, add 5 CSR's for deposition.
2. All overscore (i.e., $\overline{133}$), channeled (133c), or gullied (5 erosion) are rated at 25 CSR's.
3. T units are the same as uplands except that alluvial benches are 2 CSR's less than uplands.

J. Parent materials

1. Deoxidized loess: 3 CSR's less than oxidized
2.

loess	loess/till	till
Index soil	5 less than loess	10 less than loess

3. Loamy vs. silty bottom lands

   loamy: 3 CSR's less than silty

K. Muck and peaty soils

1. Muck

< 20" over mineral soil	15 CSR's less than poorly drained landscape associate
20 to 40" over mineral soil	30 CSR's less than poorly drained landscape associate
> 40"	25 CSR's less than 20- to 40-" depth

2. Peat

Peaty muck and peat	10 CSR's less than comparable depth phase of muck (< 20" 10 CSR's less than poorly drained associate)