

ANALYSIS OF THE MANAGEMENT
OF A COTTON-GROWING ENTERPRISE.

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ANALYSIS OF THE MANAGEMENT OF A COTTON-GROWING ENTERPRISE

Managerial Training Content of the Type
Jobs of an Enterprise of Growing
Cotton for Market



REVISED 1934

UNITED STATES DEPARTMENT OF THE INTERIOR . . . *Harold L. Ickes, Secretary*
OFFICE OF EDUCATION *George F. Zook, Commissioner*

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CONTENTS

	Page
Foreword.....	v
Basis of procedure.....	1
Managerial training content of the type jobs of an enterprise of growing cotton for market.....	6
Job I. Determining the cotton acreage.....	6
II. Keeping records and accounts.....	7
III. Procuring cottonseed.....	7
IV. Testing the seed.....	9
V. Preparing seed for planting.....	9
VI. Buying fertilizer for cotton.....	10
VII. Preparing the land for planting.....	10
VIII. Planting the seed.....	12
IX. Cultivating.....	14
X. Applying poison for bollweevil control.....	15
XI. Picking.....	16
XII. Selecting seed for next year's planting.....	17
XIII. Marketing.....	18
XIV. Summarizing the records and accounts at the close of the accounting period.....	19
XV. Interpreting the records and accounts.....	19

Publications of the United States Department of Agriculture relating to cotton.....	20

FOREWORD

The manuscript for this bulletin, consisting of an analysis of the managerial jobs normally encountered in an enterprise of growing cotton, was originally prepared in 1926 under the direction of C. H. Lane, Chief of the Agricultural Education Service, Federal Board for Vocational Education, by C. H. Schopmeyer, specialist in agricultural instruction, United States Department of Agriculture, in cooperation with Arthur P. Williams, regional agent for agricultural education of the Federal Board, who prepared the introduction and is responsible for the form used in the analysis. The bulletin was revised in 1930, and has been again revised in 1934 by Mr. Williams.

The material included is based on an extensive study of the work of practical farmers, particularly in the States of Texas, Louisiana, and Mississippi, and on conferences with specialists in the United States Department of Agriculture.

The bulletin is specifically directed to vocational teachers in all types of agricultural schools, to teacher trainers, and to State supervisors for the purpose of assisting in the selection and organization of training content in the field of activity considered. It is also intended to serve as an illustration of an effective procedure in analyzing managerial-training content of farm jobs.

GEORGE F. ZOOK,
Commissioner.

ANALYSIS OF THE MANAGEMENT OF A COTTON-GROWING ENTERPRISE

Managerial Training Content of the Type Jobs of an Enterprise of Growing Cotton for Market

BASIS OF PROCEDURE

This bulletin consists essentially of the results of analyzing the managerial jobs involved in growing cotton. It is not intended, in any sense, as a course of study or as a series of lesson plans.

The primary purpose for which classified analyses of content are made in vocational education is to secure a fairly complete and accurate *inventory of functioning content*. The time may come when all the content of vocational education in agriculture will have been completely analyzed and classified, but that time is still far in the future. In the meantime, the agricultural teacher must himself do much analysis if he is to know exactly what he proposes to teach. The analyses given in this bulletin will serve as samples of the results of analyzing certain jobs of a managerial type and will show the teacher who has to make similar analyses of the nature of the results to be obtained.

A second and quite distinct use of the analytic process in managerial training is *as a teaching device for training in processes of constructive thinking*. When used for this purpose the data as furnished by the class may not be entirely accurate or complete. In this case, absolute accuracy and completeness are not essential, the content of the analysis being regarded as a byproduct. *The direct objective is to develop on the part of pupils the power of critically selecting, evaluating, and intelligently using facts in dealing with a given situation.*

In case the teacher has occasion to teach the particular managerial jobs which are covered in this bulletin, the analyses as given will suggest to him, in a general way, how he can expect analyses of these jobs to work out when he uses analytic procedures in his teaching. Also, in doing this, the teacher should simply direct the work and require the pupils to take an active part, thus securing training in the selection, evaluation, and organization of content.

In a similar way a teacher trainer may use managerial analysis effectively *as a device to develop on the part of prospective teachers the*

power of visualizing functioning teaching content. This is particularly necessary since trainees are usually already competent in some farming occupation; and, to the degree that their activities and thinking procedures in connection with such occupation have become habitual, it is difficult for them to recognize the component elements of their own training or to teach it to others effectively. In a teacher-training institution, the making of classified analyses of content should be required of trainees to the extent that is necessary to enable them to develop the power of visualizing functioning content and not with the chief aim of securing complete analyses of training content.

From the above statements it is evident that the results of the analyses as given in this bulletin should never, under any circumstances, be placed directly in the hands of pupils. They are not intended for that purpose but merely as an aid to the teacher. The most fatal thing that could be done would be to make such an analysis a text for an informational lesson and place it in the hands of pupils for study and recitation.

Teachers are particularly cautioned against expecting or requiring their pupils to carry through the analyses of these jobs in exactly the way that is outlined in this bulletin. Not only would local adaptation come in, but the teacher must remember that the purpose of this work is to train his pupils in thinking constructively in dealing with a job and that it is the procedure which counts. For example, one of the most futile things that could be done would be for the teacher to put the list of factors on the board and tell the class to learn them or to insist that the class make up a list of the factors agreeing exactly with those given on the analyses sheets. It is needless to say that a use of this material based upon formal study, recitation, and examination would utterly defeat the entire purpose for which the material has been prepared and for which this bulletin is issued.

This analysis has been prepared on the basis of the following conceptions with reference to a farming occupation:

The *purpose* of vocational education in agriculture of less than college grade is to train persons who have entered upon or who are preparing to enter upon the work of the farm for proficiency in specific farming occupations. This should include, as requisite and feasible, the development of certain ideals and appreciations of farming and farm life.

A *farming occupation* consists in the performance of one or more of the functions of a farming business; namely, ownership, management, and operation under a given type of farming. (Examples: A resident owner of a dairy farm, a tenant cotton farmer, a hired farm manager of a commercial egg farm, and a farm laborer on a general crop farm.)

A *type of farming* is usually understood to refer to certain common characteristics which may be recognized in the farming pursued by a certain group of farmers, usually within a locality, but sometimes under similar conditions in other localities. A type of farming may be identified by the enterprise or enterprises conducted and particularly by the major source or sources of income and the intensity and stability of the practices. (Examples: Dairy farming, general stock and crop farming, cotton farming, and specialized poultry farming.)

A *farm enterprise* consists of a series of jobs in the production and disposal of a farm commodity, together with byproducts, if any. The enterprise should always be designated in terms of the principal commodity or product and not in terms of the byproducts. Enterprises may be rated either as major or minor, depending upon their relative importance in the type of farming with respect to extent and net returns. An enterprise may also be contributory, depending upon whether or not its product is consumed in the conduct of one of the other enterprises.¹ (Examples: Producing market milk, growing silage for dairy cows, growing corn for grain, producing market pork, and growing vegetables for home use.)

A *farm job* is an actual unit of farm work having a definite purpose and setting and requiring specific equipment, supplies, or working data, as the case may be. By the term "unit" is meant something which can be completed more or less independently of other similar pieces of work. Most farm jobs have to do with individual enterprises, in which case the job is identified with the given enterprise. (Examples: Cultivating cotton, selecting seed corn.) There are also farm jobs which have to do more with the business of the farm, as a whole, than with any one enterprise. (Examples: Financing the farm business, draining the farm installing a water system.) Although the term "farm job" is frequently used in a general sense, for the sake of brevity or general reference, it should be used only in a specific sense in connection with teaching situations. From this standpoint, a farm job, depending upon the type of activity or ability involved, may be classified either as an operative unit or as a managerial unit.

An *operative job* is one in which the pupil is taught to do the work according to some standard or accepted practice re-

¹ See also Federal Board for Vocational Education Bulletin No. 33, revised 1934, Principles in Making the Vocational Course of Study in Agriculture in the High School.

sulting in a concrete product. By standard practice is meant a procedure commonly followed by farmers in a locality or tested and recommended by agricultural experiment stations; in short, some established practice. For convenience in teaching, an operative job is usually analyzed into its component activities which are called operations.

A *managerial job* is one which involves only the making of decisions. Managerial ability is required whenever action is determined upon by a process of independent thinking, and when optional situations are faced. The making of a decision involves a consideration of the factors in the given situation. A factor is one of the elements, conditions, or influences that contribute to produce a result.

Operative training centers on the ability to do a specific job as an end in itself. Managerial training centers on instruction and practice in a thinking procedure; hence, from that standpoint, we can regard as a byproduct the conclusions which are reached for the particular job which is used as a basis for the teaching. The reason for this is that the conclusions reached for any specific situation, however important they may be, serve only that immediate need, while the managerial training secured is the application of a typical mental procedure which functions in a wide variety of specific situations. In all cases, however, real farm jobs which are important to members of the class should be used as a basis for such teaching.

Operative ability is required by practicing the *job operations* according to some standard or accepted practice and with the intelligent application of the requisite knowledge of materials and working conditions. The operations are merely convenient subdivisions of the job unit. Managerial ability is acquired by practice in making *decisions* involving the consideration of managerial factors, ways and means, equipment and materials, and working conditions for the respective jobs studied.

In making an analysis of managerial training content, the job itself may be regarded as the making of a major decision which can be made quite independently of other decisions occurring in the farm enterprise under consideration. This major decision, for the sake of convenience, is usually resolved into several minor decisions just as an operative job is analyzed into its successive operations. Determining the kind of decisions to be made is the first step in a managerial analysis. For example, the working out of a managerial job of "Procuring cottonseed" might, in some cases, result in the decision to buy a particular lot of seed, but in order to arrive at this final decision a number of minor decisions would have to be made; namely, "What variety to grow", "Whether to use home-grown seed or to buy, or both", "Whether to plant a seed plot", and the like.

The next step is to determine the factors which should be considered in making each of the decisions. Since, in farming, as in any industry, the amount of net return is the measure of success, and since a net return is possible only when costs are less than income, practically all of the factors appearing in an analysis of managerial training content are either direct cost factors, or are factors which affect the ultimate cost of the unit of product.

When a farm job has been analyzed into the "decisions to be made" and the "factors to be considered", one is in a position to know what facts will need to be secured and used in the thinking. Hence, the assembly of such functional information should always follow the analysis of decisions and factors and not vice versa.

In addition to such facts as will function directly in working out a specific job, there are frequently many items of related information which can be included profitably in the study. This related information will consist of interpretations of practice and of natural phenomena in terms of such sciences as biology, chemistry, and physics. Such interpretations will often increase the student's interest in the work and, hence, are valuable. The teacher should, however, be always on his guard against the temptation to spend too much time on such generalizations and interpretations at the expense of time necessary to deal effectively with the specific facts required in connection with the specific jobs with which he is dealing. This caution is especially necessary where time is limited.

Regardless of the extent to which a given farmer in practice may perform both operative and managerial jobs in any order, or in any combination, the learner can profitably center his attention on only one type of job at a time. *Hence training for operative and for managerial jobs should be separated during the learning period.* This distinction merely points to the desirability of centering the attention of the learner on the specific type of job which he is doing at a given time rather than of confusing him in a vain attempt to master everything at once. In most cases, managerial ability can be more readily acquired if the learner already possesses considerable operative ability as an apperceptive base.

In this bulletin only the managerial training content of farm jobs in an enterprise of growing cotton has been developed, although reference has been made frequently to certain operative practices with which pupils should be familiar as a basis for their managerial thinking. The farm jobs selected are managerial units rather than operative units, although in some cases the nominal designation of the job applies equally well both to operative units and to managerial units. With the material to be found in both State and Federal bulletins on specific operative practice applying to given conditions and localities, and with surveys of local farm practice, teachers should have no

difficulty in finding teaching content for such instruction in operative practice as they may deem necessary.

MANAGERIAL TRAINING CONTENT OF THE TYPE JOBS OF AN ENTERPRISE OF GROWING COTTON FOR MARKET

Job 1. Determining the Cotton Acreage

Decisions (to be made)	Factors	Kind of information needed for applying factors
<p>1. How many acres to devote to cotton.</p>	<p>Labor. Tillable area. Weather. Farming system. Suitability of land. Certainty of return. Capital requirements. Forecasted net income.</p>	<p>Average number acres of cotton tended by each man in the locality, when using the customary equipment. Farm labor schedule. Number of acres in the farm under cultivation. Other crops grown on the farm and number of acres of each. Farm demands for a given amount of each of the other crops for family and livestock use. Number of acres required for other crops grown on the farm. Number of acres of land on the farm suitable for growing cotton with respect to type of soil, drainage, and fertility. Specific land requirements with respect to fertility, contour, drainage, and type of soil for cotton production. Fertility of the soil in relation to plant growth best suited for bollweevil control. Possibility of serious insect or disease damage to the crop viewed from experience of the past. Favorableness of the normal weather for cotton growing. Seasonal weather conditions which will influence the number of acres of land which can be properly prepared for cotton. Normal yield of cotton for the locality. Normal yield of cotton on the farm. Net returns per acre from cotton during last 10 years. Need of capital for labor, fertilizer, and other supplies. Stability of income from cotton compared with other crops which may be grown in the locality. Prospective net income forecasted upon the trends of costs of production, trends in prices, possible carry-over from previous crop and accounts of previous years.</p> <p><i>Related information:</i> Normal weather conditions of the locality with respect to killing-frost dates, seasonal distribution of rainfall, mean monthly temperature, and extremes in monthly temperatures during the growing season. Distribution of investment in land, labor, and equipment in the production of cotton in the locality. Principles which underlie the establishment of a cropping system for the maintenance of the productivity of the soil. Influences which affect the farm labor supply for the locality. The way soils are classified. Significance of the different soil classifications. Types of cotton grown in different regions in the United States. Other countries which produce cotton. Varieties and types of cotton grown in other countries. Climatic and soil conditions in the cotton-producing area in foreign countries. Trends in production in foreign countries.</p>
<p>2. What fields to devote to cotton.</p>	<p>Size of fields. Diseases. Type of soil. Other crops grown. Probable yield.</p>	<p>Farm layout of fields of tillable land. Fields which are infested with cotton diseases and need other crops grown which are immune to the diseases. Productivity of the soil of the different fields which is suitable for cotton. Fields which are sufficiently drained for growing a cotton crop. Fields in which the soil type is best suited for cotton. Fields which need a soil improvement crop. Forecasted yield based on a previous experience and the amount of fertilizer used.</p> <p><i>Related information:</i> Physical, chemical, and biological properties of a productive soil. Characteristics of cotton diseases as wilt, anthracnose, blight, rust, and the like.</p>

Job II. Keeping Records and Accounts

Decisions (to be made)	Factors	Kind of information needed for applying factors
1. What kinds of records and accounts to keep.	Purpose of record. Time required. Other accounts kept.	Value of the different kinds of records and accounts of cash, cost, labor, production, weather, and working conditions. Essential facts to be brought out by the records. Estimate of the time needed for keeping the records and accounts considered. Kinds of other farm records and accounts kept.
2. What kind of record blanks to use.	Kind of record. Simplicity. Adaptability.	Forms in common use. Essential entries required for the different kinds of records kept. Arrangement of forms for convenient and accurate entry. Adaptability of ready-made forms.
3. What accounting period to use if a separate cotton enterprise cost account is kept.	Season of production. Disposal of crop. Other accounts kept.	Date of the beginning of the production cycle. Date when a final settlement for the cotton sold is made. Date the accounts can be closed. Date when other accounts, if any, must be closed. Date when returns for the cotton sold can be calculated.
4. What charges to make for land, equipment, and supplies if a cotton enterprise cost account is kept.	Basis for evaluation.	Different basis for evaluating real estate (as market value, productive value, and assessed value), tools, machinery, and value of supplies on hand. Method of calculating charges to make for equipment which is used on the farm for other purposes. Apportionment of fixed charges such as taxes, insurance, and upkeep of the equipment. Procedure in making and checking estimates where specific figures are not practical.
5. When to make entries.	Accuracy. Availability of time.	Accuracy of entries promptly made as compared with deferred entries. Possibility of making entries at stated periods. Appreciation of the possible waste of effort and time in confusion of items and lapses of memory. Time available in daily work schedule. Procedure in making and checking estimates where specific figures are not available.

Job III. Procuring Cottonseed

Decisions (to be made)	Factors	Kind of information needed for applying factors
1. What variety to plant.	Local practice. State law. Experimental data. Earliness. Purity of seed. Diseases. Quality of lint. Outturn. Picking quality. Weather. Size of plant. Yield. Net returns.	The varieties which other farmers in the locality grow and data on the yields which have been obtained. Advantages of all farmers agreeing on and growing the same variety. Local conditions which favor the agreement of the farmers in the locality on producing a single variety. State law relating to the growing of a single variety in a locality. Data on variety tests from the State Experiment Station showing the adaptability of cotton varieties. Time required for the different varieties to mature lint cotton. Period at which cotton can be matured in the locality to escape, to some extent, the damage by bollweevil. Varieties of cotton of which pure seed can be easily obtained. Varieties which have disease resistant qualities, especially to diseases occurring in the locality. Ratio of lint to seed in the different varieties. Length and strength of the staple of the different varieties. easiness with which the open balls of the different varieties can be picked. Varieties producing plants from which the lint cannot be easily blown before picking time. The size to which plants of the different varieties grow. Influence of size of plants on time required for maturing and on the yielding quality. Data on the yield of cotton secured in the locality from the different varieties. Varieties which have given most satisfactory net returns in the locality; considering yield per acre, quality of lint, and price received.

Job III. Procuring Cottonseed—Continued

Decisions (to be made)	Factors	Kind of information needed for applying factors
1. What variety to plant—Contd.	Net returns—Contd.	<p><i>Related information:</i> Botanical classifications and relationship of the cotton plant. How varieties of cotton are produced. Branching habit of the plant. Description of the leaves of cotton plants. Arrangement of leaves on the plant stems. Function of leaves. Botanical characteristics of the cotton flower. The parts of the cotton flower. Rate of floral bud production. Period of development from the appearance of a floral bud to a flower. How fertilization takes place. Period of growth of the boll from the flower to maturity. How the varieties of cotton may become mixed or crossed. Nature of the diseases of cotton. How fungous diseases reproduce. How cotton plants become infected by fungous diseases.</p>
2. Whether to use home-grown seed or to buy seed, or both.	Yield. Purity of home-grown seed. Quality of lint of home-grown seed. Amount of home-grown seed. Amount of seed needed. Germinability of home-grown seed. Price.	Yield of cotton secured from home-grown seed. Yield and quality of lint secured on the farm compared with the yield and quality of lint secured by other farmers in the locality. Proof of the degree of purity of the home-grown seed. Length and uniformity of staple of home-grown variety compared with other varieties. Ratio of lint to seed in seed cotton produced from home-grown seed. Strength of lint of home-grown variety compared with other varieties. Amount of good home-grown seed on hand. Amount of seed needed to plant the cotton acreage. Results of test on the germinability of home-grown seed. Price of available seed having the quality desired which justifies the buying of the seed for planting rather than planting the common home-grown seed.
2. Whether or not to plant a seed plat.	Number of acres in cotton. Need for improved seed. Purity of seed.	Amount of cottonseed needed for planting. Yield and quality of lint secured by planting seed taken from the general crop compared with seed from a seed plat. Purity and quality of seed obtainable from the general cotton crop. Purity and quality of seed obtainable for planting the seed plats. Price at which seed of the variety and quality can be purchased.
4. Where to buy seed.	Reliability of seedman. Guaranty on seed. Source of seed offered for sale. Supply of desired kind of seed. Quality. Diseases. Price.	Reputation of the seedman for reliability and quality of seed offered for sale. The kind of guaranty which will be protection to the buyer of cottonseed. Accurate information as to where the seed offered for sale was grown. Parties having a supply of the kind of seed desired. Accurate information with respect to length of lint and the "outturn" of lint at the gin. Supply of seed which is disease-free and of disease-resistant varieties. Prices of cottonseed from various sources. Transportation costs from the various places where seed is available. Estimate of the cost of seed from the different places.
5. When to buy seed.	Planting date. Scarcity of supply. Capital. Price.	Date when the seed will be needed for planting. Date when there is certainty of a supply of good seed. Availability of capital. Urgency of the need for capital for other purposes. Data to show the general price fluctuation of cottonseed during the seasons.
6. How much seed to buy.	Home-grown seed used. Number of acres to plant. Price of seed.	Quantity of seed needed to plant an acre. Number of acres of cotton to be planted. Area which can be planted with home-grown seed, if any is suitable for use. Amount of seed advisable to buy at the given price.

Job IV. Testing the Seed

Decision (to be made)	Factors	Kind of information needed for applying factors
1. Whether or not to make a germination test of home-grown seed.	Appearance of seed. Storage condition. Amount of seed. Rate of planting.	Appearance of seed which indicates viability. Conditions under which the seed has been stored with respect to suitability for the preservation of the viability of the seed. Amount of seed on hand. Sufficiency of supply of seed to permit of a liberal rate of planting to make sure of a stand even though the germination percent is low. <i>Related information:</i> Conditions necessary for the germination of seed. The optimum temperature for the germination of cottonseed. Description of the different parts of the seeds of cotton. Anatomical relationship of the lint to cottonseed coat.
2. When to test the seed.	Date of planting. Labor schedule. Time required.	Date when seed will be needed for planting. Time needed to procure a supply of seed in case the home supply of seed is found unfit to use. Date when other farm work is least urgent. Date when the seed have had a "rest period" sufficient for germination. Date when there is the least possibility of subsequent deterioration. Amount of time needed to make the test.
3. How to secure a representative sample for testing.	Amount of seed. Manner of storage.	Amount of seed needed to make a reliable test. Place in the bulk of seed where sample should be taken. Number of sacks to sample when seed is stored in sacks. Mixing to do before taking the final sample.

Job V. Preparing Seed for Planting

Decisions (to be made)	Factors	Kind of information needed for applying factor
1. Whether to treat the seed with sulphuric acid for disease control.	Source of seed. Cotton acreage. Facilities. Cost.	Whether the seed has been selected from disease-resistant varieties grown on disease-free land. Possibility of the seed being disease free. Amount of seed which can be conveniently and profitably treated. Possibility of providing seed-treating facilities on the farm. Public facilities in the locality where seed may be taken for treatment. Cost of treating the seed. Estimated profits from treating. Other advantages of treating the seed with sulphuric acid resulting from the delinting of the seed. <i>Related information:</i> Physical and chemical properties of sulphuric acid.
2. Whether to delint and reclean the seed.	Kind of planter used. Facilities. Type of soil. Condition of soil. Quality of seed. Cost.	Difficulty in getting planter to make an even distribution of gin-run seed. How delinting the seed aids in making a more even distribution of seed by the planter. Comparison of the time required for the germination of delinted seed and gin-run seed under the soil conditions on the farm. How moisture and temperature of the soil affects the time required for germination of delinted seed and gin-run seed. Availability of facilities for properly delinting the seed. Advantages in recleaning cottonseed. Cost of delinting and recleaning seed. Estimated benefits from delinting and recleaning compared with the cost.
3. What method of delinting to use.	Efficiency. Facilities. Convenience. Cost.	Thoroughness of the different methods of delinting the seed. Effect of the delinting process on disease control. Possibility of seed damage by the different methods of delinting the seed. Availability of facilities for delinting. Delinting method which is suitable for use on the home farm. Comparative cost of the different methods of delinting.

10 ANALYSIS OF MANAGEMENT OF A COTTON-GROWING ENTERPRISE

Job VI. Buying Fertilizer for Cotton

Decisions (to be made)	Factors	Kind of information needed for applying factors
1. What kind of fertilizer to apply.	Manner of application. Type of soil. Fertility of soil. Time of application. Local practice.	Data on the results obtained from specific kinds of fertilizers on types of soils in the locality. Records on the yield of cotton obtained from the soil in previous years. Kind of fertilizer suitable for application before planting the seed. Kind of fertilizer suitable for application with planter. Kind of fertilizer suitable for side dressing of cotton. Results other farmers have secured with fertilizers. <i>Related information:</i> Chemical and physical properties of fertilizer substances. Meaning of a fertilizer formula and chemical analysis, as stated on fertilizer labels. Mineral composition of the cotton plant. Kind and source of elements used to build plant tissue in plant growth.
2. Whether to buy ready-mixed fertilizer or buy the component materials and mix them at home.	Home facilities. Local practice. Cost.	Facilities needed on the farm to satisfactorily mix fertilizer materials. Whether other farmers in the locality home mix their fertilizer or buy ready-mixed fertilizers. Cost per ton of desired kind of ready-mixed fertilizers f.o.b. local railroad station. Cost of the component materials needed to make up the equivalent of the desired ready-mixed material and the labor cost of home mixing the fertilizer.
3. When to buy fertilizer.	Date of application. Kind of fertilizer. Price. A available capital. Storage space. Method of buying.	Probable date the fertilizer will be needed. Whether the fertilizer will be home mixed or purchased ready mixed. Forecast on the price conditions. A availability of capital for the purchase of fertilizer. Facilities for storage on the home farm. Whether fertilizer is purchased individually or in cooperation with other farmers.
4. How much fertilizer to use.	Capital. Fertility of soil. Kind of fertilizer. Method of application. Normal rainfall (in growing season). Estimated increase in yield. Local practice.	Amount of money available for the purchase of fertilizer. Productivity of the soil. Experimental data to show the maximum amount of fertilizer which will give a profitable return. Amount of fertilizer of the various kinds which is commonly applied on other similar land. Dependence of the amount of fertilizer applied on the method of application. Effect of variation in rainfall on the amount of fertilizer which can be profitably used. <i>Related information:</i> Law of diminishing returns with respect to the application of fertilizers for cotton.
5. Where to buy the fertilizer.	Price. Transportation costs. Kind of fertilizer desired.	Price quotations from different sources of supply. Transportation rates from different sources of supply. Where the desired kind of fertilizer can be obtained.

Job VII. Preparing the Land for Planting

Decision (to be made)	Factors	Kind of information needed for applying factors
1. Whether to bed up, flat break, or flat break and then bed up.	Local practice. Slope of land. Type of soil. Rainfall. Condition of soil. Previous crop. Material to be turned under. Insects. Labor. Equipment on hand. Cost.	Practice of local farmers with respect to preparing land for cotton. Influence of flat breaking on the various types of soils. Slope of land which favors washing. Soil condition which is best for growing cotton. Effectiveness of flat breaking on the improvement of the friability of the soil if needed. Amount and seasonal distribution of rainfall. Torrential character of rains. Porosity of the soil and readiness with which rains drain off the land. Value of different practices in controlling erosion. How the different ways of preparing the land affect drainage.

Job VII. Preparing the Land for Planting—Continued

Decision (to be made)	Factors	Kind of information needed for applying factors
1. Whether to bed up, flat break, or flat break and then bed up—Contd.	Cost—Continued.	<p>Nature of the previous crop which has left the soil in such a state that flat breaking will put it in the best condition.</p> <p>Effectiveness of flat breaking in covering the material on the land.</p> <p>Difficulty of handling material on the surface when the land is bedded without first being flat broken.</p> <p>Method of planting, whether planted on beds or on the level.</p> <p>Date when plowing is done.</p> <p>Time needed for the flat broken soil to settle sufficiently for making up beds.</p> <p>Effect flat breaking will have on the control of troublesome insects.</p> <p>Date when other farm work is less urgent.</p> <p>Relative cost of flat breaking and bedding up.</p> <p>Availability of labor.</p> <p>Economy of buying new equipment and power considered in terms of the area covered per day.</p>
2. How to dispose of the stalks.	Season. Size of stalks. Method of preparation of soil.	<p>Condition of stalks in the fall or early winter.</p> <p>Methods suitable for handling stalks of different size.</p> <p>Condition of stalks required for best work by the different methods of soil preparation.</p>
3. What method to use in bedding.	Tools on hand. Condition of soil. Distance between rows. Material on land. Fertilizer used. Labor schedule.	<p>Adaptability of tools on hand.</p> <p>Effectiveness of the different ways of bedding the land which has been flat broken and land which has not been flat broken.</p> <p>Work needed to get the soil bedded up properly with respect to fineness, height of bed, and width of bed.</p> <p>Work needed to put the soil between the rows in the best condition.</p> <p>Method of bedding the land which will properly cover the material on the surface of the land.</p> <p>Manner of bedding which will properly bed down fertilizer.</p>
4. Whether to put down fertilizer and bed upon it or apply fertilizer at planting time or later.	Method of planting. Kind of fertilizer used. Labor. Amount of fertilizer used.	<p>Adaptability of the method of planting used to the application of fertilizer at the time of planting.</p> <p>Effect of fertilizer when applied in the different ways.</p> <p>Labor schedule at time of planting compared with the time of bedding.</p> <p>Availability of labor.</p> <p>Comparison of the cost of applying fertilizer at planting time, at the time of bedding, and at the time of cultivating the crop.</p> <p>Amounts of fertilizer which can be effectively used with different methods of application.</p>
5. What implements to use for distributing fertilizer.	Area planted. Amount applied. Condition of soil. Methods of preparing beds. Kind of fertilizer.	<p>Kind of implement which is suitable for applying the fertilizer to the area planted.</p> <p>Kind of implement which will distribute fertilizer at the desired rate and in the desired place with respect to location in the row.</p> <p>Implement which is suitable for work in the type and condition of soil on the land to be planted.</p> <p>Implement which is suited for distributing fertilizer on the land when the particular method of bedding is used.</p> <p>Kind of fertilizer distributor which will handle fertilizing material used.</p>
6. When to flat break.	Type of soil. Contour of land. Danger of floods. Labor schedule. Insect control. Previous crop. Weather. Condition of soil. Lease contract.	<p>Influence of weather on the type of soil on the farm if plowed early and allowed to stand considerable time without being worked.</p> <p>Whether the land will wash if plowed and left fallow for long periods.</p> <p>Possibility of the land being damaged by an overflow of water.</p> <p>Farm labor schedule to show when other farm work is less urgent.</p> <p>Time when plowing the land will most effectively destroy insects.</p> <p>Condition of the previous crop which can be plowed up most advantageously.</p> <p>Period when the weather is normally favorable for plowing.</p> <p>Condition of the soil with respect to moisture.</p> <p>Customary dates when old tenants leave and new tenants come on the farm.</p>

14 ANALYSIS OF MANAGEMENT OF A COTTON-GROWING ENTERPRISE

Job IX. Cultivating

Decisions (to be made)	Factors	Kind of information needed for applying factors
1. What implements to use.	Cultivators on hand. Cotton area. Size of plants. Condition of soil. Weediness. Method of planting. Bedding system. Condition of implements on hand. Price of new implements. Labor.	Suitability of cultivators on hand for the cultivating to be done. Whether the cotton area is such that 1-horse, 2-horse, 1-row cultivator, or a 2-row cultivator will cultivate the crop at the lowest cost. Size of cultivator which can be drawn by the power available. Cultivator adapted to cultivating plants of different sizes. Attachments of cultivators adapted to the kind and condition of the soil, and weed growth. Kind of cultivators suitable for destroying the weed growth on the land. Kind of cultivator suited to the method of planting, whether on hills or on level surface. Kind of cultivator suited to the style of beds upon which the cotton was planted. State of repair of the cultivators on hand. Cost of new implements suited for the work. Estimated returns from the purchase of new cultivators. Adequacy of labor supply. Ability of laborers to use large cultivators drawn with 2 or more horses.
2. When to thin or "chop."	Size of plants. Seasonal condition. Insects.	The size of the plant with a given number of leaves which indicate the stage of growth for chopping. Effect of thinning at different stages of growth. When the general weather conditions are favorable for the growth of cotton. Possibility of making a selection of vigorous plants. When the possibility of insects killing the plants seems past.
3. How far apart to make the hills.	Fertility of the soil. Amount of fertilizer applied. Rainfall. Local practices. Skill of choppers. Width of row.	<p><i>Related information:</i> Life history and feeding habits of the insects which damage the young cotton plants. Effect of crowding on the growth of plants.</p> <p>Size of plants desired. Fertility of the soil compared with similar soils on which data on spacing of hills is available. Experience other farmers in the locality have had on spacing of plants and the application of fertilizer. Spacing of hills made on the basis of the amount of fertilizer applied. Normal rainfall in the locality. Dependence of spacing of plants on rainfall. Spacing used by other farmers in the locality. Experimental data on yields of cotton on land similar to that on the farm with different spacing of hills. Dependence of accuracy of spacing on the skill of chopper. Dependence of the space between hills on the width of row and variety.</p>
4. How many stalks to leave in the hill.	Fertility of the soil. Amount of fertilizer applied. Rainfall. Local practices. Skill of choppers. Spacing of hills.	Productivity of the soil compared with similar soils on which data on the number of plants per hill is available. Experience other farmers in the locality have had on the number of plants per hill and the application of fertilizer. Normal rainfall in the locality. Dependence of the number of plants per hill on rainfall. Number of stalks other farmers in the locality grow in a hill under bollweevil conditions. Experimental data on yield of cotton on land similar to that on the farm with different number of plants per hill. Dependence of accuracy in the number of plants per hill on the skill of chopper. Relation of the number of plants per hill to the spacing of hills.
5. What implements to use for chopping.	Area in cotton. Labor. Size of plants. Weediness. Condition of soil. Distance between hills.	Area of cotton which can be chopped by hand with the labor supply on the farm. Advantages in hand chopping. Advantages in using a horse-drawn chopper. Size of hoe suited to the size of plants. Efficiency of hand chopping compared with horse-drawn chopper when the land is weedy. Chopping tools adapted to the condition of the soil. Dependence of the size of hoe on the spacing between hills.

Job IX. Cultivating—Continued

Decisions (to be made)	Factors	Kind of information needed for applying factors
4. How deep to cultivate.	Weather. Weediness. Kind of weeds. Stage of growth. Type of soil. Condition of soil.	Effectiveness of different depths of cultivation in controlling the different kinds of weeds encountered. Characteristics of the root systems of the weeds to be controlled. Location of the cotton roots in the soil at the different stages of growth. Tendency of different soils to become compact. Need for loosening up compactness of the soil. <i>Related information:</i> The different forms of weeds of plants. Rooting habits of the cotton plant. Functions of plant roots. How water moves in the soil by capillary action and the conditions which affect the rate of this movement.
5. Whether to "throw out" middles in cultivating.	Amount of soil. Weather. Degree of weather.	Whether soil left in the middle is sufficient to warrant throwing it out. Effect "throwing out" of middles will have in destroying weeds. Effect of "throwing out" middles on the moisture content of soil.
6. How often to cultivate.	Weather. Weediness. Stage of growth. Type of soil.	Frequency of cultivations needed to prevent weed damage to the cotton plants. Fertility of the soil needed for cotton. Effect of rain on the stability or crusting of the soil. Dependence of the number and frequency of cultivations given on the number and amount of rains. Frequency of cultivations needed at the different stages of growth of the plants. <i>Related information:</i> How cultivation benefits a growing crop. Conditions which affect the structure of the soil.
7. When to give the last cultivation.	Weather. Development of bolls. Bollweevil infestation.	Need for continued cultivation due to weed growth. Boll development which indicates the stage of maximum development has been reached. Influence of cultivation on bollweevil control.

Job X. Applying Fertilizer for Bollweevil Control¹

Decisions (to be made)	Factors	Kind of information needed for applying factors
1. Whether to make a prophylactic application of poison for cotton-wool weevils.	Location of weevils. Infestation past year. Presence of weevils on young plants.	Places favorable for the infestation of bollweevils. Whether the bollweevils were numerous the previous year. Period when the weevils emerge from hibernation. Presence of adult weevils on the young plants. <i>Related information:</i> Life history and feeding habits of the bollweevil.
2. What method to use in making a prophylactic application of poison.	Cotton acreage. Landed produce. Labor. Weather.	Effectiveness, time required, and cost of hand application of poison as compared with machine application for different cotton acreages. Possibility of having to repeat the application of poison due to weather.
3. Whether to apply calcium arsenate seven days after the weevils begin to hatch.	Experience. Landed produce. Infestation. Estimated profit.	Results obtained by the application of calcium arsenate on previous crops or familiarity with reliable experimental data. Experience other farmers in the locality have had in the use of calcium arsenate. Degree to which the cotton crop has become infested with weevil. Estimated cost of applying calcium arsenate. Possibility of loss if the crop if poison is not applied. Estimated profit which may result by the thorough application of poison.

¹The investigations of the agricultural experiment stations have led to certain conclusions in the control of the bollweevil by the application of calcium arsenate fruit. Definite recommendations have been made with respect to the time for applying the poison, the amount of calcium arsenate to apply per acre in each application, the number of applications to make, and the conditions under which the poison should be applied. The cotton grower cannot do better than follow these recommendations. At the same time there appears to be no remedy for the farmer to consider in the matter of applying poison for bollweevil, therefore no discussion there has been set up in this case.

16 ANALYSIS OF MANAGEMENT OF A COTTON-GROWING ENTERPRISE

Job X. Applying Poison for Bollweevil Control—Continued

Decisions (to be made)	Factors	Kind of information needed for applying factors
4. What dusting apparatus to use.	Cotton acreage. Durability. Skill of man. Cost.	The size of apparatus needed to cover the cotton area in an opportune time. Comparative cost of different dusting machines. Features of construction which indicate durability. Features of construction which indicate efficiency. Machine of such simplicity that it can be handled by the men employed on the farm.
5. Where to get the calcium arsenate powder.	Price. Quality of material. Reliability of dealer. Local practice.	Price quotations on calcium arsenate. Statement of the quality of the calcium arsenate on which price quotations are made. Information on the reliability of dealer. Past experience with reference to purchase of calcium arsenate. Experience and conclusions of other farmers in the locality. Opportunity to have calcium arsenate analyzed by the Federal Insecticide and Fungicide Board. <i>Related information:</i> Chemical composition and physical characteristics of calcium arsenate.
6. When to buy calcium arsenate.	Possible need. Certainty of supply. Storage space. Avaliable capital. Price.	Protection against boll weevil damage afforded by keeping a supply of calcium arsenate on hand. Uncertainty of being able to get a supply of calcium arsenate in case there is a general heavy infestation of weevils. Facilities for storing the calcium arsenate on the farm. Price and price trends of calcium arsenate during year. Capital on hand and urgency of other needs for capital.
7. How much calcium arsenate to buy.	Cotton acreage. Amount needed per acre. Storage space.	Number of acres of cotton on the farm. Maximum amount needed in case there is a heavy infestation of weevil during all of the growing season. Adequacy of storage space on the farm for storing calcium arsenate.
8. Whether to have a check area to test effect of poison.	Experience.	Number of years poison has been used on the farm. Success in past years in controlling weevil by applying dust poison. Success other farmers have had in poisoning. Experimental data on poisoning tests.

Job XI. Picking

Decisions (to be made)	Factors	Kind of information needed for applying factors
1. When to start picking.	Percentage of bolls open. Market conditions. Labor schedule. Weather. Labor supply. Cotton acreage.	Percentage of bolls open which will yield enough cotton per acre to justify picking. Urgency of other work on the farm. Damage which adverse weather conditions will cause to opened cotton bolls. Price of cotton at picking time. Forecast of the price based upon production figures and the general market condition. Avaliable labor supply for picking cotton. Number of acres in cotton and approximate yield per acre. Length of time with the available labor supply required to pick the cotton.
2. What care to give or require in picking.	Condition of cotton in field. Market grade requirements. Skill of pickers.	Whether the open cotton bolls have been damaged or beaten out. The market grades of cotton—requirements of each grade. Kind of cotton required to be given the best grade. Dependableness of pickers with respect to keeping the seed cotton clean and free from damaged cotton.
3. How much help to hire.	Amount of cotton. Variety. Regular farm labor. Wages.	Number of acres of cotton on the farms, and approximate yield. Characteristics of the variety with respect to holding the lint after the bolls are open. Amount of cotton the regular farm labor force can pick with expediency. Length of period during which the cotton crop can be picked without deterioration or damage. Current wages paid for picking cotton.

Job XI. Picking—Continued

Decisions (to be made)	Factors	Kind of information needed for applying factors
4. What wages to pay.	Prices of cotton. Seasonal conditions. Labor supply. Local customary wages. Yield of cotton. Weediness.	Current price level of cotton. Favorableness of weather for cotton picking. Availability of labor. Wages paid by other farmers in the locality. Wages required to attract labor. Dependence of wages on the yield of seed cotton. Weediness of the cotton land which will make picking of the cotton more difficult.
5. What protection to give picked seed cotton.	Amount of cotton. Storage facilities. Condition of seed cotton. Weather. Agreement with tenant. When ginned.	Approximate amount of cotton which will need protection. Facilities available on the farm for storing seed cotton. Dryness of seed cotton when picked which will make it possible to pile up large quantities without danger of damage. Weather conditions which will make protection essential. Effect absorbed moisture will have on the grade of cotton. Agreement with tenant with respect to the handling of the cotton after it is picked. Length of time seed cotton is held before it is ginned.
6. When to begin the second picking.	Percentage of bolls open. Labor schedule. Weather. Market conditions. Labor supply.	Percentage of bolls open which will make it worth while to pick over the field. Urgency of other work on the farm. Approximate time required to pick the cotton. Usual weather conditions during the cotton-picking period. Forecast of the market conditions based upon present price, production figures, etc. Farm labor supply. Expedition with which the labor force can pick over the cotton area.
7. How many times to pick.	Yield per picking. Available labor. Labor schedule. Weather.	Estimated percentage of the bolls open when the pickings are made. Available labor on the farm and time required to pick over the cotton. Urgency of other work on the farm. General seasonal weather conditions with respect to suitability for ripening the bolls and preserving the quality of the lint on opened bolls.

Job XII. Selecting Seed for Next Year's Planting

Decisions (to be made)	Factors	Kind of information needed for applying factors
1. When to select.	Maturity. Provision for storage. Opportunity to gin.	Stage of maturity of bolls suitable for seed. Available storage space on the farm suitable for protection of seed cotton intended for seed. Arrangement which can be made for ginning to keep the seed from becoming mixed with other varieties.
2. How much to select.	Acres to be planted. Rate of planting. Possible waste in cleaning.	Acres to be planted the following year. Amount of seed to be planted per acre. Whether the seed will be delinted and reseeded.
3. What to select.	Purity. Uniformity. Yield. Maturity. Plant characteristics. Dryness. Freedom from insect damage. Freedom from disease.	Advantage of roguing the cotton field for seed selection early in the season to prevent undesirable crossing. Distinguishing characteristics which indicate purity of the variety grown. Importance of uniformity in the time of maturity, size, and character of plants, and the length and strength of lint. Form and size of bolls indicating a high yield of lint. Size and branching habits of cotton plants which are most desirable from the standpoint of yield and maturity. The stage of maturity of plants at which the cotton bolls should be selected. Branches which produce bolls most desirable for seed. The degree of dryness of bolls suitable for seed selection. Indications of disease-damaged bolls. Indications of insect-damaged bolls.
4. How to have the seed cotton ginned.	Variety of cotton. Attitude of ginner.	Whether the same variety of cotton is generally grown by the farmers ginning at the local gin. Willingness of the ginner to thoroughly clean the gin from seed of other varieties. Precaution necessary to prevent an admixture of seeds of other varieties.

18 ANALYSIS OF MANAGEMENT OF A COTTON-GROWING ENTERPRISE

Job XII. Selecting Seed for Next Year's Planting—Continued

Decisions (to be made)	Factors	Kind of information needed for applying factors
5. Where to store the seed intended for planting.	Dryness of storage place. Security from animal damage. Security from mixture of other seed.	Storage space on the farm where the seeds will keep thoroughly dry. Storage space which gives absolute protection from animals. Storage space where other cottonseed will not become mixed with the seed desired for planting.

Job XIII. Marketing

Decisions (to be made)	Factors	Kind of information needed for applying factors
1. Whether to sell as seed cotton or ginned cotton.	Amount produced. Ginning accommodations. Comparative prices.	Amount of seed cotton needed to make a bale of ginned cotton. Local accommodations with respect to cotton gins. Differences in price.
2. Whether to sell individually or in a cooperative marketing association.	Local cooperative facilities. Amount of cotton produced. Quality of cotton produced. Price.	Marketing functions which must be performed in marketing cotton. Local organization of farmers existing for cooperation in the marketing of cotton. Possibilities of the local farmers entering into a cooperative marketing organization for storing and selling cotton. Amount of cotton produced in the locality with respect to being sufficient for handling cooperatively. Uniformity of cotton grown by the local farmers. Marketing functions which the cooperative association performs. Comparison of cost of marketing and price received for cotton when marketed individually with the cost and price received with marketed cooperatively.
3. What marketing functions to hire performed.	Individual facilities. Public facilities. Cooperative facilities.	<i>Related information:</i> Plan of organization of an association of farmers for the cooperative marketing of cotton. The meaning and importance of the different marketing functions. The market grades of cotton and the requirements for each grade.
4. What market to sell in.	Price. Transportation charges. Kind of buyers.	Marketing functions for which adequate facilities are maintained on the farm. Public facilities in the locality which may be hired to perform cotton marketing functions. Marketing functions for which cooperative facilities are maintained in the locality. Whether sufficient skill and knowledge is possessed for performing the function. Estimation of the costs of the marketing functions when performed individually when public agency is hired, and when performed in cooperation with other farmers. Efficiency of each agency in performing the particular marketing functions.
5. When to sell.	Price. Finances. Agreement with tenant.	Price quotations from different markets. Transportation facilities and charges for transporting cotton to the different markets. Scrupulousness and capability of the buyers at the different markets. <i>Related information:</i> What a cotton market is considered to be. Influences which cause cotton prices to fluctuate. Future cotton markets; location, organization, and methods of conducting business. Cotton producing countries, annual production of each. Whether about the same amount of cotton is produced each year or whether a tendency exists to increase or decrease the production.
		Average variation of cotton price during the year. Data on the world production of cotton for the current year; also the amount of cotton carried over from the previous year. Urgency of the need for money to meet financial obligations. Opportunity to obtain credit or a loan on cotton stored in a warehouse. When the cotton may be sold, depending upon the agreement made with the tenant.

ANALYSIS OF MANAGEMENT OF A COTTON-GROWING ENTERPRISE 19

Job XIII. Marketing—Continued

Decisions (to be made)	Factors	Kind of information needed for applying factors
6. What private marketing agency to patronize.	Service rendered. Charges. Honesty.	Capability of the marketing agencies and the services rendered by each. Charges made by the different agencies for the services rendered. Scrupulousness of the agencies.
7. What sales agreement to make with cotton buyers when selling individually.	Quality of cotton. Amount of cotton. Location of buyer. Location of cotton.	Ability to determine the grade of cotton offered for sale. Realization of the value of cotton, based upon the current price quotations. Number of bales of cotton and the local facilities for transporting it from seller to buyer. Transportation rates and estimated cost of transporting the cotton. Date when the cotton can be delivered.

Job XIV. Summarizing the Records and Accounts at the Close of the Accounting Period

Decisions (to be made)	Factors	Kind of information needed for applying factors
1. What statements to draw up.	Kinds of records and accounts kept. Interpretations desired. Data available.	Date when the accounts can be closed as determined by the nature of the enterprise. Value of finding interest on the capital invested in the enterprise. Value of finding the charge to make against the cotton crop for manure or fertilizers applied. Value of finding the overhead charge, including taxes, insurance, and upkeep. Value of finding and apportioning joint costs. Value of the net income from the cotton crop, cost per acre, profit per acre, and labor returns from the enterprise. Value of estimating the relative significance of each of the above calculations. Availability of data for the above calculations from either the account or from reasonably accurate estimates.

Job XV. Interpreting the Records and Accounts

Decisions (to be made)	Factors	Kind of information needed for applying factors
1. What adjustments to make in the next year's cotton crop.	Net returns. Forecasts for next year.	Accurately calculated returns from the enterprise. Comparison of conditions for the past year with the conditions for a normal year with respect to the influence of weather, diseases, insects, and other pests. Returns other farmers in the locality have secured. Comparison of the market conditions of the past year with those of a normal year. Forecasts of supply, demand, and price for next year. Reports on intentions to plant.
2. What changes to plan for the enterprise practices for next year.	Returns from the crop.	List of the work units or jobs in producing the crops. Comparison of the practices in the execution of those jobs with those of the farmers who have been most successful in growing cotton. Possibility of exercising greater efficiency in the performance of the jobs next year.

PUBLICATIONS OF THE UNITED STATES DEPARTMENT OF AGRICULTURE RELATING TO COTTON

NOTE.—Publications are on sale by the Superintendent of Documents, Government Printing Office, Washington, D.C.

Farmers' Bulletins:

- 501 F. Cotton improvement under weevil conditions. 5¢.
- 831 F. Red spider on cotton. 5¢.
- 1329 F. Bollweevil problem. 5¢.
- 1384 F. Community cotton production. 5¢.
- 1432 F. Pima and upland cotton in Arizona. 5¢.
- 1465 F. Cotton ginning. 5¢.
- 1595 F. The bollworm or corn ear worm as a cotton pest. 5¢.
- 1661 F. Farm study of the cotton plant. 5¢.

Department Bulletins:

- 375 D. Disadvantages of selling cotton in seed. 5¢.
- 457 D. Relation between primary market prices and qualities of cotton. 5¢.
- 948 D. Composition of cottonseed. 25¢.
- 985 D. System of accounting for cotton ginneries. 10¢.
- 1056 D. Marketing cottonseed for planting purposes. 5¢.
- 1111 D. One-variety cotton communities. 10¢.
- 1148 D. Comparative spinning tests of 1921 crop of cotton grown under weevil conditions in Southeastern States. 5¢.
- 1153 D. Bollweevil cotton in Texas. 5¢.
- 1204 D. Dusting cotton from airplanes. 10¢.
- 1219 D. Delinting and recleaning cottonseed for planting purposes. 10¢.
- 1392 D. Cooperative marketing of cotton. 10¢.
- 1445 D. Services in cotton marketing. 10¢.
- 1473 D. Cotton-spacing experiments at Greenville, Tex. 15¢.
- 1488 D. Manufacturing tests of cotton of white grades of universal standards for American cotton. 10¢.

Department Circulars:

- 175 DC. Linters. 5¢.
- 200 DC. Improvements in cotton production. 5¢.
- 205 DC. Cottonseed mixing increased by modern gin equipment. 5¢.
- 278 DC. Commercial classification of American cotton, with reference to standards for grade, color, and staple. 10¢.
- 361 DC. Cotton hopper, or so-called cotton flea. 5¢.
- 381 DC. Uniform-depth press-wheel cotton, planter attachment. 5¢.
- 414 DC. Sea-island and Meade cotton in Southeastern States. 5¢.

Yearbook Separates:

- 605 Y. Improved methods of handling and marketing cotton. 5c.
- 877 Y. The cotton situation. 15¢.
- 968 Y. Cotton of American-Egyptian variety in United States. 5¢.
- 1025 Y. Cotton communities growing one variety only are increasing. 5¢.
- 1111 Y. Fertilizer materials for cotton growing must be well chosen. 5¢.
- 1114 Y. Cotton gin fires frequent; chief cause is static electricity. 5¢.
- 1134 Y. Cotton of long staple could be produced in much greater quantity. 5¢.
- 1185 Y. Cotton more productive when thick spaced for small upright plants. 5¢.

12 ANALYSIS OF MANAGEMENT OF A COTTON-GROWING ENTERPRISE

Job VII. Preparing the Land for Planting—Continued

Decisions (to be made)	Factors	Kind of information needed for applying factors
7. What kind of plow to use in flat breaking.	Plow on hand. Power available. Type of soil. Condition of soil. Cost of new plow.	Suitability of plow on hand with respect to size, soil condition, and power available. Power needed to draw a given sized plow under particular soil condition. Kind of plow adapted for efficient work in the type and condition of soil on the farm. Estimated returns to come from the purchase of a new plow. <i>Related information:</i> Materials used to make the different parts of the plow. Mechanical principles involved in the construction of the plow; as the wedge, incline plane, and screw. Forces acting on the soil particles as they pass over the surface of the plow, as gravity, weight of soil particles, friction between the soil particles and the surface of the plow, and shearing from contact of soil particles. Friction in relation to draft. Influence of the materials used in the construction of the plow on the amount of friction. Dependence of the movement of soil particles on the resultant of the components of the forces involved. Relation of the hitch to line of draft and line of load.
8. How deep to plow.	Kind of plow. Type of soil. Character of subsoil. Depth of soil. Power available. Material to be turned under. Insects.	Minimum and maximum depth to which the kind of plow used will do satisfactory work. Depth of plowing best suited to the type of soil on the farm, as indicated by the depth of soil and character of subsoil. Depth to which the soil has been previously plowed. Power needed to plow the land to different depths. Data to show the effect on yield on land similar to that on the farm, plowed to different depths. Depth at which the plow used does the most effective work when surface material is to be turned under. Depth of plowing needed to aid in destroying insects.
9. When to level off the bed for planting.	Condition of soil. Date of planting.	Condition of soil with respect to moisture and fineness. General seasonal weather conditions. Time after leveling, the soil will remain in best condition for planting.
10. What implement to use for leveling.	Implements on hand. Condition of soil. Weediness.	Suitability of implements on hand for leveling. Kind of implement needed to effectively work down the soil to the particular desired condition. Implement which will be effective in destroying weed growth.
11. How high to leave the beds.	Rainfall. Type of soil. Condition of soil. Weediness. Kind of planter used.	Variations to make in the height of the bed, depending upon the condition of the soil. Height of bed to make for given types of soil. Height of bed needed for proper drainage. Amount of leveling to do to destroy the weeds. The amount of leveling of the bed which the planter will do.

Job VIII. Planting the Seed

Decisions (to be made)	Factors	Kind of information needed for applying factors
1. What method of distributing fertilizer to use after the land has been bedded.	Kind of distributor used. Kind of fertilizer used. Kind of bed.	Location in the row where the fertilizer will not injure the seed. Where the particular kind of fertilizer should be applied in the row for the best results. Distribution of fertilizer which is suited to the kinds of beds made. <i>Related information:</i> How plants draw nourishment from the soil. The process of osmose. Harmful results which may come from a heavy application of fertilizer too close to the roots of the young cotton plants.

Job VIII. Planting the Seed—Continued

Decisions (to be made)	Factors	Kind of information needed for applying factors
2. When to plant.	Condition of soil. Local practice. Warmth of soil. Frost. Weather. Variety.	<p>Fineness of soil which is suitable for planting. Moisture condition of soil which is suitable for planting. Period during which most of the cotton in the locality is planted. Warmth of soil necessary for the proper germination of cottonseeds. Normal date of the last killing frost in the spring. Normality of the season with respect to rain and temperature. Time required to mature the particular variety planted.</p> <p><i>Related information:</i> Conditions necessary for germination. Effect of an excessive amount of moisture in the soil on the germination of the seeds. Normal date when the soil is warm enough for planting cottonseeds.</p>
3. What kind of planter to use.	Planter on hand. Amount of land. Method of applying fertilizer. Method of bedding up. Attachments. Cultivator used.	<p>Suitability of planter on hand with respect to condition of repair, size, and attachments. Amount of land which will make the use of a 2-row planter profitable. Planter which will distribute fertilizer and plant the seed in the same operation. Planter attachments which will work well on the kind of beds made. Planter attachments which will firm the soil around the seed. Row spacing required by the kind of cultivator used.</p> <p><i>Related information:</i> Movement of soil water by capillary attraction. Influence of the compactness of the soil on the rise of moisture by capillary attraction.</p>
4. How deep to plant.	Region. Type of soil. Moisture. Fineness of seed bed. Weather. Local practice.	<p>Regional seasonal rainfall and its relation to the depth of planting. Relation of the different soil types to moisture-holding power and to rate of warming. Influence of the amount of moisture in the soil on the depth to cover the seeds. Relation of the fineness of the seed bed to the depth seeds should be covered. Influence of the temperature and weather on the depth of planting. Common practice in the locality as to the depth of planting.</p>
5. How wide apart to make the rows.	Local practice. Variety. Root development. Rainfall. Fertility of soil. Cultivator used.	<p>Distance apart farmers in the locality commonly plant cotton. Data from experimental trials to show the results of planting in rows at different widths apart. Variation in the width of rows required by the different varieties. Width of row needed to permit suitable root development. Distance apart rows should be made on soils of various degrees of fertility. Relation of rainfall to the size plants grow. Width of row required by the kind of cultivator used.</p> <p><i>Related information:</i> Effect of the thickness of planting on growth of plants.</p>
6. How much seed to plant per acre.	Germinability of seeds. Time of planting. Seasonal weather. Type of soil. Condition of soil. Local practice.	<p>Percentage of germination for the seeds to be used for planting. Favorableness of the temperature and soil moisture at planting time. Whether date of planting is earlier or later than the normal planting time. Whether the type of soil is such that a rain tends to make a hard crust on the surface. Fineness of the soil which will aid in a more complete germination.</p> <p><i>Related information:</i> Nature of the germination of the cottonseed. Ability of the young plant to force its way to the surface of the soil.</p>