August 21, 1961.

To the Graduate Council:

I am submitting herewith a thesis written by Appaswamy Devasigamoney entitled "Potential Use, Management And Productivity of Loudon County Soils". I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agronomy.

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POTENTIAL USE, MANAGEMENT AND PRODUCTIVITY OF LOUDON COUNTY SOILS

A Thesis

Presented to

the Graduate Council of

The University of Tennessee

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

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by

Appaswamy Devasigamoney

August 1961

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ACKNOWLEDGMENTS

The author expresses his appreciation to the International Cooperation Administration of the United States Government, the Government of India, the Mysore Government Department of Agriculture and the authorities of the University of Tennessee - India Agricultural Program for making this study possible.

The author expresses his sincere gratitude and indebtedness to his Major Professor and Chairman of the Graduate Committee, Dr. Maxwell E. Springer, for planning and guiding the present work to fruition with mature and fruitful advices and inexhaustible patience ever since the commencement of this study.

The author expresses appreciation to Dr. F. F. Bell for serving on the author's Committee and for giving useful suggestions for improving the presentation of this thesis.

Appreciation and thanks are also due to Dr. Rufus W. Beamer for serving on the author's Graduate Committee and kindly perusing this thesis.

The author also expresses his appreciation to the U. S. D. A. Soil Conservation Service, Nashville, Tennessee, for making available the Soil Survey Report of Loudon County for the use of the author to prepare this guide.

The author wishes to express his appreciation to Mrs. Edith Szathmary for the typing of this thesis.

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CHAPTER I

INTRODUCTION

There is consensus of opinion among soil scientists that soil survey interpretations are inadequate for efficient farm planning. Seldom are farmers provided with predictions regarding the behavior of their soils under defined systems of use and management. Since interpretations are an important part of soil survey, they should be comprehensive enough to contemplate several alternative uses and combinations of management practices for a given soil. They should be specific, yet flexible enough to permit substitution among cropping systems, management level and practices. With such guides farmers would be able to work out cropping programs and management systems suited to their soils.

There is a great need for technical soil management guides for every county or state. Guides based upon soil survey reports can take cognizance of natural limitations such as steep slopes, erodibility, shallow depth, stoniness, overflow hazards and salinity which affect the potential use, management and productivity of the soils. They can make specific suggestions of a temporary nature as to crop adaptations, alternative cropping systems and fertilizer programs that are applicable to a given soil and which may bring about improvements in productivity and conservation. Such guides will help farmers to understand better the particular capabilities of their soils and to adopt with greater

confidence those practices that conserve and keep their soils productive.

The primary objective of soil management is to obtain the highest production commensurate with land, labor and capital invested. Soil productivity in the modern sense connotes the soils response to management practices.

The objective of the present study is to outline in simple terms a soil management guide for some of the soils of Loudon county. Crop adaptation and expected yields are considered along with a description of each soil. With long time productivity, or conservation in mind, the alternative cropping systems for each of several combinations of management level and practices may be suggested. From these the farmer may choose the one best suited to his situation.

CHAPTER II

SELECTED LITERATURE REVIEW

Several investigators have dealt elaborately on the modern concept and significance of soil survey interpretations. In a review of the soil survey predictions Simonson (14) points out that to make sound predictions it is necessary to accumulate considerable body of knowledge about soils and their behaviour. Judgement as to the usefulness of a soil for cultivation or grazing can be made only with some form of agriculture in mind. Aandahl (1) states that predictions of future soil behaviour or of changes in productivity in response to changing combinations of practices over time is an important but much neglected aspect of soil survey interpretations. The soil scientists who make soil maps can prepare first approximations of the interpretations for important soils. After critical review and improvement by others these should find wide application. Pointing out the role of soil survey in modern farming Kellogg (7) contends that interpretations are made to indicate the capabilities of the soils for use, the adapted crops, estimated yields, opportunities and limitations for various management practices and the qualities that are partly controlled by the current state of the agricultural arts and the economic outlook. He further states that "The main purpose of soil survey is to define the different types of soils in ways that our knowledge about soil behavior and farming systems can be

organized and presented to the farmers so that they can work out the best combination of practices of their own soils." Soils subjected to several natural limitations and drawbacks like slope, degree of erosion, shallowness, undesirable physical characteristics, stones and drainage conditions which affect the capability of the land for efficient use need consideration while using the soil survey information for land use planning. Hockensmith (5) reports that the greater the total effect of the natural limitations the less suitable is the land for cultivation or other uses. The range of uses to which soils are put depends on the progress achieved in science and technology in a society.

Simonson (15) indicates that the use suitability, management requirements and yields obtainable depend in part on the soil and in part on the technology and scientific resources available to the people.

Technical groupings of soils with a view to bringing out selected characteristics or conditions for specific objectives and treatments is considered an important and widely used device in the opinion of Orvedal and Edwards (11). Simonson and Englehorn (16) consider them as steps for bringing out the relationships and to organize and extend information on soil use and management. Bell and Springer (3) report that yield information with adequate records of soil tests and management practices used on specific soil are valuable information for farmers and agricultural workers to use in planning a sound land use program

and to predict the productive capacity and response to management of similar soils on other farms in the region. In discussing the basic theory of soil conservation Kellogg (8) points out that the most efficient plan must provide for significant sustained production for efficient use of the soils to obtain an optimum level of productivity. Viewing soil conservation and efficient management as inseparables having many things in common Salter (13) advocates that any program of agricultural land use must rest on the foundation of improved soil management and cropping practices. He further indicates that "Welding together improved practices into systems of soil and crop management will meet the needs of the farming enterprise as a whole." The modern farmers' tendency to develop greatest economic yield potential by adopting the best known combinations of management practices is attributed by Krantz (9) to increased application of soil management research and technology. This awareness of technical information among farmers has stimulated soil investigators to bring out land management guides (2, 10, 6, 18) for scientific farming. Sloping lands need special devices and the soil-loss equations have become valuable tools in the hands of trained workers in the field of conservation farm planning (20, 21). A joint committee of personnel from the University of Tennessee and the Soil Conservation Service appointed during 1957 to evolve suitable factors for estimating soil loss at different levels of management and practices under Tennessee conditions has assembled the information in the shape of a Handbook (19).

CHAPTER III

METHODS AND PROCEDURES

This soil management guide is prepared primarily for use of the farmers and agricultural workers of Loudon county in planning for maximum returns and sustained productivity under defined management. It is based upon information gathered from the Soil Survey Report (4), a soil-loss estimating equation (19), and other sources (2, 6, 10, 18). The soil series selected for study have several natural limitations such as steep slopes, shallow depth, stoniness and great erosion hazards. They need special management techniques to enchance the present level of productivity. These soils have rolling to hilly topography with steep and strong upland slopes. The soil series with similar characteristics, especially those affecting T/K, are grouped together as indicated below:

Bland, Lehew and Litz Series.
Bolton, Etowah and Hermitage Series.
Cúmberland and Decatur Series.
Dewey and Waynesboro Series.
Fullerton Series
Fullerton Cherty Silt Loam and Nolichucky Series.
Sequoia Series.

The soil mapping units[1] under each soil series in the group are treated separately for their physical properties, crop adaptation, and estimated crop yields under defined management. Alternative cropping systems for different conservation practices, management

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[1]Soil mapping units are cartographic separations which includes soil type, slope gradient, and degree of erosion.

levels, and fertilizer programs are treated group-wise.

For the soil mapping units represented by abbreviated symbols on the soil map of Loudon County the slope percent[2] and degree of erosion are explained as follows:

Slope Legend

No slope given on nearly level soils	0-2%
B - Gently sloping	2-5%
C - Sloping	5-12%
D - Moderately steep	12-20%
E - Steep	20-30%
F - Very steep	30 + above

Erosion Legend

Slight - no symbol given. The surface soil consists entirely of A horizon throughout nearly all of the delineated area except for soils having thin A horizons.

2 - Eroded - The soil has been eroded to the extent that ordinary tillage implements reach through the remaining A horizon. Generally the plow layer consists of a mixture of the original A horizon and underlying horizon.

3 - Severely eroded - The plow layer consists essentially of materials from the B (subsoil) or other underlying horizons. All, or practically all, of the original surface soil, or A horizon, has been removed.

A mapping unit with symbol FdE3 indicates Fullerton cherty silty

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[2] Percent slope refers to the number of feet change in elevation per 100 feet horizontal distance (2% slope = 2 feet change in elevation per 100 feet horizontal distance.)

clay loam, severely eroded steep phase.

Physical characteristics of the soils. Some important physical characteristics from the standpoint of management and productivity are the color, texture, structure and thickness of the surface soil and subsoil. These are indicators of permeability, aeration, natural drainage, available water holding capacity, workability and erodibility of a soil. In addition is slope which affects runoff and erosion.

Estimated yields of principal crops under defined management. The estimated yields under defined management practices[3] are from the Soil Survey Report (4). They are based on results from long term experiments, soil productivity and management studies, and experience of agronomists.

The defined management is a higher level than that commonly adopted. Yields under prevailing practices and management are 20 to 35% less than those reported.

Crop adaptation. Crop adaptation is the degree to which plants are suited to grow under specified environmental conditions. Differnet crops have different requirements which the soil must provide. The crop adaptation of a soil is influenced by the nature rock, physiographic positions, drainage conditions, difference in slopes and the nature of management systems (12) as well as the chemical and physical properties of the soil. Cropping systems should be tailored to fit the soil patterns.

Special management suggestions and conservation practices. The alternative cropping systems recommended for different conservation practices and management levels on the soils on rolling to hilly topography are based upon the principles developed from a recent study of soil-loss estimation in Tennessee (19) which is an improvement over the slope-practice methods adopted in the northeastern and north central states. The soil-loss estimating equation visualizes, A = RKLSCP.

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[3] F.F. Bell, Associate Agronomist, University of Tennessee and D. K. Springer, Soil Scientist, Soil Conservation Service, Nashville, Tennessee.

A = Average annual soil loss in tons per acre. R = The rainfall erosion index (a numerical evaluation of the capacity of a specific rainfall pattern to erode soil from unprotected fields.) K = The erodibility factor of a specific soil (soil loss in tons per acre per year per erosion-index unit on a 9% slope of fallow soil, 72.6 feet long). L = Length of slope. S = Percent slope, C = Cropping management factor (reflects a combination of effects of cover, management, prior land use, and distribution of erosion potential). P = Practice factor. A is equated to T, the soil-loss tolerance or the estimated maximum soil-loss that will still achieve the degree of conservation needed for sustained economic production in the forseeable future. The R factor and T/K values with 1, 2, and 3 erosion for the different soils are given in Table 1.

Cropping management factors for some cropping systems suited to Eastern Tennessee were taken from the soil-loss estimation Handbook (19). For convenience they were arranged logarithmically on the three master sheets, Tables 2, 3, and 4. Each is for one of three management levels, i.e., 60 bushels of corn or 2 to 3 tons hay, 40 bushels of corn or 1 to 2 tons hay, and 20 bushels of corn or 0.5 to 1 ton hay.

On the left side of each sheet are columns for each of three cultivation practices, i.e., up and down slope, contouring, and contour strip cropping. Within each of these columns, numbers for percent slope are arranged in order of soil loss ratio.

On a frosted acetate sheet Figure 1, T/K values are arranged

logarithmically. Length of slope in feet are so placed on this sheet that, when superimposed on the percent slope in an appropriate column of Table 2, 3 or 4, T/K lines will coincide with the C values where expected soil loss, A, will just equal soil loss tolerance, T. All cropping systems above the appropriate T/K line are considered alternatives for the management level listed on that sheet. If moved to percent slope in the column for a different practice, the T/K line again sets apart the cropping systems which may be considered for that practice and level of management. Repeating these steps on a master sheet for other management levels will give the acceptable systems for the various practices at that level of management.

With these tools one should first determine the kind of soil, percent of slope and length of slope for the field or area being considered. T/K can then be looked up on Table 1. These values for length of slope and T/K may be used with Figure 1. By consulting the estimated yields table for the given soil or soils and evaluating the desire of the farmer, a feasible and desirable management level may be chosen. From the master sheet for that management level, e. g. Table 2, one may use Figure 1 to determine the range of alternatives for each of the practices considered. This gives a range of cropping systems from which one may be chosen.

This method was used to set up the general tables [4] for

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[4] M. E. Springer, Univ. of Tennessee, D. K. Springer, C. B. Breinig and F. R. Parris.

alternative cropping systems for different conservation practices and management levels for each mapping unit of the several series studied.

Length of slope was simplified by computing for two lengths, i.e. 100 and 300 feet. For the purpose of calculation the following values were used for each of the slope groups: B (2-5%) - 4%, C (5-12%) - 10%, D (12-20%) - 17%, and E (20-30) - 25%.

Another set of gadgets, figures 2 to 8, is designed for use with individual soils of the seven groups of soil series. Cutouts and arrows are located according to T/K values so that alternative systems may be read from Tables 2, 3 or 4 without looking up T/K. Directions for use appear on each figure.

Recommended fertilizer program. The fertilizer recommendations for different crops are based on the recommendations made by the Agricultural Extension Service, University of Tennessee[5]. The soil test results for phosphate and potash are given in terms of pounds per acre (seven inches) and the ranges are stated as very low, low medium and high. The following table may be used to convert pounds to a rating:

Phosphate			Potash		
Pounds P_2O_5		Rating	Pounds K_2O		Rating
0-5	-	very low	0-80	-	very low
6-15	-	low	90-130	-	low
16-25	-	medium	140-180	-	medium
above 25	-	high	above 180	-	high

[5]Fertilizer Recommendations for Tennessee, Publication No. 381, Jan. 1961, Agricultural Extension Service, University of Tenn.

Liming recommendations are made in accordance with the terms used to indicate the different ranges in pH (17).

Extremely acid	Below pH 4.5
Very strongly acid	4.5 - 5.0
Strongly acid	5.1 - 5.5
Medium acid	5.6 - 6.0
Slightly acid	6.1 - 6.5
Neutral	6.6 - 7.3

CHAPTER IV

RESULTS AND DISCUSSION

Upland and terrace soils occupy more than four-fifth of the area of Loudon county (4). The other fifth is made up of soils in the bottomlands and depressions. However, it is extremely important to agriculture because of the gentle slopes, generally productive soils, and simpler management problems. In this study emphasis is placed upon the soils of the uplands and terraces because of the variety of characteristics and complexity of hazards involved.

All of the soils studied have similarities in a few properties, but differ greatly in others. The organic matter content and natural fertility level are low. All are low in bases with reactions ranging from extreme to slight acidity (pH 4 to 6). All are well drained and have good aeration. Slopes vary, but large areas are on rolling to hilly topography. Erosion is a serious problem where soils are bare or not well covered and, in many places, exposed subsoils and shallow surface soils are evidence of its effects. Some soils are naturally shallow. Others contain chert or shale fragments which limit available moisture-holding capacity. In contrast, some of the soils are deep, easy to work, and well adapted to a wide variety of crops. The characteristics of the soils of different series are described briefly on pages 18 to 58.

In addition to natural limitations such as steep slopes, shallow depth or stone content, lack of improved management has,

in places, contributed to a low level of productivity.

Despite these limitations the soils described have potentials for higher yields, and under good management are already producing yields as listed under each series.

Alongside the predicted yields for each of several crops is the available water-holding capacity (in inches) of the soil. It is based upon data from the Soil Survey Report (4) and is the water released between field capacity and wilting point to the most probable rooting depth of summer growing crops. Therefore, it is an important factor in crop adaptation and in dry seasons has a big influence on yields.

The general suggestions for alternative cropping systems consider the soil, topography, practices such as contouring and strip cropping, and management level as reflected by yields. Because rainfall affects yields of crops and erosion of soil, it was considered in arriving at both yields and acceptable cropping systems. However, since over a period of years it probably averages about the same throughout the county, no presentation is made. Contrasted with Bland, Lehew, Litz, and Sequoia, soils of such series as Etowah, Hermitage, Cumberland and Waynesboro are deeper and less erosive. Runoff and erosion are, of course, much greater on steep and long slopes than on short or gentle ones. The practices of contouring and contour strip cropping reduce erosion and permit more intensive cropping systems. Cover provided by a high yielding crop on a well fertilized soil is certainly more effective in breaking the impact of rainfall and holding the soil

against erosion than a sparse cover of the same crop. Nevertheless, these suggestions have some limitations because of the range of slopes in each slope class.

Where more specific information on soil and slope is available, Figure 1 and Tables 2, 3 and 4 may be used for more precise suggestions. This method may be used for any soil in the county on which T/K is known. The method using the Figure (2 to 8) for a given soil and Tables 2, 3, and 4 is even simpler because none of the terms in the soil loss estimating equation must be looked up. Where conditions are favorable and terracing is desired, both of these methods set out the alternative cropping systems when the horizontal terrace spacing in feet is used as length of slope in the contour strip cropping column.

The fertility level of surface soils varies greatly because of past treatment and management. Carefully taken soil samples may be used to estimate this level and are prerequisites to wise fertilizer additions. The county agent can furnish information on how to sample a field according to the important soils and where to send the samples for testing. Results from the soil testing laboratory are a guide to needed fertilizer. However, the soil test does not always indicate how much of a particular nutrient should be applied. On different soils with the same test value for the surface soils the amounts of the nutrient which should be added may differ greatly.

Within the discussion of each group of soil series is a guide to the amounts of phosphate and potash which may be recommended

for various crops when the soil test results for phosphorus and potassium are available.

These amounts are only suggestions which may be increased or decreased as more information about the individual soils is available.

Many of the soils need lime for successful growth of some plants, especially legumes. One step in estimating the amount of lime needed is met by the soil test results which report the active acidity of the soil in terms of pH. In addition to this measure of reaction, other factors which must be considered are crop or crops involved and the kind of soil. The suggested amounts given in the discussion of each group of soil series are based upon the rough guide of two tons of lime for each unit of pH change.

Since they are for finely ground, high quality lime, the amounts must be greater when the lime is coarse or of low quality. Lime should be applied several months before seeding time and be well mixed with the soil preferably by plowing. After three or four years the soil should be retested.

The soil management guides presented here are intended to help farmers and agricultural workers find management systems to fit each farm situation. They do not, however, deal with the farmer's overall situation as to land and capital or his farming system. Neither do they reconcile the complex soil pattern which makes up some farms. Some problems may be handled by field arrangement. Others

require compromise among the suitable systems for the various soils. However, the tools presented here should help in reallocation of management systems according to the capabilities and potentialities of the soils so as to assure high yields and sustained productivity.

The guide may be used most effectively with the detailed soil map and a first hand inspection of the farm. Each important mapping unit or cluster of similar mapping units can then be studied for characteristics which affect adaptation for, and expected yields of various crops. After estimating the length of slope and percent of slope the alternative cropping systems for each combination of practices and management levels can be determined. When this is done for all areas of the farm, the cropping system, practice, and management level may be selected for each soil or field which best fits into the overall farm plan. Then before a field is seeded soil samples should be taken from each soil, Knowing the properties and test results of each soil, fertilizer and lime programs can be selected which will fit the field and the wishes of the farmer.

GROUP I

BLAND, LEHEW AND LITZ SERIES

1. BLAND

Bland Silty Clay Loam: BnC, (5-12%), BnD (12-20%). These soils are on hill tops and on short and moderately steep slopes. The surface soils on hilltops are dark reddish-gray silty clay loam and sub-soils are weak red or dusky red silty clay or clay. On the moderately steep slopes the surface soils range to dusky red silty clay loam or silty clay. The shallow and clayey nature limits the workability, infiltration, and available water holding capacity of the soils. Erosion and drought hazards are high.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT[1]

Mapping Unit	A.W.H.C.[2]	Corn bu.	Tobacco Lbs.	Alfalfa Tons	Red clover & perennial grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over seeded on small grain Tons	Sudan grass pearl-millet C.A.D.	White clover and orchard grass or fescue C.A.D.[3]
BnC	4	21	-	-	1.3	14	25	-	1.0	0.5	-	75
BnD	4	-	-	-	-	12	21	-	0.8	0.4	-	65

[1]See page No. 8 for definition.

[2]A.W.H.C. = Available water holding capacity. (in inches)

[3]No. of days 1 acre will graze a cow, horse, or steer or 5 swine, or 7 sheep without injury to the pasture.

Crop adaptation: BnC - Poorly suited to row crops and best suited to pasture. Small grains may be grown.

BnD - Not suitable for tilled crops but best suited to forestry or pasture.

2. LEHEW

Lehew Loam: LhD (12-20%), LhE (20-30%), LhF (30%). These soils are on short and steep upland slopes. The surface soils are very dark grayish-brown to reddish gray loam and subsoils are reddish brown loam. These soils are generally shallow. The soils on the very steep slopes are shallow. The moderately sloping soils have good tilth and workability. The available water holding capacity is low. These soils are potentially erosive.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red clover & perennial grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded on small grain Tons	Sudan grass or pearl millet C.A.D.	White clover and orchard grass or fescue C.A.D.
LhD	4	-	-	1.6	-	14	24	-	0.9	0.4	-	65
LhE	4	-	-	-	-	-	-	-	-	-	-	55
LhF	4	-	-	-	-	-	-	-	-	-	-	--

Crop adaptation: LhD - Can be used for pasture and crops. Fescue and small grains are most suitable.

LhE - Fescue is among the best suited pasture crops. Best suited for forest.

LhF - Forestry is the best use.

3. LITZ

Litz Silt Loam: LtC (5-12%), LtD (12-20%), LtE (20-30%). These soils are on moderately short slopes. The surface soils are yellowish-brown, friable silt loam and subsoils are strong brown or yellowish-red shaly silty clay or shaly silty clay loam. They are shallow soils. Available moisture-holding capacity is low or very low. They are characterised by droughtiness. Runoff and erosion hazards are great.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.[1]	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl-millet C.A.D.	Orchard-grass Or Fescue And White Clover C.A.D.
LtC	4	25	-	1.8	1.3	18	35	19	1.1	0.5	-	85
LtD	4	21	-	1.6	-	16	30	15	0.9	0.4	-	75
LtE	4	-	-	-	-	-	-	-	-	-	-	-

[1]A.W.H.C. - Available water-holding capacity in inches.

Crop adaptation: LtC - Poorly suited for row crops, suitable for small grains, alfalfa, legumes and grasses. Permanent pastures of fescue or orchardgrass and white clover will have good carrying capacity with good management.

LtD - Poorly suited to cultivated crops. Fairly suited to pastures of grasses and legumes if well fertilized.

LtE - Not suited to cultivated crops. Best suited to pasture or forestry. Fescue is better suited than orchardgrass.

Litz Shaly Silty Clay Loam: LaC3 (5-12%), LaD3 (12-20%), LaE3 (20-30%). These are mainly rolling to hilly soils over acid shales. The surface soils are yellowish-brown shaly silty clay loam to strong brown or yellowish-red silty clay loam as a result of severe erosion. Shallow gullies are developed. The available moisture-holding capacity is very low. Erosion hazards are great.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl-millet C.A.D.	Orchard-grass Or Fescue And White Clover C.A.D.
LaC3	3	14	-	1.2	0.9	8	15	8	-	0.3	-	60
LaD3	3	-	-	0.9	-	-	-	-	-	-	-	45
LaE3	3	-	-	-	-	-	-	-	-	-	-	65

Crop adaptation: LaC3 - Poorly suited to the common row crops. Better suited to close growing crops and pasture. With adequate fertilization and good management all the pasture crops can be grown.

LaD3 - Poorly suited to row crops. With good management and adequate fertilization and liming fair stands of pastures of grass and legume such as white clover, fescue and orchardgrass can be grown.

LaE3 - Poorly suited to row crops or pastures. Best suited to forest.

BLAND, LEHEW AND LITZ SERIES

ALTERNATIVE CROPPING SYSTEMS FOR DIFFERENT CONSERVATION PRACTICES AND MANAGEMENT LEVELS

Mapping Unit	Length of Slope	60 bu. corn 2-3 tons hay		40 bu. corn 1-2 tons hay			20 bu. corn 0.5-1 ton hay		
		U* & D**	Contour Strip	U & D	Contour	Contour Strip	U & D	Contour	Contour Strip
BnC	Short-100 ft.	Properties of the soil		20-21	20-22	20-27	41a	41a	-
	Long-300 ft.	make consistent yields		20-21	20-21	-	F***	-****	-
LtC	Short-100 ft.	such as these unlikely		20-22	20-22	20-30	41a	41a	-
	Long-300 ft.			20-21	20-22	20-30	F	-	-
LaC3	Short-100 ft.			20-21	20-21	20-30	F	-	-
	Long-300 ft.			F	20-21	-	F	-	-
BnD	All lengths			F	-	-	F	-	-

ALTERNATIVE CROPPING SYSTEMS FOR DIFFERENT CONSERVATION PRACTICES AND MANAGEMENT LEVELS

Mapping Unit	Length of Slope	60 bu. corn 2-3 tons hay			40 bu. corn 1-2 tons hay			20 bu. corn 0.5-1 ton hay		
		U & D	Contour	Contour Strip	U & D	Contour	Contour Strip	U & D	Contour	Contour Strip
L1D	Short-100 ft.	Properties of the soil			F	20-21	-	F	-	-
	Long-300 ft.	make consistent yields			F	-	-	F	-	-
LtD	Short-100 ft.	such as these unlikely			F	20-21	-	F	-	-
	Long-300 ft.				F	-	-	F	-	-
LaD3	All lengths				F	-	-	F	-	-
L1E, LtE, LaE	All lengths				F	-	-	F	-	-
L1F	All lengths				F	-	-	F	-	-

*U = Up

**D - Down

***F - Forestry

****'-' - Practice not practical.

Recommended fertilizer practices: Bland, Lehew and Litz soil series are characterized by moderate to low fertility, low organic matter, and from slight to extreme acidity. The shallow depth

and droughtiness do not warrant heavy fertilization on a grass-legume pasture. However, soil tests indicate the proper amounts of fertilizers to be added to get a fair stand of pasture for the listed crops. The following rates of fertilizer in pounds per acre may be added along with nitrogen if the soil test indicates that the fertility is very low, low, medium, or high in phosphate and potash.

Crops	Nitrogen: Time of Seeding	Nitrogen: Top Dress	Phosphate application when soils test indicates: V. low	low	med.	high	Potash application when soil test indicates: V. low	low	med.	high
Alfalfa										
Establishment	0-15	-	180	120	60	30	210	210	190	135
Maintenance		-	75	60	45	0	210	210	190	135
Grass-legume										
Establishment	30	-	60	60	60	30	60	60	60	30
Maintenance		0-30	30	30	30	0	30	30	30	0

LIME IN TONS PER ACRE TO BE APPLIED WHEN SOIL TEST INDICATES THE FOLLOWING PH RANGE

Crops	Soil acidity: Soil pH:	Very strong: 4.5 - 5.0	Strong: 5.1 - 5.5	Medium: 5.6 - 6.0	Slight: 6.1 - 6.5	Neutral: 6.6 - 7.3
Alfalfa		5	4	3	2	1
Grass-legume		4	3	2	1	0

For fertilizer mixtures and method of application refer to Publication No. 381, Jan. 1961, Agr. Ext. Serv., Univ. of Tenn. or see the county agent for more details.

GROUP II

BOLTON, ETOWAH, AND HERMITAGE SERIES

1. BOLTON

Bolton Silt Loam: BOC2 (5-12%), BOD2 (12-20%), BOE2 (20-30%). These soils are on rolling ridge crests, moderately long to long slopes in the uplands. The surface soils on the rolling ridge crests are dark-brown silt loam, and the subsoil ranges from dark reddish brown or dark red to yellowish red. The soils on the long slopes are mostly eroded, exposing the dark reddish brown to red silty clay loam subsoils. Runoff and erosion are problems as the steepness increases. The available moisture-holding capacity is medium to high. They are highly productive and easy to work.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl-millet C.A.D.	Orchard-grass Or Fescue And White Clover C.A.D.
BoC2	7	64	1,950	3.2	2.5	23	47	29	1.5	0.7	75	150
BoD2	7	52	1,600	2.9	-	20	41	25	1.3	0.6	-	135
BoE2	7	--	---	-	-	--	--	--	-	-	-	110

2. ETOWAH

Etowah Silt Loam: E+B (2-5%), E+C (5-12%), E+D (12-20%). They are mainly on low and intermediate terraces along the Tennessee and Little Tennessee Rivers with gentle and short slopes of moderate steepness. They are characterized by surface soils of dark brown silt loam and subsoils of yellowish red to reddish-brown silty clay loam. Where erosion has occurred the reddish brown silty clay loam has been exposed. The available moisture-holding capacity is high. They are highly productive soils.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red clover & perennial grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over seeded on small grain Tons	Sudan-grass or pearl millet C.A.D.	White clover and orchard grass or fescue C.A.D.
E+B	7	75	2,300	3.4	2.6	26	52	35	1.8	0.9	85	160
E+C	7	64	1,950	3.2	2.5	23	47	31	1.5	0.7	75	150
E+D	7	53	1,600	2.9	-	20	41	27	1.3	0.6	--	135

3. HERMITAGE

Hermitage Silt Loam: HeB2 (2-5%), HeC2 (5-12%). These soils are on gentle foot slopes between Dewey and Decatur soils on uplands and the Emory soils on narrow strips along the drainage ways. The surface soils are dark-brown silt-loam and the subsoils are yellowish-red to reddish-brown silty clay loam. The variations in depth and color of the surface soils are due to differences in erosion. Available moisture-holding capacity is high. These are highly productive soils. Erosion hazards are moderate.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl-millet C.A.D.	Orchard grass Or Fescue And White Clover C.A.D.
HeB2	7	75	2,300	3.4	2.6	26	52	35	1.8	0.9	85	160
HeC2	7	64	1,950	3.2	2.5	23	47	31	1.5	0.7	75	150

Hermitage Cherty Silt Loam: HcC (5-12%). The surface and subsoils are similar to the silt loam except for fine chert fragments throughout the profile. The chert fragments interfere with cultivation and lower production. The available moisture holding capacity is medium. Erosion is a moderate hazard.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl-millet C.A.D.	Orchard-grass Or Fescue And White Clover C.A.D.
HcC	5	58	1,900	3.0	2.3	23	45	30	1.4	0.7	65	145

Crop adaptation: E+B, HeB2 — Suited to alfalfa, tobacco, vegetables and other row crops including legume grass pasture. High yields can be produced on adequate fertilization and good management.

BoC2, E+C, HeC, HeC2 — Suited to corn, tobacco, vegetables, row crops and legume-grass pasture. Response to fertilization is good. Liming and fertilization with good management will increase the yields.

BoD2) Suited to all common crops and legume grass pasture. Fertilization and
E+D) good management are essential for high yields.

BoE2 Best suited to pasture; if well fertilized and managed, high yields of pasture can be expected.

BOLTON, ETOWAH AND HERMITAGE SERIES

ALTERNATIVE CROPPING SYSTEMS FOR DIFFERENT CONSERVATION PRACTICES AND MANAGEMENT LEVELS

Mapping Unit	Length of Slope	60 bu. corn 2-3 tons hay			40 bu. corn 1-2 tons hay			20 bu. corn 0.5-1 ton hay		
		U & D	Contour	Contour Strip	U & D	Contour	Contour Strip	U & D	Contour	Contour Strip
E+B)	Short-100 ft.	1-11	1-12	1-19	20-34	20-36	20-39	Owing to the high productivity of the soils management at this level is not suggested.		
HcB2)	Long-300 ft.	1-9	1-11	1-13	20-32	20-34	20-36			
BoC2)										
E+C)	Short-100 ft.	1-6	1-9	1-11	20-24	20-30	20-34			
HeC2)	Long-300 ft.	1-3	1-6	1-9	20-22	20-24	20-32			
HeC)										
BoD2)	Short-100 ft.	1-2	1-2	1-6	20-21	20-22	20-24			
E+D)	Long-300 ft.	1-2	1-2	-	20-21	20-21	-			
BoE2	Short-100 ft.	1	1	-	20-21	20-21	-			
	Long-300 ft.	1	1	-	F	-	-			

F - Indicates forestry
- Indicates practice not practical

Recommended fertilizer practices: Bolton, Etowah and Hermitage soil series are characterized by high potential productivity. The soil pH ranges from moderate to strongly acid. Their productivity can be increased by heavy fertilization. For crops listed the following rates of fertilizers in pounds per acre may be added along with nitrogen if soil tests indicate that the levels of phosphate and potash are very low, low, medium or high.

Crops	Nitrogen		Phosphate				Potash			
	Seeding Time	Top Dress	V. low	Low	Med.	High	V. low	Low	Med.	High
Corn	15-30	45-90	80	60	40	30	80	60	40	30
Small grain	30-60	30-60	80	60	40	20	40	20	0	0
Tobacco burley	120	-	150	120	90	60	300	240	180	120
Alfalfa Establishment	0-15	0	180	120	60	30	210	210	190	135
Maintenance	-	-	75	60	45	-	210	210	190	135
Grass-legume Establishment			180	120	60	30	120	90	60	30
Maintenance		30	60	45	30	30	60	45	30	0

See page No. 24 for lime application.

GROUP III

CUMBERLAND AND DECATUR SERIES

1. CUMBERLAND

Cumberland Silty Clay Loam: CmB2 (2-5%), CmC2 (5-12%), CmC3 (5-12%), CmD2 (12-20%), CmE2 (20-30%). These soils are on high terraces of fairly short to long steep slopes developed from the alluvium along the Tennessee and Little Tennessee River. The surface soils of the moderately eroded phase are dark-reddish brown friable silty clay loams. The subsoils are dark red silty clay loam to firm clay. The severely eroded soils have a surface layer of dark red moderately friable silty clay loam to clay loam with a clayey subsoil. Available moisture-holding capacity is medium. The soils on steep slopes with severe erosion have poor tilth and workability, rapid runoff, and great erosion hazards.

ESTIMATED YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan grass Or Pearl-millet C.A.D.	Orchard-grass Or Fescue And White Clover C.A.D.
CmB2	6	65	1,800	3.7	2.4	30	55	38	1.6	0.8	75	150

ESTIMATED YIELDS UNDER DEFINED MANAGEMENT (cont.)

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl-millet C.A.D.	Orchard grass Or Fescue And White Clover C.A.D.
CmC2	6	56	1,550	3.5	2.3	28	52	36	1.4	0.7	65	145
CmC3	5	39	1,050	2.9	1.9	20	37	26	0.9	0.4	45	120
CmD2	6	49	1,350	3.0	-	23	42	29	1.2	0.6	--	120
CmD3	5	28	800	2.2	-	14	25	18	0.7	0.3	--	90
CmE2	6	--	---	-	-	--	--	--	-	-	--	95

Crop adaptation: CmB2 - Well suited to all common crops. With good fertilization and management it will produce good yields.

CmC2 - Well suited to all common crops. Yields can be increased with fertilization and management.

CmC3 - Poorly suited to row crops. Suitable for hay and pasture crops. Proper fertilization, liming and management will enhance yields of small grains, white clover, alfalfa, red clover, orchard grass, timothy and fescue.

CmD2 - Moderately well suited to cultivated crops. Well suited for pastures

or hay of grasses and legumes.

CmD3 - Better suited to permanent pasture. Adequate fertilization and good management will produce good stands of orchard-grass, white clover, and other pasture plants.

CmE2 - Best suited to hay and pasture. Pasture yields can be increased by fertilization and good management.

Cumberland Gravelly Clay Loam: CuC2 (5-12%), CuD2 (12-20%). The colors of the surface and subsoils are similar to Cumberland silty clay loam, but the textures are coarse due to the gravel. Severely eroded surface soils in some places are gravelly clay or sandy clay. Available moisture-holding capacity is low. Runoff is rapid. Erosion control is a major problem.

ESTIMATED YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan grass Pearl-millet C.A.D.	Orchard-grass Or Fescue And White Clover C.A.D.
CuC2	5	52	1,350	3.3	2.1	25	46	32	1.2	0.6	60	135
CuD2	5	45	1,150	2.8	-	21	37	26	1.0	0.5	50	110

Crop adaptation: CuC2 - Suited to all common crops though gravel interferes. Liberal use of fertilizer and good management will improve the yields.

CuD2 - Suitable for growing pasture crops like alfalfa, red clover, white clover, lespedeza and orchardgrass. With adequate fertilization and management corn or other row crops can be grown occasionally.

Cumberland and Decatur Silty Clay Loams: CrE3 (20-30%). These steep soils are on stream terraces and rolling to hilly uplands with moderately long slopes. The surface soils are dark red silty clay loam or clay loam. The subsoils are dark red clay. Available moisture-holding capacity is low. Runoff and erosion hazards are great, and shallow gullies have developed in some places. Estimated crop yields are slightly lower than those of CmD3.

Crop adaptability: Best suited to pasture. Fertilization and good management will increase yields.

2. DECATUR

Decatur Silty Clay Loam and Silty Clay: DcB2 (2-5%), DcC2 (5-12%), DcC3 (5-12%), DcD2 (12-20%), DcD3 (12-20%). These soils are on rolling to hilly smooth uplands and some are on short and strong slopes. They have many characteristics common with the associated Dewey and Cumberland soils. The surface soils are dark reddish brown silty clay loam. Subsoils are dark red firm clay. Available moisture-holding capacity is medium. The severely eroded surface soils are red to dark red firm silty clay with lighter red subsoil. Available moisture-holding capacity is low. On the severely eroded

soils the physical characteristics are poor and erosion hazards are great.

ESTIMATED CROP YIELD UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl-millet C.A.D.	Orchard-grass Or Fescue And White Clover C.A.D.
DcB2	6	65	1,800	3.7	2.4	30	55	38	1.6	0.8	75	150
DcC2	6	56	1,550	3.5	2.3	28	52	36	1.4	0.7	65	145
DcC3	5	39	1,050	2.9	1.9	20	37	26	0.9	0.4	45	120
DcD2	6	49	1,350	3.0	-	23	42	29	1.2	0.6	-	120
DcD3	5	28	800	2.2	-	14	25	18	0.7	0.3	-	90

Crop adaptation: DcB2 - Well suited to all common crops especially to alfalfa, red clover, orchard-grass and other legumes and grasses. Tobacco and vegetables can also be grown with good fertilization and management.

DcC2 - Same as above

DcC3 - Suited to small grains, legume-grass pasture, and hay. Good pasture can be raised with adequate fertilization and good management.

DcD2 - Well suited to legume-grass pasture and small grains.

DcD3 - Not suited to row crops. High quality legume -grass pasture can be maintained with good fertilization and management.

CUMBERLAND AND DECATUR SERIES

ALTERNATIVE CROPPING SYSTEMS FOR DIFFERENT CONSERVATION PRACTICES AND MANAGEMENT LEVELS

Mapping Unit	Length of Slope	60 bu. corn 2-3 tons hay			40 bu. corn 1-2 tons hay			20 bu. corn 0.5-1 ton hay		
		U & D	Contour	Contour Strip	U & D	Contour	Contour Strip	U & D	Contour	Contour Strip
CmB2)	Short-100 ft.	1-10	1-12	1-18	20-33	20-36	20-39	41a-43	41a-45	41a-47
DcB2)	Long-300 ft.	1-9	1-11	1-12	20-32	20-34	20-36	41a	41a-43	41a-46
CmC2)										
CuC2)	Short-100 ft.	1-6	1-9	1-10	20-24	20-30	20-33	41a	41a	41a-44
DeC2)	Long-300 ft.	1-2	1-6	1-9	20-22	20-23	20-32	41a	41a	41a-41b
CmC3)	Short-100 ft.	-	-	-	20-22	20-27	20-33	41a	41a	41a-42
DeC3)	Long-300 ft.	-	-	-	20-21	20-22	20-27	F	41a	-
CmD2)										
CuD2)	Short-100 ft.	1-2	1-2	1-6	20-21	20-22	20-24	F	41a	-
DcD2)	Long-300 ft.	1-2	1-2	-	20-21	20-22	-	F	-	-
CmD3)	Short-100 ft.	-	-	-	20-21	20-21	-	F	-	-
DcD3)	Long-300 ft.	-	-	-	F	-	-	F	-	-
CmE2	Short-100 ft.	1	1	-	F	-	-	F	-	-
	Long-300 ft.	F	-	-	F	-	-	F	-	-
CrE3	All lengths	F	-	-	F	-	-	F	-	-

Recommended fertilizer practices: The general fertility status and organic matter content of Cumberland and Decatur soils are moderate to moderately high except those soils which have been subjected to severe erosion and bad management. The soil pH ranges from medium to strongly acid. Adequate fertilization, proper liming, and good management are needed for increasing the production of the cultivated hay and pasture crops. If soil test values indicate that the fertility level of these soils are very low, low, medium or high in phosphate and potash refer to page No. 30 for the recommended rates of fertilizer and lime applications.

GROUP IV

DEWEY AND WAYNESBORO SERIES

1. DEWEY

Dewey Silty Clay Loam: DeB2 (2-5%), DeC2 (5-12%), DeD2 (12-20%), DeE2 (20-30%). These soils are on the crests of low hills and moderately long slopes in the upland parts of the valley. The surface soils on low hills are brown to dark brown silty clay loam and due to erosion the soils on long slopes are brown to reddish-brown silty clay loams. The subsoils are yellowish-red to red firm silty clay or clay. They contain small amounts of fine chert. The available moisture holding capacity is medium. In general, the tilth and workability of these soils are good. Erosion hazards are moderately serious.

ESTIMATED CROPS YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl-millet C.A.D.	Orchard-grass Or Fescue And White Clover C.A.D.
DeB2	6	65	1,800	3.7	2.4	30	55	38	1.6	0.8	75	150

ESTIMATED CROPS YIELDS UNDER DEFINED MANAGEMENT (cont.)

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl-millet C.A.D.	Orchard-grass Or Fescue And White Clover C.A.D.
DeC2	6	56	1,550	3.5	2.3	28	52	36	1.4	0.7	65	145
DeD2	6	49	1,350	3.0	-	23	42	29	1.2	0.6	--	120
DeE2	6	--	-	-	-	--	--	--	-	-	--	95

Crop adaptation: DeB2 - Well suited to tobacco and truck crops and other common crops, such as corn, small grain, lespedeza, alfalfa and orchardgrass. It responds well to good fertilization and management.

DeC2 - Well suited to row crops. With adequate fertilization and good management, good yields of alfalfa, red, and white clovers and grasses can be obtained. Tobacco can also be grown well.

DeD2 - Well suited to hay and pasture crops. Corn and other row crops can be grown with fertilization and good management.

DeE2 - Well suited to common pasture crops. Good yields of legumes can be obtained with good fertilization. Not suited for tilled crops.

Dewey Silty Clay: DwC3 (5-12%), DwD3 (12-20%), DwE3 (20-30%). These soils are similar to Dewey silty clay loam but the original surface layers are almost removed by severe sheet erosion and the present surface layers are yellowish-red firm silty clay. The subsoil is similar to surface soil but is more clayey. Shallow gullies have developed in several places. The available moisture-holding capacity is low. The tilth and physical condition of the soils are poor.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan grass Or Pearl-millet C.A.D.	Orchard-grass Or Fescue And White Clover C.A.D.
DwC3	-	39	1,050	2.9	1.9	20	37	26	0.9	0.4	45	120
DwD3	-	28	800	2.2	-	14	25	18	0.7	0.3	--	-
DwE3	-	-	-	-	-	-	-	-	-	-	--	-

Crop adaptation: DwC3 - Best suited for permanent pasture. Not suited to late-maturing crops, tobacco and vegetables. If adequately fertilized and well managed moderately high levels of alfalfa and other deep rooted legumes and row crops can be raised.

DwD3 - Poorly suited to tilled crops including corn and tobacco. If well fertilized and limed good pastures of legume and grasses can be raised well. Well suited to small grains.

DwE3 - Poorly suited to cultivated crops. Best suited to pasture or forest. With good fertilization and management, fair yields of orchardgrass, white clover, fescue, Sericea lespedeza and other common pasture crops can be produced.

2. WAYNESBORO

Waynesboro Loam: W1B2 (2-5%), W1C (5-12%), W1C2 95-12%), W1D2 (12-20%), W1E2 (20-30%). These soils are on the rounded hilltops, moderately short and steep slopes of high stream terraces. The surface soils are yellowish-brown to brown friable loam and the subsoils are red to dark-red clay loam or clay. The available moisture-holding capacity is moderately high. They have good tilth and are easy to work. Erosion is a problem on steep slopes.

Waynesboro Clay Loam: WmD3 (12-20%). The surface soil is strong brown to red friable clay loam and subsoil red to dark red clay loam to clay. Shallow gullies have developed in some places. Tilth is rather poor. The available moisture-holding capacity is medium. Erosion is a major problem.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl-millet C.A.D.	Orchard-grass Or Fescue And White Clover C.A.D.
W1B2	7	65	2,000	3.5	2.4	30	55	38	1.6	0.8	75	150
W1C	7	63	1,900	3.3	2.3	29	54	38	1.5	0.7	75	145
W1C2	7	56	1,700	3.3	2.3	28	52	36	1.4	0.7	65	145
W1D2	7	49	1,450	2.8	-	23	42	29	1.2	0.6	-	120
W1E2	7	-	-	-	-	-	-	-	-	-	-	95
WmD3	6	28	850	2.1	-	14	25	18	0.7	0.3	-	90

Crop adaptation: W1B2 - Well suited to all common crops including alfalfa, tobacco, truck crops. With fertilization and good management good pastures of legume-grasses can be produced.

W1C - Well suited to row crops, pasture and forest.

W1C2 - Well suited to all common crops. Management and adequate fertilization will improve the yields of hay and pasture crops including alfalfa and red clover.

W1D2 - Suited to row crops and pasture. Good pasture can be maintained by adequate fertilization and management.

WlE2 - Poorly suited to row crops. Pasture can be improved by fertilization and management.

WmD3 - Poorly suited to row crops. Fair yields may be obtained with good fertilization and management. Well suited to pasture crops.

Waynesboro Gravelly Loam: WgC2 (5-12%), WgD2 (12-20%), WgE2 (20-30%). These are similar to Waynesboro loam except that the gravelly textures reduce the available moisture holding capacity and make the soils droughty. On steep slopes runoff is rapid and erosion hazards are high.

Waynesboro Gravelly Clay Loam: WkD3 (12-20%), WkE3 (20-30%). These have surface soils of yellowish-brown or strong brown to yellowish red gravelly clay loam and subsoils of red gravelly clay loam to gravelly clay. Shallow gullies and the exposure of the subsoil at some places are the resullt of severe erosion. These soils are droughty and have poor tilth. Erosion hazards are great.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl-millet C.A.D.	White Clover And Orchard-grass Or Fescue C.A.D.
WgC2	5	48	1,450	2.4	2.1	23	47	31	1.1	0.5	60	130
WgD2	5	42	1,300	2.0	-	19	38	25	1.0	0.5	-	105

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT (cont.)

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl-millet C.A.D.	White Clover And Orchard-grass Or Fescue C.A.D.
WgE2	5	-	-	-	-	-	-	-	-	-	-	-
WkD3	4	36	750	1.5	-	11	22	15	0.6	0.3	-	80
WkE3	4	-	-	-	-	-	-	-	-	-	-	-

Crop adaptation: WgC2 - Suited to all common crops. With high fertilization and management moderate yields can be obtained.

WgD2 - Well suited to pasture crops. Common crops can be grown but moisture availability limits yields. Adequate fertilization will help produce moderate yields.

WgE2 - Not suited to row crops. Good pasture crops can be raised by adequate fertilization and good management.

WkD3 - Poorly suited to row crops. Pasture crops can be grown profitably with adequate fertilization and good management.

WkE3 - Not suited to row crops. Fair yields of pasture can be obtained if well fertilized and managed. Well suited to forest.

ALTERNATIVE CROPPING SYSTEMS FOR DIFFERENT CONSERVATION PRACTICES AND MANAGEMENT LEVELS

Mapping Unit	Length of Slope	60 bu. corn 2-3 tons hay			40 bu. corn 1-2 tons hay			20 bu. corn 0.5-1 ton hay		
		U & D	Contour	Contour Strip	U & D	Contour	Contour Strip	U & D	Contour	Contour Strip
DeB2	Short-100 ft.	1-9	1-11	1-17	20-33	20-35	20-37	41a-43	41a-45	41a-47
	Long-300 ft.	1-9	1-10	1-12	20-28	20-33	20-36	41a	41a-43	41a-46
W1B2	Short-100 ft.	1-10	1-12	1-18	20-33	20-36	20-39	41a-44	41a-46	41a-50
	Long-300 ft.	1-9	1-11	1-12	20-32	20-34	20-36	41a-41b	41a-44	41a-47
DeC2	Short-100 ft.	1-4	1-7	1-9	20-22	20-27	20-33	41a	41a	41a-43
	Long-300 ft.	1-2	1-3	1-9	20-21	20-22	20-29	F	41a	-
DwC3	Short-100 ft.	1-2	1-4	1-9	20-22	20-22	20-30	41a	41a	-
	Long-300 ft.	1-2	1-2	1-6	20-21	20-22	20-24	F	41a	-
W1C W1C2 WgC2	Short-100 ft.	1-6	1-9	1-10	20-24	20-30	20-33	41a	41a	41a-44
	Long-300 ft.	1-2	1-6	1-9	20-22	20-24	20-32	41a	41a	41a-41b
DeD2	Short-100 ft.	1-2	1-2	1-4	20-21	20-21	-	F	-	-
	Long-300 ft.	1	1-2	-	F	20-21	-	F	-	-
DwD3 WkD3 WmD3	Short-100 ft.	-	-	-	20-21	20-21	-	F	-	-
	Long-300 ft.	-	-	-	F	20-21	-	F	-	-
W1D2 WgD2	Short-100 ft.	1-2	1-2	1-6	20-21	20-22	20-24	F	41a	-
	Long-300 ft.	1-2	1-2	-	20-21	20-21	-	F	-	-

ALTERNATIVE CROPPING SYSTEMS FOR DIFFERENT CONSERVATION PRACTICES AND MANAGEMENT LEVELS

Mapping Unit	Length of Slope	60 bu. corn 2-3 tons hay			40 bu. corn 1-2 tons hay			20 bu. corn 0.5-1 ton hay		
		U & D	Contour	Contour Strip	U & D	Contour	Contour Strip	U & D	Contour	Contour Strip
DeE2	Short-100 ft.	1	1	-	F	-	-	F	-	-
	Long-300 ft.	F	-	-	F	-	-	F	-	-
W1E2 WgE2	All lengths	1	1	-	F	-	-	F	-	-
DwE3 WkE3	All lengths	-	-	-	F	-	-	F	-	-

Recommended fertilizer practices: Dewey and Waynesboro soil series are moderate in fertility, organic matter content and are medium to strongly acid in reaction. The silty clay and gravelly clay loam soils of these series have low fertility, poor tilth, and are droughty. For production of good yields soils need to be fertilized adequately and managed well. Liming is essential. For the listed crops the following rates of fertilizers in pounds per acre may be applied along with nitrogen if the soil test indicates that the fertility is very low, low, medium or high in phosphate and potash.

Crops	Nitrogen		Phosphate				Potash			
	Seeding Time	Time of Dress	V. low	Low	Med.	High	V. low	Low	Med.	High
Alfalfa										
Establishment	0-15	0	180	120	60	30	210	210	190	135
Maintenance	-	0	75	60	45	0	210	210	190	135
Small grain	30-60	30-60	80	60	40	20	40	20	0	0
Corn	15-30	45-90	80	60	40	30	80	60	40	30
Grass-legume										
Establishment	30	-	60	60	60	30	60	60	60	30
Maintenance	-	0-30	30	30	30	0	30	30	30	0

See page No. 24 for lime application.

GROUP V

FULLERTON SERIES

1. FULLERTON

Fullerton Silt Loam: FsB (2-5%), FsC (5-12%), FsD (12-20%), FsE (20-30%), FsF (30 +). These soils are on tops of hills and ridges with moderately long, steep slopes in the uplands. The surface soils on the gentle slopes are dark grayish brown to yellowish brown. Moderate and steep slopes have yellowish brown silt loam. The subsoils have strong brown silty clay loam to yellowish red or red firm clay. In general, these soils have good tilth and structure. The available moisture holding capacity is medium. Erosion is slight to moderate.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl millet C.A.D.	White Clover And Orchard grass Or Fescue C.A.D.
FsB	6	70	1,950	3.4	2.4	31	57	40	1.7	0.8	80	150
FsC	6	63	1,750	3.2	2.3	29	54	38	1.4	0.7	75	145
FsD	6	52	1,450	2.9	-	26	48	33	1.3	0.6	-	130
FsE	6	-	-	-	-	-	-	-	-	-	-	105
FsF	6	-	-	-	-	-	-	-	-	-	-	-

Crop adaptation: FsB - Suitable for all the cultivated crops.

FsC - Suitable for cultivated and pasture crops.

FsD - Better suited for grasses and legumes, common crops can be grown with good management.

FsE - Best suited for pasture and forest.

FsF - Not suiteable for row crops. Poorly suited to pasture and well suited to forest.

Fullerton Silty Clay Loam: F+C3 (5-12%), F+D3 (12-20%), F+E3 (20-30%). These soils are on crests of hills and ridges, short slopes of low rolling hills, moderately long and steep slopes in the uplands. Surface soils are almost gone. The present surface soils are strong brown or yellowish red silty clay loam. The subsoils are yellowish red or red firm clay. Tilth and physical characteristics of the soils are poor. The available moisture-holding capacity is medium to low. Erosion hazards are very high.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan grass Or Pearl-millet C.A.D.	White Clover And Orchard-grass Or Fescue C.A.D.
F+C3	5	39	1,050	2.6	1.9	20	37	26	0.9	0.4	45	120
F+D3	5	28	850	2.0	-	14	25	18	0.7	0.3	-	90
F+E3	5	-	-	-	-	-	-	-	-	-	-	-

Crop adaptation: F+C3 - Better suited to small grains, legumes and grasses, hay and pasture than corn, tobacco and vegetables.

F+D3 - Good yields of small grains and common hay and pasture crops like lespedeza may be obtained by good soil mamagement. Not suitable for tobacco and vegetables. Some are suitable for forest.

F+E3 - Unsuited to tilled crops. With good management and fertilization fair stands of fescue, orchardgrass and other pasture crops may be obtained. Best suited to pasture and forestry.

GROUP VI

FULLERTON CHERTY SILT LOAM AND NOLICHUCKY SERIES

1. FULLERTON

Fullerton Cherty Silt Loam: FcC (5-12%), FcD (12-20%), FcE (20-30%), FcF (30 + %). These soils are on hills and ridges and on the long slopes in uplands. The surface soils on the hills and ridges are strong brown cherty silty clay loam due to the removal of the surface layers by erosion. Subsoil is yellowish red cherty silt loam. The soils on the long slopes have surface soils of yellowish brown cherty silt loam and subsoils of yellowish red cherty silty clay loam to yellowish red cherty clay. The available moisture holding capacity is medium to low. Erosion is serious on the long slopes. High content of chert interferes with cultivation and productivity.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl millet C.A.D.	White Clover And Orchard-grass Or Fescue C.A.D.
FcC	5	45	1,450	2.4	2.1	26	49	34	1.3	0.6	45	130
FcD	5	37	1,250	2.1	-	23	43	30	1.0	0.5	-	110
FcE	5	-	-	-	-	-	-	-	-	-	-	90
FcF	5	-	-	-	-	-	-	-	-	-	-	-

Crop adaptation: FcC - Suited to cultivated crops, alfalfa and orchardgrass.

FcD - Suitable for pasture and hay crops.

FcE - Suitable for pasture crops with low nutrient and moisture requirements.

FcF - Poorly suited to row crops or pasture but suitable for forest.

Fullerton Cherty Silty Clay Loam: FdD3 (12-20%), FdE3 (20-30%), FdF3 (30 + %). These soils are on long slopes in the uplands. The surface soils are almost gone. The present surface layers are strong brown to yellowish red cherty silty clay loams and subsoils are yellowish red to red cherty clay. Runoff and the hazards of erosion are serious. The available moisture-holding capacity of these soils is low. High chert and clay content interfere with the workability.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl-millet C.A.D.	White Clover And Orchard-grass Or Fescue C.A.D.
FdD3	4	20	650	1.5	-	12	22	16	0.6	0.3	-	80
FdE3	4	-	-	-	-	-	-	-	-	-	-	-
FdF3	4	-	-	-	-	-	-	-	-	-	-	-

Crop adaptation: FdD3 - Suitable for pasture and forest but not for tilled crops.

FdE3 - Fairly suited to pasture and well suited to forestry.

FdF3 - Suitable for forestry.

2. NOLICHUCKY

Nolichucky Gravelly Fine Sandy Loam: NoC (5-12%), NoD2 (12-25%), These soils cap the rounded hills and on high terraces of Little Tennessee River. They are coarse textured soils from alluvial deposits characterised by water worn pebbles and cobblestones. The surface soils are dark grayish brown to yellowish brown gravelly fine sandy loam and the subsoils are yellowish-red to red gravelly sandy clay. Available moisture-holding capacity is moderate to low.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan grass Or Pearl millet C.A.D.	White Clover And Orchard-grass Or Fescue C.A.D.
NoC	5	49	1,450	2.4	2.1	24	49	33	1.3	0.6	65	130
NoD2	5	38	1,150	2.0	-	19	38	25	1.0	0.5	-	105

Crop adaptation: NoC - Well suited to most crops, corn, small grain, lespedeza, orchardgrass, white clover provided the fertility level is increased. Fescue can be grown well.

NoD - Suited to common row crops if the fertility level is increased.

FULLERTON, FULLERTON (CH) AND NOLICHUCKY SERIES

ALTERNATIVE CROPPING SYSTEMS FOR DIFFERENT CONSERVATION PRACTICES AND MANAGEMENT LEVELS

Mapping Unit	Length of Slope	60 bu. corn 2-3 tons hay			40 bu. corn 1-2 tons hay			20 bu. corn 0.5-1 ton hay		
		U & D	Contour	Contour Strip	U & D	Contour	Contour Strip	U & D	Contour	Contour Strip
FsB	Short-100 ft.	1-9	1-11	1-13	20-33	20-34	20-36	41a-42	41a-44	41a-47
	Long-300 ft.	1-7	1-9	1-11	20-27	20-33	20-35	41a	41a-43	41a-45
FsC	Short-100 ft.	1-3	1-6	1-9	20-22	20-25	20-33	41a	41a	41a-42
	Long-300 ft.	1-2	1-3	1-7	20-21	20-22	20-27	F	41a	-
F+C3	Short-100 ft.	-	-	-	20-21	20-21	20-27	F	41a	-
	Long-300 ft.	-	-	-	20-21	20-21	-	F	-	-
FcC	Short-100 ft.	1-5	1-8	1-10	20-23	20-27	20-33	41a	41a	41a-43
	Long-300 ft.	1-2	1-4	1-9	20-22	20-22	20-30	41a	41a	-
NoC	Short-100 ft.	1-6	1-9	1-10	20-23	20-30	20-33	41a	41a	41a-43
	Long-300 ft.	1-2	1-5	1-9	20-22	20-23	20-30	41a	41a	41a-41b
FsD	Short-100 ft.	1-2	1-2	1-3	20-21	20-21	-	F	-	-
	Long-300 ft.	1	1	-	F	-	-	F	-	-
F+D3	All lengths	-	-	-	F	-	-	F	-	-

ALTERNATIVE CROPPING SYSTEMS FOR DIFFERENT CONSERVATION PRACTICES AND MANAGEMENT LEVELS

Mapping Unit	Length of Slope	60 bu. corn 2-3 tons hay U & D	Contour	Contour Strip	40 bu. corn 1-2 tons hay U & D	Contour	Contour Strip	20 bu. corn 0.5-1 ton hay U & D	Contour	Contour Strip
FcD	Short-100 ft.	1-2	1-2	1-5	20-21	20-21	20-23	F	-	-
	Long-300 ft.	1-2	1-2	-	20-21	-	-	-	-	-
FdD3	Short-100 ft.	-	-	-	20-21	20-21	-	F	-	-
	Long-300 ft.	-	-	-	F	-	-	F	-	-
NoD3	Short-100 ft.	1-2	1-2	1-6	20-21	20-22	20-23	F	41a	-
	Long-300 ft.	1-2	1-2	-	20-21	20-21	-	F	-	-
FsE	Short-100 ft.	1	1	-	F	-	-	F	-	-
FcE	Long-300 ft.	F	-	-	F	-	-	F	-	-
F+E3, FdE3, FcF, FdF3	All length	F	F	F	F	F	F	F	F	F

In general, the Fullerton and Nolichucky soils series are low in fertility. Their fertilizer requirements are high. If P and K are applied the yield of cultivated crops will be much better than the present yields. Heavy fertilization is needed to maintain a good, productive grass-legume pasture. The most reliable way to determine the fertility status of the soils is the "soil test". If the soil test indicates that the nutrient level is very low, low, medium or high refer to page 47 for fertilizer and page 24 for lime.

GROUP VII

SEQUOIA SERIES

1. SEQUOIA

Sequoia Silty Clay Loam: SKB2 (2-5%), SKC2 (5-12%), SKD2 (12-20%) and Sequoia Silt Loam: Seo (5-12%). These soils are on low rolling hills and ridges with moderately short upland slopes underlain by acid shales. The surface soils are yellowish brown silty clay loam and the subsoils are strong brown silty clay loam to yellowish-red silty clay. The Sequoia silt loam has slightly thicker surface soil and is uneroded. The available water holding capacity is medium to low.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red Clover & Perennial Grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded On Small Grain Tons	Sudan-grass Or Pearl-millet C.A.D.	White Clover And Orchard-grass Or Fescue C.A.D.
SKB2	5	50	1,650	2.9	2.2	23	47	26	1.4	0.7	65	140
SKC2	5	40	1,350	2.6	2.0	20	41	23	1.1	0.5	50	125
SKD2	5	33	1,100	2.1	-	16	32	17	0.9	0.4	-	100
SeC	5	47	1,550	2.7	2.1	23	46	26	1.3	0.6	60	130

Crop adaptation: SKB2 - Suitable for all common crops. With adequate fertilization and good management good yields of tobacco, truck crops and corn may be obtained.

SKC2 - Suited to all common crops. The yields of small grains, legumes and grasses can be improved by fertilization and good management.

SKD2 - Moderately suited to row crops but well suited to pasture. Fertilization and good management will improve yields.

SeC - Suited to all common crops. Adequate fertilization and good management will improve yields of tobacco, corn and pasture crops.

Sequoia Silty Clay: SlC3 (5-12%), SlD3 (12-20%). These are similar in origin to the Sequoia silty clay loam but are severely eroded with a surface layer of yellowish-red silty clay. Shallow gullies are in some areas. These have poor tilth and are droughty. Available water-holding capacity is low. Erosion hazards are great.

ESTIMATED CROP YIELDS UNDER DEFINED MANAGEMENT

Mapping Unit	A.W.H.C.	Corn Bu.	Tobacco Lbs.	Alfalfa Tons	Red clover & perennial grass Tons	Wheat Bu.	Oats Bu.	Barley Bu.	Lespedeza Alone Tons	Lespedeza Over-seeded on small grain Tons	Sudan-grass or pearl millet C.A.D.	White clover and orchard-grass or fescue C.A.D.
SIC3	4	25	850	1.8	1.4	11	22	12	0.7	0.3	30	85
SID3	4	14	500	1.4	-	6	13	7	0.4	0.2	-	65

Crop adaptation: SLC3 - Suited to pasture crops. Proper fertilization and deep tillage will help in producing good pasture as well as some row crops.

SLD3 - Poorly suited to row crops. Suited to pasture crops. Yields can be raised by fertilization and good management.

ALTERNATIVE CROPPING SYSTEMS FOR DIFFERENT CONSERVATION PRACTICES AND MANAGEMENT LEVELS

Mapping Unit	Length of Slope	60 bu. corn 2-3 tons hay			40 bu. corn 1-2 tons hay			20 bu. corn 0.5-1 ton hay		
		U & D	Contour	Contour Strip	U & D	Contour	Contour Strip	U & D	Contour	Contour Strip
SKB2	Short-100 ft.	1-8	1-10	1-11	20-27	20-33	20-36	41a	41a-43	41a-45
	Long-300 ft.	1-4	1-9	1-10	20-22	20-30	20-33	41a	41a	41a-44
SKC2, SeC, SIC	Short-100 ft.	1-2	1-3	1-7	20-21	20-22	20-27	F	41a	-
	Long-300 ft.	1-2	1-2	1-4	20-21	20-21	-	F	-	-
SKD2, SID3	Short-100 ft.	1	1-2	-	F	F	-	F	-	-
	Long-300 ft.	1	1	-	F	-	-	F	-	-

Recommended fertilizer practices: Sequoia soils are low in fertility, organic matter content and are strongly acid in reaction. These soils need to be fertilized adequately and managed well for improving the productive capacity. See page No. 47 for the rates of fertilizers to be applied in pounds per acre if the soil tests indicate very low, low, medium or high levels of phosphate and potash. Refer to page 24 for lime rates.

TABLE I

TABLE FOR SOILS AND EROSION CLASS, LOUDON COUNTY

Soils	T/K VALUES FOR EROSION 1 & 2	3
Bland	5	2
Bolton	13	10
Cumberland	12	9
Decatur	9	6
Dewey	9	6
Emory	14	11
Etowah	13	10
Fullerton	8	5
Fullerton Ch.	10	7
Hermitage	13	10
Landisburg	7	4
Leadvale	7	4
Lehew	6	3
Litz	6	3
Neubert	14	11
Nolichucky	11	7
Sequoia	5	5
Taft	5	2
Tellico	9	6
Waynesboro	12	9

T = Soil loss tolerance
K = Soil Erodibility Factor
R = factor (rainfall-erosion-index) for Loudon County = 200

TABLE II

MASTER SHEET WITH ALTERNATIVE CROPPING SYSTEMS AT MANAGEMENT LEVEL FOR 60 BUSHELS CORN, 2-3 TONS HAY

PRACTICE: U & D	PRACTICE: Countour	PRACTICE: Contour strip	System No.	
SLOPE PERCENT				
.20	.20			
.18				
.16	.18		1	Meadow, well-established gr.-leg., excellent cover.
.14	.16			
.12	.14	.20		
.11		.18		
.10			2	Meadow renovated 1 in 6 yrs., turn-plow and fallow (Aug. 1-30) heavy fert.
.9	.12	.16		
.8				
.7	.10	.14		
.6	.9	.12		
.5	.8		3	Small grain-M-M-M-M-Corn, rd. 1.
.4	.7	.10	4	" " -M-M-M-Corn, rd.1.
			5	" " -M-M-M-Tobacco, rd. r.
.3	.6	.9	6	" " -M-M-Corn, rd. 1.
	.5	.8	7	" " -M-Corn, rd. 1.
			8	" " -M-Tobacco, rd. r.
.2	.4	.7	9	" " Cont. rd. 1. with a. lesp. disk and harrow.
	.3	.6		
		.5		
	.2	.4	10	M-M (gr. leg.)-Corn-corn, rd. 1.
		.3	11	Small grain, cont., rd. 1., early seeded
		.2	12	Small grain, cont., rd. 1., late-seeded.
			13	Corn, cont., without w.c., rd. 1.
			14	Corn, cont., rd. 1. with w. c., late-seeded.
			15	Tobacco, cont., with w. c., early seeded, 8T man.
			16	Sudan Grass or millet cont. with early-seeded w. c.
			17	Corn, cont. rd. r. with early-seeded w. c.
			18	Tobacco, cont., rd. r. without w.c. 8T man.
			19	Corn, cont., rd. r. without w. c.

TABLE III

MASTER SHEET WITH ALTERNATIVE CROPPING SYSTEMS AT MANAGEMENT LEVEL FOR 40 BUSHELS CORN 1-2 TONS HAY

PRACTICE				
SLOPE PERCENT	U & D	Contour	Contour Strip	System No.
.20	.20			
.18				
.16	.18			
.14	.16			
.12	.14	.20		
.11		.18		
.10				20 Meadow, well-established gr.-leg., fair cover.
.9	.12	.16		21 Meadow, well-established a. lesp. or cl.(s) for seed, rd. l.
.8				
.7	.10	.14		
.6	.9	.12		22 Meadow, well-established a. lesp. or cl.(s) grazed or hay.
.5	.8			23 Small grain-M-M-M-(gr. leg.).
.4	.7	.10		24 " " M-M-M-M-Corn, rd. l.
	.6	.9		25 " " M-M-(gr. leg.)
.3				26 " " M-M-M-Tobacco, rd. r.
	.5	.8		27 " " M-M-M-Corn, rd. l.
.2	.4	.7		28 " " M-M-Corn, rd. l.
		.6		29 " " M (a. lesp., rd. r.)
	.3			30 " " M-M (a. lesp., rd. r.)
		.5		31 " " M (gr. leg., rd. r.) Tobacco, rd. r.
	.2	.4		32 " " M (gr. leg., rd. l.) Corn, rd. l.
		.3		33 " " M (Clovers) Corn, rd. l.
		.2		34 M-M (gr. leg.) Corn-Corn, rd. l.
				35 Winter cover (grass or grain + legume) conti., annual seed bed prep. mod., starter, fert.
				36 Small grain + legume (late-seeded)-corn, rd. l.
				37 Corn, cont., rd. l. with late-seeded w. c.
				38 " " rd. r. with early-seeded w. c.
				39 " " rd. l. without w. c.
				40 " " rd. r. without w. c.

TABLE IV

MASTER SHEET WITH ALTERNATIVE CROPPING SYSTEMS AT MANAGEMENT LEVEL FOR 20 BUSHELS CORN 0.5-1.0 TON HAY

PRACTICE				
SLOPE PERCENT	U & D	Contour	Contour Strip	System No.
.20				
.18	.20			
.16	.18			
.14	.16			
.12	.14	.20		
.11		.18		
.10				
.9	.12	.16		
.8				
.7	.10	.14		
.6	.9	.12	→	41a Meadow, fair cover.
.5	.8			
.4	.7	.10		
.3	.6	.9		
	.5	.8		
.2	.4	.7		
	.3	.6	→	41b Small grain-M-M-M-M-Corn, rd. 1.
		.5	→	42 " " M-M-M-Corn, rd. 1.
	.2	.4	→	43 " " M-M-(gr.-leg.) Corn, rd. 1.
			→	44 " " M-(gr.-leg.) Corn, rd. 1.
		.3		
			→	45 " " M-(a. lesp.) rd. r., Corn, rd. 1.
		.2	→	46 M-M-(gr.-leg.)-Corn-Corn, rd. 1.
			→	47 Small grain + leg., late-seeded, Corn, rd. 1.
			↗	48 Corn, cont., rd. 1. with late-seeded w. c.
			→	49 Corn, cont., rd. r. with early seeded w. c.
			↘	50 Corn, cont., rd. 1. without w. c.
			→	51 Corn, cont., rd. r. without w. c.

CHAPTER V

SUMMARY AND CONCLUSION

Detailed interpretations of the characteristics and behaviour of soils are needed for efficient farm planning. A guide to potential use, management, and productivity of some Loudon county soils has been prepared from information in the new detailed Soil Survey Report, a soil-loss estimating equation, current fertilizer recommendations, and other sources.

The main objective of the guide is to point out to the farmers how the soils on their farms will respond to various types of uses and treatments. Some soils are suited to only one type of use but most of the soils in the county have many alternative uses. The soil types in each series are treated for their physical characteristics and crop adaptation. Soil types of different series with similar characteristics are grouped together for alternative cropping systems at different management levels, conservation practices, and fertilizer programs. The cropping systems and conservation practices suggested are based on several factors, such as rainfall-erosion-index, soil factor, cropping-management factor, length and percent slope as envisaged in the soil-loss estimating equation evolved in a recent study for Tennessee conditions.

Two types of gadgets embodying the principles of soil-loss estimating equation are presented to enable the farmers and ag-

ricultural workers of the county to select alternative cropping systems and practices for the individual mapping units on farm by simple manipulations.

The guide is designed to present the alternative combination of cropping systems, conservation practices and management levels which will sustain production on each soil so that the farmer may choose one which fits his overall farm situation.

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APPENDIX

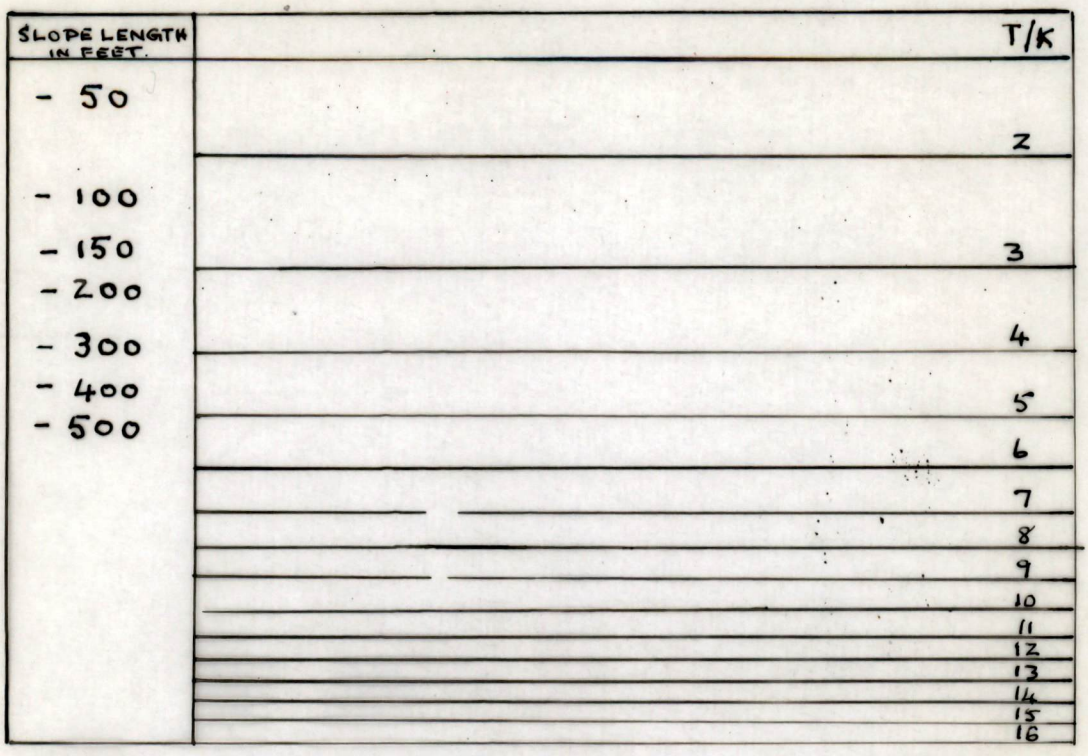


FIGURE 1. GADGET FOR DETERMINING ALTERNATIVE CROPPING SYSTEMS FOR DIFFERENT CONSERVATION PRACTICES AND MANAGEMENT LEVELS.

INSTRUCTIONS FOR USE:-

i DETERMINE THE PERCENT SLOPE OF THE MAPPING UNIT.

ii DETERMINE THE LENGTH OF SLOPE.

iii LOOK UP T/K FOR THE MAPPING UNIT IN TABLE 1.

iv PLACE THE LENGTH OF SLOPE ON THIS FIGURE ALONG SIDE THE PERCENT SLOPE UNDER THE DESIRED PRACTICE ON THE MASTER SHEET FOR THE EXPECTED LEVEL OF MANAGEMENT.

v CROPPING SYSTEMS THAT APPEAR ABOVE THE LINE OF THE GIVEN T/K ARE THE ALTERNATIVE CROPPING SYSTEMS ACCEPTABLE WITH THAT PRACTICE.

vi SELECT THE ONE SUITED TO YOUR CONDITION.

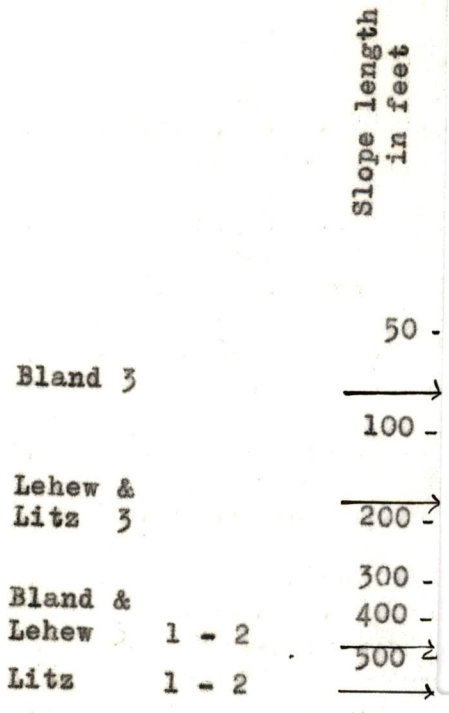


Figure 2. Gadget for determining cropping systems for Bland, Lehew and Litz series.

INSTRUCTIONS FOR USE:

I. Determine the percent slope of the mapping unit for which cropping systems are planned.

II. Determine the length of slope.

III. Select the master sheet for the expected level of management. Then place the length of slope on this sheet along side the percent slope under the desired practice on the master sheet.

IV. Cropping systems that appear above the cut-out or the arrow are for the given soil the alternative cropping systems acceptable under that practice.

V. Select the one suited to your condition.

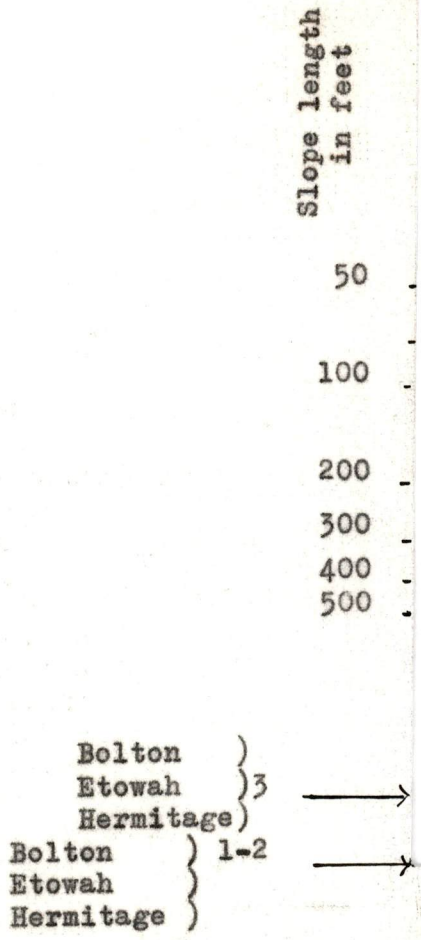


FIGURE 3. GADGET FOR DETERMINIMG CROPPING SYSTEMS FOR BOLTON, ETOWAH, AND HERMITAGE SERIES.

INSTRUCTION FOR USE:

I. Determine the percent slope of the mapping unit for which cropping systems are planned.

II. Determine the length of slope.

III. Select the master sheet for the expected level of management. Then place the length of slope on this sheet along side the percent slope under the desired practice on the master sheet.

IV. Cropping systems that appear above the cut-out or the arrow are for the given soil the alternative cropping systems acceptable under that practice.

V. Select the one suited to your condition.

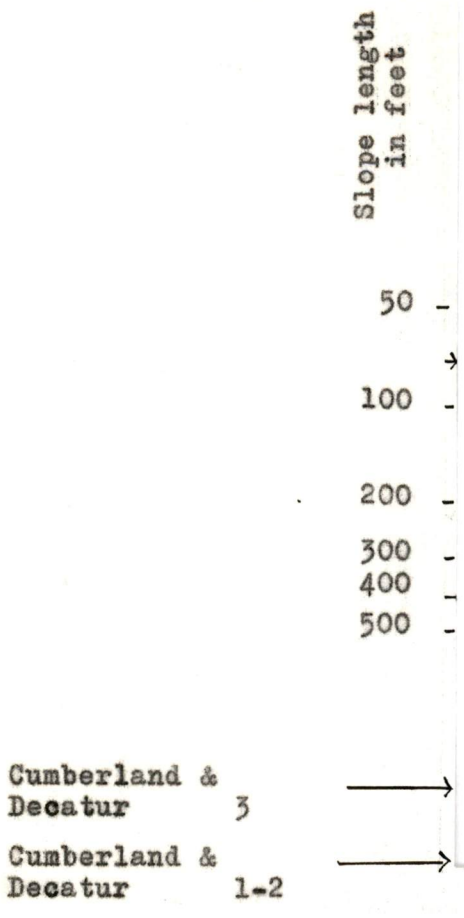


Figure 4. Gadget for determining cropping systems for Cumberland and Decatur series.

INSTRUCTIONS FOR USE:

I. Determine the percent slope of the mapping unit for which cropping systems are planned.

II. Determine the length of slope.

III. Select the master sheet for the expected level of management. Then place the length of slope on this sheet along side the percent slope under the desired practice on the master sheet.

IV. Cropping systems that appear above the cut-out or the arrow are for the given soil the alternative cropping systems acceptable under that practice.

V. Select the one suited to your condition.

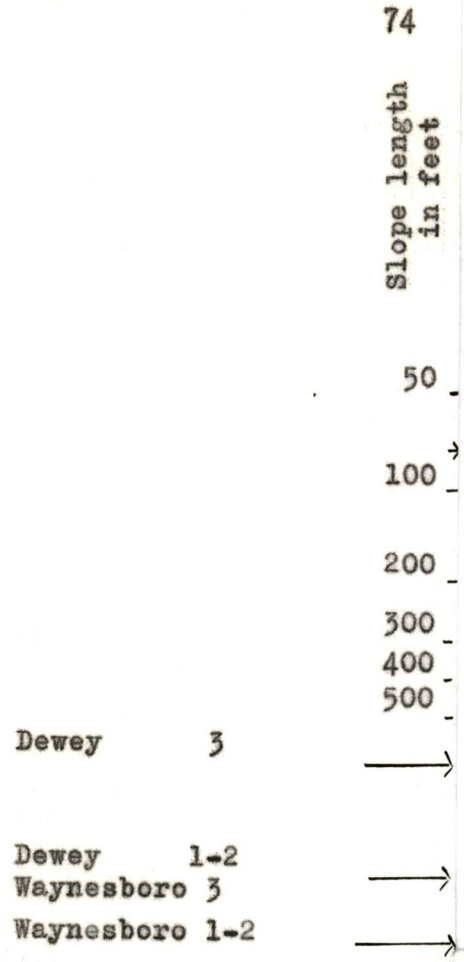


Figure 5. Gadget for determining cropping systems for Dewey and Waynesboro series.

INSTRUCTIONS FOR USE:

I. Determine the percent slope of the mapping unit for which cropping systems are planned.

II. Determine the length of slope.

III. Select the master sheet for the expected level of management. Then place the length of slope on this sheet along side the percent slope under the desired practice on the master sheet.

IV. Cropping systems that appear above the cut-out or the arrow are for the given soil the alternative cropping systems acceptable under that practice.

V. Select the one suited to your condition.

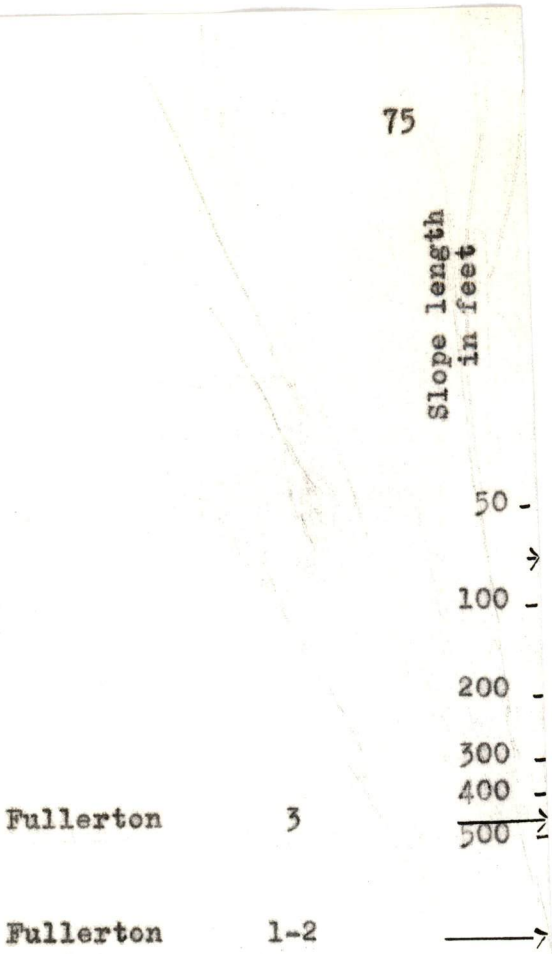


Figure 6. Gadget for determining cropping systems for Fullerton series.

INSTRUCTIONS FOR USE:

I. Determine the percent slope of the mapping unit for which cropping systems are planned.

II. Determine the length of slope.

III. Select the master sheet for the expected level of management. Then place the length of slope on this sheet along side the percent slope under the desired practice on the master sheet.

IV. Cropping systems that appear above the cut-out or the arrow are for the given soil the alternative cropping systems acceptable under that practice.

V. Select the one suited to your condition.

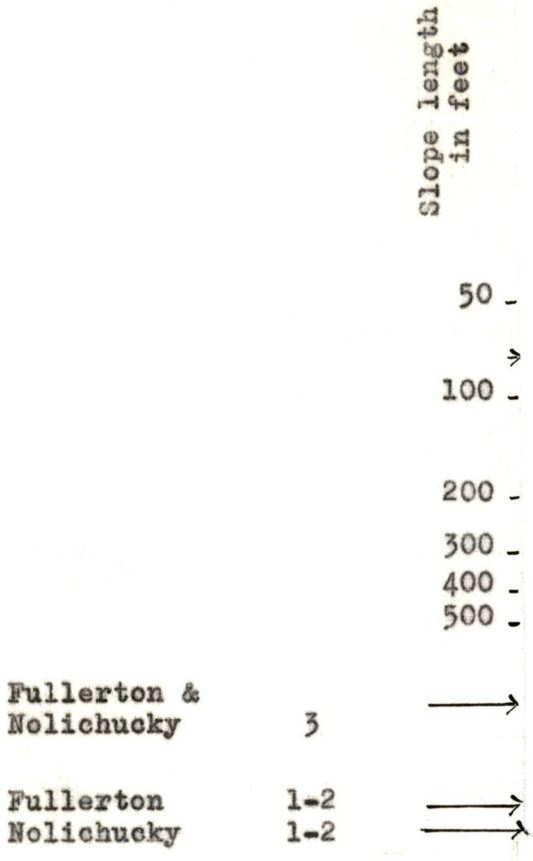


Figure 7. Gadget for determining cropping systems for Fullerton Cherty Silt loam and the Nolichucky series.

INSTRUCTIONS FOR USE:

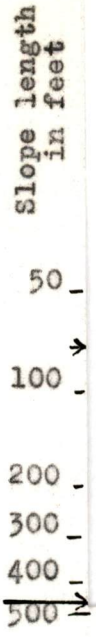
I. Determine the percent slope of the mapping unit for which cropping systems are planned.

II. Determine the length of slope.

III. Select the master sheet for the expected level of management. Then place the length of slope on this sheet along side the percent slope under the desired practice on the master sheet.

IV. Cropping systems that appear above the cut-out or the arrow are for the given soil the alternative cropping systems acceptable under that practice.

V. Select the one suited to your condition.



Sequoia 1-2 and 3

Figure 8. Gadget for determining cropping systems for Sequoia .

INSTRUCTIONS FOR USE:

I. Determine the percent slope of the mapping unit for which cropping systems are planned.

II. Determine the length of slope.

III. Select the master sheet for the expected level of management. Then place the length of slope on this sheet along side the percent slope under the desired practice on the master sheet.

IV. Cropping systems that appear above the cut-out or the arrow are for the given soil the alternative cropping systems acceptable under that practice.

V. Select the one suited to your condition.