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De Soto County soils

E. J. McNutt

Harvey B. Vanderford

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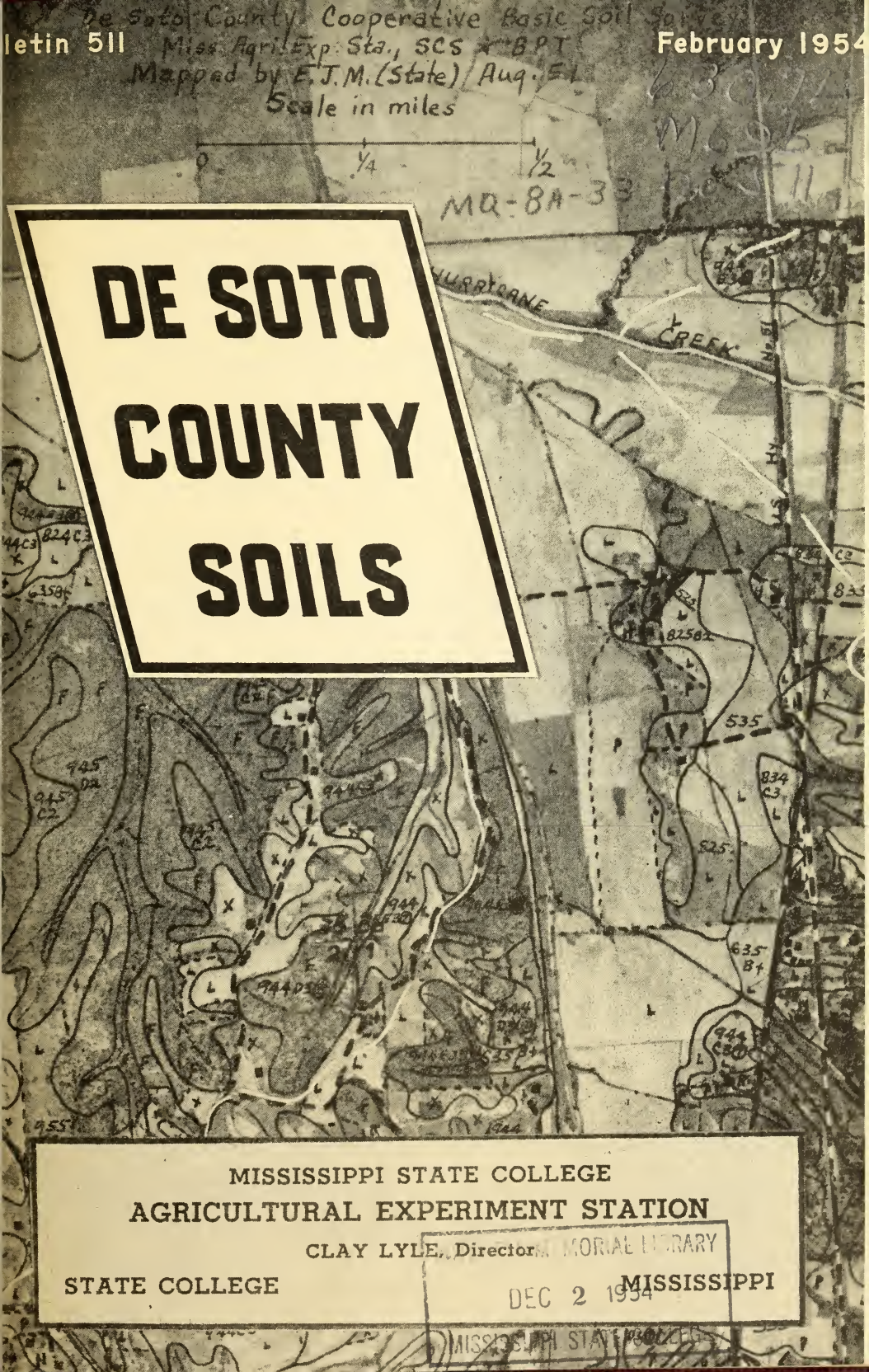
De Soto County Cooperative Basic Soil Survey
Miss. Agri. Exp. Sta., SCS & BPI
Mapped by E.J.M. (State) Aug. '51
Scale in miles
0 ¼ ½
MQ-8A-3



DE SOTO COUNTY SOILS

MISSISSIPPI STATE COLLEGE
AGRICULTURAL EXPERIMENT STATION
CLAY LYLE, Director
STATE COLLEGE MISSISSIPPI

SOIL SURVEY PARTY FOR DE SOTO COUNTY

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The Soil Conservation Service and the Bureau of Plant Industry, Soils and Agricultural Engineering cooperated with the Mississippi Agricultural Experiment Station in the Soil Survey of De Soto County.

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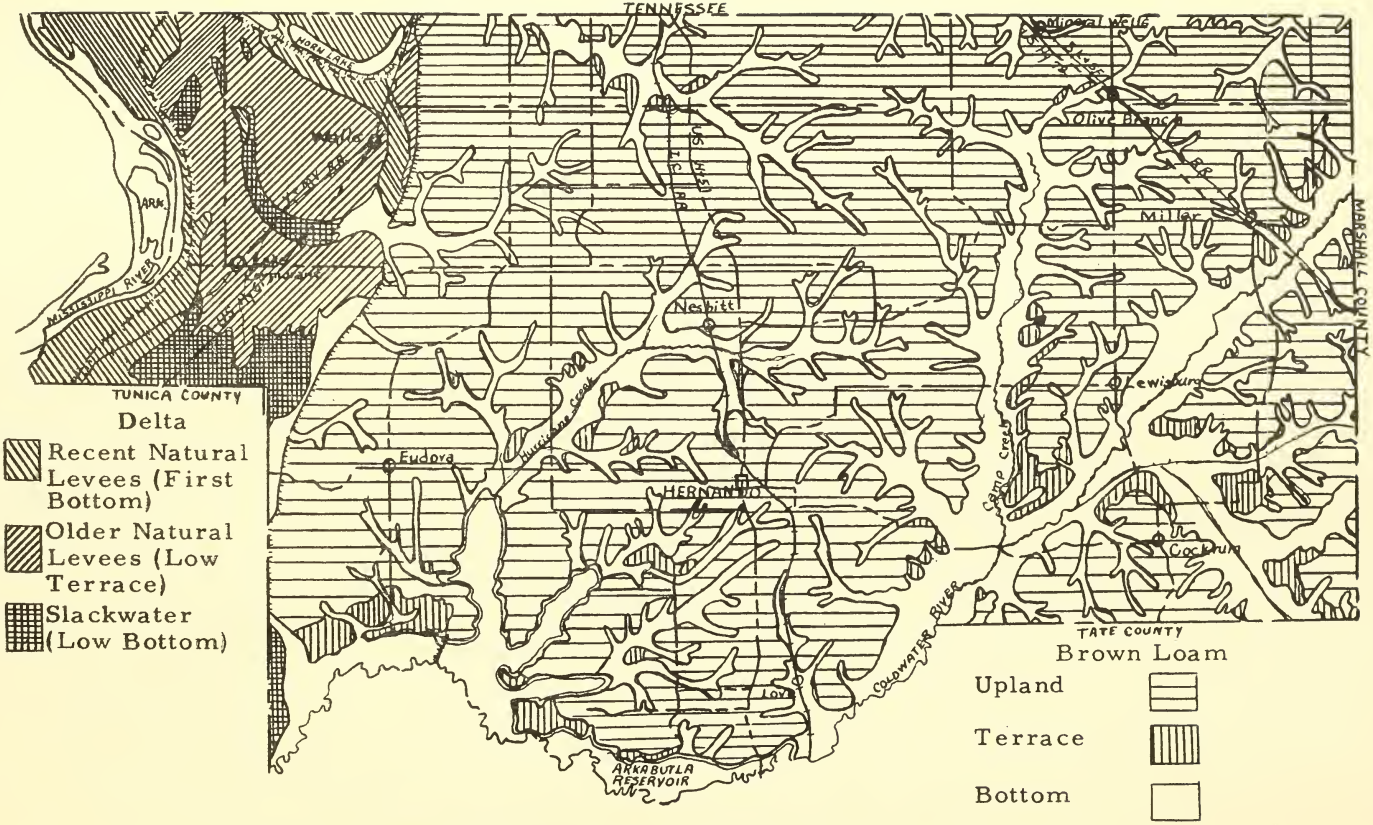


Figure 1. Major Soil Groups of De Soto County.

DE SOTO COUNTY SOILS

By E. J. McNUTT and H. B. VANDERFORD

This soil report is written primarily for agricultural workers and the farmers of DeSoto County. It has been prepared to aid them in their study and use of the soil maps of this county. The management recommendations are based on field experiments of the Mississippi Agricultural Experiment Station, observation and field studies and the experience of good farmers. Suggestions are included regarding use, conservation and management of the various soils of the county.

In using this bulletin with a soil map of De Soto County, follow the instructions below for easy reference.

1. Locate the boundary of your farm on the soil map.
2. Note soil numbers on your soil map. Determine the soil group of your land by locating these numbers in the index of this bulletin.
3. The index will also give the page numbers where the use and management of the soil group is discussed.
4. For further information, turn to the table of contents.

General Information on De Soto County Soils

De Soto County is divided into two main soil areas — the Loess Hills or "Brown Loam" and the Mississippi River Flood Plain or "Delta". The soils of the Brown Loam were derived from loess which is a silty wind blown deposit. The soils of the Delta were formed from sediments deposited by the overflowing Mississippi River or its tributaries.

Soils of the Loess Hills or Brown Loam

The generally accepted theory of the origin of the loess or silty soil material from which these soils were developed is that during certain stages of the ice age, the melting of the glaciers during the summers caused large volumes of water to flow toward the gulf. This created great floods which carried enormous quantities of "rock flour" or finely ground rock. During the cold winters the flow of the water would be stopped or greatly reduced, and wide broad flats of this silty material was left over the flood plains exposed to the sun and wind. Prevailing winds out of the southwest lifted clouds of the dry silt into the air and it settled on the hills and valleys east of the river flood plain. The theory helps explain the fact that the windblown silty deposits are deep on the bluff bordering the Delta and thin out gradually to the east.

The soils of the Brown Loam area are divided into four general groups as follows:

1. Soils of the uplands. The uplands portion is dissected with numerous drainageways and streams. As stated before the soils were formed from silty windblown materials. Subject to severe erosion, a continuous row-cropping system has caused much of the soil to be washed away and deep gullies have formed. This is especially true on cultivated slopes of five percent or more. Many of the cultivated areas have had the silt loam surface layer removed by erosion, leaving the silty clay loam subsoil exposed on the surface. The soils of the uplands range from the Natchez soils on the bluff beginning at the edge of the Delta and extending eastward through the Loring Deep phase, Loring, Grenada, Calloway, and Henry soils. The topography ranges from level to hilly (slope 0 to over 17 percent). The upland soils cover ap-

proximately 65 percent of the area of the county.

A few small areas of soils formed from coastal plain materials are found in the upland area, usually on the steeper slopes bordering the major stream flood plains. These soil profiles contain much gravel, as in the Guin soils, or sand, as in the Kershaw soils. In addition to these two series, there are two soil complexes composed of intermingled soils of two or more series that cannot be easily separated on the map. These two complexes are Lexington-Loring-Providence and Brandon-Loring. The Lexington, Providence and Brandon soils are composed of a thin mantle of loess (silty wind blown material about two feet thick) over coastal plain sandy or gravelly material. These two complexes and the Guin and Kershaw soils make up about two percent of the total of the upland soils.

2. Soils of the Terraces. These soils are found bordering the major stream flood plains in the Brown Loam area. They were formed from silty material washed from loess-formed soils and deposited by the streams when they flowed at a much higher level. There is little observable differences in the profiles of similar soils of the terraces and uplands. The separations of these two are based primarily on position. In cultural practices and treatment these soils respond similar to the upland soils. The topography of these soils is less rugged than the soils of the upland. Except for some steep escarpments along stream channels or former stream channels, the usual slope is gently undulating to undulating. The soil series of this group, from best to poorest drained, are: Lintonia, Richland, Olivier and Calhoun. These soils comprise about two percent of the total land area of the county.

3. Soils of Local Alluvium. These soils occupy the long narrow upland drainageways, upland depressions and toe slopes bordering the stream flood plains. They consist primarily of silty material washed or sloughed down from local loess-formed soils. They are subject to both deposition and removal of soil material by flood water. These overflows are usually of short duration and ordinarily little damage is done to crops on these soils. The soil series of this group, from best to poorest drained, are: Tigrett, Briensburg and Dyer. In addition to these, there is one other mapping unit called mixed local alluvium composed of a mixture of sand, silt and gravel materials. All the soils of this group cover about five percent of the total land area of the county.

4. Alluvial Soils or Soils of the Bottoms. These soils are composed of silty material washed from soils or loess origin and deposited by the overflowing streams in their flood plains. These soils are similar in many respects to the Local Alluvial, differing primarily in being located in broader more level and uniform areas. This group represents some of the best soils for cultivated crops in the county. They are subject to flooding during prolonged rainy periods and some crop damage may be expected, especially on some of the poorer-drained soils during wet years. This group is composed primarily of the soils of the Vicksburg, Collins, Falaya and Waverly series with a few areas of Hymon and Ina soils and a soil complex called mixed alluvium. The bottoms make up about thirteen percent of the soils of the county.

Soils of the Misssissippi River Floodplain or "Delta"

Approximately 15 percent of the area of De Soto County is in the Delta. Practically all of the Delta soils were developed from sediments deposited by the Mississippi River. On the eastern side of the Delta the Coldwater River and some of the smaller streams such as

Whites Creek, Jackson Creek and Johnson Creek have influenced small areas of Delta soils with silty materials washed from the Brown Loam.

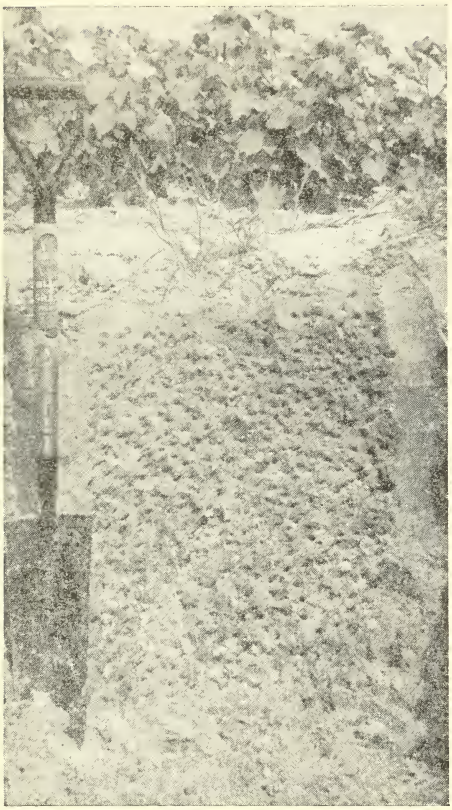
The sediments from which the soils are formed have been deposited recently, in terms of geologic age. The total depth of sediments, however, may be several hundred feet thick. A wide variety of minerals are included in these sediments since the drainage area above De Soto County includes some 20 states. Many of these minerals come from fresh unweathered glacial sources and some from highly weathered sources. This has resulted in a wide range of minerals in the Delta soils of DeSoto County.

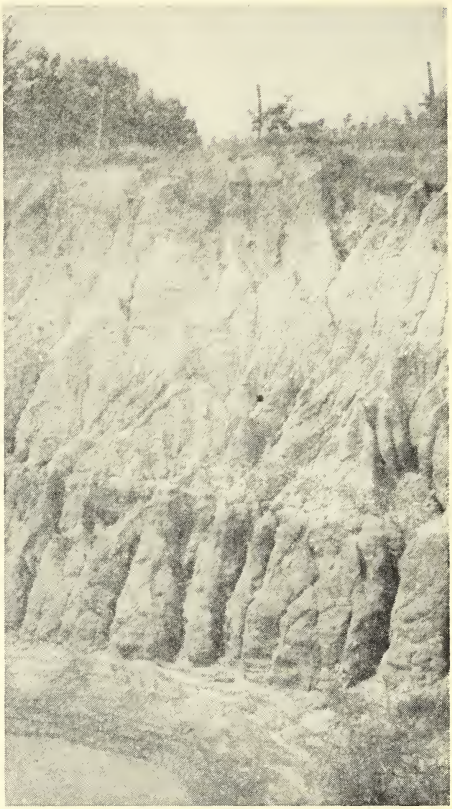
The rate of flow of water determines the distribution of sediments of different textures carried by any stream. As a heavily laden stream overflows its banks the rate of flow of water is decreased and the heavier sediments are deposited. This eventually results in a natural levee being formed along the channel of the stream. As the water flows on over the land, its speed is gradually reduced and smaller lighter particles are deposited until it reaches the low slack water areas where the lightest particles or clay sediments are deposited. This natural process of levee building goes on until eventually the levees and the stream bed itself may become higher than the slack water area. During floods the river may leave its channel and flow through the low areas where the process of natural levee formation is repeated. Thus the area will eventually be interlaced with oxbow lakes, bayous and depressions of former stream channels.

In this process of valley filling the natural levees along the present stream channels are still receiving sediments. The older abandoned natural levees are weathering without the addition of fresh materials. The two levee conditions, the slack water area and the depressions form four general soil groups of the Delta as follows:

1. Soils of the Recent Natural Levees (First Bottom). These soils are characterized by being neutral to alkaline (sweet) and by having little or no profile development. The sediments deposited by the river are alkaline due to the presence of lime, and since it takes some time for the lime to leach from an alkaline soil to form an acid (sour) soil, the soils of the recent natural levees remain alkaline. Alkaline seep water coming under the artificial levee during periods of high floods helps to keep some of the protected soils near the levee sweet. Most of these soils are light colored due to the fact that organic matter has not built up in them. In the deposition of sediments the heavier sandy materials were first deposited from the overflowing water and the Crevasse soils were formed. Next in order are the Robinsonville, Commerce and Mhoon soils. The First Bottom group of soils comprise about 13 percent of the soils of the Delta region or about two percent of the soils of the county.

2. Soils of the Older Natural Levees (Low Terrace). The soils of this group are found bordering former channels and runs of the Mississippi River, usually on the highest elevations in the Delta. They were formed from the heavier sediments deposited from relatively fast moving water. Ordinarily the sandy-textured soils occur on the former stream bank and the texture gradually changes until the clay-textured soils of the slack water areas are reached. These soils have been free from overflowing long enough to have some profile development and have been in place long enough to have become partially leached. These productive soils are usually medium to slightly acid or sour. Locally, they are called sandy or loamy soils. They are the most abundant of any of the four groups of soils in the Delta region of the county, covering approximately 47 percent of that area or





Deep, well drained, bottomland soils (left photograph) are used for row crops. The photograph on the right illustrates the loess (wind-blown material) over coastal plain sand and gravel.

about seven percent of the total area of the county (see figure 1). The soils of this group are composed primarily of the Bosket, Dubbs, and Dundee series with a few small areas of the Clack, Beulah and Forestdale series.

3. **Soils of the Slackwater Group (Low Bottom).** The soils of this group were formed from Mississippi River sediments high in clay content deposited by slow moving or still water. They are usually found on some of the lower elevations in relatively broad, level to nearly level areas. These soils are high in natural fertility but poor physical characteristics (such as high clay content, poor internal drainage, cracking when dry, sticky or gummy when wet) limit the production of some crops. These soils comprise approximately 20 percent of the Delta area or about three percent of the total area of the county (see figure 1).

4. **Soils of the Depressions.** These soils, not shown in figure 1, occur in each of the three previously mentioned groups. These are low usually long and narrow areas where excess water accumulates from the surrounding

higher land. Their poor internal drainage, slow runoff, and low position limit the production of some crops. They cover approximately seven percent of the Delta area or about one percent of the total area of the county.

Physiography, Relief And Drainage

The Delta slopes gradually to the south, its elevation ranges from 200 to 210 feet above mean sea level. The elevation of Walls, in the north part of the Delta region, is 210 feet and Lake Cormorant, in the south part of the Delta region, is 205 feet above mean seal level. The relief is level to undulating with a few steeper narrow escarpments along some of the streams and bayous or their former banks. It is drained by the Mississippi River (the portion unprotected by the levee), and Lake Cormorant Bayou and its small tributaries. Horn Lake, in this area, was formed by a Mississippi River cut-off which occurred many years ago and covers about 1000 acres.

The Loess Hills or Brown Loam area of the county is subject to severe erosion and gullies are evident throughout most of it, with many areas of rough gullied land in various sections of the county. The erosion hazard has been increased by the cultivation of row crops (principally cotton) on slopes that were too steep for row crops. The most rugged and steep slopes are found along the loess bluffs bordering the eastern side of the Delta. The more nearly level upland is found in the northeast part of the county adjoining the Tennessee State line. The elevation ranges from a low of 190 feet above sea level in the Coldwater River bottom at the Tunica County line to 400 feet at Olive Branch in the northeast corner of the county.

Most of the Brown Loam area is drained by the Coldwater River and its tributaries. Sam Creek, Hurricane Creek (with its tributary Wolf Creek), Muscanna Creek, Cane Creek, Short Fork Creek, Camp Creek (with its tributaries Bean Patch Creek and Nolehoe Creek) all flow generally in a south or southwestern direction and enter the Coldwater River to the south. Caney Creek, Jourdan Creek, and Pigeon Roost Creek (with its tributaries Byhalia Creek and Red Banks Creek) flow generally in a northwestward direction and enter the Coldwater River to the north. Horn Lake Creek in the northwest part of the Brown Loam area flows northwestward into Tennessee and finally into Horn Lake. Along the western edge of the Brown Loam, Johnson Creek, Jackson Creek and Whites Creek flow westward into the Delta and then on into Lake Cormorant Bayou, which eventually flows into the Coldwater River to the south.

There is one large artificial lake, Arkabutla Lake, in the Brown Loam region which has a 5,100 acre conservation pool and a 33,400 acre flood control pool. This lake, formed by an earth fill dam on the Coldwater River, is located a few miles up the river from where it flows into the Delta. Its principal use is flood control. It is also used for such recreation as hunting, fishing, boating, etc.

Vegetation

The native vegetation of the Delta area of De Soto County consisted primarily of hardwoods, chiefly oak, walnut, hackberry, elm, gum, beech, willow, birch, sycamore, hickory, wild pecan, ash and maple with some cypress and a dense undergrowth of vines and canes. In the Brown Loam the above mentioned trees as well as cherry, holly, mulberry, yellow poplar, sasfras, honeylocust, boxelder, and dogwood grow with some cedar.

Only about 15 percent of the land has never been cleared. The woodland is confined chiefly to the stronger slopes of the uplands, the Coldwater River bottom and practically all of the area between the Mississippi River and the pro-

tective levee.

Agriculture

Most of the crops of this section of the country are grown to some extent in De Soto County. Since the days of the early settlers, cotton has been the chief source of income for farmers. Cotton is grown to some extent throughout the county and quite extensively in the Delta region. Corn is also grown throughout the county with some rather high yields (100 bushels or more to the acre) being produced the last few years on some of the better soils. The acres devoted to the main crops in 1949 were as follows: cotton 51,810, corn for grain 25,868, soybeans for beans 2,208, soybeans for other purposes 1,571, oats for grain 1,109, sorghum for silage 926, cowpeas for all purposes 1,500, lespedeza for hay, 11,720, vegetables harvested for sale 291, and tree fruits 438.

Dairying and beef cattle production are second only to cotton in source of income. Since 1920 the number of cattle has doubled in De Soto County. With a good market for both dairy products and beef cattle in nearby Memphis, much emphasis is being placed on these enterprises. Much of the soil that erodes too easily to be in cultivated crops may be made to produce good pastures with proper seeding and management .

Soil Survey Methods and Definitions

Soil surveying consists of the examination, classification, and mapping of soils in the field and the recording of their characteristics, both internal and external, with special interest upon the features that influence the adaptation of the land for the growing of crop plants, grasses and trees.

The soils are examined systematically in many locations. Test pits are dug, numerous borings are made; and exposures, such as those in road or railroad cuts, gullies, ditches, pits and other excavations are studied. Each excavation exposes a series of layers or horizons, called collectively the soil profile. Each horizon of the soil, as well as the parent material beneath the soil is studied. The following characteristics are noted:

1. Texture—The percent of sand, silt and clay.

2. Color—An indication of internal drainage and organic matter content.

3. Structure—The arrangement of the individual particles into aggregates.

4. Reaction—The acidity or alkalinity (sourness or sweetness) of the soil.

5. Permeability—The quality of the soil that enables it to transmit water or air.

6. Internal drainage—That quality of the soil that permits the downward flow of water through it.

7. Runoff—The rate of surface water runoff.

Also noted are the arrangement and thickness of the different layers or horizons, the nature of the parent material, the topography or lay of the land, and the degree of both sheet and gully erosion.

Upon the basis of their characteristics, soils are grouped into classification units. The three principal units are: (1) series, (2) type, and (3) phase. In places two or more of these principal units may be in such intimate or mixed patterns that they cannot be clearly shown separately on the map and must be mapped as a complex.

A soil series is a group of soils similar in almost every respect except the texture of surface layers. Therefore, a series is composed of soils with essentially the same color, structure, and other important internal characteristics, the same

natural drainage conditions and the same range in relief. The textures of the surface or plow layers may differ within a series. Sharkey, Dowling, Bosket, Commerce, Loring, Richland and Collins are names of important series found in this county.

Within a soil series are one or more soil types, defined according to the texture of the surface layer of the soil. Thus the class names of the soil texture, such as clay, silty clay, silty clay loam, silt loam, very fine sandy loam, and fine sandy loam is added to the series to give the complete name of the soil type. For example Dundee very fine sandy loam and Dundee silt loam are soil types of the Dundee series. Except for the surface textures these two soil types have essentially the same internal characteristics.

One soil type may occur on several different slopes and may have different degrees of erosion. These differences in slope and erosion are shown by the use of soil phases. For example, Loring silt loam, eroded gently undulating phase (slope, 2 to 5 percent) and Loring silt loam, hilly phase (slope 17 percent or more) are two phases of the same soil type. These two phases have different management problems. The gently undulating phase may be cultivated easily, where as the hilly phase is too steep for practical cultivation.

Miscellaneous land types are used in soil classification and mapping for areas of land that have no natural soil, or that are too inaccessible for examination, or where for other reasons it is not feasible to classify and map the area in detail. Alluvial soils (unclassified) is a miscellaneous land type used in De Soto County for areas lying between the Mississippi River and the protective levee. Two other miscellaneous land types found in the Loess Hills region are Rough gullied land, Loring soil materials and Rough gullied land, Grenada soil materials.

The soil surveyors have made a map of this county, showing the location of each of the soil types, phases and complexes in relation to roads, houses, streams, lakes and other local cultural and natural features of the landscape.

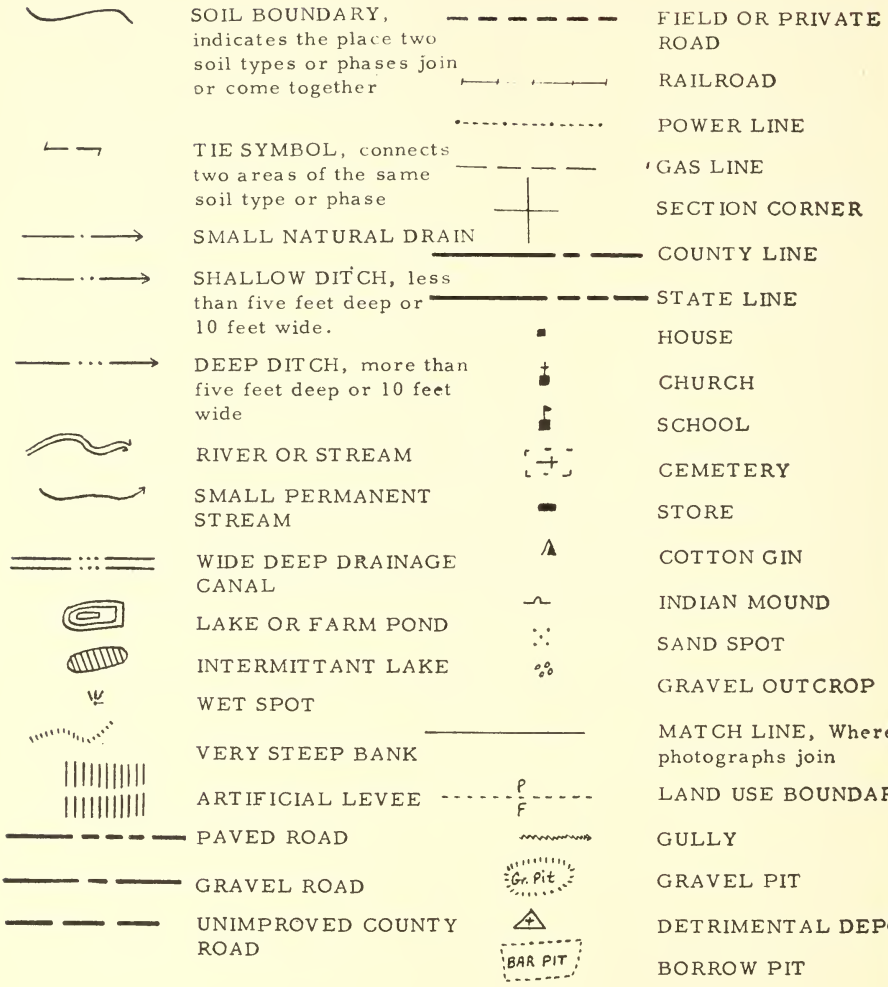
Know Your Soils and Plan Their Management

First Examine The Soil Map

1. Note Symbols—In using this bulletin it is necessary to examine your soil map and become familiar with the various symbols used to designate certain features of the land (see page 12).

Each separate area of the soil mapped is indicated on the map with a symbol. The first number of the symbol refers to the position of the soil and the source of the parent material, the second number indicates the degree of internal drainage, and the third number gives the texture of the surface layer. These first three* numbers of the soil symbol indicate the soil type. Following these numbers is a capital letter indicating the percent of slope, another number indicates the degree of sheet erosion, another number indicates deep gullies, if any.

*In the Brown Loam area, the soils formed from coastal plain material or mixed loess and coastal plain material have an additional number in their symbol which indicates that the profile contains some sand, gravel or both.



Learn the above list of symbols so that they may be recognized on the soil map.

BROWN LOAM AREA

Postition

5. Bottoms (alluvial soils)
6. Local Alluvium
8. Terrace
9. Upland

Internal Drainage

1. Poor
2. Poor to somewhat poor
3. Somewhat poor to moderately well
4. Moderately well to well
5. Well
6. Somewhat excessive
7. Excessive

Surface Texture

1. Heavy clay (not used)
2. Clay
3. Silty clay
4. Silty clay loam
5. Silt loam
6. Very fine sandy loam
7. Fine sandy loam
8. Loamy sand
9. Sand

Slope

A. 0 to 2 percent (level)
B. 2 to 5 percent (gently undulating)
C. 5 to 8 percent (undulating)
D. 8 to 12 percent (gently rolling)
E. 12 to 17 percent (rolling)
F. 17 percent or over (hilly)

Erosion

+. Accumulates
1. None to slight
2. Eroded (25 to 75 percent of original surface lost)
3. Severely eroded (more than 75 percent of original surface and up to 25 percent of subsoil lost)
4. Very severely eroded (more than 25 percent of subsoil lost)
8. Frequent shallow gullies
(7). Occasional deep gullies
(8). Frequent deep gullies
9. 75 percent or more of land area destroyed by gullies

Present Land Use

F. Forest
H. Home site
L. Cultivated land
P. Pasture
X. Idle land

DELTA AREA

Position

1. First Bottom
1. First Bottom (recent natural levees)
2. Depression
3. Low Bottom (slackwater deposits)
4. Low Terrace (old natural levees)

Internal Drainage

1. Poor
2. Poor to somewhat poor
3. Somewhat poor to moderately well
4. Moderately well to well
5. Well
6. Somewhat excessive
7. Excessive

Surface Texture

1. Heavy clay (not used)
2. Clay
3. Silty clay
4. Silty clay loam
5. Silt loam
6. Very fine sandy loam
7. Fine sandy loam
8. Loamy sand
9. Sand

Slope

A°. 0 to ¼ percent (level)
A. ¼ to 2 percent (nearly level)
B. 3 to 5 percent (gently undulating)
C. 6 to 10 percent (undulating)
D. Over 10 percent (sloping)

Erosion

+. Accumulates
1. None to slight
2. Eroded (25 to 75 percent of original surface lost)
3. Severely eroded (more than 75 percent of original surface and up to 25 percent of subsoil lost)

Present Land Use

F. Forest
H. Home site
L. Cultivated land
P. Pasture
X. Idle land

Another capital letter found in each area, but not joined to the other symbol, indicates the land use when the area was mapped. For example, the symbol 944C3(7) indicates the following:

9—An upland soil in the Brown Loam region of the county.

4—The soil is moderately well to well drained .

4—The surface layer is a silty clay loam.

C—The slope ranges from 5 to 8 percent .

3—Sheet erosion has removed at least 75 percent of the surface layer and usually part of the subsoil in places.

(7)—There is an occasional (more than 100 feet part) deep gully not easily crossed with farm machinery.

The diagram on page 13 explains the numbers and letters found on the soil map, other symbols may be found on page 12.

2. Entire Soil Profile Important—A soil profile is a vertical section of the soil down through its various layers from the surface through the subsoil and on into the parent material. In studying and classifying soils, the profile must be examined to a depth of 40 inches or more. Often two soils have identical surface layers but may differ widely in the subsoil and hence have different land uses and agricultural values. The subsoil characteristics are important and should be understood.

3. Soil Types Vary—Various soil types or mapping units have a range in properties. The same mapping unit examined in many places may have similar but not necessarily identical characteristics. On one side of the range it may resemble a better soil and on the other a poorer soil. Boundaries between mapping units vary in sharpness. Some may change in a matter of a few feet others may change over a space of 100 feet or more. Between most soil types there is a transitional zone in which the soil has properties common to both.

In some areas the soil types are so intermixed that separation is not practical. These areas are called complexes.

Compare Your Yields With Test Yields

High crop yields year after year are the results of good management. Continued low yields may be caused by poor soil, poor management, or by growing unadapted crops. Tables 1 and 3 show average yields that can reasonably be expected for cotton, corn, or soybeans, and acres of permanent pasture required per animal unit on these soils over a five-year period under good management.

Actual production records must be kept to make yield comparisons. Five-year records are necessary for good averages because of wide seasonal variations in rainfall, temperature, and insect or disease injury Unless yearly records are maintained, the high yields are likely to be remembered and the low yields forgotten.

Practices resulting in high yields of one crop, such as cotton, will not necessarily produce high yields of other crops. Some soils will produce higher yields of a specific crop than other soils. Therefore, the first step in producing high yields of any crop is to select land to which this particular crop is adapted. Since cotton is still the chief cash crop on most farms, the best-all-round land on the farm is usually planted to this crop. However, it is important that the remaining soils on the farm be planted to some adapted crop to which the soils' poor physical characteristics are not a limiting factor to good yields.

Since new crop varieties, new cultural practices, new plant disease, and new insect pests may greatly affect yield levels in the future, the figures in tables 1 and 3 must be regarded as current.

Soil Management

The purpose of this section is to explain briefly some of the principles of good soil management. For recommendations for specific soils, see "Soil Groups of DeSoto County Their Use and Management," page 33. Soil management includes such practices as (1) choice and rotations of crops, (2) fertilization, (3) tillage operations and (4) water control on the land. Since De Soto County has two different soil areas, each with different management problems, they will be discussed separately.

Brown Loam Area
General Recommendations

1. Choice and Rotation of Crops — This is a general discussion of crops and rotations; for recommendations on specific soils see "Soil Groups of De Soto County Their Use and Management" page 33. The better drained bottom and local alluvial soils (those with the second number 3 or 5) are well adapted to the production of both cotton and corn and may be planted to row crops frequently, provided sufficient organic matter is returned to the soil in the form of crop residues, manure, and winter or summer legumes where practical The poorest drained of these soils (those with second numbers of symbol 1) are best adapted to trees, while the other poor to somewhat poorly drained soils (those with second number of symbol 2) are best adapted to pasture and hay production.

In general, crops that effectively retard runoff should be grown more of the time on the steeper than on the less steep slopes of the soils of the uplands or terraces that are similar in every respect except slope. Most of the time for example, the hilly phase should be in forest, sloping phase in forest or pasture, gently sloping phase in pasture, undulating phase in close growing crops and the gently undulating and level phases in row crops.

2. Fertilization—The soils of the Brown Loam area require the addition of commercial fertilizer for the profitable production of crops. Non-legumes require all three major plant food elements, nitrogen, phosphorus (phosphate) and potassium (potash). In general, less nitrogen and more potash is needed in the bottoms and local alluvial areas than on the upland or terraces. Legume crops need phosphorus and potassium and usually lime for best growth. The incorporation of organic matter in the soils in the form of legumes, manure or crop residues is helpful in keeping the soil in a good mellow condition and in increasing the rate at which it will absorb water. Most of these soils are well adapted to the growth of vetch and wild winter peas.

The addition of lime is helpful on the more acid soils for crop production, especially legumes. The need for lime should be established before it is applied. The acidity of the topsoil and the texture are the two factors that govern the amount of lime necessary to adjust the reaction.

Proper soil analysis can serve as a good indicator of soil fertility and the need for lime. Therefore, the farmer should have his soil tested in the laboratory and use this information in developing specific fertilizer practices in his fields. Current fertilizer recommendations of the Mississippi Agricultural Experiment Station should be consulted each year for up to date fertilization information.

To obtain the full value of fertilizer used, it is necessary to control both insects and weeds as well as follow other good farming methods.

3. Tillage Operations — On the soils of the uplands and terraces the soils should be tilled in such a manner that they will be in condition to retard runoff and absorb water. Tillage should be at such times and in such manner that the

Table 1. Estimated average yields of principal crops under good management and proposed general land use recommendations for the Brown Loam soils of De Soto County.

Soil symbol	Soil group	Soil name	Cotton lint (lbs. per acre)	Corn (hybrid) (bu. per acre)	Soybeans (bu. per acre)	Pasture (ac. per animal unit)[1]	Proposed land use[2]	Workability[3]	Conservability[4]
514	5b	Waverly silty clay loam	----[5]	----	----	----	3	Poor	Very good
515	5b	Waverly silt loam	----	----	----	----	3	Poor	Very good
524	5b	Falaya silty clay loam	300	40	18	3.2	2-3	Fair	Very good
525	5b	Falaya silt loam	300	45	18	3.2	2-3	Good	Very good
5256	5b	Ina silt loam	300	45	18	3.2	2-3	Good	Very good
530	1c	Mixed alluvium	425	55	20	2.5	1-2-3	Good	Very good
534*	1b	Collins silty clay loam	600	60	22	2.2	1-2-3	Fair	Very good
535*	1a	Collins silt loam	625	85	22	2.0	1-2-3	Very good	Very good
535B+	1a	Collins silt loam, gently undulating phase	625	85	22	2.0	1-2-3	Very good	Good
5356	1a	Hymon silt loam	600	80	20	2.2	1-2-3	Very good	Very good
555	1a	Vicksburg silt loam	750	90	28	1.6	1-2-3	Very good	Very good
615	5b	Dyer silt loam, level phase	----	----	14	3.6	2-3	Good	Good
615B+	5b	Dyer silt loam, gently undulating phase	----	----	14	3.6	2-3	Good	Good
630	1c	Mixed local alluvium, level phase	425	60	25	2.0	1-2-3	Very good	Good
630B+	1c	Mixed local alluvium, gently undulating phase	450	65	25	2.0	1-2-3	Very good	Good
630C+	1c	Mixed local alluvium, undulating phase	400	55	22	2.5	2-1-3	Very good	Good
630D+	1c	Mixed local alluvium, gently rolling phase	350	40	18	2.8	2-1-3	Good	Fair
635	1a	Briensburg silt loam, level phase	500	60	25	2.0	1-2-3	Very good	Very good
635B+	1a	Briensburg silt loam, gently undulating phase	550	65	25	2.0	1-2-3	Very good	Very good
635C+	1a	Briensburg silt loam, undulating phase	450	55	22	2.5	2-1-3	Very good	Good
655	1a	Tigrett silt loam, level phase	700	90	30	1.5	1-2-3	Very good	Very good
655B+	1a	Tigrett silt loam, gently undulating phase	700	85	28	1.6	1-2-3	Very good	Very good
655C+	1a	Tigrett silt loam, undulating phase	500	65	25	1.9	2-1-3	Very good	Good
815A1	5a	Calhoun silt loam, level phase	----	----	12	3.5	2-3	Fair	Good
815B1	5a	Calhoun silt loam, gently undulating phase	----	----	12	3.5	2-3	Fair	Good
815B2	5a	Calhoun silt loam, eroded gently undulating phase	----	----	10	3.8	2-3	Fair	Good
825A1	5a	Olivier silt loam, level phase	375	35	22	3.0	2-3	Good	Good
825B1	4	Olivier silt loam, gently undulating phase	425	45	25	2.8	2-1-3	Good	Good

825B2	4	Olivier silt loam, eroded gently undulating phase	375	35	22	3.0	2-1-3	Good	Fair
824B3	4	Olivier silty clay loam, severely eroded gently undulating phase	300	25	15	3.4	2-1-3	Fair	Poor
824C3	6	Olivier silty clay loam, severely eroded undulating phase	250	20	12	3.6	2-3	Fair	Poor
835A1	2b	Richland silt loam, level phase	450	45	20	2.4	1-2-3	Good	Very good
835B1	2b	Richland silt loam, gently undulating phase	500	50	25	2.2	1-2-3	Very good	Good
835B2	2b	Richland silt loam, eroded gently undulating phase	475	45	22	2.4	1-2-3	Good	Good
834B3	3b	Richland silty clay loam, severely eroded gently undulating phase	300	30	15	3.0	2-1-3	Fair	Poor
835C1	3b	Richland silt loam, undulating phase	450	45	22	2.3	2-1-3	Good	Poor
835C2	3b	Richland silt loam, eroded undulating phase	325	35	18	3.0	2-1-3	Good	Poor
834C3	3b	Richland silty clay loam, severely eroded undulating phase	250	25	12	3.4	2-1-3	Fair	Very poor
835D2	3b	Richland silt loam, eroded gently rolling phase	300	30	15	3.2	2-1-3	Fair	Very poor
834D3	4b	Richland silty clay loam, severely eroded gently rolling phase	225	22	10	4.0	2-3	Fair	Very poor
845B1	2a	Lintonia silt loam, gently undulating phase	550	65	28	2.0	1-2-3	Very good	Good
845B2	2a	Lintonia silt loam, eroded gently undulating phase	500	60	25	2.0	1-2-3	Very good	Fair
844B3	3a	Lintonia silty clay loam, severely eroded gently undulating phase	300	35	15	3.2	2-1-3	Fair	Poor
844C3	3a	Lintonia silty clay loam, severely eroded undulating phase	250	20	12	3.4	2-1-3	Fair	Very poor
844D3	6a	Lintonia silty clay loam, severely eroded gently rolling phase	200	15	10	3.6	2-3-1	Fair	Very poor
844E3	6a	Lintonia silty clay loam, severely eroded rolling phase	------	----	----	3.8	2-3	Poor	Very poor
844F3	7b	Lintonia silty clay loam, severely eroded hilly phase	------	----	----	----	3	Poor	Very poor
915A1	5a	Henry silt loam, level phase	------	----	10	3.8	2-3	Fair	Very good

Table 1. Estimated average yields of principal crops under good mangem ent and proposed general land use recommendations for the Brown Loam soils of De Soto County. —(Cont.)

Soil symbol	Soil group	Soil name	Cotton lint (lbs. per acre)	Corn (hybrid) (bu. per acre)	Soybeans (bu. per acre)	Pasture (ac. per animal unit)[1]	Proposed land use[2]	Workability[3]	Conservability[4]
925A1	5a	Calloway silt loam, level phase	250	20	15	3.0	2-3	Fair	Very good
925B1	4	Calloway silt loam, gently undulating phase	325	35	20	3.8	2-1-3	Good	Good
925B2	4	Calloway silt loam, eroded gently undulating phase	300	30	18	3.5	2-1-3	Good	Fair
924B3	4	Calloway silt loam, severely eroded gently undulating phase	225	25	12	4.5	2-1-3	Fair	Poor
924C3	6c	Calloway silt loam, severely eroded undulating phase	200	20	10	4.6	2-3	Fair	Poor
930	7c	Rough Gullied Land, Grenada soil materials (all slopes)	------	----	----	----	3	Very poor	Very poor
935B1	2b	Grenada silt loam, gently undulating phase	435	45	25	2.3	1-2-3	Very good	Good
935B2	2b	Grenada silt loam, eroded gently undulating phase	400	40	20	2.8	1-2-3	Good	Fair
934B3	3b	Grenada silty clay loam, severely eroded gently undulating phase	275	25	----	2.7	2-1-3	Fair	Fair
93531	3b	Grenada silt loam, undulating phase	375	35	18	3.0	2-1-3	Good	Fair
935C2	3b	Grenada silt loam, eroded undulating phase	300	30	22	2.6	2-1-3	Good	Poor
934C3	3b	Grenada silty clay loam, severely eroded undulating phase	250	20	16	3.2	2-3-1	Fair	Poor
935D1	3b	Grenada silt loam, gently rolling phase	325	35	20	3.0	2-3-1	Good	Poor
935D2	3b	Grenada silt loam, eroded gently rolling phase	275	30	18	3.5	2-3-1	Fair	Poor
934D3	6b	Grenada silty clay loam, severely eroded gently rolling phase	200	15	10	3.8	2-3	Fair	Very poor
935E1	6b	Grenada silt loam, rolling phase	----	----	12	3.6	2-3	Fair	Poor
935E2	6b	Grenada silt loam, eroded rolling phase	------	----	10	3.8	2-3	Fair	Poor
934E3	7c	Grenada silty clay loam, severely eroded rolling phase	----	----	----	4.0	3	Fair	Very poor
935F1	7c	Grenada silt loam, hilly phase	----	----	----	----	3	----------	----------
934F3	7c	Grenada silty clay loam, severely eroded hilly phase	----	----	----	----	3	----------	----------
940	7b	Rough Gullied Land, Loring soil							

945B1	2a	Loring silt loam, gently undulating phase	625	60	25	2.2	1-2-3	Very good	Good
945B2	2a	Loring silt loam, eroded gently undulating phase	550	50	22	2.4	1-2-3	Very good	Fair
944B3	3a	Loring silty clay loam, severely eroded gently undulating phase	400	35	18	3.0	2-1-3	Good	Poor
945C1	3a	Loring silt loam, undulating phase	400	45	20	2.4	2-1-3	Good	Poor
945C2	3a	Loring silt loam, eroded undulating phase	375	35	18	2.6	2-1-3	Good	Poor
944C3	3a	Loring silty clay loam, severely eroded undulating phase	300	25	15	2.8	2-1-3	Fair	Very poor
945D1	3a	Loring silt loam, gently rolling phase	350	35	18	3.0	2-1-3	Good	Very poor
945D2	3a	Loring silt loam, eroded gently rolling phase	300	30	15	3.2	2-1-3	Good	Very poor
944D3	6a	Loring silty clay loam, severely eroded gently rolling phase	225	18	12	3.8	2-3-1	Poor	Very poor
945E1	6a	Loring silt loam, rolling phase	----	----	10	3.5	2-3	Poor	Very poor
945E2	6a	Loring silt loam, eorded rolling phase	----	----	10	3.8	2-3	Poor	Very poor
944E3	6a	Loring silty clay loam, severely eroded rolling phase	----	----	8	5.0	2-3	Poor	Very poor
945F1	7a	Loring silt loam, hilly phase	----	----	----	----	3	----	----
945F2	7a	Loring silt loam, eroded hilly phase	----	----	----	----	3	----	----
944F3	7b	Loring silty clay loam, severely eroded hilly phase	------	----	----	----	3	----	----
9448C3	3a	Brandon-Loring silty clay loams, severely eroded undulating phase	300	25	15	3.8	2-1-3	Fair	Very poor
9458E1	6a	Brandon-Loring silt loams, rolling phases	----	----	15	----	2-3	----	----
9448E3	6a	Brandon-Loring silty clay loams, severely eroded rolling phases	----	----	8	----	2-3	----	----
9458F2	7a	Brandon-Loring silt loams, eroded hilly phase	----	----	----	----	3	----	----
955B2	2a	Loring silt loam, eroded gently undulat- deep phase	650	65	25	1.8	1-2-3	Very good	Fair
954B3	3a	Loring silty clay loam severely eroded gently undulating deep phase	400	40	20	2.3	2-1-3	Good	Poor
955C1	3a	Loring silt loam, undulating deep phase	450	45	22	2.2	2-1-3	Good	Poor
955C2	3a	Loring silt loam, eroded undulating deep phase	400	40	20	2.4	2-1-3	Good	Poor
954C3	3a	Loring silty clay loam, severely eroded undulating deep phase	300	25	15	2.7	2-1-3	Good	Very poor
955D2	3a	Loring silt loam, eroded gently rolling deep phase	375	30	20	2.5	2-1-3	Good	Very poor

Table 1. Estimated average yields of principal crops under good mangement and proposed general land use recommendations for the Brown Loam soils of De Soto County. —(Cont.)

Soil symbol	Soil group	Soil name	Cotton lint (lbs. per acre)	Corn (hybrid) (bu. per acre)	Soybeans (bu. per acre)	Pasture (ac. per animal unit) [1]	Proposed land use [2]	Workability [3]	Conservability [4]
954D3	6a	Loring silty clay loam, severely eroded gently rolling deep phase	200	15	12	3.2	2-3-1	Fair	Very poor
955E1	6a	Loring silt loam, rolling deep phase	----	----	15	3.0	2-3	Fair	Very poor
955E2	6a	Loring silt loam, eroded rolling deep phase	----	----	15	3.2	2-3	Fair	Very poor
945E3	6a	Loring silty clay loam, severely eroded rolling deep phase	----	----	10	3.8	2-3	Poor	----------
955F1	7a	Loring silt loam, hilly deep phase	----	----	----	----	3	----------	----------
955F2	7a	Loring silt loam, eroded hilly deep phase	----	----	----	----	3	----------	----------
954F3	7b	Loring silty clay loam, severely eroded hilly deep phase	----	----	----	----	3	----------	Very poor
9546C3	3a	Lexington-Loring-Providence silty clay loams, severely eroded undulating phases	300	25	15	3.7	2-1-3	Fair	Very poor
9546D3	6a	Lexington-Loring-Providence silty clay loams, severely eroded gently rolling phases	----	----	----	3.2	2-3-1	Fair	Very poor
9556E1	6a	Lexington-Loring-Providence silt loams, rolling phases	----	----	----	3.0	2-3	Fair	Very poor
9556E2	6a	Lexington-Loring-Providence silt loams, eroded rolling phases	----	----	----	3.2	2-3	Fair	Very poor
9546E3	6a	Lexington-Loring-Providence silty clay loam, severely eroded rolling phases	----	----	----	4.5	2-3	Poor	----------
9556F1	7a	Lexington-Loring-Providence silt loams, hilly phase	----	----	----	----	3	----------	----------
9556F2	7a	Lexington-Loring-Providence silt loams, eroded hilly phase	----	----	----	----	3	----------	----------
9546F3	7b	Lexington-Loring-Providence silty clay loam, severely eroded hilly phases	----	----	----	----	3	----------	----------
965F1	7a	Natchez silt loam, hilly phase	----	----	----	----	3	----------	----------
9779F1	7a	Guin gravelly sandy loam, hilly phase	----	----	----	----	3	----------	----------
9779F2	7a	Guin gravelly sandy loam, eroded hilly phase	----	----	----	----	3	----------	----------
9788E2	7b	Kershaw loamy sand, eroded rolling phase	----	----	----	----	3	----------	----------
9788E1	7a	Kershaw loamy sand hilly phase	----	----	----	----	3	----------	----------
9788F2	7a	Kershaw loamy sand [illegible]	----	----	----	----	3	----------	----------

soil will be bare of vegetation for as short a period as possible. Rows on these soils should be on the contour. On the more level bottoms and drainageways the rows should ordinarily be run so as to carry the water that falls on it to a ditch or waterway outlet.

All the soils of the Brown Loam area have a relatively wide range of moisture condition at which tillage operations may be carried on successfully. The heavier textured soils (those with the third number in the symbol being 4) have a somewhat narrower range of moisture condition for good tillage operation. Plowing too wet tends to leave the soil in a cloddy condition and makes it more difficult to cultivate. It also tends to break down the good physical structure of the soil making it more difficult for roots and air to penetrate.

4. Water Control on the Land—Water control on the land includes (1) control of too rapid runoff, (2) protection from damaging floods, (3) drainage, and (4) irrigation.

A rapid runoff of water usually results in a loss of both water and soil. The effect of the loss of water is very noticeable during the growing periods of prolonged dry weather. The loss of soil is also very noticeable in De Soto County. The effect is cumulative and the results are to be seen in the eroded and gullied fields of the county. The control of this runoff of water involves many of the good soil management practices. Runoff is retarded by dense growing crops, contour rows, crop residues and organic matter, the ability of the soil to absorb and store water, vegetated waterways, water detention and water storage dams. If the water that falls on the land is to be used effectively then the soil must be planted to an adapted crop, an adequate supply of nutrients must be available, the physical condition of the soil must be suitable for the root systems of the plants, and insects, disease and weeds must be

[1] An animal unit is equivalent to one mature cow, steer or horse, five hogs, or seven sheep or goats.

[2] Numbers in this column indicate the following: 1, Row crops; 2, Grasses and legumes; and 3, Trees. Thus the figures 2-1-3 indicates the best general use of this soil is for grasses and legumes, next best is for row crops and last for trees.

[3] Workability is the ease of tillage, harvesting and other field operations.

[4] Conservability is the ease with which the soil and plant nutrients can be conserved and productivity and workability maintained.

[5] Not recommended.

*One underscore with this symbol indicates a shallow phase (clay at a depth of 12 to 24 inches); two underscores indicates a moderately shallow phase (clay at a depth of 24 to 36 inches).

controlled. These are the principals upon which good soil management is based, they are also the principals upon which control of runoff is based.

The quantity and rate of runoff increases with an increase in slope on soils that are similar in other respects. In general, crops that effectively retard runoff should be grown more of the time on the steeper than on the less steep slopes of the same soil type.

Protection from floods is a problem in the drainageways and bottoms. Ordinarily the floods occur in the winter or early spring before crops are planted, but occasionally considerable damage is done by the overflowing streams. The risks involved here may be lessened somewhat by controlling the rapid runoff from the hill land, providing adequate channels and by using diversion ditches.

Only in rare instances are drainage ditches required in the uplands. Occasionally an isolated depression or low area requires an artificial ditch. Before ditches are attempted, the capability of the soil should be determined (see table 1 for estimated yields). On some soils, low yields may be expected regardless of how much drainage is provided. The size of the ditch should be determined by the size and cover of the watershed and type of soil. The ditch should be larger for an area without permanent cover or on a soil with poor internal drainage. Ditches should be kept free of silt obstructions by adequate erosion control in the watershed. Ditch banks may be kept from eroding and sloughing off by using vegetation such as kudzu, trees or deep rooted grasses.

Irrigation has not proved very practical in the Brown Loam area of De Soto County. Many of the upland and terrace areas are too steep to be well adapted to irrigation but some of the more level areas, especially the bottoms, could be irrigated.

Some factors to be considered in planning an irrigation system for the Brown Loam area are (1) an adequate inexpensive source of water (2) relief or lay of the land, (3) high enough anticipated returns per acre to justify irrigation equipment, (4) use of a system adapted to the lay of the land that will give an ample supply of water in a short period and (5) the ability to irrigate when the crop needs it. The need for irrigation on most crops is difficult to anticipate. Normally at the present time irrigation could be justified on only the specialized high acre value crop.

Mississippi River Flood Plain or Delta Soil Region General Recommendations

The following discussion of soil management is applicable to all soils in the Delta region of De Soto County. Special recommendations may be found in "Soil Groups of De Soto County Their Use and Management" for Delta Region, page 42.

1. Drainage—Good drainage is an important factor in obtaining the most efficient land use for most soils of the Delta region of De Soto County. However, regardless of how much drainage has been provided, if the crop is not adapted to the soil, low yields may be expected (see table 3 for the estimated average yields of crops on different soil types).

The soil map can be a good guide for locating a system of natural surface drainage for each farm. The long and usually narrow depressional areas (the soil type numbers that begin with 2, for example 210 and 212) make up the natural drainage pattern of each farm. These low swags should be used primarily for the location of ditches and secondarily for the production of some adapted crop. The type and size of ditch used should be governed by the size of the watershed area and the soil types comprising the watershed area. Surface runoff from

Table 2. 1954* recommendations for pasture and forage crops in Brown Loam section.

Pasture Crop	Recommended Varieties	Rate of Seeding per acre	Time of Planting	Fertilization,[1] Lbs./Acre annual application except lime
Bermuda Grass	Common Coastal	5 lbs. or one clump every three feet	Feb. to May	Lime to pH 6.5. 60 lbs. phosphate (P_2O_5). 25 lbs. potash (K_2O) (or 300-400 lbs. 0-16-8) At least 60 lbs. nitrogen in April. Additional nitrogen as needed.
Bahia Grass			Feb. to April or Aug. to Oct.	Lime to pH 6.5. 50 lbs. phosphate (P_2O_5). 25 lbs. potash (K_2O) (or 300-400 lbs. 0-16-8) Topdress after germination with 30 lbs. nitrogen. Additional nitrogen as needed.
Millet	Pearl Cattail Starr	10 lbs. in rows 25 lbs. broadcast	Seeded by June 15	Lime to pH 6.5. 60 lbs. phosphate (P_2O_5). 25 lbs. potash (K_2O). (or 600 lbs. 5-10-5). Apply 30 lbs. of nitrogen at planting time followed by 30 lbs. nitrogen each month of grazing.
Sudan	Tift, Sweet	Same as millet	Seeded by June 15	Same as for Millet
Alfalfa	Buffalo, Kansas Oklahoma, Ranger Atlantic and Williamsburg	20 lbs. per acre	Seeded by Oct. 15	Establishment: Lime to pH 6.5. 200 lbs. phosphate (P_2O_5). 100 lbs. (K_2O) (or 1200 lbs. 0-16-8). Apply 10 lbs. borax. Maintenance: 100 lbs. phosphate, 100 lbs. potash (or 700 lbs. 0-14-14) 10 lbs. borax.)
Lespedeza	Kobe, Climax Common	25 lbs.	Feb.-March	Lime to pH 6.5. 60 lbs. phosphate (P_2O_5). 25 lbs. potash (K_2O) (or 300-400 lbs. 0-16-8).

Table 2. 1954* recommendations for pasture and forage crops in Brown Loam section.

Pasture Crop	Recommended Varieties	Rate of Seeding per acre	Time of Planting	Fertilization,[1] Lbs./Acre annual application except lime
Tall Fescue	Alta Kentucky 31	5-10 lbs.	Sept. 1-Oct. 15	Lime to pH 6.5. 60 lbs. nitrogen and 60 lbs. phosphate (P_2O_5). 60 lbs. potash (K_2O). (or 750 lbs. 8-8-8) Additional nitrogen as needed.
Tall Fescue & White Clover	Tall Fescue: Alta, Kentucky 31; White Clover: Ladino, La. S-1 or other adapted strains	2 lbs. clover to 5-10 lbs. fescue	Sept. 1-Oct. 15	Establishment: Lime to pH 6.5. 60 lbs. nitrogen and 100 lbs. phosphate (P_2O_5). 100 lbs. potash (K_2O) (or 1000 lbs. 5-10-5) Maintenance: 60 lbs. nitrogen, 60 lbs. phosphate, and 60 lbs. potash. (or 750 lbs. 8-8-8)
Ryegrass-Clover	Ryegrass: Domestic Italian, American, Annual Clover: Ladino, La. S-1 or other adapted strain—Common and Reseeding Crimson	20-25 lbs. ryegrass, 2 lbs. all varieties White Clover or 25 lbs. Crimson	Sept. 1-Oct. 15	Lime to pH. 6.5. 60 lbs. nitrogen and 100 lbs. phosphate (P_2O_5). 50 lbs. potash (K_2O). (or 500 lbs. 5-10-5.)
Small grain Clover	Small grain: Oats, wheat, rye, barely Clover: Ladino, La. S-1 or other adapted strain—Common and Reseeding Crimson	120 lbs. small grain 2 lbs. all varieties White Clover or 25 lbs. all crimson	Sept. 1-Oct. 15	Same as for Ryegrass-Clover.
Ryegrass	Italian, Annual Domestic, American	20-25 lbs.	Sept. 1-Oct. 15	Lime to pH 6.5. 60 lbs. nitrogen and 60 lbs. phosphate (P_2O_5). 25 lbs. potash (K_2O). (or 700 lbs. 8-8-4). Additional nitrogen as needed.

Table 2. 1954* recommendations for pasture and forage crops in Brown Loam section.

Pasture Crop	Recommended Varieties	Rate of Seeding per acre	Time of Planting	Fertilization[1], Lbs./Acre annual application except lime
Crimson Clover	Common and reseeding	20-30 lbs.	By Sept. 1	Lime to pH 6.5. 60 lbs. phosphate (P_2O_5). 25 lbs. potash (K_2O). (or 300-400) lbs. 0-16-8). For seed production, 10 lbs. borax.
White Clover	Ladino, La. S-1 or other adapted strains	2 lbs.	Sept. 1-Oct. 15	Establishment: Lime to pH 6.5. 100 lbs. phosphate (P_2O_5). 50 lbs. potash (K_2O). (or 600 lbs. 0-16-8) For seed production: 10 lbs. borax. Maintenance: 60 lbs. phosphate, 25 lbs. potash. (or 300-400 lbs. 0-16-8) 10 lbs. borax.
Red Clover	Kenland and Common	8-12 lbs.	Sept. 15-Oct. 15	Same as for White Clover.
Dallis Grass	Domestic, Imported	10 lbs. live Dallis grass seed	Feb.-April; Aug.-Oct.	Lime to pH 6.5. 60 lbs. phosphate (P_2O_5). 25 lbs. potash (K_2O). or 300-400 lbs. 0-16-8. Top dress after germination with 30 lbs. nitrogen. Additional nitrogen as needed.
Dallis Grass-Lespedeza	Dallis Grass: Domestic, Imported Lespedeza: Common, Kobe, Climax	10 lbs. live Dallis grass seed 15 lbs. lespedeza	Dallis Grass : Feb.-Apr.; Aug.-Oct. Lespedeza: Feb.-Mar.	Establishment: Lime to pH 6.5. 100 lbs. phosphate (P_2O_5). 50 lbs. potash (K_2O). or 600 lbs. 0-16-8. Maintenance: 60 lbs. phosphate, 25 lbs. potash (or 300-400 lbs. 0-16-8).
Dallis Grass-Clover	Dallis Grass: Domestic, Imported White Clover: Ladino, La. S-1 or other adapted strain	15 lbs. Dallis 2 lbs. White Clover	Dallis Grass Feb.-Apr.; Aug.-Oct. White Clover: Sept. 1-Oct. 15	Same as for Dallis Grass-Lespedeza.

Table 2. 1954* recommendations for pasture and forage crops in Brown Loam section.

Pasture Crop	Recommended Varieties	Rate of Seeding per acre	Time of Planting	Fertilization,[1] Lbs./Acre annual application except lime
Lespedeza Sericea		30-35 lbs. (hulled)	Feb. 1-July 1	Same as for Lespedeza,
Austrian Winter Peas		50 lbs.	Sept. 15-Oct. 15	Same as for Lespedeza,
Wild Winter Peas	Known as Wild winter peas, Caley peas, Singletary pea	50 lbs.	Sept. 1-Oct. 15	Same as for Lespedeza,
Cow Peas	For seed: Iron, Chinese Red, Blackeye No. 5, Crowder, Dixielee; For Hay: Brabham, New Era, Clay	25 lbs. if planted by rows. 60 lbs. broadcast	May 15-June 15	Same as for Lespedeza,
Kudzu		500-1000 crowns	Before May 1	Same as for Lespedeza,
Vetch	Hairy	30 lbs.	Sept. 15-Oct. 15	Same as for Lespedeza,
Oats	Delta Red 88 Madison Co. Nortex 107, Victorgrain 48-93, Arlington, Mustang	For forage: 128 lbs. (4 bu.) For grain: 80 lbs. (2½ bu.)	For forage: Sept. 1-Oct. 1 For grain: Oct. 1-Oct. 15	For forage: Lime to pH 6.5. 60 lbs. nitrogen, 60-120 lbs. phosphate (P_2O_5). On soils known to be low in potash, apply 25 lbs. potash (K_2O). Topdress in Feb. with 60 lbs. nitrogen. For grain: Apply 20 lbs. nitrogen and 20 lbs. phosphate (P_2O_5) prior to seeding. Topdress with 40 lbs. nitrogen about March 1.
Rye	Abruzzi	For forage: 100 lbs. For grain: 80 lbs.	Same as for Oats Same as for Oats	Same as for Oats. Same as for Oats.

Wheat	Atlas 66, Coker 47-27 Chancellor,	For forage: 100 lbs.	Same as for Oats	Same as for Oats.
		For grain: 80 lbs.	Same as for Oats	Same as for Oats.
Barley	Kenbar	For forage: 100 lbs.	Same as for Oats	Same as for Oats.
		For grain: 80 lbs.	Same as for Oats	Same as for Oats.

[1] In case of all mixed fertilizers the equivalent amounts of other grade, ratios or mixtures may be substituted.

*Changes may be made in the future based on latest research findings, therefore, these must be regarded as current recommendations.

sandy soils is much less than the runoff from clay soils; therefore, the clay soil areas will require more and larger ditches. Occasionally, it is necesary to cut ditches across ridges to drain isolated low areas. However, this practice should be avoided as much as possible since the absence of cross ditches results in the longer row essential to mechanized farming.

2. Field Layout and Row Direction—When practical, field boundaries should be placed on soil boundaries that separate soil types requiring different treatment. Fertilizer application and other management practices suitable for the entire field can then be planned.

Where possible, roads and turnrows should be located on soil boundaries. Roads that cross soil boundaries, rather than follow them, tend to divide the field into smaller units undesirable for mechanized farming. The boundaries of soils on C (6 to 10%) and D (10% or over) slopes, as well as escarpments and stream banks, are ideal locations for roads.

Row direction is important and should be governed by the soil type, slope of the land, and method of tillage. Soils on level topography require row direction that allows the best possible runoff. On poorly to somewhat poorly drained soils the row direction should be such that each row will carry the excess water to an outlet. Of course, this should not be done when there is danger of erosion. The somewhat poorly to somewhat excessively drained soils (soil type numbers where the middle digit is 3, 4, 5 or 6) should have rows running on the contour in order to conserve moisture and prevent excessive erosion. Generally, this means the rows should parallel the natural low swags, natural streams, bayous, and ridges.

The above suggestions usually make it possible to lay out permanent fields with larger areas and longer rows. These long rows over uniform soil tend to make

mechanized farming more efficient.

3. Fertilization—Fertilizer is very important in the Delta to obtain maximum yields from crops; however, the number of fertilizer elements needed for the majority of the soils of this area is much smaller than in the Brown Loam area.

Nitrogen has long been recognized as the most lacking fertilizer element in Delta soils of De Soto County. Addition of nitrogen and organic matter to the soil increases the productivity for non-legume crops. Legume crops, manure and crop residues are good sources of organic matter. Vetch and bur clover are well adapted to the silty and sandy soils (soil types with numbers ending in 5, 6, or 7). Vetch and winter peas are both adapted to soils with high clay content (soil types with numbers ending in 2, 3, or 4).

However, growing of winter legumes on clay soils to be turned under in the spring is very hazardous. The shallow surface layers of these soils make it difficult to cover a rank growth of winter legumes well enough for rapid decomposition. Usually, most of these fine textured soils are broken in the fall so that it is not necessary to disturb the seed bed in the spring. Spring breaking of these soils usually leaves them in a cloddy condition throughout most of the growing season. For these clay soils, a rotation where summer legumes, such as soybeans, are grown for nitrogen and organic matter, is sometimes desirable. Where it is not practical to grow leguminous crops, a commercial nitrogenous fertilizer must be used on all non-legume crops if maximum yields are to be obtained.

Depressional areas, where water accumulates from higher surrounding land, maintain a higher nitrogen level and do not require additionals of large amounts of commercial nitrogen. In fields where numerous small depressions occur more efficiency can be obtained by leaving fertilizer off rows located in depressions and applying more to rows on the ridges.

Many soils of the De Soto County Delta are acid, or sour. Many crops are acid tolerant—for example, cotton and corn. Clovers and most other legumes grow best on soils that have only a slightly acid, neutral or slightly alkaline reaction. (Soils with these reactions are usually referred to as being sweet, these soils are indicated by the first number of the symbol being 1 as 156A1.) Soils that are acid, or sour, should receive applications of lime until the reaction reaches the above mentioned sweet condition, if any of the legume crops are to be grown. Soils with high clay content in the top soil will require much more lime to bring them to the desired reaction level than sandy soils with the same degree of sourness.

Experimental work with phosphorus (phosphate) and potassium (potash) fertilizers on most Delta soils has shown little need for these minerals. This does not mean that there are no areas in the Delta area of the county deficient of these minerals. This, also, does not mean that in years to come Delta soils will not be depleted of their phosphate and potash supply. The sediments from which the soils of the De Soto County Delta were formed were rich in these minerals, and the past continuous cotton type farming has removed little of these elements. If a change should occur in the type of agriculture in which more hay and grain crops would be grown these elements would be removed from the soil much faster. These deficiencies first show up in the soils of the old natural levees (low terrace) group, and it is on these soils that the farmer should watch for symptoms and reduced yields in his crops. In many cases reduced yields are caused by the poor physical condition of the soil. This condition must be corrected before

crops can efficiently use the available fertilizer.

When farmers think that their soils may be low in phosphorus or potassium, or if they decide to lime their land and want to know the approximate amount to apply, they should have their soil tested in the quick-test soils laboratory and use this information for further studies in the field. If the test shows an existing deficiency in phosphorus or potassium and yields have been declining over a period of years, the farmer should then apply the recommended fertilizer treatment on 10 to 15 rows in the field, or a small plot if in a pasture. It is important that 10 to 15 rows next to the treated rows be left as a check on which no phosphorus or potassium is applied. After comparing the results between the treated and untreated plots, the farmer is then in position to decide whether or not he should use phosphorus and potassium fertilizers on a larger scale. Consult some of the agricultural workers in the county regarding how to collect samples for soil analysis.

4. Irrigation—Irrigation of row crops is in the experimental stage with good possibilities for the future. Rice irrigation has been successful.

With the type of irrigation required for rice production, the subsoil is important. There must be a subsoil layer which will retard or prevent the downward movement of water. The Alligator and Sharkey soils are ideal for this type of irrigation. It also can be practiced on the Forestdale, Tunica, and Mhoon soils without serious loss of water.

Most all soils of the De Soto County Delta section, with the exception of those on steep slopes, may be irrigated for pasture and row crops. Should you plan to irrigate pasture and row crops, keep the following points in mind.

1. Irrigate the crops as they need it. Once the ground is badly cracked it is difficult and costly to seal these cracks, and the plants' root systems have already been damaged. Often row crops start a second growth after irrigation when it has been delayed for a long period of time. This second growth usually reduces the yields of these crops.

2. Use a system of irrigation where several inches of water can be applied in a fairly short time so that it will be comparable to a normal, good rain. Irrigation with only small amounts of water usually gives no beneficial results.

Regardless of the crop you plan to irrigate, be sure to have an abundant source of water before making definite plans for irrigation. When several farmers are irrigating large areas with water from the same lake or small stream, the water supply is sometimes exhausted during dry seasons.

Know the Specific Problems of Your Soils

Study your soil map and identify all of the different types of soil on your farm. After they have been identified, study their descriptions in this bulletin and the estimated average yields and proposed land use in tables 1 and 3.

Most farms have soils varying widely in adaptability to different crops. Some may be excellent pasture land, but a poor risk for cotton production. By using the soil map as a guide, soils adapted to similar crops and requiring similar management practices may be blocked off and put to the same land use.

Each soil condition has problems which may or may not be general in all of your soils. All may have the same surface texture; but the internal drainage could vary from poor to excellent. This variability can affect crop adaption. On the other hand, the internal drainage may be the same on all your soils, but surface textures may vary widely. These variations can affect the choice of crops and methods of tillage.

Many fields in De Soto County have

Table 3. Estimated average yields of principal crops under good management and proposed general land use recommendations for the Delta soils of De Soto County.

Soil symbol	Soil group	Soil name	Cotton lint (lbs. per acre)	Corn (hybrid) (bu. per acre)	Soybeans (bu. per acre)	Pasture (ac. per animal unit[1])	Proposed land use[2]	Workability[3]	Conservability[4]
100	-----	Alluvial soils (unclassified, wooded area unprotected by levee)	[5]	---	---	---	-------	----------	----------
123A°	D4b	Mhoon silty clay, level phase	375	55	30	2.8	3-2-1	Poor	Very good
123A1	D4a	Mhoon silty clay, nearly level phase	400	65	30	2.6	2-3-1	Poor	Very good
124A1	D3	Mhoon silty clay loam, nearly level phase	400	70	30	2.6	2-1-3	Fair	Very good
133A1	D2a	Commerce silty clay, nearly level phase	500	70	30	2.6	1-2	Poor	Very good
133B1	D2a	Commerce silty clay, gently undulating phase	550	70	30	2.5	1-2	Poor	Good
134A1	D2a	Commerce silty clay loam, nearly level phase	700	75	30	1.9	1-2	Good	Excellent
134B1	D2a	Commerce silty clay loam, gently undulating phase	700	75	30	1.9	1-2	Good	Good
135A1	D1a	Commerce silt loam, nearly level phase	725	80	30	1.8	1-2	Excellent	Excellent
135B1	D1a	Commerce silt loam, gently undulating phase	750	85	30	1.7	1-2	Excellent	Very good
135C1	D1b	Commerce silt loam, undulating phase	450	65	30	2.0	2-1	Excellent	Fair
136A1	D1a	Commerce very fine sandy loam, nearly level phase	775	85	30	1.7	1-2	Excellent	Excellent
136B1	D1a	Commerce very fine sandy loam, gently undulating phase	750	85	30	1.7	1-2	Excellent	Excellent
156A1	D1a	Robinsonville very fine sandy loam, nearly level phase	825	90	35	1.5	1-2	Excellent	Excellent
156B1	D1a	Robinsonville very fine sandy loam, gently undulating phase	825	90	35	1.5	1-2	Excellent	Excellent
170A1	D5	Crevasse soils, nearly level phase	-----	---	---	5.0	2-1	Excellent	Good
170B1	D5	Crevasse soils, gently undulating phase	---	---	---	5.0	2-1	Excellent	Good
212A+	D4b	Dowling clay	250	25	15	---	3-2-1	Very poor	Good
213A+	D4b	Dowling silty clay	250	25	15	---	3-2-1	Very poor	Good
210A+	D3	Dowling soils	300	30	20	3.3	2-1-3	Poor	Good
235A+	D1a	Souva silt loam	500	60	30	3.0	1-2	Good	Very good
312A1	D4a	Alligator clay, nearly level phase	375	30	25	3.0	2-3-1	Poor	Very good
312B1	D4a	Alligator clay, gently undulating phase	400	30	25	3.0	2-3-1	Poor	Very good
313A°	D4b	Alligator clay, nearly level phase	375	30	25	3.5	3-2-1	Poor	Very good
313A1	D4a	Alligator silty clay, nearly level phase	400	30	25	3.5	2-3-1	Poor	Very good
313B1	D4a	Alligator silty clay, gently undulating phase	425	30	25	3.0	2-3-1	Poor	Very good
314A1	D3	Alligator silty clay loam, nearly level phase	450	40	25	3.5	2-1-3	Fair	Very good
322A°	D4b	Sharkey clay, level phase	375	30	25	3.5	2-3-1	Poor	Very good
322A1	D4a	Sharkey clay, nearly level phase	400	30	25	3.5	2-3-1	Poor	Very good

322B1	D4a	Sharkey clay, gently undulating phase	400	35	25	3.0	2-3-1	Poor	Very good
323A1	D4a	Sharkey silty clay, nearly level phase	375	35	25	3.5	2-3-1	Poor	Very good
324A1	D3	Sharkey silty clay loam, nearly level phase	400	40	25	3.0	2-1-3	Fair	Very good
324B1	D3	Sharkey silty clay loam, gently undulating phase	425	40	25	3.0	2-1-3	Fair	Very good
325+A	D3	Sharkey silt loam, nearly level phase	450	45	25	2.8	2-1-3	Good	Very good
325+B	D3	Sharkey silt loam, gently undulating overwash phase	450	45	25	2.5	2-1-3	Good	Very good
326+B	D3	Sharkey very fine sandy loam, gently undulating overwash phase	450	45	25	2.5	2-1-3	Very good	Very good
333A1	D2a	Tunica silty clay, nearly level phase	500	40	30	2.2	1-2	Poor	Very good
333B1	D2a	Tunica silty clay, gently undulating phase	500	40	30	2.2	1-2	Poor	Very good
423A1	D4a	Forestdale silty clay, nearly level phase	375	35	20	2.6	2-3-1	Poor	Very good
424A1	D3	Forestdale silty clay loam, nearly level phase	450	45	25	2.6	2-1-3	Good	Very good
424B1	D3	Forestdale silty clay loam, gently undulating phase	450	45	25	2.6	2-1-3	Good	Very good
425A1	D3	Forestdale silt loam, nearly level phase	475	50	25	2.5	2-1-3	Good	Very good
433A1	D2a	Dundee silty clay, nearly level phase	500	55	30	2.4	1-2	Poor	Excellent
433B1	D2a	Dundee silty clay, gently undulating phase	500	55	30	2.4	1-2	Poor	Very good
433C2	D2b	Dundee silty clay, eroded undulating phase	450	50	25	2.6	2-1	Poor	Fair
434A1	D2a	Dundee silty clay loam, nearly level phase	550	65	30	2.4	1-2	Good	Very good
434B1	D2a	Dundee silty clay loam, gently undulating phase	550	65	30	2.6	1-2	Good	Good
434C1	D2b	Dundee silty clay loam, undulating phase	475	60	28	2.9	2-1	Good	Fair
434C2	D2b	Dundee silty clay loam, eroded undulating phase	450	50	25	3.0	2-1	Good	Fair
435A1	D1a	Dundee silt loam, nearly level phase	650	65	35	2.2	1-2	Excellent	Excellent
435B1	D1a	Dundee silt loam, gently undulating phase	600	60	35	2.3	1-2	Excellent	Very good
435C1	D1b	Dundee silt loam, undulating phase	450	65	30	2.4	2-1	Very good	Good
435C2	D1b	Dundee silt loam, eroded undulating phase	425	60	25	2.6	2-1	Very good	Fair
436A1	D1a	Dundee very fine sandy loam, nearly level phase	725	70	35	2.4	1-2	Excellent	Excellent
436B1	D1a	Dundee very fine sandy loam, gently undulating phase	700	65	35	2.5	1-2	Excellent	Very good
436B2	D1a	Dundee very fine sandy loam, eroded gently undulating phase	600	60	30	2.6	1-2	Excellent	Good
436C2	D1b	Dundee very fine sandy loam, eroded undulating phase	450	55	25	3.0	2-1	Very good	Fair
445A1	D1a	Dubbs silt loam, nearly level phase	800	90	35	2.0	1-2	Excellent	Excellent
445B1	D1a	Dubbs silt loam, gently undulating phase	775	80	35	2.3	1-2	Excellent	Excellent
445C1	D1b	Dubbs silt loam, undulating phase	500	85	35	2.0	2-1	Excellent	Very good
445C2	D1b	Dubbs silt loam, eroded undulating phase	475	70	30	2.5	2-1	Excellent	Good
446A1	D1a	Dubbs very fine sandy loam, nearly level phase	800	90	35	2.0	1-2	Excellent	Excellent

	Soil group	Soil name	Cotton lint (lbs. per acre)	Corn (hybrid) (bu. per acre)	Soybeans (bu. per acre)	Pasture (ac. per animal unit[1])	Proposed land use[2]	Workability[3]	Conservability[4]
446B1	D1a	Dubbs very fine sandy loam, gently undulating phase	800	90	35	2.3	1-2	Excellent	Excellent
446C2	D1b	Dubbs very fine sandy loam, eroded undulating phase	500	80	35	2.5	2-1	Excellent	Fair
456A1	D1a	Bosket very fine sandy loam, nearly level phase	800	90	32	1.6	1-2	Excellent	Excellent
456B1	D1a	Bosket very fine sandy loam, gently undulating phase	750	75	30	1.8	1-2	Excellent	Very good
456C2	D1b	Bosket very fine sandy loam, eroded undulating phase	500	65	22	2.0	2-1	Excellent	Good
460D2	D5	Beulah-Dundee soils, eroded sloping phase	400	50	20	2.3	2-1	Good	Poor
466A1	D1a	Beulah very fine sandy loam, nearly level phase	550	70	18	2.6	1-2	Excellent	Excellent
466B1	D1a	Beulah very fine sandy loam, gently undulating phase	550	70	15	2.8	1-2	Excellent	Excellent
466C2	D1b	Beulah very fine sandy loam, eroded undulating phase	450	50	12	3.2	2-1	Excellent	Good
467B1	D1a	Beulah fine sandy loam, gently undulating phase	550	70	15	3.0	1-2	Excellent	Excellent
467C2	D1b	Beulah fine sandy loam, eroded undulating phase	45	50	12	3.0	2-1	Excellent	Good

[1] An animal unit is equivalent to one mature cow, steer or horse, five hogs, or seven sheep or goats.

[2] Numbers in this column indicate the following: 1, Row crops, principally cotton and corn; 2, Close growing crops for grain, hay, pasture or soil improvement; 3, Rice and soybeans. Thus the figures 3-2-1 indicates that the best recommended use of this soil is rice and soybeans, next best for close growing crops and last for row crops.

[3] Workability is the ease of tillage, harvesting and other field operations.

[4] Conservability is the ease with which the soil and plant nutrients can be conserved and productivity and workability maintained.

[5] Not recommended.

two or more soils with widely varying characteristics that require different types of crops and management. When the area of one soil is very small it is often necessary to farm it the same as the surrounding area. Otherwise each soil type can be managed separately and put to its best land use.

Soil Groups of De Soto County, Their Use and Management

Since the county is divided into two soil areas, each with different use and management problems, the soils of each area are grouped and discussed separately.

Brown Loam Area

In this soil area seven soil groups or classes of land are recognized. This classification is based on management requirements and the ability of the land to produce the major crops.

These groups are as follows: 1, the most productive land for row crops; 2, good cotton land; 3, cotton and pasture land; 4, pasture and hay land; 5, hardwood tree, pasture and hay land; 6, temporary and permanent pasture land; and 7, tree and kudzu land.

Group 1a. The soils of this group range from somewhat poorly to well drained internally with the majority of them being moderately well to well drained. They have silt loam surfaces easily worked over a rather wide range of moisture conditions. They occur in the bottoms and along the long narrow drainageways, upland depressions and toe slopes bordering the bottoms. Level areas (0 to 2 percent) predominates with some areas being gently undulating a few undulating in topography.

Protection from flooding is the major problem with these soils. Normally these floods occur in winter or early spring before crops are planted and very little damage is done. Adequate ditches must be provided for the normal flow of water across these areas. In many areas diversion ditches are helpful to keep surface water from the upland areas from washing across and causing damage to the crops and soils of the bottoms.

These soils are excellent for both cotton and corn. They are also very good for sorghum, soybeans, hay and pasture crops. Winter cover crops and summer legumes for green manure crops should be grown where practical to increase fertility and improve the physical characteristics of the soil.

The soils of this group are: 555, 535[1], 535B+, 655, 655B+, 635 and 635B+.

Group 1b. The soils of this group are somewhat poorly to moderately well drained and are found in the bottom areas. They have silty clay loam surfaces which are heavier textured than the soils of group 1a. They are somewhat more difficult to till than the soils with a silt loam surface because of the tendency to get hard when dry and sticky when wet.

Adequate artificial drainage must be provided for these soils. The moisture range for easy cultivation is not as wide as for the silt loam surface soils.

These soils are not quite as well adapted to cotton and corn as those of group 1a, but they are very well suited to soybeans, sorghum, hay and pasture crops. Crop residues and both winter and summer legumes should be turned under to maintain organic matter, improve tilth and fertility of the land.

The soils of this group are as follows: 534[2].

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[1]One underscore under the symbol on the map indicates a shallow phase (clay at a depth of 12 to 24 inches); two underscores indicate a moderately shallow phase (clay at a depth of 24 to 36 inches).

[2]This symbol underscored one time on the map indicates a shallow phase (clay at a depth of 12 to 24 inches); two underscores indicate a moderately shallow phase (clay at a depth of 24 to 36 inches).

Group 1c. The soils of this group are composed of sand, silt and some fine gravel in places. The sand and gravel have washed from the gullied upland areas and have been deposited along the small drain-ways or bottoms to form this group. The textures are not uniform throughout a given mapping unit of these soils. The sand and small gravel layers may occur on the surface or in the subsoil and these layers may vary in thickness.

These soils are easily tilled. Adequate drainage ditches must be provided to carry excess water from these soils and the surrounding uplands. One of the problems is to keep the ditches and streams from overflowing and depositing deep beds of sand on these soils.

Cotton and corn are well adapted to this land but it is also suited to pasture and hay crops. Grasses do especially well.

The soils of this group are as follows: 630, 630B+, 630C+, 530, and 5356.

Group 2a. This group is the best of the soils of the upland and terraces. The topography is gently undulating (slope 2 to 5 percent). They have a friable silt loam surface from 2 to 8 inches thick and are moderately well to well drained internally. The subsoil is somewhat easily penetrated by plant roots, water and air. These soils occur on the ridgetops of both the upland and the stream terraces.

Rows should be run on the contour and close growing crops for hay, pasture or soil improvement should be grown every other year. Row crops may be grown more often provided crop residues and a good growth of winter legumes are turned under each year.

These soils are excellent for cotton, very good for corn and are well suited for small grain, soybeans, sorghum, hay and pastures. Organic matter for improving the fertility and physical characteristics may be had by turning under crop residues and both winter and summer legumes where practical.

The soils of this group are as follows: 955B2, 955BO, 945B1, 945B2, 945BO, 845B1, and 845B2.

Group 2b. These soils are not as well drained internally as those of group 2a. A compact grayish hardpan layer beginning at a depth of 20 to 30 inches somewhat restricts the downward movement of water. These soils have a friable silt loam surface about 2 to 8 inches thick that is easily tilled. They are found on the more level ridgetops of the uplands and the terraces. Most of the areas are gently undulating (slope 2 to 5 percent) with some few areas being level (0 to 2 percent).

Rows should be run on the contour and close growing crops should be rotated with row crops to prevent excessive erosion. Organic matter may be added by turning under winter cover crops and summer legumes.

These soils are adapted to about the same crops as those of group 2a. They are very good for cotton, good for corn and are adapted to soybeans, sorghum, hay and pasture crops.

The soils of this group are as follows: 835A1, 835B1, 835B2, 935B1 and 935B2.

Group 3a. These soils are moderate-well to well drained internally and have moderate to light-textured surfaces. The original or uneroded surfaces are all friable silt loams. Many of the areas are severely eroded, having practically all of the 6 to 8 inch original silt loam surface removed and in places part of the subsoil, leaving the heavied textured (silty clay loam) subsoil exposed on the surface. An occasional deep gully not easily crossed with heavy machinery (indicated by the symbol (7)) may be found in some of the areas. These soils occur on both older stream terraces and uplands. The topography ranges from gent-

ly undulating to gently rolling (slope 2 to 12 percent).

The major problems on these soils is the control of erosion. This may be done by running the rows on the contour and keeping the land covered with vegetation as much of the time as possible. A rotation of one year of row crops to two years of close growing crops for hay, pasture or soil improvement is suggested. The gullies should receive individual treatment, such as filling up by pushing in with machinery, sodding with heavy grass sod and by using small check-dams. The lighter textured, more porous silt loam textured surfaces will absorb and sold more water than the eroded heavier textured surfaces. The heavy textured soils especially should have plenty of organic matter in the form of crop residues and green manure crops to help keep the soil more open and porous.

For row crops these soils are best adapted to cotton production. They are well suited to hay, small grain, and pasture crops. Turning under winter cover crops and summer legumes will improve the fertility and physical properties of the soil. Hay and pasture recommendations may be found on page 23.

The soils of this group are as follows: 954B3, 844B3, 944B3, 944B3(7), 955C1, 955C2, 945C1, 945C2, 954C3(7), 844C3, 944C3(7), 9546C3, 9448C3(7), 955D2(7), 945D1, 945D1(7), 945D2, 945D2(7).

Group 3b. The soils of this group have a compact hardpan layer at a depth of about 20 to 30 inches from the surface. They have a moderate to light textured surface (silt loam and silty clay loam). Severe sheet erosion in many areas has removed the friable silt loam surface leaving the silty clay loam subsurface soil exposed. These soils are moderately well drained internally and the surface runoff is moderate to somewhat rapid.

The main problem is the control of erosion which may be accomplished by contour rows and keeping a vegetative cover on the soil as much of the time as possible. A rotation of one year of row crops to two years of close growing crops for hay, pasture or soil improvement is suggested. As much organic matter as possible should be turned under in the form of winter cover crops, summer legumes and crop residues so as to increase fertility and cause the surface to be more open and porous to receive and store additional water for the use of the crops.

The water storage capacity is not quite as much on these soils as on the soils of group 3a, neither do deep rooted plants do as well on these soils. For row crops they are best adapted to cotton. They are well adapted to hay, small grain and pasture crops. Winter cover crops and summer legumes should be turned as often as practical to improve the fertility, structure and other physical properties of the soil.

The soils of this group are as follows: 834B3, 934B3, 934B3(7), 835C1, 835C2, 935C2, 834C3, , 834C3(7), 934C3, 934C3(7), 835D2(7), 935D1, 935D1(7), 935D2, and 935D2(7).

Group 4. The soils of this group have shallow rather light yellowish subsoils and a grayish compact hardpan layer beginning at a depth of about 12 to 20 inches. They are somewhat poorly drained internally and have moderate surface runoff. The severely eroded areas have a heavier textured surface than the other areas because erosion has removed the lighter textured surface leaving the silty clay loam subsoil exposed. These soils occur on gently undulating (slope, 2 to 5 percent) topography on both the old stream terraces and the uplands.

Rows should be run on the contour and a rotation which includes one year of row crops with three years of close growing crops for hay, pasture or soil improvement is suggested. Winter cover crops and summer legumes should be

Table 4. 1954* Delta pasture crop recommendations.

Pasture Crop	Recommended varieties	Rate of Seeding per acre	Fertilizer	Time of planting
Alfalfa	Buffalo Kansas Common Okla. Common	10-20 lbs.	Test soil for lime, phosphorus, and potash	Oct. 1-15
Bermuda grass	Common Coastal	5 lbs. or sprig	60 lbs. nitrogen	Mar. 1-Apr. 1
Dallis grass	Imported or Domestic	10 lbs. live seed	30 lbs. nitrogen after germination	Oct. 1-Nov. 1
Fescue and ladino	Kentucky 31	5-10 lbs. Fescue 1-2 lbs. Ladino	30 lbs. nitrogen at planting, 60 lbs. for winter grazing	Oct. 1-Nov. 1
Red clover	Kenland Common	10-15 lbs. seed alone or in small grains	Test soil for lime, phosphorus, and potash	Oct. 1-Nov. 1
Ladino clover		1-2 lbs. seed with grass	Test soil	Oct. 1-Nov. 1
White clover		2-4 lbs. seed with grass	Test soil	Oct. 1-Nov. 1
Crimson clover	Hard seeded for volunteer crop	12-15 lbs.	Test soil for lime, phosphorus, and potash	Oct. 1-Nov. 1
Sudan grass	Tift Sweet	6-10 lbs. in 38" to 40" rows	60 lbs. nitrogen	June 1-20
Persian clover	Not recommended			
Hop clover	Not recommended			
Lespedeza	Korean or Climax	20-25 lbs. seed in small grains		Feb. 15-Mar. 15
Grain sorghum	Martin	4-10 lbs. in 38" to 40" rows	30-45 lbs. nitrogen	June 1-July 1
Oats	Delta Red 88 Nortex 107 Delair	3 bushels 2½ bu. for grain	60 lbs. nitrogen in Sept. for winter grazing 30-40 lbs. nitrogen in Feb. for grain	For grazing, early September For grain, mid-October
Ryegrass	Annual	25-30 lbs.	60 lbs. nitrogen	Sept. 1-15

Wheat	Chancellor Atlas 66 Coker 47-27	1 1/4 bu. 1 1/2 bu. for grain	Same as for oats	Same as oats
Johnson grass and red colver mixture		10-15 lbs. spring 10 lbs. fall	60 lbs. nitrogen	April 1-June 1 Oct. 1-Nov. 1 after Johnson grass established

*Changes may be made in the future based on latest research findings, therefore, these must be regarded as current recommendations.

grown and turned under where practical.

These soils are best adapted to pasture, hay and soybeans. Cotton and corn may be grown in a long time rotation with these other crops.

The soils of this group are as follows: 825B1, 825B2, 925B1, 925B2, 824B3, and 924B3.

Group 5a. The soils of this group are very shallow and have grayish subsoils not easily penetrated by water, air or plant roots. They are located on the lower elevations of the old stream terraces and the broad flat and slightly depressed areas of the uplands. The predominant relief is level (slope, 0 to 2 percent) with some areas being gently undulating (slope, 2 to 5 percent). The surface texture of all these soils is a silt loam with somewhat heavier subsoils and compact hardpan layers at shallow depths. The water holding capacity of these soils is very low. They are very wet during the periods of heavy rainfall and very dry during the drier periods of the year.

Since little water penetrates down through these soils, surface drainage must be provided in the form of V- and W-ditches.

The best uses for these soils are for pasture and forest, with possibly some hay, especially lespedeza, in better drained areas. Row crops are not recommended although during favorable seasons a fair yield of cotton or corn may be produced.

The soils of this group are as follows: 825A1, 925A1, 815A1, 815B1, 815B2, and 915A1.

Group 5b. The soils of this group are the somewhat poorly to poorly drained soils of the bottoms and the small drainageways. They have moderate textured surfaces and gray subsoils. The predominant relief is level, although a few areas are gently undulating (slope ranges from 0 to 5 percent).

Water stands for long periods of time over most of these soils and extensive

Table 5. Cropping system, Seeding and fertilizer recommendations for the Delta farm.

Field No.	Acres	Crops	Seeding recommendations	Fertilizer recommendations
1	50	Cotton continuously followed by vetch or bur clover	Cotton, 1 bushel per acre. Vetch, 30 lbs. in September. Bur clover, 10-15 bushels unhulled in July or August	Good growth of vetch or clover plus 30 pounds of nitrogen or 75 pounds nitrogen
2a	16	Cotton 2 years followed by 2 years soybeans	Cotton, 1 bushel per acre Soybeans, 1 bushel per acre	Cotton, 80 pounds nitrogen before planting
2b	16	Soybeans 2 years followed by 2 years cotton	Cotton, 1 bushel per acre Soybeans, 1 bushel per acre	Cotton, 80 pounds nitrogen before planting
3a	36	Grain sorghum 1 year, soybeans 1 year	Soybeans, 1 bushel per acre Grain sorghum, 5-7 pounds per acre	Grain sorghum, 30 pounds nitrogen
3b	36	Soybeans 1 year, Grain sorghum 1 year	Soybeans, 1 bushel per acre Grain sorghum, 5-7 pounds per acre	Grain sorghum, 30 pounds nitrogen
4	70	Rice 3 years, soybeans 3 years	Soybeans, 1 bushel per acre (rows). Rice, 2 to 3 bushels per acre	Rice, 50 to 65 pounds nitrogen second and third year
5	125	Rice 3 years, soybeans 3 years	Soybeans, 1 bushel per acre Rice, 2 to 3 bushels per acre	Rice, 50 to 65 pounds nitrogen second and third year
6	4	Soybeans 1 year, grain sorghum 1 year	Soybeans, 1 bushel per acre (rows). Grain sorghum, 8 lbs. per ac.	Grain sorghum 30 pounds nitrogen

ditches must be provided to adequately drain them. Usually the production does not warrant construction of expensive ditches except as a means of draining better nearby soils.

These soils are best adapted to pasture and forest. Fescue does well on this land. Any cultivated crop is not very well adapted because of the poor drainage and water hazard.

The soils of this group are as follows: 525, 524, 5256, 615, 615B+, 515, and 514.

Group 6a. The soils of this group are deep moderately well to well drained soils occuring on gently rolling to rolling topography (slope, 8 to 17 percent) of both the upland and old stream terraces. On the terraces these soils are located on the short abrupt slopes of the former stream banks. These soils have moderate to light surface textures. The texture is a silt loam except where severe sheet erosion has removed the silt loam surface and exposed the silty clay loam subsoil. Some areas have an occasional deep gully not crossable with heavy farm machinery (indicated by the symbol (7)).

The major problem is in controlling erosion. This may be done by keeping a vegetative cover as much of the time as possible.

The best uses of these soils are for pasture and forest production which will keep them protected from erosion with good management. These soils are well adapted to Dallis grass, Bermuda grass, lespedeza, crimson clover, sericea lespedeza and kudzu. Pasture combinations and recommendations may be found on page 23.

The soils of this group are as follows: 954D3, 954D3(7), 844D3, 844D3(7), 944D3, 944D3(7), 9546D3(7), 955E2, 955E2(7), 945E1, 945E1(7), 945E2, 945E2(7), 9556E1, 9556E2, 9458E1, 9546E3, 9546E3(7), 9448E3, 954E3 954E3(7), 844E3, 844E3(7), 944E3, 944E3(7), 955E1.

Group 6b. These soils are moderately well drained and occur on gently rolling to rolling topography in the hills and on old stream terraces. They are characterized by having a compact hardpan layer at a depth of about 20 to 30 inches. The surface is a silt loam except on the severely eroded areas where the silt loam has washed away leaving the silty clay loam subsoil exposed. Some of the areas have an occasional deep gully (indicated by the symbol (7)).

Preventing excessive erosion is the major problem on these soils. A vegetative cover should be kept on them as much of the time as possible and care should be used to prevent formation of gullies by controlling runoff water from more level areas.

These soils are best adapted to pasture and forest production. They are adapted to about the same pasture crops as for group 6a except kudzu does not do very well. Pasture recommendations may be found on page 23.

The soils of this group are as follows: 834D3, 834D3(7), 934D3, 934D3(7), 935E1 and 935E2.

Group 6c. The soils of this group are somewhat poorly drained, severely eroded soils that occur on undulating (slope 3 to 5 percent) topography of the uplands and old stream terraces. Sheet erosion has removed practically all of the original silt loam surface leaving the silty clay loam subsoil exposed. A compact hardpan layer beginning at a depth of about 12 to 20 inches is found in these soils. Some deep gullies not easily crossable with farm machinery may be found in some of the areas (indicated by the symbol (7).

Erosion control is the main problem. A permanent vegetative cover should be maintained as much of the time as possible. Control of the gullies may be had by establishing a grass sod, planting trees and constructing small check dams. The

Table 6. Cropping system, seeding and fertilizer recommendation for a Brown Loam Farm.

Field No.	Acres		Crops	Seeding Recommendation	Fertilizer Recommendation
1	28	(18 ac.) (10 ac.)	Dallis grass-Lespedeza pasture in bottom (18 ac.) Sericea lespedeza on upland (10 ac.)	15 lbs. Dallis grass per ac. 15 lbs. Common Lespedeza per ac. planted in Feb. or early March. 30 lbs. Sericea per acre planted March 1 to May 1.	500 lbs. 20% superphosphate and 200 lbs. muriate of potash every 2 years. 2 tons of lime every 4 or 5 years
2	25		Bermuda-Crimson Clover pasture	Bermuda established, over seed with 20 lbs. per ac. reseeding Crimson Clover on Oct. 1 to Nov. 15	500 lbs. 20% superphosphate and 150 lbs. muriate of potash every 2 years. 2 tons of lime every 4 or 5 years
3	20		Dallis grass-Lespedeza pasture	Same as in Field 1 for Dallis-Lespedeza pasture	Same as for Field 1
4	5		House site, graden, orchard, etc.		
5	8		Four yr. rotation—Oats followed by lespedeza 2 yrs. and cotton or corn 2 yrs. with winter cover crops of vetch	2½ bu. Oats, planted Sept. 15 to Oct. 15 35 lbs. Kobe lespedeza planted Feb. or Mar. (cover crop as below)	On Oats 60 lbs. nitrogen, 500 lbs. 20% superphosphate 100 lbs. of potash 60 lbs. nitrogen in Feb. (cotton as below) Corn 600 lbs. 6-8-8 side dress with 90 lbs. nitrogen
6	28		Cotton—cover crop of vetch or widl winter peas or (cotton 2yrs., corn 1 yr.)	1 bu. cotton seed (delinted), 30 lbs. vetch or 50 lbs. wild winter peas planted Sept. 1 to Oct. 15	With good cover crops, 600 lbs. 6-8-8 and 30 lbs. nitrogen without cover crop, 500-600 lbs. basic slag on cover crops
7	22		Six year rotation (11 ac.) Fescue and white clover 3 yrs. (11 ac.) Cotton 3 yrs. with cover crop of vetch or wild winter peas	10 lbs. fescue, 2 lbs. white clover seeded in Sept. or early Oct. 1 bu. cotton seed (delinted) (cover crop as above)	500 lbs. 20% superphosphate 200 lbs. muriate of potash 60 lbs. nitrogen, 2 T of lime every 4 or 5 years. Maintenance: 60 lbs. nitrogen 300 lbs. superphosphate 100 lbs. muriate of potash Cotton as in field 6.
8	64		Six year rotation (32 ac.) Fescue and White clover (32 ac.) Corn or 22 ac. corn and 10 ac. sorghum for silage	Fescue and Clover as above Corn 10 to 14 lbs. Sorghum 5 to 7 lbs. planted April 20 to May 20	Fescue and Clover as above Corn 600 lbs. 6-8-8 under, side dress with 90 lbs. nitrogen. Sorghum 500 lbs. 6-8-4 or equivalent.

top soil is not deep enough to warrant using machinery to push in the gullies.

These soils are adapted to permanent pasture and forest production. They are adapted to the same general pasture crops as group 6a except for lespedeza sericea and kudzu. Much less production may be expected than on the soils of group 6a under the same level of management. Pasture recommendations may be found on page 23.

This group is made up of the following soils: 824C3, 824C3(7), 924C3, and 924C3(7).

Group 7a. The soils of this group are deep moderately well to excessively drained soils that occur on the steeper slopes of the uplands. The surface runoff is rapid to very rapid. The topography ranges from rolling to hilly with a majority of the areas being hilly with slopes that range from about 12 to 75 percent. The predominant surface texture is a silt loam although this group contains a few areas of Coastal Plain soils which have a gravelly sandy loam and loamy sand surface texture. Some of these soils have an occasional deep gully not easily crossable with farm machinery (indicated by the symbol (7)).

These soils eroded very easily on these steep slopes and they are not adapted to cultivated crops or pasture. Care should be used to stop the gullies by providing protective outlets for the water from the more level areas that flows across these soils. They are best adapted to forest and at the present time they are covered with a protective forest cover. Good management includes protection from fire and grazing, harvesting mature trees and removal of undesirable trees.

The soils of this group are as follows: 965F1, 955F1, 955F1(7), 955F2, 955F2-(7), 945F2, 945F2(7), 9556F1, 9556F1-(7), 9556F2, 9556F2(7), 9458F1, 9458F2, 9788E1, 9788F2(7), 9779F1, 9779F2, and 9779F2(7).

Group 7b. The soils of this group are deep moderately well to well drained soils of the more rugged and eroded uplands and terraces. One or two areas of excessively drained Coastal Plain sandy soil are included in this group. All of these soils are severely eroded and nearly all of them are cut up with frequent deep gullies that are not crossable with farm machinery (indicated by the symbol (8)). Many of the areas have had 75 percent or more of the soil area destroyed by gullies, these areas are called Rough Gullied Land, Loring soil materials and are indicated by the symbol 940. The topography of these areas ranges from undulating to hilly with a majority of the areas being gently rolling to rolling (slope, 8 to 17 percent).

Stabilizing and controlling the erosion on these soils is the major problem. Often these gullies extend into the sand and gravel of the Coastal Plain formation and the resulting erosion and deposition of these materials in the drainageways, ditches and soils of the bottoms is detrimental to crop production and workability of these productive soils.

These areas may be stabilized by establishing a permanent cover and building check or desilting dams. They are best adapted to trees which will provide a long time protective cover. Some of the less steep areas may be planted to kudzu and used for temporary controlled grazing. Some of the gullies may be filled by the use of heavy machinery and sodded with grasses or pasture mixes and used for controlled grazing although this is an expensive process.

The soils of this group are as follows: 954D3(8), 954E3(8), 954F3, 954F3(7), 954F3(8), 944C3(8), 944D3(8), 944E3-(8), 844D3(8), 844F3(8), 944F3(7), 944F3(8), 9546D3(8), 9546E3(8), 9546F3(7), 9546F3(8), 9448E3(8), 9448F3(8), 9788F2(8), and 490 all slopes.

Group 7c. The soils of this group are

moderately well drained. They have a compact hardpan layer beginning at a depth of about 20 to 30 inches. Except for one or two steep wood areas they are severely eroded and most areas have frequent deep gullies not crossable with heavy farm machinery. Some areas have had 75 percent or more of the soil area destroyed by gullies (these areas are indicated by the symbol 930). These are the more severely eroded and gullied hardpan soils. The topography ranges from undulating to hilly with the majority of the areas being gently rolling to rolling (slope 8 to 17 percent).

The major problem with these soils is to stabilize them and prevent excessive sand and gravelly materials of these deep gullies from being deposited on the better soils and in the drainage ditches below. These soils are not deep enough to warrant pushing in the gullies with heavy machinery and they are not very well adapted to kudzu. They can best be permanently stabilized by planting to trees. Temporary help may be had by building desilting basins in the more gullied areas.

The soils of this group are as follows: 834C3(8), 834D3(8), 934C3(8), 934D3-(8), 934E3, 934E3(7), 934E3(8), 934F3-(8), 935F1 and 930 all slopes.

Delta Area

Although each soil probably has individual requirements for certain good management practices, some have management requirements in common. Soils with many management requirement in common have been grouped in this section for convenience of discussion. It is recognized that certain of the management practices suggested for the various soils may not be feasible for many farmers under present conditions. Some may attain the same objective by the use of combinations of management practices different from those indicated and better suited to their particular conditions.

Group D1a. All the soils of this group are very fertile, the most productive soils for nearly all of the crops commonly grown in the county. They are fairly well to well drained soils with light textured (silty or sandy) surface layers and subsoils through which water is not restricted very much in its movement. Plant roots, water and air penetrate these subsoils rather easily. Water storage capacity is high except on the very sandy soils (466A1, 466B1, and 467B1) which may tend to be droughty during prolonged dry periods. These soils are easy to till and may be plowed over a wide range of moisture conditions but rains causes them to crust when bare. They occur on nearly level to gently undulating topography (slopes 1/4 to 5 percent).

Since the subsoils of these soils are somewhat open or porous little artificial drainage is needed. On the more level areas a system of W-type ditches will furnish sufficient surface drainage. The rows should be run on the contour and water from them should not run off on the more poorly drained areas.

These soils are well adapted to all general crops grown in the area except rice. High yields may be maintained over a long period of time under good management. They may be cropped annually followed by winter legumes. Where winter legumes are turned under an additional amount of commercial nitrogen must be added to maintain high yields. If alfalfa or clover is to be grown, a soil analysis should be made by the soils laboratory to determine the need for minerals and fertilize accordingly. Due to their sandy nature, good internal drainage and high elevation, these soils are well suited to winter grazing. The soils of this group are as follows: 156A1, 156B1, 136A1, 136B1, 135A1, 135B1, 466A1, 466B1, 467B1, 456A1, 456B1, 446B1, 445A1, 445B1, 436A1, 436B1, 436B2, 435A1, 435B2, and 235A+.

Group D1b. These soils are similar to group D1a differing primarily in degree of slope. They occur on undulating (slope 6 to 10 percent) topography and are more subject to erosion than group D1a soils. They are fertile fairly well to well drained soils with light textured (silty or sandy) surfaces and subsoils. Water, plant roots and air penetrate these subsoils rather easily. Due to the steeper slopes water storage capacity is not quite as high as on the more level areas and crops tend to suffer more during prolonged periods of drought. These soils are easy to work and may be plowed over a wide range of moisture conditions. A crust is formed over these soils after a rain when they are left bare.

Some of these soils are moderately eroded and care must be used to prevent more erosion. Rows should be run on the contour. Row crops should be rotated with close growing crops for pasture, hay or soil improvement.

These soils are adapted to all general crops of the area except rice. They are especially well suited to pasture and hay production. Good results may be had from growing Dallis grass, lespedeza, crimson clover, Sudan grass, millet and winter grazing crops on these soils. Rotations of one year of row crops to two of close growing crops are suggested. Organic matter may be added, fertility and physical properties improved by turning under winter and summer legumes as well as residues of other crops. Additional nitrogen from a commercial source should be added for highest yields, after growing winter legumes. A soil analysis should be made by the soils testing laboratory to determine the need for other minerals before planting alfalfa or clover.

The soils of this group are as follows: 135C1, 466C2, 467C2, 456C2, 446C2, 445C1, 445C2, 436C2, and 435C2.

Group D2a. These soils have fairly heavy surface textures and water moves through the subsoil fairly well. The topography ranges from nearly level to gently undulating (slope 1/4 to 5 percent). More artificial drainage is required than on group D1a; this may be provided by a system of V- and W-ditches. Due to heavier surface texture, the moisture range for easy tillage is not quite as wide as for the sandier textured soils.

These soils are excellent for grass and hay, very good for cotton and corn and are well suited to sericea, alfalfa and other deep rooted perennials. Soybeans, lespedeza and small grains are also well adapted. The soils are suited to winter grazing.

Rows should usually be run on the contour. Commercial nitrogen is needed for best yields on non-legumes. For alfalfa and clovers, a soil test should be made to determine the need for other minerals.

The soils of this group are: 134A1, 134B1, 133A1, 133B1, 434A1, 434B1, 433A1, 433B1, 333A1, and 333B1.

Group D2b. These soils are very similar to the soils of group D2a differing primarily in being located on steeper slopes. They occur on undulating topography (slope 6 to 10 percent), are fairly well drained internally, and have a fairly heavy textured surface. Erosion is a problem on these soils and some of them are moderately eroded.

Surface drainage is moderately rapid and control measures must be used to prevent erosion and conserve moisture. These measures include contour rows and rotation with sod or close growing crops. Suggested rotations involve one year of row crops to two years of sod or close growing crops. These soils are adapted to the same general crops as those of group D2a and are especially well adapted to deep rooted perennials such as sericea and alfalfa. They are very good for permanent pasture crops and for winter grazing. Winter legume crops may be

grown but non-legume crops will need additional commercial nitrogen for best yields.

The following soils are in this group: 434C1, 434C2, and 433C2.

Group D3. The soils of this group have medium to fairly heavy textured surface layers and have rather poor internal drainage due to the high silt and clay content of this subsoil. They occur on nearly level to gently undulating topography (slope 1/4 to 5 percent) and are usually found in relatively broad areas. The common local name for this group of soils is "post oak" land.

The movement of water down through this soil is retarded by the heavy textured subsoil and the increased surface water runoff must be taken care of by extensive artificial drainage ditches. A system of V- and W-type ditches through the low areas of the fields connecting with other or similar ditches in the associated depressions should provide sufficient surface drainage. Row direction should be such that excess water is carried to adequate outlets.

These soils are fairly well adapted to cotton and corn and are excellent for pasture and hay. Rice is well adapted to the more level areas. They are well suited to small grain, soybeans and lespedeza. When used for row crops it is suggested that a rotation with close growing crops for pasture, hay or soil improvement be used every other year and that winter legumes be grown where practical.

The soils of this group are as follows: 124B1, 425A1, 424A1, 424B1, 326+B, 325+A, 325+B, 324A1, 324B1, 314A1, and 210A+.

Group D4a. This group of soils was formed from heavy textured sediments. The high clay content of the subsoil permits very little downward movement of water. These soils occur on nearly level to gently undulating topography (slope 1/4 to 5 percent) with the majority of the area being nearly level. They are found on the lower elevations in the Delta.

The lack of internal downward movement of water makes an extensive drainage system necessary to provide for the greater runoff from these soils. Rows should be run so as to give the best possible drainage, provided this does not induce erosion, and a system of V- and W-ditches should carry excess water to the main or primary ditches.

The heavy textured surface on these soils makes land preparation difficult. They are hard when dry and plastic or sticky when wet. Best results are usually obtained when these soils are bedded in the fall. The growing of winter legumes is very hazardous because of the excess water in the winter and also because this will require the land to be plowed in the spring.

These soils are well adapted to rice, hay crops, grasses and soybeans but are only fair for cotton and poor for corn. When used for cotton, a rotation which includes a summer legume or sod crop two years out of four helps maintain the fertility level and improves the physical condition of these soils. Due to low elevations and plastic or sticky characteristics they are not very well adapted to winter grazing except on a heavy sod crop. Alfalfa does well when excellent surface drainage is provided.

The soils of this group are as follows: 123A1, 423A1, 323A1, 322A1, 322B1, 313A1, 313B1, 312A1, and 312B1.

Group D4b. The soils of this group are very similar to those of group D4a, differing primarily in being located on more level topography (slope, 0 to 1/4 percent). They occupy the low level area and water removal is a major problem. Water sometimes stands on these soils for rather long periods especially during the wet winter seasons. The heavy textured

subsoils prevent or seriously retard the downward movement of water through the profile. The high clay content of the surface soil causes it to be hard when dry and plastic when wet, thus the moisture range for good tillage is not very wide.

An adequate drainage system must be provided before these soils can be utilized properly. The rows should be run so as to give the best possible drainage. Best land preparation is usually had by plowing these soils in the fall.

These soils are well adapted to rice, soybeans and grasses but are not very well suited to cotton and corn. Winter grazing and winter cover crops are not very practical.

The following soils are in this group: 322A°, 313A°, 123A°, 212A+ and 213A+.

Group D5. These soils are composed of a variety of materials but sandy textures predominated. Their sandy subsoils permits a rather rapid downward movement of water and crops tend to suffer for water during dry periods. They occur on nearly level, gently undulating and sloping topography. The steeper areas are the former banks or escarpments of the river.

These soils are adapted to early truck crops, early maturing corn, small grain and winter crops. The steeper slopes are best adapted to sod crops and hay. Rows on these areas should be run on the contour and should be rotated with close growing crops two years out of three to improve the fertility and maintain organic matter of the soil. Nitrogen fertilizers should be applied in split applications (before planting and side or top dressed) because of the tendency to leach out of these sandy soils.

The soils of this group are as follows: 460D2, 170A1, and 170B1.

In addition to the above named groups of soils of the Delta, there is an unclassified wooded area between the levee and the river. A detailed map of this area would be too difficult to be practical. Very little of it would be adapted to crops because of the floodwater hazard. Hardwood trees grow rapidly in this area and with proper management should produce a good yield of timber. Good forestry management includes eliminating undesirable trees, harvesting of mature trees, protection from fires, and providing for the reproduction of desirable species. This area has the symbol 100.

There are approximately 600 acres of land cultivated between the artificial levee and the river. The soils of this area are subject to overflow and are usually flooded at least once a year. Sometimes this overflow damages the crops and this hazard must be taken into consideration when planning to cultivate these soils. The symbol "f" within a soil mapping unit boundary of this area indicates that the soil is subject to overflow.

Preparing a Farm Plan From the Soil Map

Any man who has farmed the same land for many years knows many things about the soils of his farm. Some things about his farm he may not understand. It is important that he know about the good and bad features of his soils.

A soil map is the farmers' inventory of his land in terms of soils, their characteristics and capabilities. The soil map can be used for locating drainage ditches, farm ponds, waterways, field roads, and tenant houses; laying out permanent field and pasture boundaries; and determining row direction.

The following part of the bulletin is written for the farmer who is interested in studying the soil map and formulating and developing a logical and profitable farm plan for his farm.

To illustrate the use of soil maps in

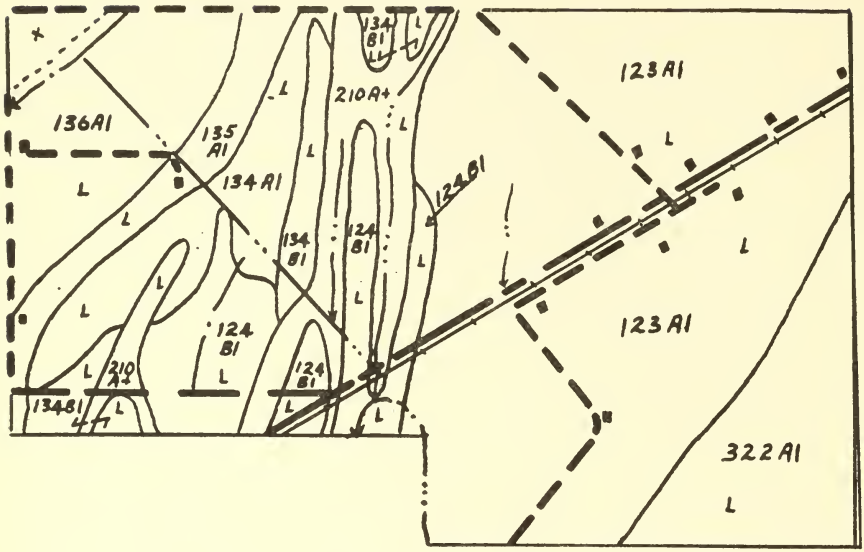

Figure 2. Soil map of a 360 acre Delta farm.

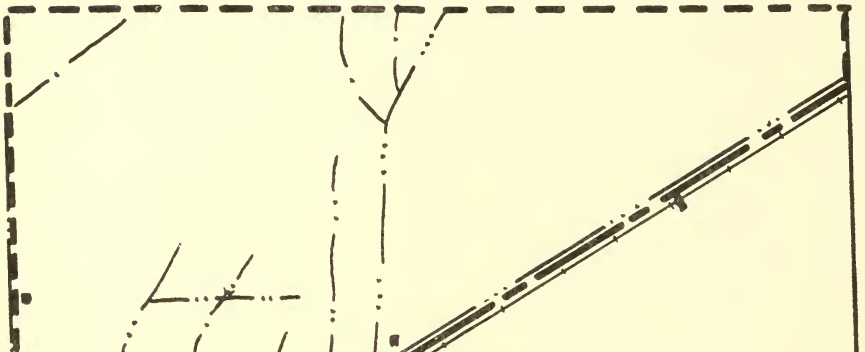

Figure 3. Delta farm drainage map with road and house locations.

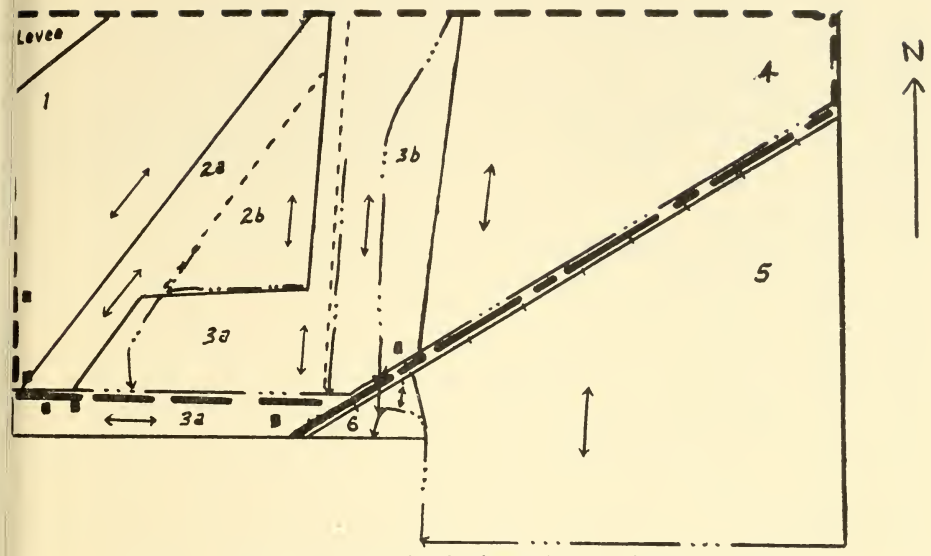

Figure 4. Field layout map of Delta farm with row direction indicated.

farm planning a 360-acre Delta farm and a 200-acre Brown Loam farm have been selected.

The soil map of the Delta farm (figure 2) indicates that there is quite a range in the soils and that a variety of crops should be grown so as to use the soils for the best adapted crop. The soils in the northwest corner are moderately well drained and have a light texture. These soils gradually get heavier and less well drained until the poorly drained clay soil is reached in the southeast corner. The soil map also indicates that the soils are all sweet except the 322A1 in the southeast corner which is usually sweet or only very slightly sour, therefore, no lime should be required on this farm at least for a number of years on general crops.

In selecting a type of farming operation the soils as well as the likes and dislikes of the farmer must be considered. This farm has been used primarily for cotton in the past. It is thought that a diversified cotton, soybeans, small grain type of program could be used to an advantage.

The drainage system for this area is very important and should not be too difficult on this farm. The low depression areas (210A+) form the natural drainage pattern. Road side ditches along the north side of the main gravel road and the lower east-west road and along the north-south field road should be provided to empty into the main drainage bayou in the south center of the farm. One dragline ditch runs south through the center of the farm, another should be constructed on the south boundary to drain into the main drainage ditch to the west. Other smaller ditches should be provided in the center of the low depressional areas.

The shallow ditch beginning near the northwest corner should be eliminated so as to provide longer rows and greater efficiency for machinery operation. A short small cross ditch constructed in the west part of the farm should keep the water from flowing onto a poorer drained soil. This ditch can also be used as a field boundary. This series of ditches together with proper row direction should provide ample surface drainage for this farm. If row crops are to be grown most of the time on the heavier soils on the eastern

side of the farm then an extensive W-ditch system should be constructed so as to empty into the main ditches to the south. Since it is planned to use this area for rice the W-ditches will not be needed.

Figure 3 shows the proposed drainage, field road and house locations for this farm. Property boundaries, soil boundaries, bayou banks and stream banks make excellent location for roads. Roads that divide fields of the same soil type should be eliminated to provide longer rows and larger fields. Many of the empty tenant houses may be eliminated since the labor requirements for proposed cropping system will not be as great as for the usual cotton farming. It is best to group the tenant houses on or near the main roads so that labor can be easily contacted, and electricity, natural gas or water can more conviently be brought to one general area.

The soil map can be used to group soils that have similar characteristics and require similar treatments into one field. Figure 4 shows the proposed permanent field layout and row direction on this farm. The soils of field 1 are well adapted to cotton and this crop may be grown continuously provided winter legumes are grown each year. The heavier texture of the soils of field 2 require the addition of more organic matter to keep them in a good state of tilth. This may be done by growing soybeans two years followed by two years of cotton. Fields 3 and 6 are made up primarily of somewhat poorly to poorly drained soils that are not too well adapted to cotton. These fields may be used for a soybean grain sorghum rotation, alternating each year. Fields 4 and 5 are composed of soils that are not very well adapted to cotton. These level fields are well adapted to soybeans or rice production and the acreage involved (195 acres) is of sufficient size to warrant the expense involved in growing rice. Soybeans may be grown the first year and rice for three years and then back to soybeans for another three years on these fields. Table 5 shows the acreage of each field, suggested cropping system and seeding and fertilizer recommendations.

It may not be practical for the farmer to make all of the suggested changes in one year, but the plan can be used as a guide or goal to be reached as conditions permit.

The soil map of the Brown Loam farm (figure 5) indicates that this farmer has a variety of soils which includes upland terrace, local alluvium and bottom soils. The soils of the uplands are 944B3, 944C3(7), 934B3, 934C3, 934D3(7), and 934D3(8). They are moderately well to well drained (as indicated by the middle figures 3 and 4), severely eroded and some of the areas have gullies. These soils are well adapted to pasture crops provided some special work is done on the gullied areas. The soils of the terrace are 835B2 and 834B3. These soils occupy a somewhat lower elevation and are not as sloping as most of the upland soils. They are moderately well drained (as indicated by the middle figure 3). The 835B2 unit shows some erosion but it still has about four or five inches of the original silt loam surface. Severe sheet erosion has removed the original surface of the 834B3 unit leaving the heavier textured subsoil on the surface (as indicated by the third figure 4). These soils are well adapted to pasture crops or rotations which include row crops. There is only one area of local alluvium soils (635B+) found in the southwest portion of the farm on the toe slopes and along the small drainageways. This soil is somewhat poorly to moderately well drained and has a silt loam surface. This area may be used for row crops or pasture depending upon the use of the adjacent soils. The soils of the bottom include the somewhat poor to moderately

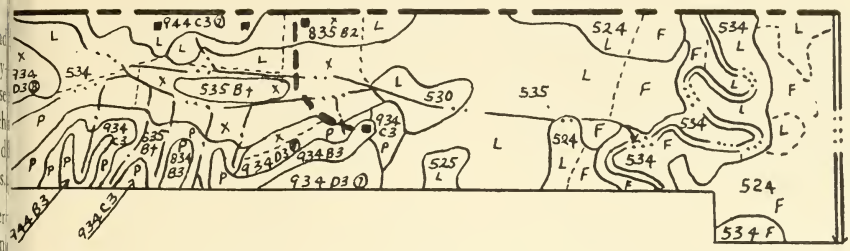

Figure 5. Soil map of a 200 acre Brown Loam farm.

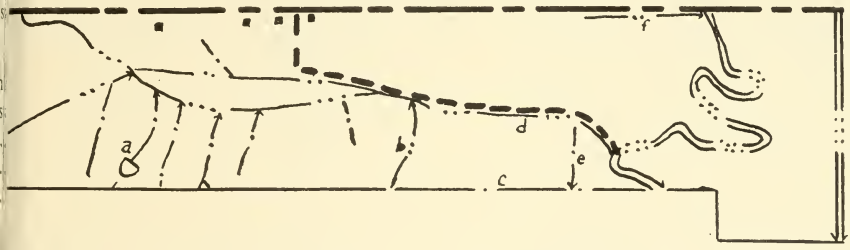

Figure 6. B own Loam farm drainage map with road and house locations. A new pond is shown at a and new ditches at b. c, d, e, and f.

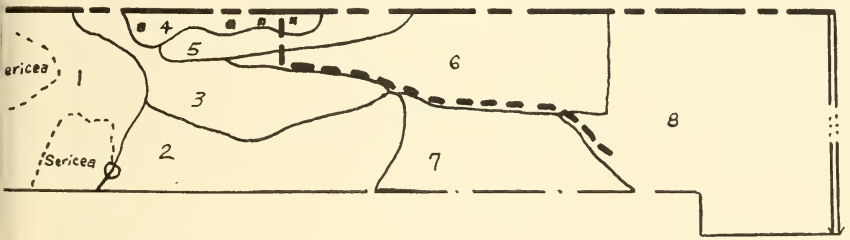

Figure 7. Field layout map of Brown Loam farm showing permanent field and pasture boundaries.

well drained 535, 535B+, 534 and 530 which are well suited to row crops or pasture; and the somewhat poorly drained 525 and 524 which are best suited to pasture or pasture-row crop rotation. The third figure indicates that these soils have silt loam (5), silty clay loam (4) and mixed silt and sand textures (0).

With this wide range of soils it is thought that best use could be made of these soils by use of a combination dairy and cotton farm. There are ample soils well adapted to pasture, others well adapted for the production of feed and some well adapted for the production of cotton.

Some consideration must be given to the farm layout. Figure 6 shows the proposed changes in the drainage system and the location of field roads and houses. A small farm pond (a) should be constructed in one of the small drainageways to provide water for the cattle in two pastures. A diversion ditch (b) should be constructed to help keep overflow water off the bottom. A half W-ditch (c) will provide ample drainage along part of the south boundary. A dragline ditch (d) needs to be constructed along the channel of an existing small ditch. A W-ditch (e) will drain a wet area and a small ditch (f) along the roadside will provide drainage for a poorly drained area. A more convenient location for the tenant home in the field may be found

on the main road near another tenant house. Along the banks of the dragline ditch is a good location for a field road.

Figure 7 gives the permanent field and pasture layout for this farm. Each field is numbered for easy reference to the proposed land use. The upland portion of field 1 is to be planted to sericea for hay or grazing while the bottom soils are to be planted to Dallis grass and lespedeza for pasture. Field 2 is composed primarily of upland and terrace soils which have a fairly good cover of Bermuda grass for which they are well adapted. Reseeding crimson clover is recommended for overseeding on the Bermuda grass. Field 3 is composed of soils of the bottoms that are well adapted to row crops or pasture. Because of its location a Dallis grass-lespedeza pasture is suggested for this field. Field 4 is used for houses, gardens, orchards, etc. The soils of field 5 are best adapted to permanent pasture or a rotation of close growing crops with row crops. A four-year rotation of oats followed by lespedeza for two years then two years of cotton or corn is suggested for this field. The soils of field 6 are well adapted to row crops and they may be grown continuously provided a winter legume crop is turned under each spring. Cotton continuously or two years cotton and one year of corn is suggested for this field. The soils of field 7 are fairly well adapted to crops and are well adapted to pasture. A six-year rotation including three years of fescue and white clover and three years of cotton is planned for this field. Field 8 is composed primarily of somewhat poorly drained soils that are well adapted to pasture and are fairly well adapted to corn and sorghum. A six-year rotation including three years of fescue and white clover and three years of corn or sorghum for silage is recommended for this field. It is also recommended that the wooded areas in field 7 and 8 be cleared and the soils utilized for the more profitable production of pasture and row crops. Table 6 outlines the cropping system, seeding and fertilizer recommendations for this farm. This plan should furnish ample pasture and feed for approximately 45 dairy cows and have 28 to 47 acres left for the production of cotton.

Soil series of De Soto County.

DELTA AREA

First Bottom	Low Terrace	Low Bottom	Depression
Crevasse	Beulah	Tunica	Souva
Robinsonville	Bosket	Sharkey	Dowling
Commerce	Dubbs	Alligator	
Mhoon	Dundee		
	Forestdale		

BROWN LOAM AREA

Deep Loess

Upland	Terrace	Local Alluvium (Colluvial)	Bottom
Natchez	Lintonia	Tigrett	Vicksburg
Loring	Richland	Briensburg	Collins
Grenada	Olivier	Dyer	Falaya
Calloway	Calhoun		Waverly
Henry			

Mixed Brown Loam and Coastal Plain

Lexington	Hymon
Brandon	Ina
Providence	

COASTAL PLAIN

Guin
Kershaw

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