# A DECISION AID TOOL FOR SELECTING FARM EQUIPMENT AND ESTIMATING COSTS OF MACHINERY COMPLEMENTS

By

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Dean of the Graduate College

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#### CHAPTER I

#### INTRODUCTION

#### Agriculture and Farm Machinery

The development and adoption of farm machine technology in United States agriculture during the past 50 years has had a significant impact on the structure of production and has brought on a substantial change in farming. Expanding farm size, increasing capitalization, and growing reliance on nonfarm inputs characterize today's modern farm, which is now so dramatically different from the small, self-sufficient unit of years past. The net effect of these changes is that farming and farm management have been transformed from a vocation and a way of life to a commercial business requiring the discipline and tools of modern business management.

Farmers are constantly called upon to make capital investment decisions. Next to land, machinery purchases require the greatest volume of capital. In addition to financial considerations, farm managers selecting machinery must consider the number of acres farmed, crops grown, labor availability, and timeliness of field operations. Farmers must balance their selection of machinery between the risk of loss from not completing field work in crucial time periods and the cost of having large machinery idle for long time periods.

#### The Problem

Many farmers have difficulty finding the appropriate machinery combination that will provide the necessary level of machinery services. Agricultural lenders attribute mismanagement in farm machinery procurement as a major culprit in farm business delinquency. Also, machinery related expenses, such as fuel, hired labor, and repairs, may constitute as much as 35% to 50% of an individual farm's operating expenses. Therefore, it seems that substantial savings and increased productivity can be secured with improved selection and allocation of machinery complements by farmers.

The farm manager must make decisions not only in regard to current machinery requirements, but also according to expected future machinery needs. Between the years of 1970 and 1988, Oklahoma farm numbers declined 25.5% (12). During the same period, the number of farms having cash receipts of more that \$40,000 increased 295%. These larger commercial farms in 1987 represented 29.3% of the total number of farms and received 90.2% of total farm proceeds, compared to only 7.4% of the farms and 59.3% of farm receipts in 1970.

On the other hand, farms with less than \$5,000 in sales represented 57.5% of all farms in 1970 and dwindled to 34.2% of all farms in 1988. This change represents an exit from the farming industry of 752 thousand farms in only 18 years. The typical farm size in the United States has increased from 242 acres in 1954 to 462 acres in 1987. Oklahoma's average farm size was 300 acres per farm in 1954, and had expanded to 449 acres per farm in 1987.

As farming's industrial structure has evolved from a large number of small farms to a much smaller number of relatively large farms, the combination of inputs used per unit of output has also changed greatly. Farm equipment is

replacing labor in the input mix, allowing farmers to spread their labor over more acres and activities. The availability of larger farm machines and the substantial economies of scale resulting from their use has allowed many family owned farms to increase in size.

The tractor is the most important item in a farm machinery complement, both in terms of the dollar investment it represents and by the chief role it plays in determining the size and composition of the complement. Generally, a shift to larger farm equipment must be preceded by an increase in tractor horsepower. Since most agricultural production requiring field machinery is seasonal, equipment will have high and low use periods and will likely stand idle much of the time.

The trade-off between labor intensive operations and machinery intensive operations is also difficult for the farmer to analyze, yet it plays a very important role in a farmer's choice of machinery. Agricultural labor is scarce. Traditional farm wage rates are relatively low when compared to other segments of the economy. In addition, most farmers need only seasonal help while most laborers prefer year round employment.

Increasing the machinery capacity presents a form of insurance, enabling adequate performance over a wider span of weather conditions. But the problem confronting many farm operators is two dimensional. Operators want the least cost combination of machinery but they also may want adequate excess capacity in their complement to guarantee completion of timely field operations in years of adverse weather conditions.

#### Decision Making Environment

Farmers make their machinery decisions on the basis of a variety of information sources. One primary source of information may be the local machinery dealer. Although machinery dealers are well informed, they may have only partial knowledge of the equipment, and may have a conflict of interest. Another source may be a neighbor who recently purchased the equipment the farmer would like to learn about. Farm industry publications and agricultural extension fact sheets are other information sources. All of these sources provide a variety of data from which a farmer must try to generate a machinery complement practical to his unique needs.

In addition to timeliness considerations in selecting machinery complements, personal preferences are also important. If a farmer buys a tractor larger than needed, fixed costs will be high. Although the added fixed costs from owning a larger tractor may or may not approach the expected savings in labor, the timeliness benefits may be substantial.

The Oklahoma farmer does not have directly available to him an economically sound machinery selection model to update, advise, and guide him in machinery selection decisions. Machinery selection is the first of a chain of machinery management decisions which can lead to profit or loss from all or part of the farm operation. A computerized model for assisting decision makers, capable of identifying feasible machinery complements, would be of significant economic assistance to the owner-operator. Furthermore, information on machinery and labor tradeoffs will be a valuable aid to the farmer planning machinery purchases.

#### Purpose of the Study

The primary purpose of this study is to develop a computer spreadsheet model, which Oklahoma producers can use for selecting machinery complements. More specifically, the machinery selection model can be used for determining if available labor hours are adequate for completing timely field operations. Also, the model can be used to select the allocation of labor and capital held in the owners resource pool.

For the purpose of demonstrating the model, eight Typical Farm Regions will be used. The eight regions are the Panhandle, West-Northwest, Southwest, North Central, South Central, Northeast, East-Northeast and Southeast areas. Because of the differing typography of these areas, each region contains three typical size farms (small, medium and large). The complement for each state area will be determined so different cropping methods, farm sizes, and farming practices can be compared. These comparisons will lead to some general conclusions concerning expected machine costs for each region of Oklahoma.

#### Objectives

- Assemble data describing a set of machinery which can be used to estimate machine working rates, match machines to tractor size, and estimate costs of owning and operating farm machinery.
- Develop a model for aggregating farm machinery information into a farm complement which can be used to determine farm machinery use, machinery cost, and labor use. The model can also be used for comparing alternative machinery complements with regards to machines chosen and complement cost.

- Identify viable farm machinery complements for areas of Oklahoma given average farm size and average crop mixes.
- Compare the composition and costs of machinery complements for areas of Oklahoma.

#### Data Requirements and Procedures

The following data are necessary to select the most economically feasible machinery complement:

- 1. The hours available for completing field work in each critical time period throughout the year.
- 2. The acres covered by each field operation in each time period.
- 3. The cost and capabilities of the machines from which the most economically feasible complements will be chosen.

The above data will be used for determining feasible machinery complements. The hours available must be specified by the producer. There are important considerations. First, because of weather patterns, how many hours will be available for field work? Second, what part of the producers time will other farm enterprises and farm management require? After answering these questions, the manager must select the number of hours available in each time period.

Information on average farm sizes and crops grown is taken from Oklahoma Typical Farm Regions data (9). This information is used to determine crop acreage, crop mix and farm size for the various farms considered in the study.

Once the crop mix is determined for each study area, the implements needed to perform each field operation are specified. The Oklahoma State

University Crop Budgets (12) are the principal source of field operation requirements.

Tractor and implement matching is accomplished using equations formulated by Bowers (2). When purchasing equipment, like other input items, size increases occur in fixed proportions. For instance, a 140 horsepower tractor may most correctly match a 19 foot tandem disk. However, the closest substitute available on the market may have a width of 18 foot 6 inches. In this study, implement prices reflect the prices of the most comparable sized equipment available on the market. The prices for all different tractors and implement sizes are compiled from dealer provided information. Once all data describing the basic machinery set and the farm are collected the model is executed. The model is discussed in detail in Chapter II.

Viable machinery solutions are then found for a number of situations. Each situation analyzed will include a unique combination of the tractor sizes, farm size, crop mix, and/or labor availability.

#### Literature Review

Substantial research has been completed in the area of farm machinery costs and performance. A multitude of studies have examined machinery costs, cost coefficients, and parameters. Hunt (7), Bowers (2), Grevis - James (4), and others have isolated these cost components and estimated the appropriate procedures for finding them. Many universities, state experiment stations, and state extension services (Arizona, Iowa, North Dakota, Oklahoma State University and others) report current machinery costs for these states. Since these figures are widely available, a detailed analysis will not be given. The

reader is directed to the bibliography and particularly to the Agricultural Engineer's Yearbook for these facts (1).

McIsaac and Lovering (11) in Canada developed a computer program in 1977 for calculating least cost implement sizes for tilling and seeding cereals. The information needed for input into the program included machinery prices, equipment use, hours of equipment life, implement draft requirements, repair rates, and operating efficiencies. Also needed were acres to be covered and field operations to be performed. The program included a penalty cost for the value of crop losses due to late seeding. The program predicted the set of machinery which would perform the given field work for the lowest total cost. Total cost was the sum of tractor, implement, labor, and penalty costs. The program did not take into account the suitability of the tractor selected for other farm needs during the year. The program also did not consider the scheduling of operations between two tractors.

Osborn and Barrick (14) developed a model for selecting equipment for Texas High Plain farms. They determined least-cost equipment combinations for three typical farm sizes and evaluated the effects of alternative wage rates on the least-cost systems. Required input data included equipment prices, tractor and implement operating characteristics, and the field operations to be performed. Their model selected equipment combinations based on technical feasibility, time requirements and annual costs, both fixed and variable. Osborn and Barrick found that equipment size had a meager effect on annual cost. That is, it was difficult to reduce annual costs by moving toward a more capital intensive operation. Osborn and Barrick also concluded that the relative availability of short-term versus long-term capital was important in selecting a machinery complement. If the use of short-term capital is restricted relative to long-term capital, long-term capital should be invested in larger equipment. Conversely, if long-term capital is more limiting, smaller equipment should be purchased and more labor employed.

Hunt (7) added a more precise and dynamic mathematical model for tractor performance by furnishing an optimal travel speed for each operation, as well as the appropriate machine size. Unfortunately, the tractor and implement sizes selected by the program did not adapt to typical equipment found on surveyed farms. Hunt's program did however, serve as the stepping stone for coming machinery selection models.

Reinschmiedt (17) developed a methodology for working with rainfall uncertainty. His procedure uses historical rainfall data for a particular area to prepare distributions of work time available in each time period during the year. The user picks a timeliness level for each period using his preferences about the percent of time he wants to complete field operations within a designated time frame. Reinschmiedt's work proved to be beneficial for future research.

Hininger (6) implemented a mixed integer programming model emphasizing the timeliness of field operations to determine least-cost farm machinery complements. With the use of the model, Hininger determined that by relaxing the time constraints for performing necessary field operations, machinery complement costs decreased due to using fewer machines and/or smaller equipment. He further concluded annual average machinery cost per acre decreased as the wage rate decreased. As wage rates were lowered smaller implements were used to execute necessary field operations. This model considered the inability to perform field operations because of wet weather conditions, but did not consider climatic conditions such as dryness or extreme cold.

Griffin (5) programmed an optimum machinery complement selection model permitting tillage requirements for a particular farm enterprise mix to be

separated or combined into a maximum of 24 mutually exclusive time periods. Requirements for a particular implement type can appear in a number of these time slots, possibly competing in each time slot with one or more other required field operations.

Using Reinschmiedt's study, along with a rainfall simulation model Griffin develop distributions of numbers of field work days. Alternative timeliness levels were calculated from the frequency distributions. These field time values were then used as time constraints in a mixed integer programming model.

A study by Kletke and Griffin (8) at Oklahoma State University looked at the effect of alternative wage rates on optimal machinery complements. A mixed integer linear programming model was developed to determine optimum machinery complements for North central Oklahoma wheat farms. Data required for the model include the hours available for field work in each critical time period, the acres to be covered by each field operation in each time period, the cost and computational parameters for all machines from which the optimal machinery complements were chosen.

The farm situations examined were relatively elementary ones. Kletke and Griffin found that as labor costs increased relative to machinery cost, farmers should substitute larger implements and tractors for hired labor.

#### Review of Subsequent Chapters

There are four subsequent chapters. The first part of Chapter II contains some of the theoretical concepts upon which this study is based. In addition, the technical, mathematical and economic relationships required for data preparation are presented. The machinery selection model used in this study is also discussed at length, including a discussion of the formulas used for

determining machinery operating and ownership costs. Chapter III presents a discussion of the model operation. Chapter III also gives some insight into the operation of the model and how user data is incorporated into the program. Finally, a typical farm example is presented to better familiarize the user with the program. Chapter IV presents the results. Economically feasible machinery complements are presented for numerous Oklahoma Typical Farm Regions. An attempt is also made to draw implications from the results. Chapter V summarizes the results and implications of the study. In addition, Chapter V outlines expected weaknesses in the model and makes suggestions for further research.

#### CHAPTER II

#### THE DEVELOPMENT OF A DECISION MODEL

The purpose of this chapter is to introduce and develop a quantitative decision model for determining feasible, cost effective farm machinery complements. The model will be developed by discussing the relevant economic theory, outlining the model structure, discussing the input, and presenting the output.

#### Machinery Cost Components

In agricultural production, a producer employs inputs according to the level of output he plans to attain. For example, additional fertilizer application or the use of herbicides may enhance yields. This is not only true for basic inputs, such as fertilizers and herbicides, but also in the use of farm machinery where larger sized equipment may improve timeliness and increase labor productivity. Machinery costs, unlike basic production input costs can be divided into two distinct types. These types are fixed costs and variable costs.

Some machinery costs are a direct result of ownership (fixed costs), while other costs can be directly associated with the level of usage of a particular item in a given time period (variable costs). Ownership or fixed costs include depreciation, interest, insurance, property taxes, and machinery storage. These costs are a result of ownership. Variable or operating costs include fuel, oil, lubrication, repair, and labor.

#### Farm Manager Goals

Agricultural producers operate with multiple goals. Possible goals include:

- 1. Maximizing profit
- 2. Providing an adequate machinery complement to insure timeliness
- 3. Expanding farm size
- 4. Having more time for family and leisure

Like most competitive firms, the primary goal is maximizing profit. Profit is defined as the level of output multiplied by the relevant price of the output less the costs of production. In an agricultural situation, output is determined by the level of inputs employed. Since output possibilities are specified by the inputs used, producers may strive to minimize the costs of inputs for producing an output to yield an adequate profit margin. However, some producers may employ higher cost, larger machinery complements to insure timely completion of field operations. Therefore, an adequately sized machinery complement may be considered a management goal. In addition, producers may purchase larger equipment to allow for expansion within the operation. A producer's goal of desiring more time for family and leisure activities may lead to choosing larger equipment.

#### Problem Identification

Agricultural production is a biological process requiring a period of time between applying inputs and receiving outputs. The timely application of inputs such as rainfall, fertilizer, herbicides, insecticides, seeding and ground preparation are all important. Unfortunately, some agricultural inputs are available only in discrete units. For instance, different fertilizer elements may be needed to bring soils to an adequate production level. However, the possibility of obtaining the proper combination of fertilizers may not exist, or it may be necessary to purchase a blend of the fertilizers containing one or more unneeded elements. This problem also exists with farm machinery. It is not possible to purchase part of a large tractor, the alternatives may be a large tractor or a small tractor. The decision maker must evaluate the discrete alternatives and select the tractor size that best achieves the goals of the manager.

Labor and capital are often thought of as close yet not perfect substitutes in agricultural production. A particular farming operation may be labor intensive, capital intensive, or have a balance in its use of capital and labor to accomplish necessary field work. The capacity of a machine is its rate of accomplishment per unit of time. Acres per hour is the most common measure of machine performance. The substitution of capital for labor occurs when larger machinery, that has the capability to complete a given field operation in a shorter time span, replaces smaller machinery that requires more time to complete the same field practices. Producers may reduce crop losses by using machinery with greater than necessary capacity to complete field operations within the "best" time periods. Excess capacity benefits the producer in years when weather patterns dictate that more than normal field operations must be performed. Also, excess capacity is desirable when rainfall may be so plentiful that the days number of days available to complete vital field work are reduced. Nevertheless, since the farmer manager is making the decision, he may prefer to substitute labor for capital by hiring additional labor to complete the field operations. As long as field operations can be completed in the required time period, output will remain the same despite the amount of labor employed or the size of equipment required to accomplish the field work.

Modern farming operations usually involve several different crops, with each one having its own tilling, planting, and harvesting requirements. In a diversified agricultural operation, there will be an extensive machinery inventory. But, each machine purchased causes the farm to incur more overhead or fixed costs. By carefully analyzing the work to be done in the available time, tractors can be selected to work with correctly sized equipment for completing important field operations on time. In the production process, the timeliness factor makes proper machine size selection important.

Since producers have the responsibility of allocating their capital and labor, it is appropriate that a machinery selection model be designed to enhance the decision making process and not arbitrarily decide what the distribution of inputs should be. Each farming operation requires a distinct machinery complement. Therefore, the model should also allow production decisions to be made according to the relevant cropping activities. Acreage specification of the crops grown and the timeliness of field operations is important in compiling a good, working machinery complement. Consequently, the model should allow for specifying acreage according to the amount of each crop grown.

Since no two farming operations are exactly alike, good judgement by the farm manager will be needed to select a machinery complement. A machinery selection system, such as the one developed in this study, will provide useful machine capacity and cost information to make the decision makers job a little easier. Because the system is designed to assist in machinery selection for diversified farm organizations, the model should allow the user to input data concerning labor availability, tractor sizes available, and cropping practices employed.

#### Data Requirements

Four types of data are needed for the model; machinery costs and capacity, the number of acres of each crop produced, field operations performed, and the labor hours available. For this study, it is assumed that there is no existing machinery complement and that the crop production plan will be repeated year after year. If the cropping pattern were to be varied from year to year, the model could be applied to each alternative farm plan, with the decision maker then selecting the most feasible machinery complement capable of performing the work required for each alternative plan.

#### The Machinery Selection Model

The machinery selection model is designed with two specific uses in mind. First, the model allows the user to determine if a complement can complete the necessary field operations with a specified amount of labor. The user can specify the monthly amount of producer labor available for cropping practices. Also, the user specifies the maximum hours each tractor can be used each month. If the producer labor is not adequate, labor is hired up to the limit each tractor can be used. Conceptually, the amount of labor available might vary between eight and twenty-four hours per day. Second, the model can be used for comparing the economic feasibility of alternative tractor sizes. A procedure can be developed to evaluate complements providing various levels of capital and labor substitution.

Unlike many machinery selection models, which require mainframe computer capacity to obtain solutions, this model uses a Lotus 1-2-3 spreadsheet.

Typical Oklahoma farms range in crop mix and farm size according to the location or area in question. Consequently, the model selection must allow for a wide variation in the size of tractors that may be used.

#### Estimating Machine Capacity

The following equation is used for estimating the effective working width of implements (Bowers):

#### **TECHNICAL WIDTH = PTO(HP)^{(.86)}(375)/(SPEED^{DRAFT})**

Where: PTO (HP) is the maximum power take off horsepower produced at the shaft when tested consecutively on the dynamometer,

.86 is a conversion factor that alters PTO horsepower into drawbar HP,

375 serves as a constant.

SPEED is the operational ground speed in miles per hour of the specific piece of machinery.

DRAFT is the force of the soil resistance placed against the drawbar in pounds per foot depending on soil depth, soil type and soil moisture content.

Acres covered per hour is a function of width, speed, and efficiency. The

following equation is for estimating acres per hour:

#### ACRES/HOUR = [(WIDTH)\*(SPEED)\*(EFFICIENCY)\*(5280)]/43560

Where: WIDTH is the actual working width of the machine in feet,

SPEED is the rate in miles per hour the implement is being operated,

EFFICIENCY is the actual field capacity over the theoretical field capacity.

5,280 is the number of feet in one mile,

43,560 is the number of square feet in one acre.

The field efficiency coefficient within the acres per hour equation helps take into account time lost in turning, filling grain boxes, adjustments, and other operations reducing the effective field capacity.

Since this model is only concerned with the acres covered per hour by each specific machine in seven horsepower ranges, a summary table in the model provides acres covered per hour for each machine for each tractor size. Each tractor size serves as a column heading and the rows consist of the various implements available to the model. The results of the calculations are presented in the relevant cells and are the acres covered per hour for each machine.

#### Field Operations Required By Crop

Unlike many machinery selection models, the user can specify the acreage of each crop he chooses to produce. The model allows eight different cropping activities. Options include crops generally grown in the Oklahoma area. Table I presents the crop activities and the number of times per month a given machine must be used for each crop. The times over for each crop are found in representative Oklahoma State University Enterprise Budgets (12). used.

Multiplying the times over for each crop by the number of acres produced gives the number of acres that must be worked each month to produce that crop. Aggregating the acres covered for each crop over all crops gives the total acres that must be covered by each machine in each month throughout the year.

## TABLE I

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WHEAT													
MACHINE	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	ост	NOV	DEC	TIMES OVER
OFFSET	0	0	0	0	0	1	0	0	0	0	0	0	1
CHISEL SWEEP	0	0	0	0	0	0	0.34	0	0	0	0	0	0.34
PLOW	0	0	0	0	0	0	0.33	0	0	0	0	0	0.33
M.B. PLOW SWEEP	0	0	0	0	0	0	0.33	0	0	0	0	0	0.33
COND. TANDEM	0	0	0	0	0	0	0	1	0	0	0	0	1
DISK SPRING-	0	0.	0	0	0	0	1	0	0	0	0	0	1
тоотн	0	0	0	0	0	0	0	1	1	0	0	0	2
DRILL	0	0	0	0	0	0	0	0	1	0	0	0	1
ALFALFA													
OFFSET	0	0	0	0	0	0	0.4	0.2	0	0	0	0	0.6
CHISEL	0	0	0	Ó	0	0.2	0	0	Ō	Ō	Ō	Ō	0.2
LANDPLAN SWEEP	E0	0	0	0	、 <b>0</b>	0	0	0.2	0	0	0	Ō	0.2
COND. CULTI-	0	0	0	0	0	0	0	0	0.2	0	0	0	0.2
PACKER SPRING-	0	0	0	0	0	0	0	0	0.4	0	0	0	0.4
TOOTH	0	0	0	0	0	0	0	0.2	0	0	0	0	0.2
S.HARROW	0	0	0	0	0	0	Ō	0	0.2	õ	Ō	Õ	0.2
DRILL WIND-	0	0	0	0	0	0	0	0	0.2	0	Ő	Ō	0.2
ROWER	0	0	0	0	1	1	0	1	1	0	0	0	4
BALER	0	0	0	0	1	1	0	1	1	0	Ō	0	4
GRAIN SOR	GHUN	M											
	0	4	0	0	0	0	0	0	0	0	0	0	
TANDEM	0	,	0	0		0	U	0	U	U	U	U	1
DISK SPRING-	0	0	1	0	1	0	0	0	0	0	0	0	2
тоотн	0	0	0	0	1	0	0	0	0	0	0	0	1
PLANTER	0	0	0	0	1	0	0	0	0	0	0	0	1
CULTIVATO	R0	0	0	0	0	1	1	0	0	0	0	0	2

## CROP BUDGETS TIMES OVER BY MACHINE

CORN													TIME 0
MACHINE	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	ост	NOV	DEC	OVER
OFFSET	0	1	2	0	0	0	0	0	0	0	0	0	3
SPRING-	0	1	0	0	0	0	0	0	0	0	0	0	1
TOOTH	0	0	0	1	0	0	0	0	0	0	0	0	1
		0	0	1	0	0	0	0	0	0	0	0	1
ROTARY		U	U	U	1	U	U	U	0	U	U	0	I
HOE S.	0	0	0	0	1	0	0	0	0	0	0	0	1
SHREDDEF	9 0	1	0	0	0	0	0	0	0	0	0	0	
PEANUTS													
OFFSET	0	0	0	1	0	0	0	0	0	0.	0	0	1
CHISEL	0	0	0	1	1	0	0	0	0	0	0	0	2
SWEEP COND.	0	0	0	0	1	0	0	0	0	0	0	0	1
PLANTER	Ö	0	Õ	Ō	1	Ő	Ő	Ő	Ő	0	Ö	Ö	1
VATOR	0	0	0	0	0	1	2	0	0	0	0	0	3
HOE	0	0	0	0	1	0	0	0	0	0	0	0	1
SOYBEANS	2												
CHISEL TANDEM	0	0	0	1	0	0	0	0	0	0	0	0	1
DISK SPRING-	0	0	0	0	2	0	0	0	0	0	0	0	2
TOOTH	0	0	0	0	1	0	0	0	0	0	0	0	1
	0	0	0	0	0	1	0	0	0	0	0	0	1
VATOR	0	0	0	0	0	0	1	0	0	0	0	0	1
COTTON													
OFFSET	1	0	0	0	2	0	0	0	0	0	0	0	3
M.B. PLOW SPRING-	0	0	0	0	0	0	0	0	0	0	0	1	1
TOOTH	0	0	0	0	1	0	0	0	0	0	0	0	1
PLANTER CULTI-	0	0	0	0	1.2	0	0	0	0	0	0	0	1.2
VATOR SPRAYER	0 0	0 0	0 0	0 0	0 1	1 0	2 0	0 0	0 0	0 0	0 0	0 0	3 1

TABLE I (Continued)

SUDAN			<u>,</u>										<b>T</b> 1150
MACHINE	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	ост	NOV	DEC	OVER
M.B.													
PLOW	0	1	0	0	0	0	0	0	0	0	0	0	1
DISK	0	0	1	0	1	0	0	0	0	0	0	0	2
SPRING-							_	_		-		_	
тоотн	0	0	0	0	1	0	0	0	0	0	0	0	1
DRILL	0	0	0	0	1	0	0	0	0	0	0	0	1
WIND													
ROWER	0	0	0	0	0	1	0	1	0	0	0	0	2
BALER	0	0	0	0	0	1	0	1	0	0	0	0	2

TABLE I (Continued)

#### Tractor-Machine-Labor Relationships

The model allows for one, two, or three tractor complements. Implement work can be allocated to any tractor or combination of tractors as specified by the user. The allocation is made by specifying the percent of work to be done by each tractor and its complement. It is assumed that each tractor will be used only with implements that match that tractor. The process used for matching a machine and tractor is discussed in the next chapter.

Tractor hours of operation are determined by multiplying machine hours by the arbitrary constant 1.1. Allocating additional time to motorized equipment, such as tractors, allows for tractor warmup, fueling and lubrication, and the transportation of equipment from one location to another. Labor hours are determined by multiplying tractor hours by 1.1. This allows for time to drive to and from the field and management associated with machinery. The model is used to allocate labor hours as calculated using the above relationships. and from the field and management associated with machinery. The model is used to allocate labor hours as calculated using the above relationships.

After a set of machinery is first selected for a farm, the complement evaluation process is begun. The objective of using the model is to select the complement best meeting the manager's multiple goals. The complement should be evaluated by examining the hours of labor (operator and hired) used. Also important is the monthly hours of use and the annual hours of tractor use as well as total complement cost. If too much or too little labor is being used, the complement can be revised to make it "better". Available for revision are the number of tractors, the horsepower size of tractors, and the mix of field operations required of each tractor. After one or more complement revisions, the manager may decide that he has designed a complement that best meets his objectives.

#### Estimating Machinery Costs

One of the most important costs influencing farm profit is the cost of owning and operating machinery. Machinery costs are one of the few costs that good management can minimize and learning how to accurately estimate machinery costs will aid in cutting costs. Accurate cost estimates play an important role in every machinery management decision. The major component of the model estimates the fixed and variable costs of machine operation. Ownership or fixed costs are those associated with physical possession of an item. Ownership costs include charges for depreciation, interest on investment, taxes, insurance, and shelter. Operating or variable costs are those associated with operating the machinery complement in performing field operations. These costs include charges for fuel, lubrication, repairs, and labor.

#### Ownership Costs

Depreciation is typically the largest cost associated with ownership. It is the loss of value resulting from normal machine wear and obsolescence. Machines depreciate or have a loss in value because of age, wear, and obsolescence (16).

The loss of value associated with typical use is termed as normal wear. The more a machine is used, the greater wear on nonreplaceable parts. As a result, the ability of the machine to operate like new may be reduced or numerous breakdowns may cause substantial loss of usable time.

Obsolescence occurs when major model changes have taken place or the machine no longer has enough capacity, even though the machine still has some useful life, it's value may be greatly reduced. New machinery concepts or technological advances may also be introduced which can make existing similar machines obsolete. A manufacturer's change in design can cause a decrease in value of existing machines. This obsolescence can result even through there is no loss in functional capability of the old machine.

There are several methods generally acceptable for computing depreciation. The declining-balance depreciation method better reflects the actual value of a machine at any age. With the declining-balance method, a machine depreciates a different amount for each year, but the annual percentage of depreciation is the same. For planning purposes, depreciation should reflect the actual decline in value incurred by the operator. Bowers uses a modified double declining balance method to represent this relationship. The major modification is the addition of a factor which yields a very high first year depreciation. Salvage value for determining depreciation costs is obtained with the following equation:

### SALVAGE VALUE = RFV1 \* LIST PRICE \* (RFV2<sup>Years</sup>)

Where: LIST PRICE is the suggested manufacturers selling price.

RFV1 is the first year correction factor,

RFV2 is a component of the standard declining balance equation.

RFV1 and RFV2 are two variables which describe the declining balance depreciation equation for machines.

YEARS represents the number of years the operator expects to own the machine.

Using the computation for salvage value, depreciation costs of operation can be determined using the following equation:

#### DEPRECIATION COSTS =

#### (PURCHASE PRICE - SALVAGE VALUE) (YEARS OWNED)

Where: PURCHASE PRICE is the actual dollar amount paid for the machine.

A large expense item for agricultural machinery is interest. It is a direct expense item on borrowed capital. Even if cash is paid for purchased machinery, money is tied up that might be available for use elsewhere in the business. Therefore interest is always a cost since the money may be used for other productive purposes. Interest rates vary considerably but usually are between 9 and 14 percent. Interest cost is computed using the following equation:

#### INTEREST COST =

# (PURCHASE PRICE + SALVAGE VALUE) \* INTEREST RATE

The model allows the user to specify the current interest rate as a data parameter.

Taxes are paid on machinery in the same manner as on other property. Tax costs vary from one place to another but are generally a function of purchase price. The annual charge for taxes would be from one to two percent of the value of the machine. In some cases, a sales tax is also assessed when the machine is purchased. The tax cost is based on the purchase price of the machine. Tax costs are computed using the following formula:

#### TAX COST = PURCHASE PRICE \* TAX RATE

The program allows the user to specify the tax rate as a model parameter.

Insurance policies are usually carried on more expensive machines while the risk of loss is usually assumed by the farmer on the simpler, less expensive machines. Many insurance companies offer blanket policies which allow farmers to insure complete machinery inventories in one policy. Whether the farmer or an insurance company carries the risk, a charge for possible loss should be made. In most cases, an annual charge for insurance or risk represents about 0.25 to 0.50 percent of the remaining value of the machine. The computed insurance cost is based on the average amount of capital invested. The formula for insurance cost is as follows:

#### INSURANCE COST =

# (PURCHASE PRICE + SALVAGE VALUE) \* INSURANCE RATE

The program allows the operator to enter the insurance rate as a model parameter.

Total ownership cost is the sum of depreciation, insurance, tax, and interest. Fixed costs vary inversely with the hours of annual use. Total costs are

not greatly affected by the amount of use. Therefore, the more equipment is used, the lower the average fixed cost per unit of work.

#### Operating Costs

The variable or operating machinery costs vary directly with usage. If a machine is not used, variable costs will not be incurred. Fuel and lubrication costs are true operating costs. This is because the hourly consumption of fuel and lubricants stay nearly constant from year to year. Repairs are also variable because they will not occur if the machine is not used.

The most accurate method for estimating fuel costs is accurate records on similar machines and operations. However, in cases where actual records are not available, fuel costs can be estimated because the amount of fuel consumed is directly related to the amount of energy exerted. Traditionally, there are three different kinds of fuel used to power farm tractor engines. These fuel types are diesel, gas, and L.P. gas. However, in more recent years, diesel engines have become the standard in tractors due to their fuel efficiency.

Fuel consumption is estimated using the following equation:

FUEL COST =

PTO HORSEPOWER \* FUEL CONSUMPTION MULTIPLIER \* FUEL PRICE PER GALLON \* ANNUAL HOURS USED

Where: The FUEL CONSUMPTION MULTIPLIER is an estimate of fuel consumed per hour per horsepower, the appropriate multiplier for diesel engines is .048.

The diesel fuel price is a parameter which the user can specify.

Modern tractors use a wide variety of lubricants-engine oil, transmission oil, hydraulic fluid, and grease. Total tractor lubrication costs are generally estimated to be 15 percent of total fuel costs. Once the fuel cost is estimated, the cost of lubrication can be calculated simply by multiplying the fuel cost by .15. The following equation is used to calculate lubrication costs:

## LUBRICATION COSTS = ANNUAL FUEL COST \* .15

The cost of fuel and lubricants is computed only for machines with motors. Lubrication costs for machines without motors are included in repair costs.

Repair costs, usually considered an operating cost, are another important part of machinery costs. Repairs required to maintain reliability will increase as annual use and length of life are increased. With any type of machine there are four main types of repair. These types are:

<1> Routine wear

<2> Accidental breakage or damage

<3> Repairs due to operator neglect

<4> Routine overhauls.

Typical examples of routine wear would include disk blades, chisel points, cultivator sweeps, fan belts, and tires. Even with the best of care, replacement of these items will be necessary sooner or later.

Accidents causing damage to machinery can happen even with the best of operators. But carelessness or rushing a job is far more likely to cause costly accidents. Unfortunately, these types of accidents often involve a frame, axle, housing, or some other part that is hard to replace. Often these types of parts
are not stocked by a dealer and/or the total damage is so severe that repair is not advisable. With good management, few of these repairs will be needed.

If time is not taken to perform needed maintenance or minor repairs, more serious problems may result. Also, putting off scheduled servicing can result in more extensive repair costs.

Machine overload and poor maintenance can be associated with accelerated machine repairs and a shorter machine life. Even if machinery is used in a responsible manner, routine overhauls are needed to replace worn or defective parts and restore original performance.

Studies of machinery repair costs indicate a wide variation in costs according to the kind of machine and the way it is used. While it is difficult to estimate repair costs for a particular machine accurately, an equation has been developed which can serve as a guideline to estimate repair costs. This model uses the following equation to compute machinery repair costs:

### **REPAIR COST =**

# LIST PRICE \* RC1 \* RC2 \* [(PERCENT LIFE)<sup>RC3</sup>] YEARS OWNED

Where percent life =

## (YEARS OWNED \* HOURS USED ANNUALLY) (HOURS OF LIFE) \* 100

Where: RC1 is the ratio of total accumulated repairs to initial list price for the entire life of the machine.

RC2 and RC3 are two repair cost constants that go together to determine the shape of the repair rate curve.

HOURS OF LIFE is the total number of hours during the machine's expected mechanical life.

The labor cost involved in farm machinery may or may not be a direct cost to the producer. For owner-operators, the hourly labor charge may be estimated by examining alternative opportunities for the owner's time, whether they be off-farm employment or other on-farm enterprises. For hired operators, a constant hourly rate might be more appropriate.

The total operating cost is the sum of the fuel cost, lubrication cost, and repair cost. Labor cost is considered separately in this model because it may represent the operators contribution to the operation. However, if the amount of owner-operator labor hours are not sufficient to complete necessary practices, hired labor will be required. Total operating costs vary according to the number of machine hours. Consequently, if unplanned field operations are required, profits will decline by the variable cost of the operation.

The model provides a summary of fixed and variable costs. Users can use the summaries to determine the feasibility and desirability of alternative machinery complements. The program also aids the operator in making comparisons between large equipment (less labor) and small equipment (more labor). The model permits the user to decide how he wishes to allocate resources. It provides information so that decision making is made with full knowledge of what to expect.

#### CHAPTER III

## DATA SPECIFICATION

#### Statewide Machinery Complements

Selecting machinery complements occurs in an environment of uncertainty. There are tradeoffs between the amounts of capital and labor employed to complete timely field operations. The inability of a machinery complement to complete field operations within the optimum time period can be considered an expense. Therefore, the machine size and labor availability should balance the low ownership cost advantage of small capacity machinery with the timely-operation advantages of larger capacity machinery.

A representative set of tractors and implements comprising the machinery complement is selected considering all possible field operations needed for the Oklahoma study area. For the purpose of this study, seven tractor sizes ranging from 95 to 200 power take off (PTO) horsepower are used. The tractor sizes are 95, 105, 125, 140, 155, 175 and 200 PTO horsepower.

## Assumptions About Machine Size Availability

In developing a complement for each tractor several assumptions were made. First, 6-row row-crop equipment is used with tractors up to 140 PTO horsepower and 12-row equipment is used with tractors greater than 140 PTO horsepower. In addition, the size of the land plane, or more commonly called land leveler, is restricted to sixteen feet in width. Even though a sixteen foot

land plane does not use some tractors to their full capability, larger land planes are not generally available.

The model also assumes a fixed size for hay equipment. This assumption was made because there are many different sizes of equipment. For example, farm equipment manufacturer's currently offer five round balers capable of producing round bales with varying dimensions. A 5-foot by 6-foot (5\*6) round baler is use for the sake of simplicity. Because of tractor PTO limitations, 540 PTO driven machinery, i.e.; balers, windrowers and rotary mowers, must be used with tractors not exceeding 140 PTO horsepower. No haying equipment can be pulled with tractors greater than 140 PTO horsepower.

Each tractor less than or equal to 140 PTO horsepower can be matched with up to 19 machines. These machines include primary and secondary tillage tools, drilling and row crop equipment and forage production equipment. Tractors greater than 140 PTO horsepower are matched with 16 machines. This includes all machines matched with the smaller tractors except forage production equipment. Table II lists the possible machines for the two horsepower ranges.

#### Matching Tractors To Implements

The machine matched with each tractor, is determined using Bowers formula for determining proper implement width and hourly acre coverage. Table III through IX reveal the specific tractor - equipment complements. Included are the working width, travel speed, efficiency criteria, and the acre coverage per hour for the respective machines.

## TRACTOR SIZE AND EQUIPMENT POSSIBILITIES

95 - 140 Horsepower

Offset Disk Chisel Plow Land plane Sweep Plow Moldboard Plow Sweep Conditioner Cultipacker Tandem Disk Springtooth Spike Harrow Grain Drill **Row Planter** Row Cultivator Rotary Hoe Sprayer Stalk Shredder Rotary Mower Windrower Round Baler

155 - 200 Horsepower

Offset Disk Chisel Plow Land plane Sweep Plow Moldboard Plow Sweep Conditioner Cultipacker Tandem Disk Springtooth Spike Harrow Grain Drill Row Planter Row Cultivator Rotary Hoe Sprayer Stalk Shredder

# TABLE III

# 95 HORSEPOWER TRACTOR TYPICAL FARM MACHINERY COMPLEMENT

Name of Machine	Technical Width	Working Width	Speed (mph)	Draft (lbs)	Field Efficiency	Acres/ Hour
OFFSET	10.21	10	4.8	625	0.81	4.81
CHISEL	9.64	10	4.1	775	0.79	3.79
LAND PLANE	12.00	12	3.5	350	0.42	2.14
SWEEP PLOW	15.47	15	5.5	360	0.75	7.74
M.B. PLOW	5.98	6	4.1	1,250	0.80	2.38
SWEEP COND.	15.92	16	5.5	350	0.75	7.96
CULTIPACKER	13.62	14	6.0	375	0.79	7.82
TANDEM DISK	13.11	13	5.5	425	0.81	7.08
SPRINGTOOTH	18.57	19	5.5	300	0.70	8.67
S.HARROW	MSW	37	6.0	100	0.70	18.84
DRILL	MSW	21	6.0	225	0.72	11.17
PLANTER	MSW	15	5.0	200	0.75	6.82
CULTIVATOR	MSW	15	5.5	320	0.65	6.50
ROTARY HOE	MSW	18	5.0	230	0.75	8.18
SPRAYER	MSW	40	5.5	200	0.60	16.00
S.SHREDDER	MSW	15	4.8	550	0.80	6.98
ROT.MOWER	MSW	15	4.5	200	0.76	6.22
WINDROWER	MSW	14	5.4	150	0.76	6.96
BALER	MSW	14	3.0	200	0.67	3.41

NOTE: MSW is the manufacturers suggested width.

TECHNICAL WIDTH is the computed width based horsepower and draft.

WORKING WIDTH is standard implement size closest to technical width available in the market.

ACRES/HOUR is computed using speed, width, and efficiency.

### TABLE IV

Name of Machine	Technical Width	Working Width	Speed (mph)	Draft (lbs)	Field Efficiency	Acres/ Hour
OFFSET	11.29	11	4.8	625	0.81	5.32
CHISEL	10.66	11	4.1	775	0.79	4.18
LAND PLANE	12.00	12	3.5	350	0.42	2.14
SWEEP PLOW	17.10	17	5.5	360	0.75	8.55
M.B. PLOW	6.61	7	4.1	1250	0.80	2.63
SWEEP COND.	17.59	18	5.5	350	0.75	8.80
CULTIPACKER	15.05	15	6.0	375	0.79	8.65
TANDEM DISK	14.49	14	5.5	425	0.81	7.82
SPRINGTOOTH	20.52	21	5.5	300	0.70	9.58
S.HARROW	MSW	37	6.0	100	0.70	18.84
DRILL	MSW	21	6.0	225	0.72	11.17
PLANTER	MSW	15	5.0	200	0.75	6.82
CULTIVATOR	MSW	15	5.5	320	0.65	6.50
ROTARY HOE	MSW	18	5.0	230	0.75	8.18
SPRAYER	MSW	40	5.5	200	0.60	16.00
S.SHREDDER	MSW	15	4.8	550	0.80	6.98
ROT.MOWER	MSW	15	4.5	200	0.76	6.22
WINDROWER	MSW	14	5.4	150	0.76	6.96
BALER	MSW	14	3.0	200	0.67	3.41

## 105 HORSEPOWER TRACTOR TYPICAL FARM MACHINERY COMPLEMENT

NOTE: MSW is the manufacturers suggested width.

TECHNICAL WIDTH is the computed width based horsepower and draft.

WORKING WIDTH is standard implement size closest to technical width available in the market.

ACRES/HOUR is computed using speed, width, and efficiency.

### TABLE V

## 125 HORSEPOWER TRACTOR TYPICAL FARM MACHINERY COMPLEMENT

Name of Machine	Technical Width	Working Width	Speed (mph)	Draft (lbs)	Field Efficiency	Acres/ Hour
OFFSET	<sup>-</sup> 13.44	13	4.8	625	0.81	6.33
CHISEL	12.69	13	4.1	775	0.79	4.98
LAND PLANE	16.00	16	3.5	350	0.42	2.85
SWEEP PLOW	20.36	20	5.5	360	0.75	10.18
PLOW	7.87	8	4.1	1,250	0.80	3.13
SWEEP COND.	20.94	21	5.5	350	0.75	10.47
CULTIPACKER	17.92	18	6.0	375	0.79	10.29
TANDEM DISK	17.25	17	5.5	425	0.81	9.31
SPRINGTOOTH	24.43	24	5.5	300	0.70	11.40
S.HARROW	MSW	53	6.0	100	0.70	26.98
DRILL	MSW	27	6.0	225	0.72	13.96
PLANTER	MSW	15	5.0	200	0.75	6.82
CULTIVATOR	MSW	15	5.5	320	0.65	6.50
ROTARY HOE	MSW	18	5.0	230	0.75	3.82
SPRAYER	MSW	40	5.5	200	0.60	16.00
S.SHREDDER	MSW	15	4.8	550	0.80	6.98
ROT.MOWER	MSW	15 🕚	4.5	200	0.76	6.22
WINDROWER	MSW	14	5.4	150	0.76	6.96
BALER	MSW	14	3.0	200	0.67	3.41

NOTE: MSW is the manufacturers suggested width.

TECHNICAL WIDTH is the computed width based horsepower and draft.

WORKING WIDTH is standard implement size closest to technical width available in the market.

ACRES/HOUR is computed using speed, width, and efficiency.

## TABLE VI

Name of Machine	Technical Width	Working Width	Speed (mph)	Draft (lbs)	Field Efficiency	Acres/ Hour
OFFSET	15.05	15	4.8	625	0.81	7.09
CHISEL	14.21	14	4.1	775	0.79	5.58
LAND PLANE	16.00	16	3.5	350	0.42	2.85
SWEEP PLOW	22.80	23	5.5	360	0.75	11.40
PLOW	8.81	9	4.1	1,250	0.80	3.50
SWEEP COND.	23.45	23	5.5 .	350	0.75	11.73
CULTIPACKER	20.07	20	6.0	375	0.79	11.53
TANDEM DISK	19.32	19	5.5	425	0.81	10.43
SPRINGTOOTH	27.36	27	5.5	300	0.70	12.77
S.HARROW	MSW	53	6.0	100	0.70	26.98
DRILL	MSW	27	6.0	225	0.72	13.96
PLANTER	MSW	15	5.0	200	0.75	6.82
CULTIVATOR	MSW	15	5.5	320	0.65	6.50
ROTARY HOE	MSW	18	5.0	230	0.75	8.18
SPRAYER	MSW	40	5.5	200	0.60	16.00
S.SHREDDER	MSW	15	4.8	550	0.80	6.98
ROT.MOWER	MSW	15	4.5	200	0.76	6.22
WINDROWER	MSW	14	5.4	150	0.76	6.96
BALER	MSW	14	3.0	200	0.67	3.41

## 140 HORSEPOWER TRACTOR TYPICAL FARM MACHINERY COMPLEMENT

NOTE: MSW is the manufacturers suggested width.

TECHNICAL WIDTH is the computed width based horsepower and draft.

WORKING WIDTH is standard implement size closest to technical width available in the market.

ACRES/HOUR is computed using speed, width, and efficiency.

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## TABLE VII

Name of Machine	Technical Width	Working Width	Speed (mph)	Draft (lbs)	Field Efficiency	Acres/ Hour
OFFSET	16.66	17	4.8	625	0.81	7.85
CHISEL	15.73	16	4.1	775	0.79	6.18
LAND PLANE	16.00	16	3.5	350	0.42	2.85
SWEEP PLOW	25.25	25	5.5	360	0.75	12.62
PLOW	9.75	10	4.1	1,250	0.80	3.88
SWEEP COND	. 25.97	26	5.5	350	0.75	12.98
CULTIPACKER	22.22	22	6.0	375	0.79	12.76
TANDEM DISK	21.39	21	5.5	425	0.81	11.55
SPRINGTOOTH	1 30.30	30	5.5	300	0.70	14.14
S.HARROW	MSW	67	6.0	100	0.70	34.11
DRILL	MSW	36	6.0	225	0.72	18.85
PLANTER	MSW	30	5.0	200	0.75	13.64
CULTIVATOR	MSW	30	5.5	320	0.65	13.00
ROTARY HOE	MSW	30	5.0	230	0.75	13.64
SPRAYER	MSW	60	5.5	200	0.60	24.00
S. SHREDDER	MSW	15	4.8	550	0.80	6.98
ROT. MOWER	NA	NA	4.5	200	0.76	NA
WINDROWER	NA	NA	5.4	150	0.76	NA
BALER	NA	NA	3.0	200	0.67	NA

## 155 HORSEPOWER TRACTOR TYPICAL FARM MACHINERY COMPLEMENT

NOTE: MSW is the manufacturers suggested width.

TECHNICAL WIDTH is the computed width based horsepower and draft.

WORKING WIDTH is standard implement size closest to technical width available in the market.

ACRES/HOUR is computed using speed, width, and efficiency.

NA represents a machine not available to this specific B Tractor size.

### TABLE VIII

Name of Machine	Technical Width	Working Width	Speed (mph)	Draft (lbs)	Field Efficiency	Acres/ Hour
OFFSET	18.81	19	4.8	625	0.81	8.87
CHISEL	17.76	18	4.1	775	0.79	6.97
LAND PLANE	16.00	16	3.5	350	0.42	2.85
SWEEP PLOW	28.50	29	5.5	360	0.75	14.25
PLOW	11.01	11	4.1	1,250	0.80	4.38
SWEEP COND.	. 29.32	29	5.5	350	0.75	14.66
CULTIPACKER	25.08	25	6.0	375	0.79	14.41
TANDEM DISK	24.14	24	5.5	425	0.81	13.04
SPRINGTOOTH	34.20	34	5.5	300	0.70	15.96
S.HARROW	MSW	67	6.0	100	0.70	34.11
DRILL	MSW	36	6.0	225	0.72	18.85
PLANTER	MSW	30	5.0	200	0.75	13.64
CULTIVATOR	MSW	30	5.5	320	0.65	13.00
ROTARY HOE	MSW	30	5.0	230	0.75	13.64
SPRAYER	MSW	60	5.5	200	0.60	24.00
S. SHREDDER	MSW	15	4.8	550	0.80	6.98
ROT. MOWER	NA	NA	4.5	200	0.76	NA
WINDROWER	NA	NA	5.4	150	0.76	NA
BALER	NA	NA	3.0	200	0.67	NA

## 175 HORSEPOWER TRACTOR TYPICAL FARM MACHINERY COMPLEMENT

NOTE: MSW is the manufacturers suggested width.

TECHNICAL WIDTH is the computed width based horsepower and draft.

WORKING WIDTH is standard implement size closest to technical width available in the market.

ACRES/HOUR is computed using speed, width, and efficiency.

NA represents a machine not available to this specific tractor size.

### TABLE IX

Name of Machine	Technical Width	Working Width	Speed (mph)	Draft (lbs)	Field Efficiency	Acres/ Hour
OFFSET	21.50	22	4.8	625	0.81	10.13
CHISEL	20.30	20	4.1	775	0.79	7.97
LAND PLANE	16.00	16	3.5	350	0.42	2.85
SWEEP PLOW	32.58	33	5.5	360	0.75	16.29
PLOW	12.59	13	4.1	1,250	0.80	5.00
SWEEP COND.	33.51	34	5.5	350	0.75	16.75
CULTIPACKER	28.67	29	6.0	375	0.79	16.47
TANDEM DISK	27.59	28	5.5	425	0.81	14.90
SPRINGTOOTH	39.09	39	5.5	300	0.70	18.24
S.HARROW	NA	NA	6.0	100	0.70	NA
DRILL	MSW	36	6.0	225	0.72	18.85
PLANTER	MSW	30	5.0	200	0.75	13.64
CULTIVATOR	MSW	30	5.5	320	0.65	13.00
ROTARY HOE	MSW	30	5.0	230	0.75	13.64
SPRAYER	MSW	60	5.5	200	0.60	24.00
S. SHREDDER	MSW	15	4.8	550	0.80	6.98
ROT. MOWER	NA	NA	4.5	200	0.76	NA
WINDROWER	NA	NA	5.4	150	0.76	NA
BALER	NA	NA	3.0	200	0.67	NA

## 200 HORSEPOWER TRACTOR TYPICAL FARM MACHINERY COMPLEMENT

NOTE: MSW is the manufacturers suggested width.

TECHNICAL WIDTH is the computed width based horsepower and draft.

WORKING WIDTH is standard implement size closest to technical width available in the market.

ACRES/HOUR is computed using speed, width, and efficiency.

NA represents a machine not available to this specific tractor size.

The farm sizes and crop mixes considered for each of the eight regions of Oklahoma are based on a previous study, Typical Oklahoma Farms (9). This study used the 1982 Oklahoma Agricultural Census to divide farms into three typical sizes (small, medium and large) for each region of the state. Typical Oklahoma crops include small grains, alfalfa, grain sorghum, corn, peanuts, soybeans, cotton, and sudan hay. The crop mixes and farm sizes will vary according to the region. The technical coefficients and factor prices will remain constant. Table X lists the technical coefficients and factor prices used in this model. The parameters are based on current price values. The technical coefficients are used by the Oklahoma State University Enterprise Budget to convert machine hours into tractor hours and labor hours, respectively.

### Using The Machinery Selection Model

The model requires user information for proper operation. Two types of information are required. Figure 1 explains the model flow and the information required. The first is basic data that most users will not revise. Included are the machinery complements (previously discussed) and the times over for each machine for each crop by month (also previously discussed). Second is the data input users will continually modify. Included are operator labor, tractor size, tractor capacity, and crop acreage. This section deals with data describing individual farm and resource situations.

## TABLE X

## TECHNICAL COEFFICIENTS USED IN THE MACHINERY SELECTION MODEL

Parameter Description	Value
PRICE PER GALLON OF DIESEL	\$0.80
INTEREST RATE PER DOLLAR OF INVESTMENT	0.09
MACHINERY INSURANCE RATE	0.006
MACHINERY TAX RATE	0.01
PRICE OF MACHINERY LABOR PER HOUR	5.00
MAXIMUM NUMBER OF TRACTORS ALLOWED IN COMPLEME	ENT 3
FACTOR BY WHICH MACHINE HOURS ARE MULTIPLIED TO	
OBTAIN TRACTOR HOURS	1.1
FACTOR BY WHICH TRACTOR HOURS ARE MULTIPLIED TO	
OBTAIN MACHINERY LABOR REQUIREMENTS	1.1

Data required for operation of the model is as follows:

- 1. Operator labor available by month,
- 2. Size of tractor or tractors,
- 3. Maximum tractor hours available by month,
- 4. Field operation allocation,
- 5. Crop acreages,
- 6. Technical and cost coefficients.

Theses data requirements will be discussed in order.



Figure 1. Complete Model Flowchart.

#### Operator Labor Available By Month

The time available for performing various operations is limited by operator labor availability. The amount of labor an operator devotes to crop production activities varies from location to location. In central and eastern Oklahoma, labor hours available are often hampered because of weather conditions. One of the requirements of this model is that the user specify monthly labor available. The labor available should consider the need for timely field operations. A major factor restricting the labor which can be applied to field work is wet fields. Following is a discussion of the days available for field work across areas of the state.

<u>Time Available For Fieldwork</u>. The estimated days available for field operations within each time period were prepared from tables developed by Reinschmiedt (17) for southwestern Oklahoma. Reinschmiedt determined from a survey of producers the amounts of field time lost as a result of alternative amounts of rainfall, given soil type and soil moisture conditions prior to the rain. Rain and wet field conditions are the primary impediments to field operations in Oklahoma.

There is a tradeoff between the specified number of suitable days available during a specific time period and the percentage of time one could expect to have at least the specified number of working days occur. The number of days available for each time period is displayed in Table XI and Table XII. Table XI represents a 95 percent timeliness level and Table XII represents an 85 percent timeliness level. The regions of study are numbered one through eight and represent the Panhandle, West-Northwest, Southwest, North Central, South Central, Northeast, East, and Southeast, respectively. For this analysis, a 95 percent timeliness level was chosen indicating a relatively high preference for successfully being able to accomplish scheduled tasks in the time periods provided. The 95 percent timeliness level dictates that work completed within the number of days specified will be possible 19 out of 20 years.

The number of operator hours devoted to machinery operations can vary considerable from time period to time period. These hours can vary due to seasonality, working conditions, other seasonal demands, and operator preferences. The total hours available per operator according to the specific time period is a product of the number of daily hours the producer will devote to field practices and the days available for completing field work.

### TABLE XI

## THE DAYS AVAILABLE FOR FIELD WORK IN EACH TIME PERIOD FOR EIGHT TYPICAL FARM REGIONS

REGION	1	2	3	4	5	6	7 and 8
PERIOD							
JANUARY	28.50	24.25	20.00	20.00	18.92	18.50	16.75
FEBRUARY	24.50	21.13	17.75	19.75	16.83	17.00	13.00
MARCH	15.50	17.50	19.50	20.25	18.08	16.00	14.50
APRIL	21.50	18.63	15.75	14.75	13.83	13.00	11.00
MAY	18.00	14.63	11.25	11.25	10.92	10.75	10.25
JUNE	17.50	15.38	13.25	14.00	12.83	12.50	11.25
JULY	18.50	18.75	19.00	17.00	18.25	18.00	18.75
AUGUST	18.50	18.50	18.50	20.50	19.00	19.25	18.00
SEPTEMBER	19.00	16.75	14.50	16.75	14.67	14.75	12.75
OCTOBER	22.75	18.25	13.75	17.00	15.08	15.75	14.50
NOVEMBER	24.00	21.00	18.00	18.75	17.25	16.75	15.00
DECEMBER	26.50	23.63	20.75	19.50	18.17	16.50	14.25

#### 95 PERCENT TIMELINESS LEVEL

### TABLE XII

## THE DAYS AVAILABLE FOR FIELD WORK IN EACH TIME PERIOD FOR EIGHT TYPICAL FARM REGIONS

REGION   1   2   3   4   5   6   7 and 8     PERIOD JANUARY   29.50   25.10   20.70   23.75   19.58   23.00   22.25     FEBRUARY   26.50   22.85   19.20   23.00   18.20   20.50   18.00     MARCH   27.50   24.36   21.86   24.00   23.58   21.63   19.25     APRIL   25.25   21.88   18.50   19.25   16.24   16.88   14.50     MAY   22.00   17.88   13.75   17.50   13.35   16.50   15.50     JUNE   22.25   19.55   16.85   20.25   16.31   18.25   16.25     JULY   22.75   22.45   22.15   23.25   22.44   23.25   23.25     AUGUST   23.50   20.72   17.93   20.75   18.14   19.13   17.50     OCTOBER   25.75   20.66   15.56   22.50   17.07   21.25   20.00     NOV				-				
PERIOD JANUARY 29.50 25.10 20.70 23.75 19.58 23.00 22.25   FEBRUARY 26.50 22.85 19.20 23.00 18.20 20.50 18.00   MARCH 27.50 24.36 21.86 24.00 23.58 21.63 19.25   APRIL 25.25 21.88 18.50 19.25 16.24 16.88 14.50   MAY 22.00 17.88 13.75 17.50 13.35 16.50 15.50   JUNE 22.25 19.55 16.85 20.25 16.31 18.25 16.25   JULY 22.75 22.45 22.15 23.25 22.44 23.25 23.25   AUGUST 23.50 23.50 21.00 22.88 21.25 21.50   SEPTEMBER 23.50 20.72 17.93 20.75 18.14 19.13 17.50   OCTOBER 25.75 20.66 15.56 22.50 17.07 21.25 20.00   NOVEMBER 28.00 24.50 21.00 23.65 20.13 22.33 </td <td>REGION</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7 and 8</td>	REGION	1	2	3	4	5	6	7 and 8
	PERIOD JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER	29.50 26.50 27.50 25.25 22.00 22.25 22.75 23.50 23.50 25.75 28.00 28.25	25.10 22.85 24.36 21.88 17.88 19.55 22.45 23.50 20.72 20.66 24.50 25.19	20.70 19.20 21.86 18.50 13.75 16.85 22.15 23.50 17.93 15.56 21.00 22.12	23.75 23.00 24.00 19.25 17.50 20.25 23.25 21.00 20.75 22.50 23.65 19.50	19.58 18.20 23.58 16.24 13.35 16.31 22.44 22.88 18.14 17.07 20.13 19.37	23.00 20.50 21.63 16.88 16.50 18.25 23.25 21.25 19.13 21.25 22.33 19.13	22.25 18.00 19.25 14.50 15.50 16.25 23.25 21.50 17.50 20.00 21.00 18.75

## 85 PERCENT TIMELINESS LEVEL

<u>Owner Labor Availability</u>. The first step in using this program, is to enter the number of labor hours available for the operation for each month (cells C44 through N44). Cell numbers are provided to aid users in data entry.

# Size of Tractor or Tractors

The second step in using this program is entering the tractor or tractors the user plans to incorporate into the model. A list of the tractors is presented in the data entry section. The model ranks the tractors according to PTO horsepower. Available in the model are tractors ranging from 95 to 200 horsepower. Users

identify the tractors horsepower (cells B15, C15, and D15). It is possible to use 1, 2, or 3 tractors. The tractors need not be listed in any specific order.

### Maximum Tractor Hours Available By Month

A crucial input for this analysis is the maximum tractor time available for each specific period. Tractor hours can be limited by weather conditions and are thus restricted to the number of days available shown in Tables XI and XII. Weather constraints include both dry and wet weather patterns. Timeliness of field operations can be hampered substantially by not having adequate tractor power to complete needed field work. The number of hours necessary in peak usage periods, such as June, July, and August, may be constrained by labor availability or weather conditions. Farm managers need to take into account the maximum number of hours a tractor can be used when selecting tractor horsepower. The maximum available tractor hours for each time period are entered (cells C47 through N47).

### Field Operation Allocation

Farm implements do not accomplish tillage tasks alone, but must be provided power and locomotion by suitably powerful tractors. This model allows the user to allocate each field operation to at least one or a combination of tractors. The specification is based on a percentage of the particular field operation the user wishes to complete with a certain tractor. For example, the user may choose to employ a two tractor complement where both tractors are allocated to completing the offset disking requirements. This is a column of data, (cells B20 through B38) where the user specifies the machines which will be employed by Tractor #1. Entries should be the percent of work which will be completed by Tractor 1. There is also a column of data for Tractor #2 (cells C20 through C38) and Tractor #3 (D20 through D38). The user must be certain that all (100%) of each field operation is performed.

#### Crop Acreage

Crop selection and acreage specification are two important features of this model. As previously stated, this model allows the user to select crops according to current operating practices and to specify the number of acres associated with each crop (cells C5 through C12). For example, if the farming operation consists of 800 wheat acres, 800 will be entered (cell C5). Each cell in this range must have a number. If a crop in this models crop mix is not produced, enter a zero.

### Technical and Cost Coefficients

Table X contains a list of the technical and cost coefficients used in the model. Following is a list of the data entry location for these coefficients.

Price per gallon of Diesel Fuel	(117)
Interest Rate per Dollar of Investment	(118)
Machinery Tax Rate	(119)
Insurance and/or Risk Rate	(120)
Wage Rate for Hired Labor	(121)

The labor needs are satisfied by operator labor and/or the purchasing of hired labor. Unlike the other operating inputs, the need for hired labor varies according to the size of operation, owner labor availability, and the size of farm equipment. If labor is hired, charges are included in operating or variable costs. In this program, hired labor will only be used if operator hours are not sufficient to complete necessary field operations in designated time periods.

Calculating The Model

### Complete Calculation

After all data has been inserted, calculation is accomplished with the computer command Alternate C (Alt-C). Alternate C completes the entire execution of the program. This includes not only calculating the labor requirements, tractor requirements and summaries; it also estimates the machinery costs for the complement given the specific farm organization.

Pressing Alt and C simultaneously executes a Lotus macro. Depending on computer speed, up to five minutes may be required for calculation.

#### Partial Calculation

The F9 computer function key partially recalculates the model. This function allows the user to compare required labor hours for alternative tractor sizes and tractor-equipment specification without timely macro execution. By using F9 to execute the model recalculation, the program user can determine the association of tractor hours and operator labor or hired labor needed to complete field operations. Using the F9 function key only recalculates the time feature of the model, it will not update ownership and operating costs. If cost comparisons are desired Alt C must be used.

### **Program Results**

This model is constructed with two intended uses. First, it provides a tool for determining the sufficiency of tractor hours and operator labor hours given a

specific complement. Second, it permits producers to compare the costs of alternative machinery complements. These costs include fixed costs, variable costs, and hired labor charges.

#### Tractor Capacity

The first results deal with tractor hours of operation. The tractor horsepower appears first (cell B58 for Tractor #1) followed by the hours of tractor operation in each month (cells C58 through N58 for Tractor #1) and finally, the total annual hours of uses (cell O58).

Following the tractor use summary is a computation of excess capacity for each tractor. The hours each tractor is used each month is subtracted from the user specified maximum tractor hours available. The results are listed in the Tractor Excess Capacity Summary. The Excess Capacity table allows the user to determine if field operations can be satisfactorily completed by the specified complement. A number greater than 0 (cells C74,75,76 through N74,75,76) implies there is excess capacity and that the tractor could perform additional work if necessary. Negative numbers indicate the tractor is being used a greater number of hours than the user specified was available. User judgement is required to increase or decrease tractor size or to reallocate work between tractors. By making appropriate changes, a "better" complement can be found.

#### Operator Labor Summary

Many farms rely solely on owner/operator labor to complete field operations. To determine if operator labor hours are sufficient monthly machine labor hours required (cells C84 through N84) are subtracted from monthly operator labor hours available (cells C83 through N83). If the results (cells C87

through N87) are zeros the operator can personally complete all field practices. However, if the result is a number greater than zero for any specific time period, the producer must either allocate more personal labor to the time period, hire labor, or select larger equipment. The cost of hired labor (cells C88 through N88) is the product of the additional hours of labor needed and the wage rate. This calculation will only be relevant if operator labor is not sufficient to complete timely field practices. Hired labor is a variable cost of operation.

#### Costs Associated With Production

This model combines fixed costs, variable costs, and charges for hired labor to determine the total annual cost associated with field operations. A cost table (cells B92 through J94) summarizes the expenses (1 line for each tractor) associated with the whole farm machinery complement. Fixed and variable costs are computed for each tractor and the equipment associated with that tractor. Depreciation, taxes, insurance, and interest are the fixed costs. Repair, fuel and lubrication are the variable costs.

From these calculations total complement operation and ownership costs can be computed. Total cost (cell G98) is the sum of ownership costs (cell F96) and operation costs (cell J96).

The tractor capacity, operator labor, and complement cost estimates provide information for model users to compare alternative complements. The information provided is sufficient to insure complement feasibility and determine which complements among those feasible have the lowest cost.

#### Sample Farm Initial Specification

Following is an example to illustrate model operation. The large westnorthwest farm is taken from an earlier study, Typical Oklahoma Farms. The daily operator labor available consists of 5 hours in January, February, November and December; 7 hours in March, April, September and October; and 9 hours in May, June, July and August. With the aid of Reinschmiedt's study (see Table XIII) the number of operator labor hours for each time period are computed. Based on the user's knowledge, a two tractor complement is selected (one 155 horsepower tractor and one 95 horsepower tractor). The maximum number of tractor hours either tractor will be used are arbitrarily constrained to 200 hours each time period. All primary and secondary tillage operations will be completed with the larger tractor while planting and having operations will be completed with the smaller tractor. The crop activities and acreages for the large west-northwest farm are 820 wheat acres, 23 sorghum acres and 73 sudan hay acres. The parameter values associated with the model are the price of diesel fuel at .80 dollars per gallon, an interest rate of 9 percent, a tax rate of 1 percent, an insurance rate of .6 percent and a hired labor wage rate of five dollars per hour. Figure 2 shows the location of all model data specified by the user. All cell locations for input are in the upper left corner of the spreadsheet template.

After all data is entered the Alt and C keys are pressed simultaneously to execute the macro and evaluate the complement.

### TABLE XIII

## OPERATOR LABOR HOURS BY TIME PERIOD WEST NORTHWEST AREA OF OKLAHOMA

TIME PERIOD	DAYS AVAILABLE PER PERIOD	OPERATOR HOURS PER DAY	TOTAL OPERATOR HOURS AVAILABLE
JANUARY	24.25	5	121
FEBRUARY	21.13	5	106
MARCH	17.5	7	123
APRIL	18.63	7	130
MAY	14.63	9	132
JUNE	15.38	9	138
JULY	18.75	9	169
AUGUST	18.5	9	167
SEPTEMBER	R 16.75	7	117
OCTOBER	18.85	7	128
NOVEMBER	21	5	105
DECEMBER	23.6	5	118

## Sample Farm (Initial Results)

The output results for this typical sample farm are presented in Figure 3. The first table summarizes the monthly tractor use. Tractor #1 (155 Hp.) is used 593 hours per year and Tractor #2 (95 Hp.) is used 170 hours per year.

The second table in Figure 3 shows the excess capacity for each tractor in each month. Tractor #1 will not meet the requirements to complete timely field operations in the July time period. This is determined by using the excess capacity summary. Tractor #1 needs an additional 28 hours to complete July field practices.

						TRACTOR SIZES								
CROP ACTIVI	TIES			ACRE	S		(IN PTO HP)							
WHEAT				820			95							
ALFALFA				0			105							
<b>GRAIN SORGHU</b>	JM			23			125							
CORN				0			140							
PEANUTS				0					15	5				
SOYBEANS				0			175							
COTTON				0			200							
SUDAN HAY				73										
	# 1		#2		#3									
TRACTOR HP	155	5	95					co	ST DA	TA EN	TRY			
MACHINE		S	PECIFI	ED				CU	RRENT	FUEL	COST	0.80		
OPERATION		T	RACTO	OR US	AGE			INT	ERES	<b>RATE</b>		0.090		
OFFSET	100	)%	0	%	0%	, D		CU	RREN	TAX F	RATE	0.010		
CHISEL	100	)%	0	%	0%	, D		INS	URAN	CE RAT	E	0.006		
LAND PLANE	100	)%	0	%	0%	, D		HIF	REDWA	AGE RA	TE	5.00		
SWEEP PLOW	100	)%	0	%	0%	, D								
M.B. PLOW	100	)%	0	%	0%	, D								
SWEEP COND.	100	)%	0	%	0%	, o								
CULTIPACKER	100	)%	0	%	0%	, o								
TANDEM DISK	100	)%	0	%	0%	, o								
SPRINGTOOTH	100	)%	0	%	0%	, 0								
S.HARROW	100	)%	0	%	0%	6								
DRILL	C	)%	100	%	0%	, o								
PLANTER	(	)%	100	%	0%	, o								
CULTIVATOR	(	)%	100	%	` 0%	6								
ROTARY HOE	C	)%	100	%	0%	, o								
SPRAYER	C	)%	100	%	0%	6								
S.SHREDDER	100	)%	0	%	0%	, o								
ROT.MOWER	C	%	100	%	0%	, o								
WINDROWER	C	)%	100	%	0%	, o								
BALER	· C	)%	100	%	0%	, 0								
OWNER-														
OPERATOR														
								OFDT	OOT			TOTAL		
LABOR JAN	FEB	MAR	APR		JUNE	JULY	AUG	SEPT	001	NOV	DEC	TOTAL		
AVAIL-	106	100	120	120	100	160	167	117	100	105	110	1 426		
ABLE 121	106	123	130	132	138	169	167	117	128	105	118	1,436		
	200	200	200	200	200	200	200	200	200	200	200			
FERIOD 200	200	200	200	200	200	200	200	200	200	200	200			

Figure 2. Tractor Horsepower Selection.

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,

A third table indicates that operator labor is sufficient to complete field operations in January, February, March, April, May, October, November and December. Hired labor will be required in June, July, August, and September.

At this point, the program user must analyze the problem and attempt to make adjustments. The initial analysis indicates Tractor #1 is not adequate to perform the July operations in a timely fashion.

### Sample Farm (A Second Iteration)

Because the initial situation is not feasible, the machinery complement must be revised to make the complement viable. Several alternatives are available; tractor size(s) could be increased, hours available could be increased, or a reallocation of fieldwork between tractors could be made. For this problem, a shift of fieldwork from Tractor #1 to Tractor #2 was made.

Figure 4 illustrates the changes made. Moldboard Plow work is shifted from 100 percent done by Tractor #1 to 75 percent done by Tractor #1 and 25 percent done by Tractor #2. Also, tandem disk fieldwork is split 50-50 between the two tractors. The model is then recalculated using the Alt-c command.

Figure 5 presents the second iteration output. Changes resulting from the second iteration are a shift in tractor hours to 519 for Tractor #1 and 291 for Tractor #2. Because the output shows excess capacity for each time period, this tractor-farm equipment complement satisfies the criteria of completing the field practices in a timely manner. The machines used with Tractor #1 include the offset disk, chisel, sweep plow, moldboard plow, sweep conditioner, tandem disk and springtooth. The total fixed costs incurred for Tractor #1 and it's equipment are \$18,288.62. Total variable costs for Tractor #1 excluding hired labor are \$6691.48. The total fixed costs incurred for Tractor #2 and it's

TOTAL

TRACTOR

HOURS HP	JAN FE	B MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1												
155 (	0.00	27 9	0.00	17	115	228	133	64	0.00	0.00	0.00	593
TRACTOR #2												
95 0	0.00 0.0	00.00	0.00	0.90	39	4	35	81	0.00	0.00	0.00	170
TRACTOR #3												
0 0	0.00 0.0	00.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE: IF NA (	NOT AV	AILABLE	) IS RE	AYE	D IN TH	E RESI	ULTS RO	W.				
CHECK HORSE	POWER	REQUIR	EMENT	S FOR	PTO DF	<b>RIVEN</b> E	QUIPME	NT.				
TRACTORS US	SED WIT	H 540 PT	O EQUI	PMEN	IT CANI	NOT EX	CEED 14	40 HORS	SEPOWE	R.		
IN ADDITION, S	S.HARRO	OW IS NO	T OFFE	RED	FOR TF	RACTOR	RS EXCE	EDING '	155 HP.			
TRACTOR HOL	JR											
REQUIREMENT	•											
SUMMARY	JAN F	EB MA	R AF	'nR	MAY	JUNE	JULY	′ AUG	SEPT	- OCT	- NOV	DEC
MAXIMUM TR	ACTOR											
HOURSPER												
MONTH (HP)	200 2	00 200	0 20	0	200	200	200	200	200	200	200	200
EXCESS CAPA					200		200					200
TRACTOR#1												
155 2	200 1	73 10	1 20	0	183	85		67	126	200	200	200
	100 1	10 13	20	0	100	05	-20	07	130	200	200	200
	000 0	00 200		0	100	161	100	105	110	200	000	000
	200 2	00 200	20	0	109	101	190	105	119	200	200	200
	•	•		, ,	•	•	•	•	•	•	•	•
	GATIVE											
AD LISTMENT									EQUIRE		1 501	MARY
ADJUSTIVIENT	SIVIATE			OIVIPL	EIEFI	ELDOP	ERATIO	ND.				
								0507	0.07			
SUMMARTJA	N FEB	MAR	APR	VIAY	JUNE	JULY	AUG	SEPT	001	NOV	DEC	IOTAL
OWNER LABOR	{											
PROVIDED 12	1 106	123	130	132	138	169	167	117	128	105	118	1,436
TOTAL HOURS	5											
REQUIRED 0.0	00 30	10	0.00	30	169	255	185	159	0.00	0.00	0.00	839
HIRED LABOR												
HOURS												
REQUIRED 0.0	0 0.00	0.00	0.00	0.00	31	86	18	42	0.00	0.00	0.00	178
COST OF HIRE	D											
LABOR 0.0	0 0.00	0.00	0.00	0.00	156	431	91	210	0.00	0.00	0.00	888
COST RESULTS	DEPREC	. INT.	INS.	TA	KES T.	F.C.	REPAIR	LUB.	FUEL T.V	.C .T.C	.C./TRA	CTOR
TRACTOR #1												
	9.108	7.356	490	1.3	35 18	289 3	.930	529	3.530 7	.989	:	26.278
TRACTOR #2		,		.,.					.,	,		
	7,012	5,667	378	1.0	48 14	.104	969	151	1.00 2	12 9		16.234
TRACTOR #3	.,	-,		.,•		,			.,,			,
	0.00	0.00	0.00	0.0	0 0 0	0 0	.00	0.00	0.00	0.00		0.00
		TOT		2000	TS /	12 303	10 TC			OSTO	10	18 20
					OR 4	13 300	40		OST PED	ACRE	10,	47 20
				2 220			+0	U	JULI FER	AORE		+1.30

Figure 3. Machinery Complement Selection Results.

DEDER ACTIVITIES   ACRES   INPLOTES     WHEAT   820   95     ALFALFA   0   105     GRAIN SORGHUM   23   125     CORN   0   140     PEANUTS   0   140     SOYBEANS   0   175     COTTON   0   200     SUDAN HAY   73   COST DATA ENTRY     MACHINE   SPECIFED   CURRENT FUEL COST     OPERATION   TRACTOR USAGE   INTERESTRATE   0.090     OFFSET   100%   0%   0%   CURRENT TAX RATE   0.010     LAND PLANE   100%   0%   0%   INSURANCE FATE   0.006     LAND PLANE   100%   0%   0%   SUBAN   SUBAN   SUBAN     SWEEP COND   100%   0%   0%   SUBAN   SUBAN   SUBAN     GRAINS 50%   50%   0%   SUBAN   SUBAN   SUBAN   SUBAN     GULTRACKER   100%   0%   SUBAN   SUBAN   SUBAN					-0						5	
WHEAI   820   95     ALFALFA   0   105     GRAIN SORGHUM   23   125     CORN   0   155     SOYBEANS   0   175     COTON   0   200     SUDAN HAY   73   COST DATA ENTRY     TRACTOR HP   155   95     CORTON   0   200     SUDAN HAY   73   COST DATA ENTRY     MACHINE   SPECIFED   CURRENT FUEL COST   0.80     OPERATION   TRACTOR USAGE   INTERESTRATE   0.090     OFFSET   100%   0%   0%   URRENT TAX RATE   0.006     LAND PLANE   100%   0%   0%   HIRED WAGE RATE   5.00     SWEEP PLOW   100%   0%   0%   CULTIPACKER   100%   0%     OULTIPACKER   100%   0%   0%   SSHARDOW   100%   0%     CULTIPACKER   0%   100%   0%   SSHARDOW   100%   0%     SSHARDDER   0%<	CROP ACTIV	IIES		ACRE	-5			μı	PIO	HP)		
ALFALFA 0 105 GRAIN SORGHUM 23 125 CORN 0 140 PEANUTS 0 140 PEANUTS 0 175 SOYBEANS 0 175 COTTON 0 200 SUDAN HAY 73 *1 #2 #3 TRACTOR HP 155 95 COST DATA ENTRY MACHINE SPECIFED CURRENT FUEL COST 0.80 OPERATION TRACTOR USAGE 0.00 CHISEL 100% 0% 0% CURRENT TAX RATE 0.010 CHISEL 100% 0% 0% CURRENT TAX RATE 0.010 CHISEL 100% 0% 0% HIRED WAGE RATE 5.00 SWEEP PLOW 100% 0% 0% SWEEP COND. 100% 0% 0% SWEEP COND. 100% 0% 0% SWEEP COND. 100% 0% 0% SPRINGTOCTH 100% 0% 0% CULTIPACKER 100% 0% 0% SPRAYER 0% 100% 0% CONNER OVE	WHEAT			820					9	5		
GHAIN SORGHUM   23   125     CORN   0   140     PEANUTS   0   155     SOYBEANS   0   175     COTTON   0   200     SUDAN HAY   73   COST DATA ENTRY     MACHINE   SPECIFIED   CURRENT FUELCOST   0.80     OPERATION   THACTOR USAGE   CURRENT TAX RATE   0.000     OFFSET   100%   0%   0%   CURRENT TAX RATE   0.000     CHAIN DHANE   100%   0%   0%   HIRED WAGE RATE   5.00     SWEEP COND   100%   0%   0%   HIRED WAGE RATE   5.00     SWEEP COND   100%   0%   0%   SUBENCED COND   100%   0%     CULTIPACKER   100%   0%   0%   SUBENCED COND   100%   0%     PLANTER   0%   100%   0%   SHARROW   100%   0%     SHAPROW   100%   0%   0%   SSHEED COND   100%   0%     SHARROW   100% <td>ALFALFA</td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td>10</td> <td>5</td> <td></td> <td></td>	ALFALFA			0					10	5		
CONN   0   140     PEANUTS   0   155     SOYBEANS   0   175     COTTON   0   200     SUDAN HAY   73   COST DATA ENTRY     MACHINE   SPECIFIED   CURRENT FUEL COST   0.80     OPERATION   THACTOR USAGE   INTERESTRATE   0.090     OFFSET   100%   0%   0%   CURRENT TAX PATE   0.000     CHISEL   100%   0%   0%   INSURANCE RATE   0.000     NME PLOW   100%   0%   0%   INSURANCE RATE   5.00     SWEEP PLOW   100%   0%   0%   INSURANCE RATE   5.00     SWEEP PLOW   100%   0%   0%   SHARNOW   100%   0%     CULIPACKER   100%   0%   0%   SHARROW   100%   0%     PLANTER   0%   100%   0%   SHARROW   100%   0%     SSHREDDER   100%   0%   0%   SPRIVENTANDE   EATER   TATE	GRAIN SORGH	UM		23					12	5		
PEANUTS 0 155   SOYBEANS 0 175   COTTON 0 200   SUDAN HAY 73 COST DATA ENTRY   MACHINE SPECIFED CURRENT FUELCOST 0.80   OPERATION TRACTOR USAGE INTERESTRATE 0.090   OFFSET 100% 0% 0% INTERESTRATE 0.000   CHISEL 100% 0% 0% INTERESTRATE 0.000   SWEEP COND 100% 0% 0% SUP	COHN			0					14	0		
SOYBEANS   0   175     COTTON   0   200     SUDAN HAY   73   200     #1   #2   #3   COST DATA ENTRY     MACHINE   SPECIFIED   CURRENT TAX ENTRY   0.80     OPERATION   TRACTOR USAGE   INTERESTRATE   0.090     OFFSET   100%   0%   0%   CURRENT TAX RATE   0.010     CHISEL   100%   0%   0%   NUTERESTRATE   0.006     LAND PLANE   100%   0%   0%   HIRED WAGE RATE   5.00     SWEEP PLOW   100%   0%   0%   K   K   K     CULTIPACKER   100%   0%   0%   K   K   K     SPRINCTOCTH   100%   0%   0%   K   K   K     CULTIPACKER   100%   0%   0%   K   K   K     SPRINCTOCTH   100%   0%   0%   K   K   K     DRILL   0%   100%   0%	PEANUTS			0					15	5		
COTTON   0   200     SUDAN HAY   73   **1   #2   #3     TRACTOR HP   155   95   COST DATA ENTRY     MACHINE   SPECIFED   CURRENT FUEL COST   0.80     OPERATION   TRACTOR USAGE   INTERESTRATE   0.090     CHISEL   100%   0%   0%   CURRENT TAX RATE   0.010     CHISEL   100%   0%   0%   INTERESTRATE   0.006     LAND PLANE   100%   0%   0%   INSURANCE RATE   5.00     SWEEP COND   100%   0%   0%   SUMER   5.00     CULTIPACKER   100%   0%   0%   SUMER   5.00     SHEPCOND   100%   0%   0%   SUMER   5.00     PLANTER   0%   100%   0%   SUMER   5.00     VILLIPACKER   100%   0%   0%   SUMER   SUMER   SUMER     OPERATOR   0%   100%   0%   SUMER   SUMER   SUMER   SUME	SOYBEANS			0					17	5		
SUDAN HAY   73     #1   #2   #3     TRACTOR HP   155   95   COST DATA ENTRY     MACHINE   SPECIFIED   CURRENT FUEL COST   0.80     OPERATION   TRACTOR USAGE   INTERESTRATE   0.090     OFFSET   100%   0%   0%   CURRENT TAX RATE   0.010     CHISEL   100%   0%   0%   HIRED WAGE RATE   5.00     SWEEP PLOW   100%   0%   0%   HIRED WAGE RATE   5.00     SWEEP COND   100%   0%   0%   CULTIPACKER   100%   0%     OULTIPACKER   100%   0%   0%   SPRINGTOOTH   100%   0%     SHARROW   100%   0%   0%   SPRINGTOOTH   100%   0%     PLAIL   0%   100%   0%   0%   SPRINGTOOTH   100%   0%     CULTIVATOR   0%   100%   0%   SPRINGTOOTH   00%   0%     SHARBOW   100%   0%   0%   SPRINGTOOTH <td>COTTON</td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td>20</td> <td>0</td> <td></td> <td></td>	COTTON			0					20	0		
#1   #2   #3     THACTOR HP   155   95   COST DATA ENTRY     MACHINE   SPECIFIED   CURRENT FUEL COST   0.80     OPERATION   TRACTOR USAGE   INTERESTRATE   0.090     OFFSET   100%   0%   0%   CURRENT FUEL COST   0.80     CHISEL   100%   0%   0%   INTERESTRATE   0.006     LAND PLANE   100%   0%   0%   INSURANCE RATE   5.00     SWEEP PLOW   100%   0%   0%   SWEEP COND.   100%   0%   0%     SWEEP PLOW   100%   0%   0%   0%   SWEEP COND.   100%   0%	SUDAN HAY			73								
TRACTOR HP   155   95   COST DATA ENTRY     MACHINE   SPECIFIED   CURRENT FUEL COST   0.80     OPERATION   TRACTOR USAGE   INTERESTRATE   0.090     OFFSET   100%   0%   0%   INTERESTRATE   0.010     CHISEL   100%   0%   0%   INTERESTRATE   0.010     LAND PLANE   100%   0%   0%   INTERESTRATE   0.006     SWEEP COND   100%   0%   0%   INTER   0.006     CULTIPACKER   100%   0%   0%   SHARROW   100%   0%     PLANTER   0%   100%   0%   SSHREDDER   100%   0%     CULTIVATOR   0%   100%   0%   SHARROW   100%   0%     <		# 1		# 2	#3							
MACHINE   SPECIFIED   CURRENT FUELCOST   0.80     OPERATION   TRACTOR USAGE   INTERESTRATE   0.090     OFFSET   100%   0%   0%   CURRENT FUELCOST   0.80     CHISEL   100%   0%   0%   INTERESTRATE   0.090     CHISEL   100%   0%   0%   INSURANCE RATE   0.006     LAND PLANE   100%   0%   0%   HIRED WAGE RATE   5.00     SWEEP COD.   100%   0%   0%   SWEEP COD.   100%   0%     SWEEP COD.   100%   0%   0%   SWEEP COD.   100%   0%     SWEEP COD.   100%   0%   0%   SWEEP COD.   100%   0%     SPRINGTOCH   100%   0%   0%   SWEEP COD.   100%   0%     DRILL   0%   100%   0%   SWEEP COD.   100%   0%     CULTIVATOR   0%   100%   0%   SSHEED CER   0%   100%   0%     OWNER-   0%	TRACTOR HP	155		95	#0			CC			TRY	
OPERATION   TRACTOR USAGE   INTERESTATE   0.090     OFFSET   100%   0%   0%   CURRENT TAX RATE   0.010     CHISEL   100%   0%   0%   INSURANCE RATE   0.006     LAND PLANE   100%   0%   0%   INSURANCE RATE   0.006     LAND PLANE   100%   0%   0%   HIRED WAGE RATE   5.00     SWEEP PLCW   100%   0%   0%   SUMER   5.00   SUMER     CULTIPACKER   100%   0%   0%   SUMER   5.00   SUMER     CULTIPACKER   100%   0%   0%   SUMER   5.00   SUMER     PLANTER   0%   100%   0%   SUMER   SUM	MACHINE	SPECIFIE	D	<u> </u>					IRREN	FUEL	COST	0.80
OFFSET   100%   0%   0%   CURRENT TAX RATE   0.010     CHISEL   100%   0%   0%   INSURANCE RATE   0.006     LAND PLANE   100%   0%   0%   HIRED WAGE RATE   5.00     SWEEP PLOW   100%   0%   0%   HIRED WAGE RATE   5.00     SWEEP COND.   100%   0%   0%   SWEEP COND.   100%   0%     SWEEP COND.   100%   0%   0%   SWEEP COND.   100%   0%     CULTIPACKER   100%   0%   0%   SWEEP COND.   100%   0%     SPRINGTCOTH   100%   0%   0%   SWEEP COND.   100%   0%     CULTIPACKER   100%   0%   0%   SWEEP COND.   100%   0%     CULTIVATOR   0%   100%   0%   SWEEP COND.   00%   SWEEP COND.   00%   SWEEP COND.   0%   SWEEP COND.   0% </td <td>OPERATION</td> <td>TRACTO</td> <td>RUSA</td> <td>GE</td> <td></td> <td></td> <td></td> <td>INT</td> <td>FERES</td> <td>TRATE</td> <td>0001</td> <td>0.090</td>	OPERATION	TRACTO	RUSA	GE				INT	FERES	TRATE	0001	0.090
CHISEL 100% 0% 0% INSURANCE RATE 0.006   LAND PLANE 100% 0% 0% HIRED WAGE RATE 5.00   SWEEP COND 100% 0% 0% HIRED WAGE RATE 5.00   SWEEP COND 100% 0% 0% HIRED WAGE RATE 5.00   SWEEP COND 100% 0% 0% SUMER 50% 50%   CULTIPACKER 100% 0% 0% SPRINGTOOTH 100% 0%   SHARROW 100% 0% 0% SPRINGTOOTH 100% 0%   DRILL 0% 100% 0% 0% SPRINGTOOTH 100% 0%   SHARROW 100% 0% 0% SPRINGTOOTH 0% 100% 0%   SHARROW 100% 0% 0% 0% SSE	OFFSET	100%	0	%	09	6		CL	IRREN	ΤΤΑΧΕ	RATE	0.010
LAND PLANE 100% 0% 0% HIRED WAGE RATE 5.00 SWEEP PLOW 100% 0% 0% 0% M.B. PLOW 75% 25% 0% SWEEP COND 100% 0% 0% CULTIPACKER 100% 0% 0% SPRINGTOOTH 100% 0% 0% SPRINGTOOTH 100% 0% 0% DRILL 0% 100% 0% CULTIVATOR 0% 100% 0% CULTIVATOR 0% 100% 0% SPRAYER 0% 100% 0% SPRAYER 0% 100% 0% SPRAYER 0% 100% 0% WINDROWER 0% 100% 0% OWNER- OPERATOR MONTHLY LABOR JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC TOTAL HOURS AVAIL- ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436 MAXIMUM TRACTOR HOURS PERIOD 200 200 200 200 200 200 200 200 200 20	CHISEL	100%	0	%	09	6		INS		CE RA	TE	0.006
SWEEP PLOW 100% 0% 0%   MB. PLOW 75% 25% 0%   SWEEP COND. 100% 0% 0%   CULTIPACKER 100% 0% 0%   SPRINGTOOTH 100% 0% 0%   SPRINGTOOTH 100% 0% 0%   SPRINGTOOTH 100% 0% 0%   DRILL 0% 100% 0%   CULTIVATOR 0% 100% 0%   ROTARY HOE 0% 100% 0%   SSHREDDER 100% 0% 0%   SSHREDDER 0% 100% 0%   WINDROWER 0% 100% 0%   OWNER- 0% 100% 110%   AUAIL- AUA AUA AUA   AVAIL- AUA	LAND PLANE	100%	0	%	09	6		HIF	REDW	AGE RA	TE	5.00
M.B. PLOW 75% 25% 0%   SWEEP COND. 100% 0% 0%   CULTIPACKER 100% 0% 0%   TANDEM DISK 50% 50% 0%   SPRINGTOOTH 100% 0% 0%   SHARROW 100% 0% 0%   DRILL 0% 100% 0%   DRILL 0% 100% 0%   CULTIVATOR 0% 100% 0%   SPRAYER 0% 100% 0%   SSHREDDER 100% 0% 0%   SSHREDDER 100% 0% 0%   SSHREDDER 100% 0% 0%   ROT.MOWER 0% 100% 0%   WINDROWER 0% 100% 0%   OWNER- 0% 100% 0%   OWNER- 0% 100% 0%   OWNER- 0% 100% 0%   ALER 0% 100% 0%   AVAIL- ABLE 121 106 123 130 132	SWEEP PLOW	100%	0	%	0%	6						
SWEEP COND. 100% 0% 0%   CULTIPACKER 100% 0% 0%   TANDEM DISK 50% 50% 0%   SPRINGTOOTH 100% 0% 0%   SHARROW 100% 0% 0%   DRILL 0% 100% 0%   DRILL 0% 100% 0%   CULTIVATOR 0% 100% 0%   CULTIVATOR 0% 100% 0%   SHREDDER 100% 0% 0%   SSHREDDER 100% 0% 0%   ROTARY HOE 0% 100% 0%   SSHREDDER 100% 0% 0%   ROT.MOWER 0% 100% 0%   OWNER- 0% 100% 0%   OWNER- 0% 100% 0%   OWNER- 0% 100% 0%   OVERS Jaborne June July AUG SEPT OCT NOV DEC TOTAL   HOURS AVAIL- AUA June June Ju	M.B. PLOW	75%	259	%	0%	6						
CULTIPACKER 100% 0% 0%   TANDEM DISK 50% 50% 0%   SPRINCTOOTH 100% 0% 0%   SPRINCTOOTH 100% 0% 0%   DRILL 0% 100% 0%   DRILL 0% 100% 0%   CULTIVATOR 0% 100% 0%   CULTIVATOR 0% 100% 0%   ROTARY HOE 0% 100% 0%   SSHREDDER 100% 0% 0%   SSHREDDER 100% 0% 0%   WINDROWER 0% 100% 0%   OWNER- 0% 100% 0%   OWER- JAN FEB <mar< td=""> APR MAY   JULS JAN FEB<mar< td=""> APR MAY   AVAIL- ABLE 121 106 123</mar<></mar<>	SWEEP COND.	100%	0	%	0%	6						
TANDEM DISK 50% 50% 0%   SPRINGTOOTH 100% 0% 0%   DRILL 0% 100% 0%   DRILL 0% 100% 0%   DRILL 0% 100% 0%   DRILL 0% 100% 0%   CULTIVATOR 0% 100% 0%   CULTIVATOR 0% 100% 0%   SPRAYER 0% 100% 0%   SSHREDDER 100% 0% 0%   ROT.MOWER 0% 100% 0%   WINDROWER 0% 100% 0%   OWNER- 0% 100% 0%   OWNER- 0% 100% 0%   OWNER- 0% 100% 0%   OVERATOR MONTHLY JUNE JULY AUG SEPT OCT NOV DEC TOTAL   HOURS AVAIL- ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436	CULTIPACKER	100%	0	%	09	6						
SPRINGTOOTH 100% 0% 0%   S.HARROW 100% 0% 0%   DRILL 0% 100% 0%   DRILL 0% 100% 0%   PLANTER 0% 100% 0%   CULTIVATOR 0% 100% 0%   ROTARY HOE 0% 100% 0%   SSHREDDER 100% 0% 0%   SSHREDDER 100% 0% 0%   ROTARY HOE 0% 100% 0%   SSHREDDER 100% 0% 0%   ROT.MOWER 0% 100% 0%   OWNER- 0% 100% 0%   ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436   MAXIMUM THACTOR -<	TANDEM DISK	50%	509	%	0%	6						
S.HARROW 100% 0% 0%   DRILL 0% 100% 0%   PLANTER 0% 100% 0%   CULTIVATOR 0% 100% 0%   CULTIVATOR 0% 100% 0%   ROTARY HOE 0% 100% 0%   SPRAYER 0% 100% 0%   SSHREDDER 100% 0% 0%   NOTARY HOE 0% 100% 0%   SSHREDDER 100% 0% 0%   WINDROWER 0% 100% 0%   OWNER- 0% 100% 0%   LABOR JAN FEB MAR APR MAY   JULY AUG SEPT OCT NOV DEC TOTAL   HOURS AVAIL- ABLE <td< td=""><td>SPRINGTOOTH</td><td>100%</td><td>0</td><td>%</td><td>0%</td><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	SPRINGTOOTH	100%	0	%	0%	6						
DRILL 0% 100% 0%   PLANTER 0% 100% 0%   CULTIVATOR 0% 100% 0%   ROTARY HOE 0% 100% 0%   SPRAYER 0% 100% 0%   SSHREDDER 100% 0% 0%   ROT.MOWER 0% 100% 0%   WINDROWER 0% 100% 0%   BALER 0% 100% 0%   OPERATOR 0% 100% 0%   OWNER- 0% 100% 0%   OPERATOR 0% 100% 0%   OVERATOR 0% 100% 0%   OVERATOR 0% 100% 0%   OVERATOR 0% 100% 0%   ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436   MAXIMUM TRACTOR HOURS 200 200 200 200 200 200 200 200 200 200 <td>S.HARROW</td> <td>100%</td> <td>0</td> <td>%</td> <td>0%</td> <td>6</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	S.HARROW	100%	0	%	0%	6						
PLANTER 0% 100% 0%   CULTIVATOR 0% 100% 0%   ROTARY HOE 0% 100% 0%   SPRAYER 0% 100% 0%   SSHREDDER 100% 0% 0%   ROTARY HOE 0% 100% 0%   SSHREDDER 100% 0% 0%   ROT.MOWER 0% 100% 0%   WINDROWER 0% 100% 0%   OWNER- 0% 100% 0%   OWNER- 0% 100% 0%   OWNTHLY LABOR JAN FEB MAR APR MAY   LABOR JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC TOTAL   HOURS AVAIL- ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436   MAXIMUM TRACTOR HOURS 200 200 200 200 <t< td=""><td>DRILL</td><td>0%</td><td>100</td><td>%</td><td>09</td><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	DRILL	0%	100	%	09	6						
CULTIVATOR 0% 100% 0%   ROTARY HOE 0% 100% 0%   SPRAYER 0% 100% 0%   SSHREDDER 100% 0% 0%   ROT.MOWER 0% 100% 0%   WINDROWER 0% 100% 0%   OWNER- 0% 100% 0%   OWNER- 0% 100% 0%   OWNER- 0% 100% 0%   OWNER- 0% 100% 0%   OWINDROWER 0% 100% 0%   OWNER- 0% 100% 0%   OVERATOR 0% 100% 0%   MONTHLY LABOR JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC TOTAL   HOURS AVAIL- ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436   MAXIMUM TRACTOR HOURS 200 <t< td=""><td>PLANTER</td><td>0%</td><td>100</td><td>%</td><td>0%</td><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	PLANTER	0%	100	%	0%	6						
ROTARY HOE 0% 100% 0%   SPRAYER 0% 100% 0%   SSHREDDER 100% 0% 0%   ROT.MOWER 0% 100% 0%   WINDROWER 0% 100% 0%   OWNER- 0% 100% 0%   OWNER- 0% 100% 0%   OPERATOR 0% 100% 0%   MONTHLY LABOR JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC TOTAL   HOURS AVAIL- ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436   MAXIMUM TRACTOR HOURS PER TIME PEDEVD 200	CULTIVATOR	0%	100	%	<b>`</b> 0%	6						
SPRAYER   0%   100%   0%     SSHREDDER   100%   0%   0%     ROT.MOWER   0%   100%   0%     WINDROWER   0%   100%   0%     OWNER-   0%   100%   0%     OWNER-   0%   100%   0%     OPERATOR   0%   100%   0%     MONTHLY   LABOR   JAN   FEB   MAR   APR   MAY   JUNE   JULY   AUG   SEPT   OCT   NOV   DEC   TOTAL     HOURS   AVAIL-   ABLE   121   106   123   130   132   138   169   167   117   128   105   118   1,436     MAXIMUM   TRACTOR   HOURS   PER TIME   PERVID   200<	ROTARY HOE	0%	100	%	09	6						
S.SHREDDER 100% 0% 0%   ROT.MOWER 0% 100% 0%   WINDROWER 0% 100% 0%   OWNER- 0% 100% 0%   LABOR JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC TOTAL   HOURS AVAIL- ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436   MAXIMUM TRACTOR HOURS PERIOD 200<	SPRAYER	0%	100	%	09	6						
ROT.MOWER 0% 100% 0%   WINDROWER 0% 100% 0%   BALER 0% 100% 0%   OWNER- 0% 100% 0%   OWNER- 0% 100% 0%   OVERATOR 0% 100% 0%   MONTHLY LABOR JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC TOTAL HOURS   AVAIL- ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436   MAXIMUM TRACTOR HOURS PERTIME PERTIME PERTIME PERTIME 200 <td< td=""><td>S.SHREDDER</td><td>100%</td><td>0</td><td>%</td><td>09</td><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	S.SHREDDER	100%	0	%	09	6						
WINDROWER 0% 100% 0%   BALER 0% 100% 0%   OWNER- OPERATOR 0% 100% 0%   MONTHLY LABOR JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC TOTAL   HOURS AVAIL- ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436   MAXIMUM TRACTOR HOURS PER TIME PER TIME PERTIME 200 <t< td=""><td>ROT.MOWER</td><td>0%</td><td>100</td><td>%</td><td>09</td><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	ROT.MOWER	0%	100	%	09	6						
BALER 0% 100% 0%   OWNER- OPERATOR OPERATOR OPERATOR MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC TOTAL   HOURS AVAIL- ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436   MAXIMUM TRACTOR HOURS PER TIME PER TIME PERTIME 200 <t< td=""><td>WINDROWER</td><td>0%</td><td>100</td><td>%</td><td>09</td><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	WINDROWER	0%	100	%	09	6						
OWNER- OPERATOR   MONTHLY LABOR JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC TOTAL   HOURS AVAIL- ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436   MAXIMUM TRACTOR HOURS PER TIME PER TIME PERTIME 200 <td>BALER</td> <td>0%</td> <td>100</td> <td>%</td> <td>09</td> <td>6</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	BALER	0%	100	%	09	6						
OWNER- OPERATOR   MONTHLY LABOR JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC TOTAL   HOURS AVAIL-   ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436   MAXIMUM TRACTOR HOURS PER TIME PERTIME PERTIME 200												
OPERATOR   MONTHLY   LABOR JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC TOTAL   HOURS AVAIL- ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436   MAXIMUM TRACTOR HOURS PER TIME PER TIME PERCID 200 200 200 200 200 200 200 200 200 200 200	OWNER-											
MONTHLY   LABOR   JAN   FEB   MAR   APR   MAY   JUNE   JULY   AUG   SEPT   OCT   NOV   DEC   TOTAL     HOURS   AVAIL-   ABLE   121   106   123   130   132   138   169   167   117   128   105   118   1,436     MAXIMUM   TRACTOR   HOURS   PER TIME   PERTIME   PERDD   200	OPERATOR											
LABOR   JAN   FEB   MAR   APR   MAY   JUNE   JULY   AUG   SEPT   OCT   NOV   DEC   TOTAL     HOURS   AVAIL-   ABLE   121   106   123   130   132   138   169   167   117   128   105   118   1,436     MAXIMUM   TRACTOR   HOURS   PER TIME   PERTIME   PERDD   200	MONTHLY											
HOURS AVAIL- ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436 MAXIMUM TRACTOR HOURS PER TIME PER TIME	LABOR JAN	FEB MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
AVAIL-   ABLE 121 106 123 130 132 138 169 167 117 128 105 118 1,436   MAXIMUM TRACTOR HOURS PER TIME PER TIME PERDD 200	HOURS											
ABLE   121   106   123   130   132   138   169   167   117   128   105   118   1,436     MAXIMUM   TRACTOR   HOURS   PER TIME   PER TIME   200 <td>AVAIL-</td> <td></td>	AVAIL-											
MAXIMUM TRACTOR HOURS PER TIME PERIOD 200 200 200 200 200 200 200 200 200 20	ABLE 121	106 123	130	132	138	169	167	117	128	105	118	1,436
TRACTOR HOURS PER TIME PERIOD 200 200 200 200 200 200 200 200 200 20	MAXIMUM											·····
HOURS PER TIME PERIOD 200 200 200 200 200 200 200 200 200 20	TRACTOR											
PER TIME PERIOD 200 200 200 200 200 200 200 200 200 20	HOURS			ŧ								
PERIOD 200 200 200 200 200 200 200 200 200 20	PER TIME											
	PERIOD 200	200 200	200	200	200	200	200	200	200	200	200	

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Figure 4. Tractor Horsepower Selection.

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TOTAL TRACTOR

HOURS HP JAN	FEB	MAR	APR_	MAY	JUNE 、	JULY	AUG	SEPT	OCT	NOV	DEC TO	DTAL
TRACTOR #1												
155 0.00	20	5	0.00	12	115	170	133	64	0.00	0.00	0.00	519
TRACTOR #2												
95 0:00	11	7	0.00	18	39	99	35	81	0.00	0.00	0.00	291
TRACTOR #3		•			•••			• •				
0 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE: IE NA (NO		ABLE)	S RELA	YED IN	THE BE	SUIT	SROW	0.000				0.00
CHECK HORSEPO	NER RE	OUIREN	IENTS F	ORPTO	DRIVE	VEOU	IPMENT	•				
TRACTORSLISED			FOUR			EXCE				R		
										<b>.</b>		
TRACTOR LIQUE		13 1101	OFFER		TRACI			JING 15	SHF.			
TRACTOR HOUR												
REQUIREMENT												
SUMMARY JAN	FEB	MAR	APR	<u>MA</u>	Y JU	NE ,	JULY	AUG	SEPT	OCT	NOV	DEC
MAXIMUM TRACT	OR											
HOURS PER												
MONTH (HP) 20	200	200	200	20	0 20	0	200	200	200	200	200	200
EXCESS CAPACIT	Y											
TRACTOR #1	-											
155 20	1 1 8 0	105	200	1.8	Q (	25	30	67	136	200	200	200
	100	195	200	100	0 0	55	50	07	150	200	200	200
		100	000	1.0	• •	<b>~</b> 1	101	105	110		000	000
95 20	J 189	193	200	18	2 1	61	101	165	119	200	200	200
TRACTOR #3												
0	0 0	0	0		0	0	0	0	0	0	0	0
NOTE: IF NEGA	ΓΙνέ Νι	JMBER	S APPE	ear in	THE T	RACTO	OR HO	UR RE	QUIRE	MENT	SUMN	IARY
ADJUSTMENTS M	AY BE N	FEDED				ODED	ATIONIO	•				
ABOR		22020	10 001	VIPLEI	EFIELD	OPER	ATIONS					
			10 001	VIPLET	EFIELD	OPER	ATIONS					
SUMMARY JAN	FEB	MAR	APR	MAY		JULY	AUG	SEPT	ост	NOV	DEC TO	DTAL
SUMMARY JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	ост	NOV	DEC TO	DTAL
SUMMARY JAN OWNER LABOR PROVIDED 121	FEB	MAR 123	APR 130	MAY	JUNE	JULY	AUG 167	SEPT	OCT	NOV	DEC TO	DTAL
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS	FEB 106	MAR 123	APR 130	<u>MAY</u> 132	JUNE 138	JULY 169	AUG 167	<u>SEPT</u> 117	OCT 128	NOV 105	DEC TO 1181	<u>) TAL</u>
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS BEOLIBED 0.00	FEB 106	MAR 123	<u>APR</u> 130	<u>MAY</u> 132	<u>JUNE</u> 138	<u>JULY</u> 169	AUG 167	<u>SEPT</u> 117	OCT 128	NOV 105	DEC TO	DTAL ,436
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS REQUIRED 0.00	FEB 106 35	MAR 123 13	APR 130 0.00	MAY 132 33	<u>JUNE</u> 138 169	<u>JULY</u> 169 296	AUG 167 185	<u>SEPT</u> 117 159	OCT 128 0.00	NOV 105 0.00	DEC TO 1181 0.00	DTAL ,436 890
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS REQUIRED 0.00 HIRED LABOR	FEB 106 35	MAR 123 13	APR 130 0.00	MAY 132 33	<u>JUNE</u> 138 169	<u>JULY</u> 169 296	AUG 167 185	<u>SEPT</u> 117 159	OCT 128 0.00	NOV 105 0.00	DEC TO 118 1 0.00	DTAL ,436 890
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS REQUIRED 0.00 HIRED LABOR HOURS	FEB 106 35	MAR 123 13	APR 130 0.00	<u>MAY</u> 132 33	<u>JUNE</u> 138 169	<u>JULY</u> 169 296	AUG 167 185	<u>SEPT</u> 117 159	OCT 128 0.00	NOV 105 0.00	DEC TO 118 1 0.00	DTAL ,436 890
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS REQUIRED 0.00 HIRED LABOR HOURS REQUIRED 0.00	FEB 106 35 0.00	MAR 123 13	APR 130 0.00	MAY 132 33 0.00	<u>JUNE</u> 138 169 31	<u>JULY</u> 169 <u>296</u> 127	AUG 167 185 18	<u>SEPT</u> 117 159 42	OCT 128 0.00	NOV 105 0.00	DEC TO 118 1 0.00	DTAL ,436 890 218
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS REQUIRED 0.00 HIRED LABOR HOURS REQUIRED 0.00 COST OF HIRED	FEB 106 35 0.00	MAR 123 13	APR 130 0.00 0.00	MAY 132 33 0.00	<u>JUNE</u> 138 169 31	<u>JULY</u> 169 296 127	<u>AUG</u> 167 <u>185</u> 18	<u>SEPT</u> 117 159 42	OCT 128 0.00 0.00	NOV 105 0.00	DEC TO 118 1 0.00	DTAL ,436 890 218
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS REQUIRED 0.00 HIRED LABOR HOURS REQUIRED 0.00 COST OF HIRED LABOR 0.00	FEB 106 35 0.00	MAR 123 13 0.00	<u>APR</u> 130 0.00 0.00 0.00	MAY 132 33 0.00 0.00	<u>JUNE</u> 138 169 31 156	<u>JULY</u> 169 296 127 633	<u>AUG</u> 167 185 18 91	<u>SEPT</u> 117 159 42 210	OCT 128 0.00 0.00 0.00	NOV 105 0.00 0.00 0.00	DEC TO 118 1 0.00 0.00 0.001	DTAL ,436 890 218 ,090
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS REQUIRED 0.00 HIRED LABOR HOURS REQUIRED 0.00 COST OF HIRED LABOR 0.00 COST RESULTS DE	FEB 106 35 0.00 0.00 PREC.	MAR 123 13 0.00 0.00 NT. IN	<u>APR</u> 130 0.00 0.00 0.00 15. TA	MAY 132 33 0.00 0.00 AXES	<u>JUNE</u> 138 169 31 <u>156</u> T.F.C.	<u>JULY</u> 169 296 127 <u>633</u> REP4	AUG 167 185 18 91 NR LU	<u>SEPT</u> 117 159 42 <u>210</u> B Fue	OCT 128 0.00 0.00 0.00 L T.V.C	NOV 105 0.00 0.00 0.00 0.00	DEC TO 118 1 0.00 0.00 0.001 0.001	218 ,090 DTAL ,436 890 218
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS REQUIRED 0.00 HIRED LABOR HOURS REQUIRED 0.00 COST OF HIRED LABOR 0.00 COST RESULTS DE TRACTOR #1	FEB 106 35 0.00 0.00 PREC.	MAR 123 13 0 0.00 0.00 NT. IN	APR 130 0.00 0.00 0.00 15. T/	MAY 132 33 0.00 0.00 AXES	JUNE 138 169 31 156 T.F.C.	<u>JULY</u> 169 296 127 <u>633</u> REP4	AUG 167 185 18 91 NR LU	<u>SEPT</u> 117 <u>159</u> 42 <u>210</u> B FUE	OCT 128 0.00 0.00 0.00 L T.V.C	NOV 105 0.00 0.00 0.00 0.00	DEC TO 118 1 0.00 0.00 0.001 C./TRAC	218 ,090 TOR
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS REQUIRED 0.00 HIRED LABOR HOURS REQUIRED 0.00 COST OF HIRED LABOR 0.00 COST RESULTS DE TRACTOR #1	FEB 106 35 0.00 PREC. 1	MAR 123 13 0 0.00 0 0.00 NT. IN 356 4	<u>APR</u> 130 0.00 0.00 0.00 IS. T/	MAY 132 33 0.00 0.00 AXES 335	JUNE 138 169 31 156 T.F.C.	<u>JULY</u> 169 296 127 <u>633</u> REP4	AUG 167 185 18 91 NR LUI	<u>SEPT</u> 117 159 42 <u>210</u> B FUE	OCT 128 0.00 0.00 0.00 L T.V.0	NOV 105 0.00 0.00 0.00 0.00 0.00	DEC TO 118 1 0.00 0.00 0.001 C./TRAC	218 (090) (090) (090) (090)
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS REQUIRED 0.00 HIRED LABOR HOURS REQUIRED 0.00 COST OF HIRED LABOR 0.00 COST RESULTS DE TRACTOR #1 9, TBACTOR #2	FEB 106 0 35 0 0.00 PREC. 1 108 7,	MAR 123 13 0 0.00 0 0.00 NT. IN 356 4	<u>APR</u> 130 0.00 0.00 0.00 IS. T/ 90 1,	MAY 132 33 0.00 0.00 AXES 335	JUNE 138 169 31 156 T.F.C. 18,289	<u>JULY</u> 169 296 127 <u>633</u> REP4 3,1	AUG 167 185 18 91 NR LUI	<u>SEPT</u> 117 <u>159</u> 42 <u>210</u> B FUE	OCT 128 0.00 0.00 0.00 L T.V.0 88 6	NOV 105 0.00 0.00 0.00 0.00 0.00 0.00 0.00	DEC TO 118 1 0.00 0.00 0.001 C./TRAC 2	218 (090) (0
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS REQUIRED 0.00 HIRED LABOR HOURS REQUIRED 0.00 COST OF HIRED LABOR 0.00 COST RESULTS DE TRACTOR #1 9, TRACTOR #2	FEB 106 0 35 0 0.00 PREC. 1 108 7,	MAR 123 13 0 0.00 0 0.00 NT. IN 356 4	<u>APR</u> 130 0.00 0.00 0.00 IS. T/ 90 1,	MAY 132 33 0.00 0.00 0.00 4XES 335	JUNE 138 169 31 156 T.F.C. 18,289	<u>JULY</u> 169 296 127 <u>633</u> REPA 3,1	AUG 167 185 18 91 NR LUI	<u>SEPT</u> 117 <u>159</u> 42 <u>210</u> B FUE 33 3,0	OCT 128 0.00 0.00 L T.V.0 88 6	NOV 105 0.00 0.00 0.00 0.00 0.00 0.00 0.00	DEC TO 118 1 0.00 0.00 0.001 C/TRAC 2	218 ,090 70R 4,980
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS REQUIRED 0.00 HIRED LABOR HOURS REQUIRED 0.00 COST OF HIRED LABOR 0.00 COST RESULTS DE TRACTOR #1 9, TRACTOR #2 8, TRACTOR #2	FEB 106 0 35 0 0.00 PREC. 1 108 7, 037 6,	MAR 123 13 0 0.00 0 0.00 NT. IN 356 4 398 4	<u>APR</u> 130 0.00 0.00 <u>0.00</u> IS. T/ 90 1, 27 1,	MAY 132 33 0.00 0.00 4XES 335 190	<u>JUNE</u> 138 169 31 <u>156</u> T.F.C. 18,289 16,052	<u>JULY</u> 169 <u>296</u> 127 <u>633</u> REP4 9 3,1 2 1,4	ATIONS AUG 167 185 18 91 NR LUI 40 46	<u>SEPT</u> 117 <u>159</u> 42 <u>210</u> B FUE 33 3,0 59 1,7	OCT 128 0.00 0.00 0.00 L T.V.0 88 6 30 3	NOV 105 0.00 0.00 0.00 0.00 0.00 0.00 0.00	DEC TO 118 1 0.00 0.00 0.001 C/TRAC 2 19	218 ,090 70R 4,980
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS REQUIRED 0.00 HIRED LABOR HOURS REQUIRED 0.00 COST OF HIRED LABOR 0.00 COST OF HIRED LABOR 0.00 COST RESULTS DE TRACTOR #1 9, TRACTOR #2 8, TRACTOR #3	FEB 106 35 0 0.00 PREC. 1 108 7, 037 6,	MAR 123 13 0 0.00 0 0.00 NT. IN 356 4 398 4	<u>APR</u> 130 0.00 0.00 <u>0.00</u> 15. T/ 90 1, 27 1,	MAY 132 33 0.00 0.00 0.00 AXES 335 190	<u>JUNE</u> 138 169 31 <u>156</u> T.F.C. 18,289 16,052	<u>JULY</u> 169 296 127 <u>633</u> REP4 9 3,1 2 1,4	AUG 167 185 18 91 140 46 142 25	<u>SEPT</u> 117 <u>159</u> 42 <u>210</u> B FUE 33 3,0 59 1,7	OCT 128 0.00 0.00 0.00 L T.V.C 88 6 30 3	NOV 105 0.00 0.00 0.00 0.00 0.00 0.00 0.00	DEC TO 118 1 0.00 0.00 0.001 C/TRAC 2 19	218 ,090 70R 4,980 9,484
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS REQUIRED 0.00 HIRED LABOR HOURS REQUIRED 0.00 COST OF HIRED LABOR 0.00 COST RESULTS DE TRACTOR #1 9, TRACTOR #2 8, TRACTOR #3 0.1	FEB 106 35 0 0.00 PREC. 1 108 7, 037 6, 00 0.	MAR 123 13 0 0.00 0 0.00 NT. IN 356 4 398 4 00 0.0	<u>APR</u> 130 0.00 0.00 <u>0.00</u> 15. T/ 90 1, 27 1, 00 0	MAY 132 33 0.00 0.00 0.00 AXES 335 190 0.00	<u>JUNE</u> 138 169 31 <u>156</u> T.F.C. 18,289 16,052 0.00	<u>JULY</u> 169 296 127 633 REP4 3,1 2 1,4 0 0.	AUG 167 185 18 91 140 46 142 25 00 0.00	<u>SEPT</u> 117 <u>159</u> 42 <u>210</u> B FUE 33 3,0 59 1,7 0 0.0	OCT 128 0.00 0.00 0.00 L T.V.C 88 6 30 3 00 0	NOV 105 0.00 0.00 0.00 0.00 0.00 0.00 0.00	DEC TO 118 1 0.00 0.00 0.001 C/TRAC 2 19	218 ,090 218 ,090 TOR 4,980 9,484 0.00
SUMMARY JAN OWNER LABOR PROVIDED 121 TOTAL HOURS REQUIRED 0.00 COST OF HIRED LABOR 0.00 COST OF HIRED LABOR 0.00 COST RESULTS DE TRACTOR #1 9, TRACTOR #2 8, TRACTOR #3 0.1	FEB 106 35 0 0.00 PREC. 1 108 7, 037 6, 00 0.	MAR 123 13 0 0.00 0 0.00 NT. IN 356 4 398 4 00 0.0 TOTAL	<u>APR</u> 130 0.00 0.00 <u>0.00</u> 15. T/ 90 1, 27 1, 00 0	MAY 132 33 0.00 0.00 0.00 AXES 335 190 0.00 COSTS	<u>JUNE</u> 138 169 31 <u>156</u> T.F.C. 18,289 16,052 0.00 34,34	<u>JULY</u> 169 296 127 633 REP4 3,1 2 1,4 0 0. 40.64	ATIONS AUG 167 185 18 91 140 46 142 25 00 0.00 TOT	<u>SEPT</u> 117 <u>159</u> 42 <u>210</u> B FUE 33 3,0 59 1,7 0 0.0 TAL VAR	OCT 128 0.00 0.00 0.00 L T.V.C 88 6 30 3 00 0 IABLE 0	NOV 105 0.00 0.00 0.00 0.00 0.00 0.00 0.00	DEC TO 118 1 0.00 0.00 0.001 C/TRAC 2 19 10,12	218 ,090 218 ,090 TOR 4,980 9,484 0.00 23.08

Figure 5. Machinery Complement Selection Results.

associated equipment are \$16,052.01. Total variable costs for Tractor #2 excluding hired labor are \$3431.61. Tractor #2's machinery consists of a moldboard plow, tandem disk, planter, cultivator, windrower, baler and two grain drills. The total operating cost including hired labor for this typical farm is \$45,554.05. The total operating cost is \$49.73 per acre.

## Sample Farm (A Third Iteration)

The second iteration complement is feasible; but it may be possible to lower the costs by changing the complement. In the second iteration complement, Tractor #2 could be used more hours. Thus it may be possible to lower the complement cost by using a smaller Tractor #1 and shift more of the fieldwork to Tractor #2.

Figure 6 shows the input data changes for this iteration. A 140 horsepower tractor replaces the 155 horsepower tractor and an additional portion of the moldboard plowing (25 percent) is shifted to Tractor #2. This is an acceptable strategy if the hours of tractor use do not exceed user specified limits.

Figure 7 presents the results of the revised data. Annual tractor hours are 546 and 333 for Tractor #1 and Tractor #2, respectively. Neither tractor is used more than 200 hours per month and no additional tractor hours are needed by either Tractor #1 or #2 to complete field operations. Thus, this tractor-farm equipment complement is able to complete field practices in a timely manner. The complement shift from iteration two to iteration three reduces fixed costs from \$34341 to 32634; variable costs excluding hired labor increase from \$10,123 to \$10,182; hired labor charges increase from \$1,090 to \$1,430. The total cost per acre is \$48.30. Reducing the size of Tractor #1 and shifting some

						TRACTOR SIZES								
CROP ACTIVI	TIES			ACE	RES	(IN PTO HP)								
WHEAT				820	)		95							
ALFALFA				C	)		105							
GRAIN SORGHU	UM			23	3		125							
CORN				C	)		140							
PEANUTS				C	)		155							
SOYBEANS				C	)				17	'5				
COTTON				C	)				20	0				
SUDAN HA				73	3									
	# 1		#2		#3									
TRACTOR HP	140	)	95					<u>CC</u>	ST DA	TA ENT	RY			
MACHINE		S	PECIFI	ED				CU	RRENT	FUEL	COST	0.80		
OPERATION			RACTO	OR US/	AGE			INT	EREST	<b>RATE</b>		0.090		
OFFSET	100	%	0%	6	0%			CU	RRENT	Γ TAX F	RATE	0.010		
CHISEL	100	%	0%	6	0%			INS	SURAN	CE RAT	Έ	0.006		
LAND PLANE	100	%	0%	6	0%			HIF	REDWA	AGE RA	TE	5.00		
SWEEP PLOW	100	%	0%	6	0%									
M.B. PLOW	509	%	50%	6	0%									
SWEEP COND.	100	%	0%	6	0%									
CULTIPACKER	100	%	0%	6	0%									
TANDEM DISK	509	%	50%	6	0%									
SPRINGTOOTH	100	%	0%	6	0%									
S.HARROW	100	%	09	6	0%									
DRILL	0	%	100%	6	0%									
PLANTER	0	%	100%	6	0%									
CULTIVATOR	0	%	100%	6	0%									
ROTARY HOE	0	%	100%	6	0%									
SPRAYER	0	%	100%	6	0%									
S.SHREDDER	100	%	0%	6	0%									
ROT.MOWER	0	%	100%	6	0%	•								
WINDROWER	0	%	100%	6	0%									
BALER	0	%	100%	6	0%									
OWNER-														
OPERATOR														
MONTHLY											550			
LABOR JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	001	NOV	DEC	TOTAL		
HOURS								÷.						
AVAIL-	100			400			4.07	· · · · -						
ABLE 121	106	123	130	132	138	169	167	.117	128	105	118	1,436		
TRACTOR														
	200	200	200	200	200	200	200	200	200	200	200			
1 ERIOD 200	200 /	200	200	200	200	200	200	200	200	200	200			

Figure 6. Tractor Horsepower Selection.

TOTAL TRACTOR

								0007	OOT		DE0 -	<b>OT 4</b>
HOURS HP JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC T	UTAL
TRACTOR #1												
140 0.00	15	5	0.00	13	127	167	148	71	0.00	0.00	0.00	546
TRACTOR #2												
95 0.00	22	7	0.00	18	39	130	35	81	0.00	0.000	0.00	333
TRACTOR #3												
0 0.00	0.00	0.00	0.00	0.00	0.00	0.0	0 0.00	0.00	0.00	0.000	0.00	0.00
NOTE: IF NA (NOT	AVAIL	ABLE) I	S RELA	YED IN	N THE P	RESULT	S ROW					
CHECK HORSEPOV	VER RE	QUIREN	/ENTS F	FOR PT	O DRIVE	EN EQU	IPMENT.					
TRACTORS USED	WITH 54	40 PTO	EQUIP	MENT C		<b>EXCE</b>	ED 140 ł	IORSE	POWE	R.		
IN ADDITION, S.HA	RROW	IS NOT	OFFER	ED FO	R TRAC	TORS	EXCEED	ING 15	5 HP.			
TRACTOR HOUR												
REQUIREMENT												
SUMMARY JAN	FEB	MAR	APR	IL MA	AY JI	JNE	JULY	AUG	SEPT	OCT	NOV	DEC
MAXIMUM TRACTO	OR											
HOURS PER												
MONTH (HP) 200	200	200	200	20	0 2	00	200	200	200	200	200	200
EXCESS CAPACITY	Y											
TRACTOR #1	•											
140 200	185	195	200	1.9	17	73	33	52	120	200	200	200
TRACTOR #2	, , , , , , ,	195	200	10		10	00	52	123	200	200	200
05 200	179	103	200	1 9	22	161	70	165	110	200	200	200
TRACTOR #3	170	195	200	10	-	.01	70	105	119	200	200	200
		0	0		0	0	0	0	0	•	0	0
						IBACT						
AD HISTMENTS MA									QUINE		301010	
	I DE N	EEDED	10.00			OFER	ATIONS	•				
				MAN		1111.12		OFDT	007			OTAL
SUIVINARY JAN	FEB	MAR	APR	IVIA Y	JUNE	JULY	AUG	SEPT	001	NOV	DEC I	UTAL
	100	100	100	100		100	107		100	4.6.5		100
PHOVIDED 121	106	123	130	132	138	169	167	117	128	105	1181	,436
TOTAL HOURS				<b>.</b> -			• • •					
REQUIRED 0.00	41	14	0.00	35	183	327	201	167	0.00	0.00	0.00	967
HIRED LABOR												
HOURS												
REQUIRED 0.00	0.00	0.00	0.00	0.00	45	158	34	50	0.00	0.00	0.00	286
COST OF HIRED												
LABOR 0.00	0.00	0.00	0.00	0.00	224	789	169	248	0.00	0.00	0.001	,430
COST RESULTS DEF	PREC. I	NT. IN	IS. T	AXES	T.F.C.	REP	AIR LUE	B. FUE	L T.V.C	С. Т.О	.C./TRA	CTOR
TRACTOR #1												
8,3	01 6,	639 4	43 1	,199	16,58	1 3,0	66 440	2,93	33 6,	439	2	3,020
TRACTOR #2												-
8,0	37 6.	398 4	27 1	,190	16,05	2 1,6	84 266	1,79	91 3.	743	1	9,795
TRACTOR #3	_,								- /			
0.0	o 0.	00 0	.00 0	.00	0.00	0.0	0.00	0.00	0.0	00		0.00
		TOTAL	FIXED	COSTS	32 6	633.50	TOT	AL VAR		COSTS	10.1	82.24
TOTAL OPERATING C	OST INC		HIRED	LABOR	44 3	245.34		C	OST PF	RACRE	, 1	48.30
				2.0011				0				

Figure 7. Machinery Complement Selection Results.

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of the fieldwork will result in a savings of \$1.43 per acre. Although \$1.43 per acre seems a small amount, the annual savings for a 916 acre farm are \$1,308.71.

### Summary

In this chapter, the statewide machinery complements were introduced. The farm machinery selection model was presented as a complete computer software package that can provide farm managers a tool to aid in machinery selection and management problems. The program flow as a system was also presented and explained. The discussion of input requirements and output interpretation can serve as a user's guide. Input for a sample farm was presented and results reviewed. The machinery complement for the sample farm was revised in sequential steps, demonstrating the process for using the program.

#### CHAPTER IV

## RESULTS

Machinery selection is based on a number of factors including the number of acres farmed, the crops grown, the amount of operator labor and the time available to complete field operations. Oklahoma has a wide variety of climatic conditions, soil types, and cropping systems. This dictates a wide range for feasible machinery complements.

Complements for 24 different typical farm situations are analyzed in this chapter. Each situation is in one of the eight regions of Oklahoma. The analysis looks at different size farms according to regional location.

### The Average Farm Enterprise Mix

There has always been considerable difficulty in identifying an average farm for study. Statistical averages hide the enterprise specialization found among individual farms of a given size. Also, representative or typical farm organizations generally change as farm size increases. Measuring economies of scale from farms of varying size may be biased since some of the economies may be derived from changes in enterprise mix. This study selects complements for farms of three sizes in each region. However, broad statements about economies of scale are inappropriate, since an exhaustive set of machine sizes for the small farm were not available.

#### Regions Of The State

Information concerning crops grown and farm size is obtained from an earlier study, Typical Oklahoma Farms. In this study, Oklahoma was divided into eight regions based on soils, crops grown and crop acreage as reported in the 1982 Agricultural Census (19), and Oklahoma Agricultural Statistics (13) published annually. County data was aggregated into region summaries. From the data, "average" small, medium and large farm sizes were specified for each state area. The allocation was made so that somewhere between 5 and 10 percent of the regional farmland was in small farms. The remaining 90 to 95 percent was divided as equally as possible between medium and large farms.

### Farm Descriptions For Each Area

To better comprehend the typical farms concept, region by region descriptions give some insight about the crop practices and the level of diversification in each area. Figure 8 shows the specific state areas which make up each region. Table XIV presents the average number of acres of each crop grown in each region. The average columns are four-year averages of data taken from Oklahoma Agricultural Statistics. The average can be used for comparing highly specialized areas, such as north central Oklahoma, to more diversified farming operations such as northeastern Oklahoma. Since this data is an average of all similar sized operations in the regions, there is a high probability that no such farm of this nature exists.


Figure 8. Regions of the State

# TABLE XIV

# CROP SUMMARY FOR OKLAHOMA TYPICAL FARMS

Location: PanhandleRegion 1								
	Farm Size in Acres							
Crop	Sm	all	Mediur	n	Larg	ge		
•	Average	Typical	Average	Typical	Average	Typical		
WHEAT	97	100	337	346	1545	1585		
SORGHUM	28	28	98	98	450	450		
ALFALFA	0	0	0	0	0	0		
SUDAN HAY	′ 3	3	12	12	53	53		
COTTON	0	0	0	0	0	0		
PEANUTS	0	0	0	0	0	0		
CORN	0	0	0	0	0	· 0		
SOYBEANS	0	0	0	0	0	0		
OATS	1	0	3	0	13	0		
BARLEY	2	0	6	0	27	0		
TOTAL								
ACREAGE	131	131	456	456	2088	2088		

Location: West-Northwest--Region 2

		¥				
WHEAT	62	65	208	219	801	820
SORGHUM	2	0	5	0	19	23
ALFALFA	0	0	2	0	6	0
SUDAN HAY	5	5	17	19	67	73
COTTON	0	0	1	0	4	0
PEANUTS	0	0	0	0	0	0
CORN	0	0	0	0	0	0
SOYBEANS	0	0	0	0	0	0
OATS	1	0	4	0	14	0
BARLEY	0	0	1	0	5	0
TOTAL						
ACREAGE	70	70	238	238	916	916

Location: SouthwestRegion 3							
Farm Size in Acres							
Crop	Small		Med	dium	Larg	Large	
·	Average	Typical	Average	Typical	Average	Typical	
WHEAT	61	62	224	230	827	848	
SORGHUM	2	3	7	8	28	28	
ALFALFA	2	2	8	8	31	31	
SUDAN HAY	′5	5	18	18	66	66	
COTTON	11	10	39	38	141.7	142	
PEANUTS	0	0	0	0	0.4	0	
CORN	0	0	0	0	0.1	0	
SOYBEANS	0	0	0	0	0	0	
OATS	1	0	5	0	17.2	. 0	
BARLEY	0	0	1	0	3.5	0	
TOTAL							
ACREAGE	82	82	302	302	1114.9	1115	
Location: No	orth Centra	IRegion 4					
WHEAT	71	73	280	286	964	984	
SORGHUM	1	2	6	6	20	24	
ALFALFA	3	2	11	11	34	34	
SUDAN HAY	′5	5	20	20	69	69	
COTTON	0	0	0	0	1.2	0	
PEANUTS	0	0	0	0	0.1	0	
CORN	0	0	0	0	1.4	0	
SOYBEANS	0	0	0	0	1.2	0	
OATS	1	0	3	0	10.5	0	
BARLEY	1	0	3	0	9.6	0	
TOTAL							
ACREAGE	82	82	323	323	1,111	1,111	

TABLE XIV (continued)

			Farm Size i	n Acres		
Crop	S	mall	Med	dium	Larg	e
•	Average	Typical	Average	Typical	Average	Typical
WHEAT	10	12	90	95	376	398
SORGHUM	0	0	3	3	12	12
ALFALFA	2	2	14	14	59	59
SUDAN HAY	<b>′</b> 4	4	34	34	143	143
COTTON	1	0	5	5	18.3	18
PEANUTS	0	0	1	1	4.6	6
CORN	0	0	0	0	0	0
SOYBEANS	0	0	1	1	6.3	6
OATS	1	0	5	0	21.4	0
BARLEY	0	0	0	0	1.4	0
TOTAL		10	4 5 0	4 5 0	<b></b>	0.40
ACREAGE	18	18	153	153	642	642
Location: No	ortheastR	egion 6				
WHEAT	7	8	27	29	199	217
SORGHUM	4	4	14	14	104	104
ALFALFA	1	2	5	5	33	33
SUDAN HAY	10	9	36	36	256	256
COTTON	0	0	0	0	0.1	0
PEANUTS	0	0	0	0	2.9	3
CORN	0	0	0	0	0	0
SOYBEANS	3	3	11	11	84.4	85
OATS	1	0	2	0	17.3	0
BARLEY	0	0	0	0	1.3	0
TOTAL	00	00	05	05	608	600
ACREAGE	20	20	90	90	090	698

Location: South Central--Region 5

Location: Ea	stRegion	7					
Crop	p Smal		I Medium		Larg	Large	
•	Average	Typical	Average	Typical	Average	Typical	
WHEAT	4	4	7	8	34	37	
SORGHUM	0	0	1	1	7	7	
ALFALFA	0	0	1	1	7	7	
SUDAN HAY	12	12	37	37	185	185	
COTTON	0	0	0	0	0	0	
PEANUTS	0	0	0	0	0	0	
CORN	0	0	0	0	1.9	0	
SOYBEANS	2	2	6	6	28.4	30	
OATS	0	0	1	0	2.7	0	
BARLEY	0	0	0	0	0	0	
TOTAL							
ACREAGE	18	18	53	53	266	266	
Location: So	utheastR	legion 8					
WHEAT	4	4	12	13	88	97	
SORGHUM	0	0	1	1	10	10	
ALFALFA	1	1	. 3	3	18	18	
SUDAN HAY	10	10	32	32	234	234	
COTION	0	0	0	0	1	0	
PEANUIS	0	0	2	2	11	12	
CORN	0	0	1	1	5.9	6	
SOYBEANS	2	2	5	5	38.3	38	
OATS	0	0	1	0	8.7	0	
BARLEY	0	Ο.	0	0	0.1	0	
IOTAL	4 -	47		- 7	445	445	
ACREAGE	1/	17	57	57	415	415	

# TABLE XIV (continued)

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Typical farms are modifications of average situations to develop realistic farm organizations. This is accomplished by grouping many of the smaller crop acreages with similar, larger acreage crops to form logical or typical farms for this study. In Table XIV, the average column represents mean crop acreages for the three respective farms while the typical column presents the adjusted crop acreage used in this study.

## Generation Of The Models

The machinery selection program was used to identify feasible solutions for the three farms in each region. All model runs are presented in Appendix A.

## Results From Model Runs

The types of machinery needed to complete regional field operations vary according to crops grown in each area. Table XV presents the tractor size and related farm equipment for each typical farm. Region by region analysis shows the need for only one tractor on all small and medium size farms. However, as many as three tractors are needed for some large farms. It is important to emphasize this program deals strictly with crop production. The model does not take into consideration tractor use for livestock and other common farmstead practices. If livestock is a major activity on the farm some of the fixed costs associated with tractor ownership can be allocated to livestock operations. This would reduce the fixed costs allocated to land and lower machinery costs per acre. It is assumed that all costs are allocated to the crop activities.

# TABLE XV

# MACHINERY COMPLEMENTS FOR TYPICAL FARM REGIONS

	Farm Siz	e		
Small	Medium		Large	
95	95	155	155	125
x	x	x	х	
x	X	x	х	
x	x	x	х	
x	X	x	х	x
x	X	x	х	
x	x	x	х	x
x	x	x	х	
x	x			x
x	x			x
x	x			x
•				
X	х			x
x	x			x
	Small 95 x x x x x x x x x x x x x x x x x x	Farm SizeSmallMedium9595xx	Farm SizeSmallMedium9595155XX	Small 95Medium 95Large 155xxx

Region: West-Northwest	•			
-		Farm Size		
	Small	Medium	Large	e
Tractor Size (HP)	95	95	140	95
EQUIPMENT				
OFFSET	x	X	X	
CHISEL	X	X	x	
LAND PLANE				
SWEEP PLOW	x	Х	x	
MOLDBOARD PLOW	x	х	х	x
SWEEP CONDITIONER	х	X	х	
CULTIPACKER				
TANDEM DISK	х	х	x	х
SPRINGTOOTH	x	х	х	
SPIKE HARROW				
GRAIN DRILL	x	х	x	
ROW PLANTER				x
ROW CULTIVATOR				x
ROTARY HOE				
SPRAYER				
STALK SHREDDER				
ROTARY MOWER				
WINDROWER	x	x		х
BALER	x	x		x

TABLE XV (Continued)

Region: Southwest				
C C		Farm Size		
	Small	Medium	Lar	ge
Tractor Size (HP)	95	95	125	95
EQUIPMENT				
OFFSET	x	×	Х	
CHISEL	x	x	х	
LAND PLANE	x	x	х	
SWEEP PLOW	X	x	х	
MOLDBOARD PLOW	x	x	х	х
SWEEP CONDITIONER	x	x	Х	
CULTIPACKER	x		Х	
TANDEM DISK	X	x	Х	х
SPRINGTOOTH	x	x	Х	
SPIKE HARROW	x	x	Х	
GRAIN DRILL	x	X		x
ROW PLANTER	x	X		x
ROW CULTIVATOR	x	x		x
ROTARY HOE				
SPRAYER	X	x		x
STALK SHREDDER				
KUTAKY MOWER				
WINDROWER	x	x		x
BALER	X	X		X

•

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TABLE XV (Continued)

Region: North Central				
•		Farm Size		
	Small	Medium	Larg	ge
Tractor Size (HP)	95	95	140	105
EQUIPMENT				
OFFSET	х	x	x	
CHISEL	X	x	x	х
LAND PLANE	x	x	х	
SWEEP PLOW	x	×	х	
MOLDBOARD PLOW	X	x	х	x
SWEEP CONDITIONER	x	X	x	
CULTIPACKER	x	x	x	
TANDEM DISK	X	x	x	х
SPRINGTOOTH	x	x	x	
SPIKE HARROW	х	x		
GRAIN DRILL	x	x		х
ROW PLANTER	х	x		х
ROW CULTIVATOR	x	x		х
ROTARY HOE				
SPRAYER				
STALK SHREDDER				
ROTARY MOWER				
WINDROWER	x	x		x
BALER	x	X		x

TABLE XV (Continued)

Region: South Central			
		Farm Size	
	Small	Medium	Large
Tractor Size (HP)	95	95	125
EQUIPMENT			
OFFSET	X	x	x
CHISEL	X	X	x
LAND PLANE	x	x	x
SWEEP PLOW	x	x	x
MOLDBOARD PLOW	x	X	x
SWEEP CONDITIONER	x	x	x
CULTIPACKER	x	X	X
TANDEM DISK	x	x	x
SPRINGTOOTH	×	x	X
SPIKE HARROW	x	x	X
GRAIN DRILL	x	x	x
ROW PLANTER		X	X
ROW CULTIVATOR		x	x
ROTARY HOE		x	x
SPRAYER	,	x	x
STALK SHREDDER			
ROTARY MOWER			
WINDROWER	x	X	X
BALER	X	X	X

TABLE XV (Continued)

Region: Northeast				
		Farm Size		
	Small	Medium	Larg	ge
Tractor Size (HP)	95	95	95	95
<u>EQUIPMENT</u>				
OFFORT				
	X	X	x	
CHISEL	X	x		х
LAND PLANE	х	x	х	
SWEEP PLOW	x	x	x	
MOLDBOARD PLOW	x	x	х	х
SWEEP CONDITIONER	x	x	Х	
CULTIPACKER	x	x	х	
TANDEM DISK	х	x	х	х
SPRINGTOOTH	x	x	х	
SPIKE HARROW	x	x	х	
GRAIN DRILL	x	x		х
ROW PLANTER	x	x		x
ROW CULTIVATOR	x	x		x
ROTARY HOE			х	
SPRAYER				
STALK SHREDDER				
ROTARY MOWER				
WINDROWER	x	×		~
BALER	X	×	Y	^
	~	^	^	

TABLE XV (Continued)

Region: East			
		Farm Size	
	Small	Medium	Large
Tractor Size (HP)	95	95	95
EQUIPMENT			
OFFSET	x	x	X
CHISEL	х	x	X
LANDPLANE	x	x	X
SWEEP PLOW	x	x	X
MOLDBOARD PLOW	x	x	X
SWEEP CONDITIONER	x	x	X
CULTIPACKER		x	X
TANDEM DISK	x	X	X
SPRINGTOOTH	x	x	X
SPIKE HARROW		x	X
GRAIN DRILL	x	· <b>x</b>	X
ROW PLANTER	x	x	x
ROW CULTIVATOR	x	x	X
ROTARY HOE			
SPRAYER			
STALK SHREDDER			
ROTARY MOWER			
WINDROWER	x	x	x
BALER	Х	X	X

TABLE XV (Continued)

.

Region: Southeast			
•		Farm Size	
	Small	Medium	Large
Tractor Size (HP)	95	95	95
EQUIPMENT			
OFFSET	х	x	X
CHISEL	х	X	X
LAND PLANE	х	x	X
SWEEP PLOW	x	x	Х
MOLDBOARD PLOW	x	x	X
SWEEP CONDITIONER	x	×	X
CULTIPACKER	x	x	·x
TANDEM DISK	x	x	X
SPRINGTOOTH	х	X	Х
SPIKE HARROW	X	x	х
GRAIN DRILL	х	x	Х
ROW PLANTER	x	×	X
ROW CULTIVATOR	х	X	Х
ROTARY HOE			
SPRAYER			
STALK SHREDDER		x	X
ROTARY MOWER			
WINDROWER	x	x	X
BALER	X	x	х

TABLE XV (Continued)

## Economies Of Scale In Farm Machinery Use

Economies of scale in farm machinery use result from several sources. Preeminent, are economies related to spreading the relatively high fixed costs over a greater number of acres. Maintaining satisfactory timeliness may limit economies of scale at some point. Another source of scale economies is the labor-saving and consequently cost-saving aspect of operating larger, higher capacity equipment. And finally, there are possible economies of size in purchasing farm machinery per unit of capacity. The cost per horsepower for large tractors is generally less than for small tractors. The existence of economies of scale can definitely be demonstrated by comparing the small, medium, and large typical farms in this study. Table XVI presents a comparison of the fixed and variable costs for each size farm in each region. As farm sizes increase from small to large in each respective region, fixed costs per acre

# TABLE XVI

	ΤY	PICAL FAR	M SIZE PE	R ACRE COS	STS			
	SM	IALL	MED	NUM	LARGE			
Region	Fixed	Variable	Fixed	Variable	Fixed	Variable		
1	152.07	7.69	43.69	10.63	26.32	13.61		
2	250.38	6.95	73.64	8.82	35.62	12.68		
3	274.82	8.09	74.62	10.67	30.74	16.38		
4	267.50	7.36	67.91	9.95	32.60	14.40		
5	1085.58	8.22	150.43	11.29	43.23	17.47		
6	843.66	9.25	230.90	11.19	42.45	18.56		
7	1106.74	10.14	413.87	12.46	82.46	18.85		
8	1290.30	10.20	406.22	11.97	55.79	20.75		

# OKLAHOMA TYPICAL FARMS FIXED AND VARIABLE COST COMPARISONS

decrease and variable costs per acre increase. Increases in per acre variable costs can be explained by the growing need for hired labor as farm size increases. These results are exaggerated because a 95 horsepower tractor is the smallest permitted. If smaller tractors were incorporated into the machinery complements the fixed cost per hour would decline relative to the medium and large farms, but the economies of scale would still be obvious. Table XVII presents the farm size, tractors used, excess tractor capacity, and per acre total operating costs associated with the large farms in each region. If farm managers are considering expansion, tractor excess capacity is a crucial factor. If additional land were added to an existing farm, the manager must determine if existing machinery has the needed capacity. Tractor excess capacity is the smallest remaining hour number in any critical time period. The only farm with "too much" excess capacity is the Northeast farm where 112 hours is available in the "most restrictive" time period. This could imply that the machinery complement could handle considerably more than 698 acres and not be over used. All of the other complements have limited excess capacity. If the farm size were increased, a larger machinery complement could be needed.

## Implications Of Diversification And Specialization

This section discusses the differences between a diversified farm in southwest Oklahoma and a specialized farm in north central Oklahoma. Although the farm sizes are comparable and each farm has two tractors, the diversified farm uses a 95 and 125 horsepower tractor and the specialized farm uses a 105 and 140 horsepower tractor. This indicates that farm organization has a substantial effect on the machinery complements. Diversified farms can

## TABLE XVII

# COMPARING SELECTED TRACTORS FOR LARGE TYPICAL FARMS

	Tractor	Tractor	Tractor Excess	Total Cost
Region	(HP)	Hour Use	Capacity (Hours)	Per Acre
Panhandle	95	555	38	
2088 Acres	155	582	25	
	155	606	9	
				39.93
West-Northwest	95	333	45	
916 Acres	140	546	8	
				48.30
Southwest	95	537	17	
1115 Acres	125	752	5	
				47.12
North Central	105	463	15	
1111 Acres	140	623	19	
				47.00
South Central	125	797	15	
642 Acres				60.70
Northeast	95	467	112	
698 Acres	95	· 608	44	
				61.02
East	95	464	93	
266 Acres				101.32
Southeast	95	701	46	
415 Acres				76.54

often get by with smaller machinery used in many time periods whereas specialized farms need larger machinery to get all work done in a relatively few periods. Note that the costs per acre for these two complements are both about the same \$47.00 and \$47.12 per acre, even though the complements are quite different. The specialized farm has larger tractors but relatively few implements. The diversified farm has smaller tractors but, requires more implements. In this case the costs per acre are about the same.

# Chapter Summary

An attempt was made in this chapter to estimate the costs for typical farms in all regions of Oklahoma. With the aid of typical farm examples, the program user can better comprehend the factors which are important in constructing a machinery complement. Perhaps the most important fact demonstrated in this chapter is that machinery costs vary widely. It is not appropriate to build enterprise budgets which do not take into account farm size or crop mix for the farm being examined.

# CHAPTER V

# SUMMARY AND CONCLUSIONS OF THE STUDY

## Summary

The management conditions faced by farmers today are distinguished by uncertainty and change. A farmer can not regulate the price of inputs which are purchased or the weather which may govern his daily decisions. However, when choosing and operating farm machinery, he has wide range of choices permitting the substitution of capital for labor, and thereby controlling, in some respects, his vulnerability to unfavorable weather.

The primary objective of this study was to find and apply an appropriate analytical solution procedure and to incorporate that procedure into a convenient computerized system for determining feasible machinery complements using a micro computer. The objective was accomplished using Lotus 1-2-3. This spreadsheet template can be used to input, retrieve, modify, and store relevant machinery cost and performance information. With this program, a user can easily select a machinery complement within the constraints of the subject farm's unique management characteristics, determine if the machinery and labor combination can complete timely field operations, and compute the machinery cost associated with production activities.

This program does not select an optimal solution. It simply serves as a planning tool to aid producers in selecting farm equipment. The model can be

used in an iterative fashion to select lower cost complements. However, the lowest cost complement possible cannot be assured. Using the model's feasibility and cost estimating capability, this model can help production managers, Extension personnel, and others extend their knowledge of farm machinery complements and their costs.

## Suggestions For Further Research

This machinery selection model is a practical, understandable and easy to use decision aid for assisting agricultural producers in their machinery selection decisions. Further research is needed for expanding the model. For example, the data in the current model does not allow for tractor sizes smaller than 95 horsepower. This proved to be a critical factor in machinery for small, conventional farming operations where the need for larger tractors and related equipment does not exist. Second, the budgets containing field operations used in this study were selected from a distribution of crop activities for one area of Oklahoma. For example, many field operations conducted in northwest Oklahoma are not performed elsewhere (e.g. using diversified primary tillage such as moldboard plowing, sweep plowing, and chisel plowing all in the same year), but the wheat budget for northwest Oklahoma was used for the whole state. It would improve the model if the field operations were regionalized. Third, adding machinery information for additional crops would make the model more useful to farmers with a wider range of crop enterprises. Finally, if livestock operations were included in the model, costs associated with tractor ownership could be more appropriately allocated.

A study of the impacts of changes in interest rates, wage rates, and labor availability could be undertaken. For a selected farm or farms, the "best"

complement associated with alternative interest rates, wage rates, and labor hours could be determined. These results may prove helpful for estimating expected future machinery costs. A similar study would examine changes in timeliness requirements. This would really be a study of the costs of requiring field work to be completed in fewer hours each month. Such a study could be combined with a study of the costs of not getting field work done in a timely fashion.

If the model is adopted as a useful piece of software, it could be made easier to use by installing additional macros for data entry and locating desired output. also, more machinery complements with more alternative machines would be desirable to permit farmers with special demands to use the model.

# Conclusion Of The Study

Commercial farms are larger and more highly capitalized than ever. Operating margins will continue to decline, while the cost of hired, skilled labor will continue to escalate. Agricultural producers need good tools to make crucial, effective management decisions. Innovative production decisions are needed to enhance net farm returns. This machinery selection model allows producers to examine alternative sets of farm machinery with a minimum of time effort and then choose a complement that is most efficient for their operation.

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# APPENDIX

#1

CROP ACTIVITIES	ACRES
	1 505
WHEAT	1,585
ALFALFA	0
GRAIN SORGHUM	450
CORN	0
PEANUTS	0
SOYBEANS	0
COTTON	0
SUDAN HAY	53

#2

#3

TRACTOR HP	155	155	12	5
MACHINE		SPI	ECIFIE	===== 2D
OPERATION		TR#	ACTOR	USAGE
OFFSET	50%	50%	0%	
CHISEL	50%	50%	08	
LAND PLANE	100%	0%	0%	
SWEEP PLOW	50%	50%	08	
M.B. PLOW	40%	40%	20%	
SWEEP COND.	50%	50%	08	
CULTIPACKER	100%	0%	0%	
TANDEM DISK	40%	30%	30%	
SPRINGTOOTH	50%	50%	0%	
S.HARROW	0%	100%	0%	
DRILL	0%	0%	100%	
PLANTER	0%	08	100%	
CULTIVATOR	0%	0%	100%	
ROTARY HOE	0%	08	100%	
SPRAYER	0%	0%	100%	
S.SHREADER	100%	0%	0%	
ROT.MOWER	0%	0%	100%	
WINDROWER	0%	08	100%	
BALER	08	0%	100%	

TRACTOR SIZES	
(IN PTO HP)	
95	
105	
125	
140	
155	
175	
200	

COST DATA ENTRY

CURRENT FUEL COST0.80INTEREST RATE0.090CURRENT TAX RATE0.010INSURANCE RATE0.006HIRED WAGE RATE5.00

OWNER-OPERATOR													
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
		_====											
HOURS													
AVAILABLE	143	123	109	151	162	15	167	167	133	159	120	133	1,592
MAXIMUM TRACTO	OR HO	URS											
PER TIME													
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200	

Figure 9. Machinery Complement Selection Results for Large Panhandle.

TRACTOR	ર													
HOURS	HP	JAN	FEB	MAR	APR	MAY	JUNE	JUL	Y AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR	R #1													
	155	0.00	57	19	0.00	39	111	19:	1 129	62	0.00	0.00	0.00	607
TRACTOR	R #2													
	155	0.00	57	14	0.00	34	111	175	5 129	62	0.00	0.00	0.00	582
TRACTOR	₹#3													
	125	0.00	29	18	0.00	95	102	162	2 25	125	0.00	0.00	0.00	555
NOTE:	IF NA	A (NOT	AVA	LIABLE	) IS R	ELAYED	) IN T	HE RES	ULTS RC	W.				
CHECK H	IORSEI	POWER	REQU	IREMEN	IS FOR	PTO I	DRIVEN	EQUIP	MENT.					
TRACTOR	RS USI	ED WIT	H 54	O PTO 1	EQUIPM	ENT CA	ANNOT	EXCEED	140 HC	RSEPOWER	ξ.			
IN ADDI	TION	. S.HA	RROW	IS NO	r offe	RED FO	DR TRA	CTORS	EXCEEDI	NG 155 H	IP.			
TRACTOR	HOUL	R												
REQUIRE	MENT													
SIIMMARY	,	TAN	FFB	ма	R 1	DR	MAY	TIME	V.TITT.	AUC	SEDT	007	NOV	DEC
MAYTMIN	<u>π</u> τρ <u>λ</u> (	TOP	2 80		<u> </u>		1411	CONL	0011	1100	0111		100	
HOURS	DED													
MONTU	200 20	20	200	20	· ·	200	200	200	200	200	200	200	200	200
MONTH (			200	20			200	200	200	200	200	200	200	200
EXCESS	CAPAC	111												
TRACTOR	< #⊥		1 4 2	1.0			1.61		0		1.0.0			
	155 2	200	143	18	1 2	200	161	89	9	71	138	200	200	200
TRACTOR	( #2													
	155 2	200	143	18	6 2	200	166	89	25	21	138	200	200	200
TRACTOR	(#3													
	125 2	200	1/1	18	2 2	200	105	98	38	175	75	200	200	200
NOTE:	IF	NEGA	TIVE	NUME	BERS	APPEAR	RIN	THE	TRACTO	R HOUR	REQUI	REMEN	T SU	MMARY
ADJUSTN	MENTS	MAY B	E NE	EDED TO	O COMP	LETE H	TELD	OPERAT	IONS.					
LABOR														
SUMMARY	(	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
OWNER I	LABOR													
PROVIDE	ED 1	143	123	109	151	162	158	167	167	133	159	120	133	1,592
TOTAL H	IOURS													
REQUIRE	ED (	0.00	157	57	0.00	184	356	581	311	273	0.00	0.00	0.00	1,919
HIRED I	LABOR													
HOURS														
REQUIRE	ED (	0.00	34	0.00	0.00	22	198	414	144	140	0.00	0.00	0.00	952
COST OF	HIR	ED												
LABOR	(	0.00	170	0.00	0.00	110	990	2,069	722	700	0.00	0.00	0.00	4,760
COST RE	SULTS	S DEI	PREC.	INT.	INS.	TAXES	T.F.	C. REI	PAIR L	UB. FUE	L T.V.	с.т.о.	C./TR	ACTOR
TRACTOR	₹ #1	9,	108	7,356	490 1	,335	18,28	39 4,3	108 5	42 3,61	3 8,26	3	2	6,552
TRACTOR	R #2	9,	108	7,356	490 1	,335	18,28	39 3,8	334 5	20 3.46	6 7.81	9	2	6,108
TRACTOR	₹ #3	9,	196	7,335	489	,357	18,3	17 3.	769 4	95 3.30	3 7.56	7	2	5,945
				TO	TAL FT	XED CO	OSTS 5	4,954	70 т	OTAL VAR	TABLE	COSTS	23.6	49.61
TOTAL C	PERA	FING C	OST	INCLUD	ING HI	RED LA	ABOR 8	3,364.	61	CC	OST PER	ACRE	_0,0	39.93

Figure 9. (Continued)

CROP ACTIVI	TIE	S	ACRES	5				TRACT (IN P	OR SIZ	ES			
WHEAT			820	) )					95				
ALFALFA			0						105				
GRAIN SORGH	UM		23						125				
CORN			0						140				
PEANUTS			0						155				
SOYBEANS			0						175				
COTTON			0						200				
SUDAN HAY			73										
		#1	#2		#3								
TRACTOR HP		140	95					COST	DATA E	NTRY			
MACHINE	E SPECIFIED				ED			CURRE	NT FUE	L COST		0.80	
OPERATION			TRA	CTOR	USAGE	GE INTEREST RATE				C	.090		
OFFSET		100%	0%		0%			INSUR	ANCE R	ATE	C	.006	
CHISEL		100%	0%		0%			HIRED	WAGE	RATE		5.00	
LAND PLANE		100%	08		0%								
SWEEP PLOW		100%	0%		0%								
M.B. PLOW		50%	50%	5	0%								
SWEEP COND.		100%	0%		08								
CULTIPACKER		100%	0%		0%								
TANDEM DISK		50%	50%	5	0%								
SPRINGTOOTH		100%	0%		0%								
S.HARROW		100%	0%		0%								
DRILL		0%	100%	5	0%								
PLANTER		0%	100%	5	0%								
CULTIVATOR		0%	100%	5	0%								
ROTARY HOE		0%	100%	5	0%								
SPRAYER		0%	100%	5	0%								
S.SHREADER		100%	0%		08								
ROT.MOWER		0%	100%	5	0%								
WINDROWER		0%	100%	5	08								
BALER		0%	100%	5	0%								
OWNER-OPERA	TOR											* ·	
MONTHLY													
LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS													
AVAILABLE	121 	106	123	130 	132	138	169	167	117	128	105	118 	1,436
MAXIMUM TRA	CTO	R HOUI	RS										
PER TIME	200	200	200	200	200	200	200	200	200	200	200	200	

Figure 10. Machinery Complement Selection Results for Large Northwest.

TRACTOR													
HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
140	0.00	15	5	0.00	133	127	16	7 148	71	0.00	0.00	0.0	0 546
TRACTOR #2													
95	0.00	22	7	0.00	18	39	130	35	81	0.00	0.00	0.0	0 333
TRACTOR #3													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00	0.0	0 0.00	0.00	0.0	00.00
NOTE: IF N	IA (NO	T AVAI	JIABLE)	IS RE	LAYED	IN TH	HE RESU	LTS ROW	•				
CHECK HORSE	POWER	REQUI	REMENT	S FOR	PTO D	RIVEN	EQUIPM	ENT.					
TRACTORS US	ED WI	TH 540	PTO E	QUIPME	ENT CA	NNOT I	EXCEED	140 HOR	SEPOWER	•			
IN ADDITION	, s.H	ARROW	IS NOT	OFFER	RED FO	R TRAC	CTORS E	XCEEDIN	G 155 H	Ρ.			
TRACTOR HOU	IR												
REQUIREMENT													
SUMMARY	JAN	FEB	MAR	Al	PR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
MAXIMUM TRA	CTOR												
HOURS PER													
MONTH (HP)	200	200	200	20	00	200	200	200	200	200	200	200	200
EXCESS CAPA	CITY												
TRACTOR #1													
140	200	185	195	20	00	187	73	33	52	129	200	200	200
TRACTOR #2													
95	200	178	193	20	00	182	161	70	165	119	200	200	200
TRACTOR #3													
0	0	0	0		0	0	0	0	0	0	0	0	0
NOTE: IF 1	NEGATI	VE NU	MBERS A	APPEAR	IN T	HE TRA	ACTOR H	OUR REC	UIREMEN	T SUM	MARY A	DJUST	MENTS
MAY BE NEED	DED TO	COMPI	ETE FI	ELD OF	PERATI	ONS.							
LABOR													
SUMMARY	JAN	FEB	MAR A	PR M	AY	JUNE	JULY	AUG	SEPT	ОСТ	NOV	DEC	TOTAL
OWNER LABOR	2				,					••			
PROVIDED	121	106	123 1	30 1	32	138	169	167	117	128	105	118	1.436
TOTAL HOURS	121	100	120 1	50 1.	52	100	100	107	±± /	120	105	110	1,450
REQUIRED	0.00	41	14 0	.00	35	183	327	201	167	0 00	0 00	0 00	967
HIPED LABOR	<u>, , , , , , , , , , , , , , , , , , , </u>		11 0			100	521	201	107	0.00	0.00	0.00	201
HIKED LABOR	(												
DECULDED	0 00	0 00	0 00	0 00 0	0 00	45	150	24	E 0	0 00	0 00	0 00	296
COST OF HI	0.00	0.00	0.00	0.00 0	0.00	40	129	34	50	0.00	0.00	0.00	280
LABOR		0 00	0 00		0 00	224	700	1.00	240	0 00	0 00	<u> </u>	1 420
LABOR	0.00	0.00	0.00	0.00 0		224	/89	169	248	0.00	0.00	0.00	1,430
COST RESULT	S DE	PREC.	INT.	INS. 1	TAXES	T.F.	C. REPA	AIR LU	B. FUEL	T.V.C	C. T.O.	C./TR	ACTOR
TRACTOR #1	8,	301	6,639	443 ]	1,199	16,58	1 3,00	bb 44	0 2,933	6,43	9	2	3,020
TRACTOR #2	8,	037	6,398	427 1	1,190	16,05	1,68	84 26	9 1,791	3,74	3	1	9,795
TRACTOR #3	0.	00	0.00	0.00 (	0.00	0.00	0.00	0.0	0 0.00	0.00			0.00
			TOT	AL FIX	XED CO	DSTS	32,633	.50 TO	TAL VAR	IABLE	COSTS	10,1	82.24
TOTAL OPERA	TING	COST I	NCLUDI	NG HIF	RED LA	BOR	44.245	.34	CO	ST PER	ACRE		48.30

Figure 10. (Continued)

,

CROP ACTIVITI	ES	2	ACRES					(IN PT	O HP)				
WHEAT			848						95				
ALFALFA			31						105				
GRAIN SORGHUM			28						125				
CORN			0						140				
PEANUTS			0						155				
SOYBEANS			0						175				
COTTON			142						200				
SUDAN HAY			66										
	#1		#2	. 4	ŧ3								
TRACTOR HP	125		95					COST D	ATA EN	TRY			
MACHINE			SPECIF	IED				CURREN	T FUEL	COST		0.80	
OPERATION		:	TRACTO	R USA	GE			.090					
OFFSET	1009	 k	08	(	<b>)</b> %			INSURANCE RATE 0.006					
CHISEL	1009	ł	08	(	)¥			HIRED	WAGE R	ATE		5.00	
LAND PLANE	1009	ł	0%	(	<b>)</b> %								
SWEEP PLOW	1009	ł	08	(	D&								
M.B. PLOW	50%	5	50%	(	<b>2</b> %								
SWEEP COND.	1009	ł	0%	(	) <del>%</del>								
CULTIPACKER	1009	ł	0%	(	)¥								
TANDEM DISK	50%	5	50%	(	۶C								
SPRINGTOOTH	1009	ł	08	(	38								
S.HARROW	1009	ł	0%	(	<b>3</b> 80								
DRILL	08	5	100%	(	0%								
PLANTER	08	5	100%		<b>3</b> 80								
CULTIVATOR	08	5	100%	(	08								
ROTARY HOE	0 9	5	100%	(	98								
SPRAYER	0 9	5	100%	(	<b>3</b>								
S.SHREADER	1009	ł	0%		0%								
ROT.MOWER	0 9	5	100%		C۶								
WINDROWER	0 9	5	100%		0%								
BALER	08	5	100%	(	0%								
OWNER-OPERATO	R												
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS													
AVAILABLE	100	89	137	110	101	119	171	167	102	96	90	104	1,282
MAXIMUM TRACTO	OR HO	URS											
PER TIME													
PERTOD	200	200	200	200	200	200	200	200	200	200	200	200	

TRACTOR SIZES

Figure 11. Machinery Complement Selection Results for Large Southwest.

TRACTOR

TRACTOR													
HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
125	25	17	6	0.00	78	149	195	174	84	0.00	0.00	25	752
TRACTOR #2													
95	0.00	22	72	0.00	70	75	183	47	99	0.00	0.00	33	537
TRACTOR #3													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00
NOTE: IF N	IA (NO	T AVA	LIABLE)	IS R	ELAYED	) IN TH	HE RESU	LTS ROW	•				
CHECK HORSE	POWER	REQU	IREMENI	S FOR	PTO D	RIVEN	EQUIPM	ENT.					
TRACTORS US	SED WI	TH 54	O PTO E	QUIPM	ENT CA	NNOT 1	EXCEED	140 HOR	SEPOWE	з.			
IN ADDITION	, s.H	ARROW	IS NOT	OFFE	RED FO	OR TRAG	CTORS E	XCEEDIN	G 155 I	HP.			
TRACTOR HOU	JR												
REQUIREMENT	2												
SUMMARY	JAN	FEB	MAI	х д	PR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
MAXIMIM TRA	CTOR												
HOURS PER	10101												
MONTH (HD)	200	200	200		200	200	200	200	200	200	200	200	200
EXCESS CADA		200	200		.00	200	200	200	200	200	200	200	200
EACESS CAPP	ACTIT												
125	175	100	10		00	100	51	5	25	116	200	200	175
	1/5	103	194	± 2	00	122	JT.	5	25	TIO	200	200	1/5
TRACTOR #2	200	170	1.0.1			120	105	17	150	101	200	200	1 67
95	200	1/8	19.	3 2	200	130	125	17	123	101	200	200	101
TRACTOR #3	•	•			•	0	0	0	^	0	0	0	0
	U	U 11	WDDDC	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	U 				UTDEME				
NOTE: IF I	NEGATI	LVE NU	IPMERS	APPLAR		IL IRA	ACTOR IN	JUK KLQ	UIREME	NI SUM	MARI	100051	LMENIS
MAI BE NEEL	DED TO	COMP	LEIE FI	ELD O	PERAL	LONS.							
LABOR	~~ ~~									007			
SUMMARY	JAN	FEB	MAR A	APR M		JUNE	JULI	AUG	SEPT	001	NOV	DEC	TOTAL
OWNER LABOR	<i>د</i>												
PROVIDED	100	89	137 1	10 1	.01	119	171	167	102	96	90	104	1,282
TOTAL HOURS	5												
REQUIRED	27	42	14 0	0.00 1	.63	246	417	416	244	201	0.00	64	1,418
HIRED LABOF	ર												
HOURS													
REQUIRED 0	.00 0	.00	0.00 0	0.00	62	127	246	77	99	0.00	0.00	0.00	611
COST OF HIF	RED												
LABOR 0	.00 0	.00	0.00 0	0.00 3	810	637 1	,228	384	497	0.00	0.00	0.00	3,056
COST RESULT	IS DE	EPREC.	INT.	INS.	TAXES	T.F.	C. REPA	AIR LU	B. FUE	L T.V.	с т.о	.C./TF	RACTOR
TRACTOR #1	8,	974	6,914	461 1	,276	17,625	4,95	51 54	2 3,61	2 9,10	94	2	26,729
TRACTOR #2	8,	301	6,662	444 1	,246	16,652	3,13	38 38	7 2,57	7 6,10	01	2	22,753
TRACTOR #3	0.	.00	0.00 0	.00	0.00	0.00	0.00	0.0	0.00	0.00	)		0.00
			TO	TAL FI	XED CO	OSTS	34,277	.59 TO	TAL VAL	RIABLE	COSTS	15,2	204.80
TOTAL OPERA	TING	COST	INCLUDI	NG HI	RED LA	ABOR	52,538	.25	C	OST PE	R ACRE	:	47.12

.

Figure 11. (Continued)

CROP ACTIVITI	i	ACRES					(IN PT	O HP)					
WHEAT			984						95				
ALFALFA			34						105				
GRAIN SORGHUM			24						125				
CORN			0						140				
PEANUTS			0						155				
SOYBEANS			0						175				
COTTON			0						200				
SUDAN HAY			69										
	#1		#2		#3								
TRACTOR HP	140		105					COST D	ATA EN	TRY			
MACHINE OPERATION		SPECIFIED TRACTOR USAGE					CURREN	IT FUEL ST RAT	COST E	0	0.80		
								CURREN	IT TAX	RATE	0	.010	
OFFSET	100%	5	0%		0%			INSURA	NCE RA	TE	0	.006	
CHISEL	50%		50%		0%			HIRED	WAGE R	ATE		5.00	
LAND PLANE	100%	5	0%		0%								
SWEEP PLOW	100%	5	0%		08								
M.B. PLOW	50%		50%		0%								
SWEEP COND.	100%	5	0%		0%								
CULTIPACKER	100%	ĩ	08		0%								
TANDEM DISK	50%		50%		0%								
SPRINGTOOTH	100%	5	0%		0%								
S.HARROW	100%	ī	0%		08								
DRILL	0%		100%		0%								
PLANTER	0%		100%		08								
CULTIVATOR	0%		100%		08								
ROTARY HOE	0%		100%		0%								
SPRAYER	0%		100%		0%								
S.SHREADER	100%	5	0%		0%								
ROT.MOWER	0%		100%		08								
WINDROWER	0%		100%		08								
BALER	0%		100%		0%								
OWNER-OPERATO	R												
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS							-						
AVAILABLE	100	99	142	103	101	126	153	185	117	119	94	98	1,339
MAXIMUM TRACT	OR												
HOURS PER													
TIME PERIOD	200	200	200	200	200	200	200	200	200	200	200	200	

TRACTOR SIZES

Figure 12. Machinery Complement Selection Results for Large North Central.

TRACTOR													
HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC 3	TOTAL
TRACTOR #1													
140	0.00	15	5	0.00	13	153	169	181	87	0.00	0.00	0.00	623
TRACTOR #2													
105	0.00	19	7	0.00	34	54	185	49	114	0.00	0.00	0.00	463
TRACTOR #3													
0	0.00	0.00	0.0	0	0.0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	0	0.00											
NOTE: IF NA (NOT AVALIABLE) IS RELAYED IN THE RESULTS ROW.													
CHECK HORSEPOWER REQUIREMENTS FOR PTO DRIVEN EQUIPMENT.													
TRACTORS USED WITH 540 PTO EQUIPMENT CANNOT EXCEED 140 HORSEPOWER.													
IN ADDITION, S.HARROW IS NOT OFFERED FOR TRACTORS EXCEEDING 155 HP.													
TRACTOR HO	UR												
REQUIREMEN	Т												
SUMMARY	JAN	FEB	MA	R A	PR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
MAXIMUM TR	ACTOR												
HOURS PER													
MONTH (HP)	200	20	20	0 2	00	200	200	200	200	200	200	200	200
EXCESS CAP	ACITY												
TRACTOR #1													
140	200	185	19	5 2	00	187	47	31	19	113	200	200	200
TRACTOR #2									17	110	200	200	200
105	200	181	19	3 2	0.0	166	146	15	151	86	200	200	200
TRACTOR #3	200					200	110	10	101	00	200	200	200
0	0	0		0	. 0	0	0	0	0	0	0	0	0
NOTE: IF	NEGAT	TVE NU	MBERS	APPEAR	R TN T	HE TRA	CTOR H	OUR REC		NT SUM	MARY A		IENTS
MAY BE NEE	DED TO	COMP	LETE F	TELD O	PERATI	ONS.			2021101101			000011	
LABOR													
SUMMARY	JAN	FEB	MAR	APR M	AY	JUNE	Y.IUL	AUG	SEPT	OCT	NOV	DEC	
OWNER LABO	R												
PROVIDED	100	99	142	103 1	01	126	153	185	117	119	94	98 .	1 330
TOTAL HOUR	S		112	10,0 1	01	120	100	100	11,	110	24		1,555
REQUIRED	0 00	37	13	0 00	51	228	390	254	221	0 00	0 00	0 00'	104
HIDED INDO	D.00	57	13	0.00		220	590	234	221	0.00	0.00	0.00.	1,194
HIKED LADO	ĸ												
REQUIRED	0 00	0 00	0 00	0 00 0	00	102	227	60	104	0 00	0 00	0 00	510
COST OF UT		0.00	0.00	0.00 0	.00	102	231	69	104	0.00	0.00	0.00	512
LABOR		0 00	0 00	0 00 0	00	E10 1	105	2445	20	0 00	0 00	0 00/	5.60
LABOR DECUL	0.00	0.00	0.00	<u></u>	.00	<u>512 I,</u>	105	3445	20	0.00	0.00	0.002	2,562
COST RESUL	TS D	EPREC.	INT.	INS.	TAXES	T.F.(	C REPA	AIR LU	B. FUE	L T.V.C	5.T.O.	C./TRA	ACTOR
TRACTOR #1	9	,488	1,121	1 616	,423	19,14	6 3,9	14 503	3,35	1 7,16	-	2,	6913
TRACTOR #2	8	,570	0,788	453 1	,201	17,07	1 2,8	15 3/3	2,48	1 5,67	5	22	2, /46
TRACTOR #3	0	.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00	0.00			0.00
			TO	TAL FI	XED CC	STS	36,217	.40 TC	TAL VAF	RIABLE	COSTS	13,44	12.10
TOTAL OPER.	ATING	COST	INCLUD	ING HI	RED LA	BOR	52,221	.11	CC	OST PEF	ACRE	4	17.00

Figure 12. (Continued)

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CROP ACTIVITIE	S	А	CRES					TRACTO	R SIZE: O HP)	S				
WHEAT			398					95						
ALFALFA			59						105					
GRAIN SORGHUM			12						125					
CORN			0						140					
PEANUTS			6											
SOYBEANS			6						1/5					
CUTTON UNY	UDAN HAY								200					
SUDAN HAI			145											
	#1		#2	4	<del>‡</del> 3									
TRACTOR HP	125		0					COST D	ATA EN	TRY				
ODEDATION			SPEC	TETED	ACE.			TNUEDE	T LOFF	CUST F	0	0.80		
OPERATION			TRAC	TOR US	DAGE			CUPPEN	DI KAI			.090		
OFFE	1009				 ne			TNCURREN	NCE DA	TT	0	.010		
CHISEI	1007	5 F	0% 0%					HIRED WAGE RATE				5.00		
LAND DIANE	1004	•	0%	, ,	)% )%			HIRED	MAGE N	AID				
SWEEP PLOW	1009	k	0%		08									
M.B. PLOW	1009	k i	0%	(	0%									
SWEEP COND.	1009	5	0%	(	0% 0%									
CULTIPACKER	1009	5	08		0%									
TANDEM DISK	1009	5	0%	(	0%									
SPRINGTOOTH	1009	5	0%		08									
S.HARROW	1009	5	0%		0%									
DRILL	1009	5	0%		0%									
PLANTER	1009	5	0%		0%									
CULTIVATOR	1009	5	0%	(	0%									
ROTARY HOE	1009	ł	08		0%									
SPRAYER	1009	2	0%	1	0%									
S.SHREADER	1009	5	0%		0%									
ROT.MOWER	1009	ł	0%		08									
WINDROWER	1009	6	0%	(	0%									
BALER	1009	6	0%		0%									
OWNER-OPERATOR	2													
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL	
AVAILABLE	95	84	127	97	98	115	164	171	103	106	86	91	1,246	
MAXIMUM TRACTO	OR HO	URS												
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200		

Figure 13. Machinery Complement Selection Results for Large South Central.

HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
125	3	55	18	4	94	176	153	185	103	0.00	0.00	6	797
TRACTOR #2	2												
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR #3	1												
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE: IF NA (NOT AVALIABLE) IS RELAYED IN THE RESULTS ROW													
CHECK HORSEPOWER REQUIREMENTS FOR PTO DRIVEN EQUIPMENT.													
TRACTORS U	TRACTORS USED WITH 540 PTO EQUIPMENT CANNOT EXCEED 140 HORSEPOWER.												
IN ADDITION, S.HARROW IS NOT OFFERED FOR TRACTORS EXCEEDING 155 HP.													
TRACTOR HC	UR												
REQUIREMEN	г				·~								
SUMMARY	JAN	FEB	. MA	R	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
MAXIMUM TR	RACTOR												
HOURS PER													
MONTH (HP)	200	200	20	0	200	200	200	200	200	200	200	200	200
EXCESS CAP	PACITY												
TRACTOR #1	-												
125	197	145	18	2	196	106	24	47	15	97	200	200	194
TRACTOR #2	2												
0	0	0		0	0	0	0	0	0	0	0	0	0
TRACTOR #3	3												
0	0	0		0	0	0	0	0	0	0	0	0	0
NOTE: IF	NEGAT	IVE N	UMBERS	APPEA	R,IN T	HE TRA	ACTOR HO	DUR REQ	UIREMEN	IT SUM	MARY A	DJUST	MENTS
MAY BE NEE	EDED T	O COMP	LETE F	IELD C	PERATI	ONS.							
LABOR													
SUMMARY	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
OWNER LABO	DR												
PROVIDED	95	84	127	97	,98	115	164	171	103	106	86	91	1,246
TOTAL HOUF	RS												
REQUIRED	3	60	20	5	104 :	193	168	204	114	0.00	0.00	7	877
HIRED LABO	DR												
HOURS													
REQUIRED	0.00	0.00	0.00	0.00	6	78	4	33	11	0.00	0.00	0.00	131
COST OF HI	RED												
LABOR	0.00	0.00	0.00	0.00	28 3	392	19	163	53	0.00	0.00	0.00	655
COST RESUL	LTS D	EPREC	. INT.	INS.	TAXES	T.F.	C. REPA	IR LUI	B.FUEL	T.V.C	. т.о.	C./TR	ACTOR
TRACTOR #1	. 14	,123	10,848	3,723	2,062	27,7	56 6,1	63 3,8	25 574	10,56	51	3	8,317
TRACTOR #2	2 . 0	.00	0.00	0.00	0.00	0.0	0 0.0	0.00	0.00	0.00			0.00
TRACTOR #3	3 0	.00	0.00	0.00	0.00	0.0	0 0.0	0.0	0.00	0.00			0.00
			TC	TAL F	XED CC	STS	27,756	.40 TO	TAL VAR	IABLE	COSTS	10,5	61 <b>.</b> 05
TOTAL OPER	RATING	COST	INCLUD	ING HI	RED LA	BOR	38,972	.07	cc	ST PE	R ACRE		60.70

Figure 13. (Continued)

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CROP ACTIVIT	IES		ACRES					(IN PTO HP)						
WHEAT			2:	 17					95					
ALFALFA			3	33					105					
GRAIN SORGHU	M		10	04					125					
CORN				0					140					
PEANUTS				3					155					
SOYBEANS			8	35					175					
COTTON				0					200					
SUDAN HAY			25	56										
	#1		<del>#</del> 2		#3									
TRACTOR HP	95		95					COST D	ATA EN	ITRY				
MACHINE			SPE	CIFIED	)			CURREN	T FUEL	, COSI		0.80		
OPERATION			TRA	CTOR U	JSAGE			INTERE	ST RAT	Έ	(	0.090		
								CURREN	TAX TAX	RATE	(	0.010		
OFFSET	1009	5	0%		0%			INSURA	NCE RA	TE	(	0.006		
CHISEL	08	;	100%		0%			HIRED	WAGE F	ATE		5.00		
LAND PLANE	1009	5	0%		0%									
SWEEP PLOW	1009	5	0%		0%									
M.B. PLOW	509	s	50%		0%									
SWEEP COND.	1009	5	0%		0%									
CULTIPACKER	1009	k .	0%		0%									
TANDEM DISK	50%	Ś	50%		08									
SPRINGTOOTH	1009	5	0%		0.8									
S.HARROW	1009	5	0%		0%									
DRILL	08	;	100%		0%									
PLANTER	0%	;	100%		0%									
CULTIVATOR	0%	;	100%		0%									
ROTARY HOE	1009	Ś	0%		0%									
SPRAYER	1009	Ś	0%		0%									
S.SHREADER	1009	\$	08		0%									
ROT.MOWER	1009	\$	0%		0%									
WINDROWER	0%		100%		0%									
BALER	100%	5	0%		08									
OWNER-OPERAT	OR													
MONTHLY LABO	R JAN	I FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL	
HOURS					<b></b>									
AVAILABLE	93	85	112	91	97	113	162	173	103	110	84	83	1,223	
MAXIMUM TRAC	TOR H	OURS												
PER TIME										_				
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200		

TRACTOR SIZES

Figure 14. Machinery Complement Selection Results for Large Northeast.

TRACTOR
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HOURS HP	JAN	FEB	MAR	APR M	AY JI	JNE JUI	LY AUG	SEPT	OCT	NOV	DEC	TOTAL	
TRACTOR #1													
95	0.00	83	28	0.69 10	09 1	43 47	156	41	0.00	0.00	0.00	608	
TRACTOR #2													
95	0.00	83	28	26	90	79 88	46	27	0.00	0.00	ο.	00467	
TRACTOR #3													
0	0.00	0.00	0.00	0.00 0	.00 0	.00 0.0	0.0	0 0.00	0.00	0.00	0.00	0.00	
NOTE: IF	NOTE: IF NA (NOT AVALIABLE) IS RELAYED IN THE RESULTS ROW.												
CHECK HORS	CHECK HORSEPOWER REQUIREMENTS FOR PTO DRIVEN EQUIPMENT.												
TRACTORS U	SED W	ITH 54	O PTO EQ	UIPMENT	CANNO	T EXCEE	D 140 HO	RSEPOWE	R.				
IN ADDITION, S.HARROW IS NOT OFFERED FOR TRACTORS EXCEEDING 155 HP.													
TRACTOR HOUR													
REQUIREMEN	Т												
SUMMARY	JAN	FEB	MAR	APR	MA	Y JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	
MAXIMUM TR	ACTOR												
HOURS PER													
MONTH (HP)	200	200	200	200	20	0 200	200	200	200	200	200	200	
EXCESS CAP	ACTTY												
TRACTOR #1													
95	200	117	172	199	9	1 57	153	44	159	200	200	200	
TRACTOR #2	200	11,	1/2	100	2	1 0,	100		109	200	200	200	
95	200	117	172	174	11	0 121	112	154	173	200	200	200	
TRACTOR #3	200	11,	1,5	1,1				101	1.0	200	200	200	
0	0	0	0	0		0 0	0	0	0	0	0	0	
NOTE: TE	NEGAT		IMBERS A	PPEAR	и тне	TRACTOR	HOUR RE	OUTREME	NT SUM	MARY	DJUST	MENTS	
MAY BE NEE	DED T		LETE FIF	LD OPER	ATTONS		noon nu	2011(BIID			100001	1121110	
LABOR	000 1	000112		<u></u>	11 1 0 110								
SUMMARY	TAN	FFB		D MAY	TUN	F JULY	AUG	SEDT	OCT	NOV	DEC	ποπατ.	
OWNED INDO	D		innix ni	IN PHAL	001	<u> </u>	100	00111	001	1101	000	TOTAL	
DROUTDED	л 02	05	112 0	1 07	112	162	172	103	110	9.4	03	1 222	
TOTAL HOUR	93	65	112 9	1 97	115	102	1/5	103	110	04	00	1,225	
DEOUTDED	5 0 00	102	62 2	0 210	244	140	222	75	0 00	0 00	0 00	1 1 9 9	
REQUIRED	D. 1101	103	02 2	9 219	244	140	222	15	0.00	0.00	0.00	1,105	
HIRED LABO	R HOU			0 122	1 2 1	0 00	4.0	0 00	0 00	0 00	0 00	401	
REQUIRED	0.00	98 (	0.00 0.0	122	131	0.00	49	0.00	0.00	0.00	0.00	401	
COST OF HI	RED	4.0.1			657	0 00	0.47	0 00	0 00	0 00	0 00	2 004	
LABOR	0.00	491 (	0.00 0.0	609	657	0.00	247	0.00	0.00	0.00	0.00	2,004	
COST RESUL	TS D	EPREC.	INT. I	NS. TAX	ES T	.F.C. RI	EPAIR L	UB. FUE	L T.V.	C.T.O	.C./TR	ACTOR	
TRACTOR #1	7	,337	6,117 4	08 1,1	40 15	,002 4,	,045 33	3 2,21	9 6,59	7	2	1,599	
TRACTOR #2	7	,482	5,725 3	82 1,0	42 14	,631 2,	398 25	5 1,70	3 4,35	6	1	.8,987	
TRACTOR #3	. 0	.00	0.00 0	.00 0.0	0 0.	00 0.	.00 0.	00 0.00	0.00	)		0.00	
			TOTA	AL FIXED	COST	5 29,6	32.79 T	OTAL VA	RIABLE	COSTS	10,9	52.87	
TOTAL OPER	ATING	COST	INCLUDIN	IG HIRED	LABOR	R 4258	9.62	С	OST PE	R ACRE		61.02	

Figure 14. (Continued)
CROP ACTIVIT	IES	P	ACRES				(IN PTO HP)						
WHEAT		37						95					
ALFALFA			7						105				
GRAIN SORGHU	м		7						125				
CORN			0						140				
PEANUTS			0						155				
SOYBEANS			30						175				
COTTON			0						200				
SUDAN HAY		1	.85										
	#1		#2		#3								
TRACTOR HP	95		0					COST D	ATA EN	TRY			
MACHINE			SPEC	IFIED				CURREN	IT FUEL	COST		0.80	
OPERATION			TRAC	TOR U	SAGE			INTERE	ST RAT	É	0	.090	
								CURREN	IT TAX	RATE	0	.010	
OFFSET	100%		0%		0%			INSURA	NCE RA	TE	0	.006	
CHISEL	100%		0%		0%			HIRED	WAGE R	ATE		5.00	
LAND PLANE	100%		0%		0%								
SWEEP PLOW	100%		08		0%								
M.B. PLOW	100%		0%		0%								
SWEEP COND.	100%		0%		0%								
CULTIPACKER	100%		0%		0%								
TANDEM DISK	100%		0%		08								
SPRINGTOOTH	100%		0%		08								
S.HARROW	100%		08		0%								
DRILL	100%		0%		08								
PLANTER	100%		0%		08								
CULTIVATOR	100%		0%		0%								
ROTARY HOE	100%		0%		0%								
SPRAYER	100%		0%		0%								
S.SHREADER	100%		08		0%								
ROT.MOWER	100%		0%		0%								
WINDROWER	100%		08		0%								
BALER	100%		0%		08.								
OWNER-OPERAT	OR						•						
MONTHLY LABO	R JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAI
HOURS												******	
AVAILABLE	84	65	102	77	92	101	169	162	89	102	75	71	1,118
MAXIMUM TRAC	TOR HO	DURȘ											
PER TIME	200	200	200	200	200	200	200	200	200	200	200	200	
	200	200	200	200	200	200	200	200	200	200	200	200	

TRACTOR SIZES

Figure 15. Machinery Complement Selection Results for Large East.

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TRACTOR

IRACIOR													
HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
95	0.00	89	30	9	90	107	24	103	13	0.00	0.00	0.00	464
TRACTOR #2													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR #3				••••									
0	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00		0 00
NOTE	0.00	0.00	0.00		0.00	TN	0.00		0.00	0.00	0.00	0.00	0.00
NOTE: IF	NA (N	DT AVAI	LIABLE)	IS RE	LAYED	IN TR	IE RESU	LTS ROW	•				
CHECK HORS	EPOWE	R REQU.	LREMENT	S FOR	PTO D	RIVEN	EQUIPM	ENT.		_			
TRACTORS U	SED W	ITH 540	) PTO E	QUIPME	ENT CA	NNOT H	EXCEED	140 HOR	SEPOWE	R.			
IN ADDITIO	N, S.	HARROW	IS NOT	OFFEF	RED FO	R TRAC	CTORS E	XCEEDIN	G 155	HP.			
TRACTOR HO	UR												
REQUIREMEN	Т												
SUMMARY	JAN	FEB	MAR	A	PR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
MAXIMUM TR	ACTOR												
HOURS PER													
MONTH (HP)	200	200	200	2	00	200	200	200	200	200	200	200	200
EXCESS CAD	ACTTV	200	200			200	200	200	200	200	200	200	200
EACESS CAP	ACITI												
TRACTOR #1					~ ~								
95	200	111	170	1	91	110	93	1/6	97	187	200	200	200
TRACTOR #2													
0	0	0	0		0	0	0	0	0	0	0	0	0
TRACTOR #3													
0	0	0	0		0	0	0	0	0	0	0	0	0
NOTE: IF NE	EGATIV	E NUME	BERS AP	PEAR	IN THE	E TRAC	TOR HO	UR REQU	JIREMEN	IT SUM	MARY A	ADJUST	MENTS
MAY BE NEE	DED T	O COMPI	LETE FI	ELD OF	PERATI	ONS.							
LABOR													
SUMMARY	JAN	FEB	MAR A	PR M	AY J	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
OWNER LABO	R												
PROVIDED	84	65	102 7	7 9	2 -	101	169	162	89	102	75	71	1 118
TOTAL HOUR	5	00	102 /	, ,	۰ د		105	102	0,5	102	15	11	1,110
DECUIDED	0 00	00	<b>33</b> 1	0 0	0 -	110 '	26	114	14	0 00	0 00	0 00	E 1 1
REQUIRED	- 0.00	98	33 I	9	9	118	20	114	14	0.00	0.00	0.00	511
HIRED LABO	R												
HOURS													
REQUIRED	0.00	33 0	.00 0.	00	7	17	0.00	0.00 0	0.00	0.00	0.00	0.00	57
COST OF HI	RED												
LABOR	0.00	164 0	.00 0.	00 3	5	84	0.00	0.00 0	0.00	0.00	0.00	0.00	283
COST RESUL	TS D	EPREC.	INT.	INS. 7	TAXES	T.F.C	. REPAI	IR LUB	. FUEL	T.V.C	. T.O	.C./TR	ACTOR
TRACTOR #1	1	1,126	8,616	574 1	L,619	21,93	5 2,78	5 254	1,693	4,732		2	6,667
TRACTOR #2	0	.00	0.00	0.00 0	0.00	0.00	0.00	0.00	0.00	0.00		_	0.00
TRACTOR #3	0	.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00
			TOT	AL ET	(FD CO	STC	21 035	10 00	TAT 17	TAPTE	COST		31 76
	A TT TTC	COC				POP	21,900	16	IND VAL			DE 1	01 22
TOTAL OFER	UTTING	CO31 1	TROTODI	NG HIF	AL ULA	DOK	20,900	. 10		COST	ык АС	L 1	UI.J2

Figure 15. (Continued)

CROP ACTIVITIES	ACRES	
WHEAT	97	
ALFALFA	18	
GRAIN SORGHUM	10	
CORN	6	
PEANUTS	12	
SOYBEANS	38	
COTTON	0	
SUDAN HAY	234	

TRAC	CTOR	SIZES	
(IN	PTO	HP)	
	9	95	
	10	05	
	12	25	
	14	40	
	15	55	
	17	75	
	20	00	

	#1		#2	-	#3								
TRACTOR HP	95		0					COST D	ATA EN	TRY			
MACHINE			SPEC	IFIED				CURREN	T FUEL	COST		0.80	
OPERATION			TRAC	TOR US	SAGE			INTERE	ST RAT	E	0	.090	
								CURREN	Τ ΤΑΧ	RATE	0	.010	
OFFSET	100	8	0%	(	)¥			INSURA	NCE RA	TE	0	.006	
CHISEL	1009	ક	0%	(	)%			HIRED	WAGE R	ATE	1	5.00	
LAND PLANE	100	8	0%	(	) <del>%</del>								
SWEEP PLOW	1009	8	0%	(	D&								
M.B. PLOW	100	8	0%	(	<b>)</b> %								
SWEEP COND.	1009	8	0%		<b>)</b> %								
CULTIPACKER	1009	8	0%	(	<b>)</b> %								
TANDEM DISK	1009	f	08	(	<b>)</b> %								
SPRINGTOOTH	1009	8	08	(	કે								
S.HARROW	1009	8	08	(	58								
DRILL	100	8	08	(	<b>)</b> %								
PLANTER	1009	8	08	(	<b>)</b> %								
CULTIVATOR	100	8	08	(	<b>)</b> %								
ROTARY HOE	1009	8	0%	(	<b>)</b> %								
SPRAYER	100	8	0%	(	) <del>%</del>								
S.SHREADER	100	8	80		) <del>8</del>								
ROT.MOWER	1009	8	0%	(	) <del>%</del>								
WINDROWER	100	8	0%	(	) <b>%</b>								
BALER	1009	8	0%	(	0%								
OWNER-OPERATO	R												
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS													
AVAILABLE	84	65	102	77	92	101	169	162	89	102	75	71	1,118
MAXIMUM TRACTO	OR HC	URS											
PER TIME													
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200	

Figure 16. Machinery Complement Selection Results for Large Southeast.

....

TRACTOR				·										
HOURS	HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR	#1													
	95	0.00	117	41	19	129	154	58	150	33	0.00	0.00	0.00	701
TRACTOR	#2													
	0	0.00	0.00	0.00	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR	#3													
	0	0.00	0.00	0.00	0.0	0 0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE:	IF	NA (N	OT AVA	LIABL	E) IS	RELAYE	D IN TH	HE RESU	JLTS ROW	1.				
CHECK H	ORS	EPOWE	R REQU	JIREME	NTS FO	R PTO I	DRIVEN	EQUIPM	MENT.					
TRACTOR	s u	SED W	ITH 54	O PTO	EQUIP	MENT C	ANNOT H	EXCEED	140 HOF	SEPOWER	۲.			
IN ADDI	TIO	N, S.1	HARROW	IS NO	OT OFF	ERED F	OR TRAC	CTORS E	XCEEDIN	IG 155 H	IP.			
TRACTOR	HO	UR												
REQUIRE	MEN	Т												
SUMMARY		JAN	FEB	8 M.	AR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
MAXIMUM	TR	ACTOR												
HOURS P	ER													
MONTH (	HP)	200	200	2	00	200	200	200	200	200	200	200	200	200
EXCESS	CAP	ACITY												
TRACTOR	#1													
	95	200	83	1	59	181	71	46	142	50	167	200	200	200
TRACTOR	#2													
	0	0	0		0	0	0	0	0	0	0	0	0	0
TRACTOR	#3													
	0	0	0		0	0	0	0	0	0	0	0	0	0
NOTE:	IF	NEGAT	IVE NU	UMBERS	APPE	ARINI	THE TRA	ACTOR H	OUR REC	UIREMEN	IT SUM	MARY A	ADJUST	MENTS
MAY BE	NEE	DED TO	COMP	LETE H	FIELD	OPERAT	IONS.							
LABOR														
SUMMARY		JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
OWNER L	ABO	R			1									
PROVIDE	D	84	65	102	77	92	101	169	162	89	102	75	71	1,118
TOTAL H	OUR	S												•
REQUIRE	D	0.00	129	45	21	142	170	63	165	36	0.00	0.00	0.00	771
HIRED L	ABO	R												
HOURS														
REQUIRE	D	0.00	64	0.00	0.00	50	69	0.00	3	0.00	0.00	0.00	0.00	185
COST OF	HI	RED							-					
LABOR		0.00	318	0.00	0.00	251	343	0.00	15	0.00	0.00	0.00	0.00	927
COST RE	SUL	TS D	EPREC	INT.	INS.	TAXES	T.F.C	. REPA	IR LUB	. FUEL	Τ.V.C	. т.о	.C./TR	ACTOR
TRACTOR	#1	1	1,663	9,150	610	1,732	23.15	4 4.7	45 383	2,256	7,684	1	3	0.838
TRACTOR	#2	0	.00	0.00	0.00	0.00	0.00	0.0	0 0.0	0 0.00	0.00			0.00
TRACTOR	#3	0	.00	0.00	0.00	0.00	0.00	0,0	0 0.0	0 0.00	0.00			0.00
		Ŭ		<u>т</u>	OTAL F	TXED C	OSTS	23 154	27 TO	TAL VAD	TABLE	COSTS	7 6	83 80
TOTAL O	PER	ATTNG	COST	INCLU	DING H	TRED LA	ABOR	31 765	. 41	-nu van	ST PF	R ACRE	,,0	76.54

Figure 16. (Continued).

CROP ACTIVITIE	A	CRES					(IN PT	O HP)					
WHEAT			346						95				
ALFALFA			0						105				
GRAIN SORGHUM			98						125				
CORN			0						140				
PEANUTS			0						155				
SOYBEANS			0						175				
COTTON			0						200				
SUDAN HAY			12										
	#1		#2	:	#3								
TRACTOR HP	95		0					COST D	ATA EN	TRY			
MACHINE			SPEC	IFIED				CURREN	T FUEL	COST		0.80	
OPERATION			TRAC	TOR U	SAGE	•		INTERE	ST RAT	Е	(	0.090	
								CURREN	IT TAX	RATE	(	0.010	
OFFSET	100	8	08		08			INSURA	NCE RA	TE	(	0.006	
CHISEL	1009	8	0%		08			HIRED	WAGE R	ATE		5.00	
LAND PLANE 100% SWEEP PLOW 100%			0%		08								
SWEEP PLOW 100%			0%		0%								
M.B. PLOW 100%			0%		0%								
SWEEP COND. 100%			0%		0%								
CULTIPACKER	100	8	0%		0%								
TANDEM DISK	100	8	08		0%								
SPRINGTOOTH	100	8	0%		08								
S.HARROW	1009	8	08		0%								
DRILL	100	8	0%		0%								
PLANTER	100	8	08		08								
CULTIVATOR	100	8	0%		0%								• ·
ROTARY HOE	1009	8	08		0%								
SPRAYER	100	8	0%		0%								
S.SHREADER	100	8	0%		0%								
ROT . MOWER	100	8	0%		0%								
WINDROWER	100	• }	0%		0%								
BALER	100	ł	08		08								
OWNER-OPERATOR	ł												
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
AVAILABLE	143	123	109	151	162	158	167	167	133	159	120	133	1,592
MAXIMUM TRACTO	OR HO	URS											
PER TIME													
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200	

TRACTOR SIZES

Figure 17. Machinery Complement Selection Results for Medium Panhandle.

TRACTOR

INACION													
HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
95	0.00	51	17	0.00	48	101	174	98	78	0.00	0.00	0.00	567
TRACTOR #2													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR #3													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE: IF	NA (N	OT AVA	LTABLE	) IS RE	LAYE	) TN T	HE RESU	LTS ROW					
CHECK HORS	EPOWE	R REOU	TREMEN	TS FOR	PTO D	RTVEN	EOUTPM	ENT.					
TRACTORS U	SED W	ттн 54		FOUTPME	NT CZ	NNOT	FXCEED	140 HOR	SEDOWER	, ,			
IN ADDITIO	NSI	HARROW	TS NO	T OFFE	ED EC		TODE F	VCEEDIN	C 155 L				
TR ADDIIIO	up	IIAKKOW	13 10	I OFFER	CD FC	ITAN	CIORS E	ACEEDIN	G 100 r	IF .			
TRACTOR HO	UR												
REQUIREMEN													
SUMMARY	JAN	FEE	s MA	AR A	PR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
MAXIMUM TR	ACTOR												
HOURS PER													
MONTH (HP)	200	200	20	0 20	00	200	200	200	200	200	200	200	200
EXCESS CAP	ACITY												
TRACTOR #1													
95	200	149	18	3 20	00	152	99	26	102	122	200	200	200
TRACTOR #2													
0	0	0		0	0	0	0	0	0	0	0	0	0
TRACTOR #3													
0	0	0		0	0	0	0	0	0	0	0	0	0
NOTE: IF NE	GATIV	E NUM	BERS A	PPEAR 1	IN TH	E TRAC	TOR HC	UR REQU	JIREMEN	T SUM	MARY A	ADJUST	MENTS
MAY BE NEE	DED TO	о сомр	LETE F	IELD OP	ERATI	ONS.		_					
LABOR													
SUMMARY	TAN	FFB	MAD		v	TINE		ALIC	CEDT	007	NOV	DEC	TOTAT
OWNER INPO	D	1 110	LIMIN	ALK PE	17	OUNE	0011	AUG	JEF I	001	NOV	DEC	IOIAL
DROUTDER	142	100	100	1 - 1 - 1	~ ~	150	1.67	1.67					
PROVIDED	143	123	109	151 10	52	158	16/	167	133	159	120	133	1,592
TOTAL HOUR	S												
REQUIRED	0.00	56	19	0.00 5	3	112	191	107	86	0.00	0.00	0.00	623
HIRED LABO	R												
HOURS													
REQUIRED	0.00	0.00	0.00	0.00 0.	.00	0.00	24	0.00	0.00	0.00	0.00	0.00	24
COST OF HI	RED												
LABOR	0.00	0.00	0.00	0.00 0.	.00	0.00	120	0.00	0.00	0.00	0.00	0.00	120
COST RESUL	TS D	EPREC.	INT.	INS. 1	AXES	T.F.C	. REPA	IR LUB	. FUEL	T.V.C	. т.о	.C./TR	ACTOR
TRACTOR #1	1	0,047	7,873	525 1,	476	19,921	2,350	0 310	2,067	4,727		2	4,648
TRACTOR #2	. (	0.00	0.00	0.00 0	.00	0.00	0.00	0.00	0.00	0.00	)		0.00
TRACTOR #3	(	0.00	0.00	0.00 0	.00	0.00	0.00	0.00	0.00	0.00	)		0.00
••••••••••••••••••••••••••••••••••••••			ΤО	TAL FTX	ED CO	STS 10	9,921.3	9 TOTA	L VARTA	BLE CO	OSTS	4 7	26.96
TOTAL OPER	ATING	COST	INCLUD	ING HIR	ED LA	BOR 24	4.768.2	7	C051	PER	ACRE	.,,	54 32

Figure 17. (Continued)

CROP ACTIVITIES		ACRES					(IN PI	TO HP)				
WHEAT		219						95				
ALFALFA		0					1	05				
GRAIN SORGHUM		0					1	25				
CORN		0					1	40				
PEANUTS		0					1	55				
SOYBEANS		0					1	75				
COTTON		0					2	00				
SUDAN HAY		19										
	#1	#2	:	#3								
TRACTOR HP	95	0					COST I	DATA EN	ITRY			
MACHINE		SPEC	CIFIED				CURREN	NT FUEI	_ COST		.80	
OPERATION		TRAC	CTOR US	SAGE			INTER	EST RAI	Έ	0.0	90	
OFFSET	100%	 0%		0%			CURREN	NT TAX	RATE	0.0	10	
CHISEL	100%	08		08			HIRED	WAGE F	ATE	5.	00	
LAND PLANE	100%	0%		0%						0.	00	
SWEEP PLOW	100%	0%		0%								
M.B. PLOW	100%	0%		08								
SWEEP COND.	100%	0%		0%								
CULTIPACKER	100%	08		0%								
TANDEM DISK	100%	0%		0%								
SPRINGTOOTH	100%	08		08								
S.HARROW	100%	0%		0%								
DRILL	100%	0%		0%								
PLANTER	100%	0%		0%								
CULTIVATOR	100%	0%		0%								
ROTARY HOE	100%	0%		08								
SPRAYER	100%	0%		08								
S. SHREADER	100%	0%		0%								
ROT . MOWER	100%	0%		0%								
WINDROWER	100%	0%		0%								
BALER	100%	0%		08								
OWNER-OPERATOR	2											
MONTHLY LABOR	JAN FEE	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS								======				
AVAILABLE	121 106	5 123	130	132	138	169	167	117	128	105	118	1,436
MAXIMUM TRACTO	DR HOURS											
PER TIME												
PERIOD	200 200	200	200	200	200	200	200	200	200	200	200	

TRACTOR SIZES

Figure 18. Machinery Complement Selection Results for Medium Northwest.

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TRACTOR													
HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
95	0.00	9	3	0.00	7	59	99	67	49	0.00	0.00	0.00	294
TRACTOR #2													
0	0.00	0.00	0.00	0.00	0.00	0.0	0 0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR #3													
0	0.00	0.00	0.00	0.00	0.00	0.0	0 0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE: IF	NA (N	OT AVA	LIABLE)	IS R	ELAYEI	D IN TH	IE RESU	LTS ROW	•				
CHECK HORS	EPOWE	R REQU	IREMENT	S FOR	PTO I	DRIVEN	EQUIPM	ENT.					
TRACTORS U	SED W	ITH 54	O PTO E	QUIPM	ENT CA	ANNOT E	EXCEED	140 HOR	SEPOWER				
IN ADDITIO	N, S.	HARROW	IS NOT	OFFE	RED FO	OR TRAC	CTORS E	XCEEDIN	G 155 H	IP.			
TRACTOR HO	UR												
REQUIREMEN	Т												
SUMMARY	JAN	FEB	MAI	R A	PR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
MAXIMUM TR	ACTOR				•								
HOURS PER													
MONTH (HP)	200	200	. 200	2 2	00	200	200	200	200	200	200	200	200
EXCESS CAP	ACITY												
TRACTOR #1										·			
95	200	191	197	7 2	00	193	141	101	133	151	200	200	200
TRACTOR #2													
0	0	0	C	)	0	0	0	0	0	0	0	0	0
TRACTOR #3													
0	0	0	C	)	0	0	0	0	0	0	0	0	0
NOTE: IF	NEGAI	IVE NU	JMBERS	APPEAF	R, IN T	HE TRA	ACTOR H	OUR REQ	UIREMEN	IT SUM	MARY	ADJUS	IMENTS
MAY BE NEE	DED T	O COMP	LETE FI	ELD O	PERAT	IONS.							
LABOR													
SUMMARY	JAN	FEB	MAR A	APR M	IAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
OWNER LABO	R												
PROVIDED	121	106	123 1	30 1	32	138	169	167	117	128	105	118	1,436
TOTAL HOUR	S												
REQUIRED	0.00	10	3 0	0.00	8	65	109	74	54	0.00	0.00	0.00	324
HIRED LABO	R												
HOURS													
REQUIRED	0.00	0.00	0.00 0	0.00 0	.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST OF HI	RED	0.00	0.00 0					0.00	0.00	0.00	0.00	0.00	0.00
LABOR	0.00	0.00	0 00 0		. 00	00.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST PESIL	TS 1	FPRFC	TNT	TNS	TAYES	T F C	DEDA.		FILE	T V C	<u>то</u>	C /TT	ACTOR
TPACTOP #1	13 1	763	6 991	166 1	306	17 527	. REFA.	161	1 073	2 100	·· ····		19 627
TRACION #1	0	00	0 00	0 00 I	0 00	0.00	0 00	101	T,073	0 00	,		0 00
TRACIOR #2			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00
INACION #3			0.00		VED O	0.00	17 520	71	U.UU	DTADIE	0.000	6 2 /	0.00
					AED U	0010	10 626	-/1 IC	AV LAI	OCH DI		5 2, l	02 16

Figure 18. (Continued)

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CROP ACTIVITIE		ACRES					(IN PI	CO HP)					
WHEAT			230						95				
ALFALFA			8						105				
GRAIN SORGHUM			8						125				
CORN			0						140				
PEANUTS			0						155				
SOYBEANS			0						175				
COTTON			38						200				
SUDAN HAY			18										
	#1		#2	;	<del>#</del> 3								
TRACTOR HP	95		0					COST I	DATA EN	TRY			
MACHINE			SPEC	IFIED				CURREN	NT FUEL	COST	0.8	== B 0	
OPERATION			TRAC	TOR US	SAGE			INTER	EST RAT	Ε	0.09	90	
OFFSET	100	8	0%		0%			INSURA	ANCE RA	TE	0.00	06	
CHISEL	100	8	0% 0% 0% 0%					HIRED	WAGE R	ATE	5.0	00	
LAND PLANE	100	8	0%	(	) <b>%</b>								
SWEEP PLOW	100	8	0%	(	)¥								
M.B. PLOW	100	8	0% 0%										
SWEEP COND.	100	8	0% 0% 0% 0%										
CULTIPACKER	100	8	0% 0% 0% 0%										
TANDEM DISK	100	8	0%	(	)%								
SPRINGTOOTH	100	8	0%	(	) કે								
S.HARROW	100	8	0%	(	)%								
DRILL	100	8	0%	(	)%								
PLANTER	100	8	0%	(	)%								
CULTIVATOR	100	8	0%	(	)								
ROTARY HOE	100	8	0%	Ċ	)8								
SPRAYER	100	8	0%	(	)8								
S.SHREADER	100	ł	0%	(	)								
ROT.MOWER	100	8	0%	(	)8								
WINDROWER	100	5	0%	(	)%								
BALER	100	8	0%	(	)%								
OWNER-OPERATOR	ł												
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS													
AVAILABLE	100	89	137	110	101	119	171	167	102	96	90	104	1,282
MAXIMUM TRACTOR HOURS PER TIME													
PERIOD	200	200	200 200 200			200	. 200	200	200	200	200	200	

TRACTOR SIZES

Figure 19. Machinery Complement Selection Results for Medium Southwest.

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TRACTOR

TRACIOR													
HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
95	9	12	4	0.00	46	73	119	75	57	0.00	0.00	18	413
TRACTOR #2													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR #3													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE: IF	NA (N	OT AVA	LIABLE	ISR	ELAYEI	O IN TH	IE RESU	LTS ROW					
CHECK HORS	EPOWEI	R REOU	TREMENT	IS FOR	PTO I	DRIVEN	EOUIPM	ENT.					
TRACTORS U	SED W	ттн 54	0 PTO F	TOUTPM	ENT CA	ANNOT F	XCEED	140 HOR	SEPOWER				
IN ADDITIO	N. S.	HARROW	TS NOT	r offe	RED FO	OR TRAC	TORS E	XCEEDIN	с 155 н	P			
TRACTOR HO		in in in it is a second s	10 101					Republic	5 100 11	•			
TRACIOR HO	UR m												
REQUIREMEN	1 10 11	RED		<b>.</b> .		MAY	TUNE	TITLY	AUC	CEDE	007	NOU	DEC
SUMMARY	JAN	. FEB	MA.	K A	APR	MAI	JUNE	JULI	AUG	SEPT	001	NOV	DEC
MAXIMUM TR	ACTOR												
HOURS PER													
MONTH (HP)	200	200	20	0 2	200	200	200	200	200	200	200	200	200
EXCESS CAP	ACITY												
TRACTOR #1													
95	191	188	19	6 2	200	154	127	81	125	143	200	200	182
TRACTOR #2													
0	0	0	(	C	0	0	0	0	0	0	0	0	0
TRACTOR #3													
0	0	0	(	D	0	0	0	0	0	0	0	0	0
NOTE: IF NE	EGATIV	E NUM	BERS A	PPEAR	IN TH	IE TRAC	TOR HO	UR REQU	JIREMEN	T SUM	MARY A	ADJUS	IMENTS
MAY BE NEE	DED T	O COMP	LETE F	IELD C	PERAT	IONS.							
LABOR													
SUMMARY	JAN	FEB	MAR 2	APR 1	YAN	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
OWNER LABO	R												
PROVIDED	100	89	137 :	110 :	101	119	171	167	102	96	90	104	1,282
TOTAL HOUR	S												
REOUIRED	10	13	4 (	0.00	51	81	131	82	62	0.00	0.00	) 19	454
HIRED LABO	R												
HOURS	1												
DEOUTDED	0 00	0 00	0 00 0	0 00 /		0 00	0 00	0 00	0 00	0.00			0 0 00
REQUIRED	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00
COST OF HI	RED	0 00	0 00			0 00	0 00	0 00	0.00	0.00			
LABOR	0.00	0.00	0.00 0	0.00 0	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0 0.00
COST RESUL	TS D	EPREC.	INT.	INS.	TAXES	T.F.C	. REPA	IR LUB	. FUEL	T.V.C	с. т.о	.C./T	RACTOR
TRACTOR #1	1	.1,390	8,879	592	1,674	22,535	1,480	0 226	1,506	3,212			25,748
TRACTOR #2		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00
TRACTOR #3		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00
			TO	TAL FI	XED C	OSTS 2	22,535.	44 TC	TAL VA	RIABLE	COST	s 3,	212.33
TOTAL OPER	ATING	COST	INCLUD	ING HI	RED LA	ABOR 2	25,747.	77	С	OST PH	ER ACR	E	85.26

Figure 19. (Continued)

•

CROP ACTIVITIES	ACRES
WHEAT	286
ALFALFA	11
GRAIN SORGHUM	6
CORN	0
PEANUTS	0
SOYBEANS	0
COTTON	0
SUDAN HAY	20

TRAC (IN	TOR PTO	SIZES HP)	3
		95	
	10	05	
	12	25	
	14	40	
	15	55	
	17	75	
	20	00	

	#1		#2		#3								
TRACTOR HP	95		0					COST D	ATA EN	TRY			
MACHINE			SPEC	IFIED				CURREN	T FUEL	COST		0.80	
OPERATION			TRAC	TOR US	SAGE			INTERE	ST RAT	E	0	.090	
								CURREN	T TAX	RATE	0	.010	
OFFSET	100%		0%	1	<b>J</b> &			INSURA	NCE RA	TE	0	.006	
CHISEL	100%		0%	(	<b>3</b> 80			HIRED	WAGE R	ATE		5.00	
LAND PLANE	100%		08	1	<b>3</b> %								
SWEEP PLOW	100%		0%	(	<b>3</b> 80								
M.B. PLOW	100%		08	(	<b>3</b> 8								
SWEEP COND.	100%		0%	(	<b>)</b> %								
CULTIPACKER	100%		0%	(	<b>)</b> %								
TANDEM DISK	100%		0%	(	<b>)</b> %								
SPRINGTOOTH	100%		0%	(	<b>ે</b> ક								
S.HARROW	100%		0%	(	<b>J</b> %								
DRILL	100%		0%	(	<b>3</b>								
PLANTER	100%		0%	(	<b>J</b> %								
CULTIVATOR	100%		0%	(	C &								
ROTARY HOE	100%		0%	(	<b>J</b> %								
SPRAYER	100%		08	1	<b>J</b> &								
S.SHREADER	100%		0%	(	C.S.								
ROT.MOWER	100%		0%		<b>3</b> 8								
WINDROWER	100%		0%	(	<b>S</b> 8								
BALER	100%		0%	(	<b>)</b> %								
OWNER-OPERATO	R												
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS		i											
AVATLARLE	100	99	142	103	101	126	153	185	117	110	94	0.9	1 330
			142					105				90	
MAXIMUM TRACT	OR												
HOURS PER TIM	ΙE												
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200	

Figure 20. Machinery Complement Selection Results for Medium North Central.

TRACTOR

INACION													
HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
95	0.00	12	4	0.00	) 16	82	132	93	71	0.00	0.00	0.00	409
TRACTOR #2													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR #3													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE: IF	NA (N	OT AVA	LIABLE	) IS P	RELAYE	O IN TH	HE RESU	JLTS ROW					
CHECK HORS	EPOWE	R REOU	JIREMEN	TS FOR	R PTO I	DRIVEN	EOUIPN	MENT.					
TRACTORS U	SED W	ТТН 54	0 PTO	EOUTPN	MENT C	ANNOT I	EXCEED	140 HOR	SEPOWER	2.			
IN ADDITIO	N. S.	HARROW	IS NO	T OFFE	ERED FO	OR TRAC	CTORS F	XCEEDIN	G 155 F	IP.			
TRACTOR HO	UR												
FOUTPEMENT	UIV.												
CIIMMADY	זא אז		а мл	D	100	MAV	TIME		AUC	670T	00	NOV	DEC
SOMMANI TO	ACTOR	r EL			AFK	THA I	OUNE		AUG	SEFI	001	NOV	DEC
MAXIMUM TR	ACTOR												
HOURS PER													
MONTH (HP)	200	200	20	0	200	200	200	200	200	200	200	200	200
EXCESS CAP	ACITY												
TRACTOR #1													
95	200	188	8 19	96	200	184	118	68	107	129	200	200	200
TRACTOR #2													
0	0	. 0		0	0	0	0	0	0	0	0	0	0
TRACTOR #3													
0	0	0		0	0	0	0	0	0	0	0	0	0
NOTE: IF	NEGAT	IVE N	UMBERS	APPEA	R.IN 1	TRA	ACTOR H	HOUR REQ	UIREMEN	NT SUM	MARY	ADJUS	IMENTS
MAY BE NEE	DED T	O COMP	LETE F	IELD (	OPERAT	IONS.							
LABOR													
SUMMARY	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
OWNER LABO	R												
PROVIDED	100	99	142	103	101	126	153	185	117	119	94	98	1,339
TOTAL HOUR	S												
REQUIRED	0.00	13	4	0.00	17	90	145	102	78	0.00	0.00	0.00	450
HIRED LABO	R												
HOURS													
REQUIRED	0.00	0.00	0.00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0.00		
COST OF HI	RED	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LABOR	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0.00		
COOR DECUL	<u> </u>	DDDEC	0.00	TNC		0.00	0.00	TD 177D	0.00	0.00	0.00	0.00	0.00
COST RESUL	TS D	EPREC.	. INT.	INS.	TAXES	T.F.C	REPA	IK LUB	. FUEL	T.V.C	. T.O	.C./T	RACTOR
TRACTOR #1	1	1,126	8,616	5/4	1,619	21,93	5 1,49	8 224	1,492	3,214		ć	25,149
TRACTOR #2		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00
TRACTOR #3		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00
			TC	TAL FI	IXED CO	OSTS 2	21,935.	10 TC	TAL VA	RIABLE	COST	s 3,2	214.14
TOTAL OPER	ATING	COST	INCLUD	ING HI	RED LA	ABOR 2	25,149.	24	C	OST PH	ER ACR	E	77.86

Figure 20. (Continued)

CROP ACTIVIT:	IES	AC	RES				TH (]	RACTOR IN PTO	SIZES HP)				
WHEAT			95		-				95		-		
ALFALFA		:	L 4					10	05				
GRAIN SORGHUN	М		3					1:	25				
CORN			0					1	40				
PEANUTS			1					1	55				
SOYBEANS			1					1	75				
COTTON			5					20	00				
SUDAN HAY		:	34										
	#1	4	ŧ2	<del>#</del> 3									
TRACTOR HP	95	(	)				CC	OST DAT	FA ENTR	RΥ			
							==						
MACHINE		SPI	SCIFI	ED			Ct	RRENT	FUEL C	OST	0.	.80	
OPERATION		TRA	ACTOR	USAGE			11	TEREST	C RATE		0.0	90	
	1008						CU	JRRENT	TAX RA	ATE .	0.0	010	
CHISEI	1005		10	0.5			11 11	DED W	CE RATE		0.0	00	
LAND DIANE	1005		10	0.5			п	IRED WA	AGE RAI	E	э.	.00	
SWEED DIOW	100%	(	12	08									
M B PLOW	100%	(	/ 3 ) &	08									
SWEEP COND	100%	(	) <b>2</b>	08									
CULTIPACKER	100%	, (	) <b>%</b>	0%									
TANDEM DISK	100%	(	)&	0%									
SPRINGTOOTH	100%		)&	0%									
S. HARROW	100%		) %	0%									
DRTLL	100%	(	) &	0%									
PLANTER	100%	(	) }	0%		-							
CULTIVATOR	100%		) %	0%									
ROTARY HOE	100%	(	) }	08									
SPRAYER	100%	(	)응	08									
S.SHREADER	100%	(	) %	0%									
ROT.MOWER	100%	(	) %	0%									
WINDROWER	100%	(	) %	0%									
BALER	100%	(	)%	0%									
OWNER-OPERATO	)R												
MONTHLY LABOF	R JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS			***										
AVAILABLE	95	84	127	97	98	115	164	171	103	106	86	91	1,246
MAXIMUM TRACI	TOR HOU	JRS	200	200	200	200	200				200		

Figure 21. Machinery Complement Selection Results for Medium South Central.

IRACIOR													
HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
95	1	17	6	0.81	26	47	47	51	30	0.00	0.00	2	228
TRACTOR #2													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR #3													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE: IF NA	A (NOT	AVALIA	ABLE) 1	IS REL	AYED ]	IN THE	RESULI	S ROW.					
CHECK HORSEE	OWER	REQUIRE	MENTS	FOR P	TO DRI	IVEN E	QUIPMEN	T.					
TRACTORS USE	D WIT	H 540 H	TO EQU	JIPMEN	T CANN	JOT EX	CEED 14	0 HORS	SEPOWER				
IN ADDITION,	S.HA	RROW IS	NOT C	FFERE	D FOR	TRACTO	ORS EXC	EEDING	G 155 B	IP.			
TRACTOR HOUR	2												
REQUIREMENT													
SIIMMARY .1	AN	FEB	MAR	APR	MAY		NF .TI	IT.Y	AUG	SEDT	007	NOV	DEC
				AL K	1.11.1			) 13 T	nou	0011	001	1101	
MAXIMUM IRAC	JUR												
HOURS PER	200	200	200	200	200		0 0	20	200	200	200	200	
MONTH (HP)	200	200	200	200	200	200	20		200	200	200	200	200
EXCESS CAPAC	CITY												
TRACTOR #1													
95 1	.99	183	194	19	174	15:	3 15	53	149	170	200	200	198
TRACTOR #2													
0	0	0	0	0	0	(	)	0	0	0	0	0	0
TRACTOR #3													
0	0	0	0	0	0	(	0	0	0	0	0	0	0
NOTE: IF N	EGATIV	E NUMB	ERS AP	PEAR	IN THE	TRAC	FOR HOU	JR REQU	JIREMEN	IT SUM	MARY A	DJUST	TMENTS
MAY BE NEEDE	ED TO	COMPLET	E FIEI	LD OPE	RATION	NS.							
LABOR													
SUMMARY	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
OWNER LABOR													
PROVIDED	95	84	127	97	98	115	164	171	103	106	86	91	1,246
TOTAL HOURS													
REQUIRED	. 1	19	6	0.89	29	52	52	56	33	0.00	0.00	3	251
HIRED LABOR													
HOURS													
REQUIRED	0.0	0 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0 00	0 00	0.00	
COST OF HIRE	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LABOR	0.0		0 00	0 00	0.00	0.00	0.00	0 00	0 00	0 00	0 00	0.00	
COST RESULTS	DEP	REC. TN	T. TNS	5. TAX	ES T	.F.C.	REPAT	R LUF	S. FIIFI	T.V.	<u>.</u> то	C./TP	ACTOR
TRACTOR #1	11.6	01 9.0	90 606	5 1.7	19 2	3.017	770	125	833	1.72	9	.,	24.745
TRACTOR #2	0.0	0 0.0	0 0.0		0 0	.00	0.00	0.0		0.00	)	•	0.00
TRACTOR #3	0.0	0 0 0	0 0 0		n n	00	0.00	0.0			, )		0.00
	0.0		TOTA	FTVP		 TG 22	016 54		יאד זאי		COSTIC	1 -	729 00
	TNC C	OCT THE		UTDD		10 23	744 67	. 101	AL VAR	TURDER	00515	±,	120.08
TOTAL OPERAT	LING C	UST INC	TUDING	- HIKE	D LABC	JK 24	, /44.63	>	CC	JOI PE	K ACKE		101.13

Figure 21. (Continued)

CROP ACTIVITIES	ACRES	TRACTOR SIZES (IN PTO HP)
WHEAT	29	
ALFALFA	5	105
GRAIN SORGHUM	14	125
CORN	0	140
PEANUTS	0	155
SOYBEANS	11	175
COTTON	0	200
SUDAN HAY	36	

	#1	#2		# J									
TRACTOR HP	95	0					CC	DST DAT	FA ENTF	Υ 			
MACHINE		SPI	ECIFIE	ED			Ct	JRRENT	FUEL C	OST	0.	.80	
OPERATION		TRA	ACTOR	USAGE			IN	TERES	r rate		0.0	90	
							Ct	JRRENT	TAX RA	TE	0.0	010	
OFFSET	100%	0%	1	<b>%</b>			IL	SURAN	CE RATE	2	0.0	06	
CHISEL	100%	0%		98			H	RED W	AGE RAI	Έ	5.	.00	
LAND PLANE	100%	0%		<b>%</b> C									
SWEEP PLOW	100%	08	1	98									
M.B. PLOW	100%	0%		0%									
SWEEP COND.	100%	0%		98									
CULTIPACKER	100%	08	1	0%									
TANDEM DISK	100%	0%		0%									
SPRINGTOOTH	100%	0%		ે કર									
S.HARROW	100%	08		98									
DRILL	100%	08		08									
PLANTER	100%	08	1	<b>3</b> 80									
CULTIVATOR	100%	08		08									
ROTARY HOE	100%	0%		<b>8</b> C									
SPRAYER	100%	0%		<b>3</b> 80									
S.SHREADER	100%	0%	(	3 ° C									
ROT.MOWER	100%	08		<b>3</b> 8									
WINDROWER	100%	0%	(	<b>J</b> %									
BALER	100%	0%	(	58									
OWNER-OPERATOR	ર												
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS													
AVAILABLE	93	85	112	91	97	113	162	173	103	110	84	83	1,223
MAXIMUM TRACTO	DR												
HOURS PER TIME	2												
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200	

Figure 22. Machinery Complement Selection Results for Medium Northeast.

TOTAL														
TRACTOR	R													
HOURS	HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR	R #1													
	95	0.00	23	8	3	27	31	18	28	10	0.00	0.00	0.00	148
TRACTOR	R #2													
	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR	R #3													
	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE:	IF NA	(NOT	AVALI	ABLE) I	IS REL	AYED 1	IN THE	RESULT	S ROW.					
CHECK H	HORSEP	OWER	REQUIR	EMENTS	FOR P	TO DRI	VEN E	QUIPMEN	T.					
TRACTOR	RS USE	D WIT	H 540 1	PTO EQU	JIPMEN	T CANN	OT EX	CEED 14	0 HORS	SEPOWER				
IN ADDI	ITION,	S.HA	RROW IS	S NOT C	OFFERE	D FOR	TRACT	ORS EXC	EEDING	5 155 H	Ρ.			
TRACTOR	R HOUR													
REQUIRE	EMENT													
SUMMARY	<u>с</u>	AN	FEB	MAR	APR	MAY	יט ד	NE JU	JLY	AUG	SEPT	OCT	NOV	DEC
MAXIMUN	1 TRAC	TOR												
HOURS E	PER													
MONTH	(HP) 2	200	200	200	200	200	20	0 20	00	200	200	200	200	200
EXCESS	CAPAC	ΤͲΫ												
TRACTOR	2 #1													
11010101	95 2	0.0	177	192	197	173	16	9, 19	22	172	190	200	200	200
TRACTOR	3 #2		1,,	172	191	110	10	<i>y</i> 10	2	112	190	200	200	200
11010101	0	0		0	0	0	(	h	0	0	0	0	0	0
TRACTOR	× #3	U U		Ŭ	Ũ			-	0	Ũ	· ·	Ŭ	Ŭ	Ŭ
	0	0	0	0	0	. 0	(	)	0	0	0	0	0	0
NOTE:	IF NE	GATIV	E NUMB	ERS AP	PEAR	IN THE	TRACT	FOR HOU	R REOL	JIREMEN	T SUM	MARY A	DJUSI	MENTS
MAY BE	NEEDE	DTO	COMPLE	re fiel	D OPE	RATION	IS.							
LABOR														
SUMMARY	,	JAN	I FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	ОСТ	NOV	DEC	TOTAL
OWNER I	ABOR									0011			220	101112
PROVIDE	ED	93	85	112	91	97	113	162	173	103	110	84	83	1.223
TOTAL F	IOURS		00		21	2.	110	102	1,0	100	110	•••••••••••••••••••••••••••••••••••••••	00	1,220
REQUIRE	100110 7D	0.00	25	9	4	30	34	20	31	10	0.00	0.00	0.00	162
HIRFD I	ABOR	0.00			· · ·					10	0.00	0.00	0.00	102
HOURS	JADON													
DEOUTDE	מק	0.0		0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0.00	0 00
COST OF		D.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	. HIKE				0 00	0 00	0.00	0 00	0 00	0 00	0 00	0 00	0.00	
LABOR		0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST RE	SOLTS	DEP	REC.IN	T. INS	5. TA2	KES T	.F.C.	REPAI	R LUE	. FUEL	T.V.0	C.T.O.	C./TR	ACTOR
TRACTOR	× #1	11,1	26 8,6	5/4	± 1,6	519 21	,935	444	81	539	1,06	53	4	2.998
TRACTOR	< #2	0.0				0 0	.00	0.00	0.00	0.00	0.00	,		0.00
TRACTOR	× #3	0.0	0.0	0.0	0.0	0 0	.00	0.00	0.00	0.00	0.00	,		0.00
				TOTAI	L FIXE	D COS	rs 21	,935.10	TOT	AL VAR	IABLE	COSTS	1,0	062.90
TOTAL C	OPERAT	ING C	OST INC	CLUDING	; HIRE	D LABC	DR 22	,998.01		CO	ST PE	r acre		242.08

Figure 22. (Continued)

CROP ACTIVITIE	ES		ž	ACRES			T1 (1	RACTOR IN PTO	SIZES HP)		_		
WHEAT			8				_		95				
ALFALFA			1					10	05				
GRAIN SORGHUM			1					1:	25				
CORN			0					14	10				
PEANUTS			0					19	55				
SOYBEANS			6					1	75				
COTTON			0					20	00				
SUDAN HAY			37										
	#1	#2	ŧ	#3									
TRACTOR HP	95	0					C	OST DAT	A ENTR	Y			
												-	
MACHINE		SPI	ECIFIE	D			CI	JRRENT	FUEL C	OST	Ο.	80	
OPERATION		TRA	ACTOR	USAGÈ			II	NTEREST	RATE		0.0	90	
					-		CI	JRRENT	TAX RA	TE	0.0	10	
OFFSET	100%	08	(	38			II	NSURANC	E RATE		0.0	06	
CHISEL	100%	08	(	78			H	IRED WA	GE RAT	Έ	5.	00	
LAND PLANE	100%	0%	(	<b>)</b> %									
SWEEP PLOW	100%	08	(	08									
M.B. PLOW	100%	0%	(	0% 									
SWEEP COND.	100%	0%	(	)¥									
CULTIPACKER	100%	0%	(	28									
TANDEM DISK	100%	0%	(	)*6									
SPRINGTOOTH	100%	0*	(	)*5 )*									
DDIII	100%	0.8		) 15 ) 12									
DRILL	1003	08		75 18									
CULTIVATOR	100%	0 % 0 %	(	275 192								••	
ROTARY HOE	100%	0%	(	)%									
SPRAYER	100%	0%	· ·	) <b>%</b>									
S. SHREADER	100%	0%	, (	)%									
ROT . MOWER	100%	0%	(	0%									
WINDROWER	100%	0%	(	08									
BALER	100%	0%	(	) ક									
OWNER-OPERATOR MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
	_												
HOURS	0.4	65	100	~ ~	0.2	1.01	1.00	1.00	0.0	100	76	71	1 110
AVAILABLE	84	65 	102		92	101	169	162	89	102	/5		1,118
MAXIMUM TRACTO	OR HOU	RS											
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200	

Figure 23. Machinery Complement Selection Results for Medium East.

TRACIOR													
HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
95	0.00	18	6	2	18	21	5	21	2	0.00	0.00	0.00	92
TRACTOR #2													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR #3													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE: IF NA	A (NOT	AVALI	ABLE) I	S REL	AYED I	N THE	RESULT	S ROW					
CHECK HORSER	OWER	REOUIR	EMENTS	FOR P	TO DRI	VEN E	OUIPMEN	ΙТ.					
TRACTORS USE	ED WIT	H 540	PTO EOU	IPMEN	T CANN	OT EX	CEED 14	0 HORS	SEPOWER	٤.			
IN ADDITION.	S.HA	RROW T	S NOT O	FFERE	D FOR	TRACTO	ORS EXC	EEDING	155 H	IP.			
TRACTOR HOUS	>					111101							
DECUIDEMENT													
CUMMARY		555	MAD		MAV			IT V	ALIC	CEDT	000	NOU	DEC
SUMMARI 0		r ED	PIAK	AFA	MAI	001			AUG	JEF I	001	NOV	DEC
MAXIMUM TRAC	TOR												
HOURS PER	200	200	200	200	200	20	0 00		200	200	200	200	200
MONTH (HP)	200	200	200	200	200	201	0 20	0	200	200	200	200	200
EXCESS CAPAC	CITY												
TRACTOR #1													
95 2	200	182	194	198	182	17	9 19	95	179	198	200	200	200
TRACTOR #2													
0	0	0	0	0	0	(	D	0	0	0	0	0	0
TRACTOR #3													
0	0	0	0	0	0	(	0	0	0	0	0	0	0
NOTE: IF N	EGATIV	VE NUM	BERS AP	PEAR	IN THE	TRAC	FOR HOU	IR REQU	JIREMEN	NT SUM	MARY A	ADJUST	IMENTS
MAY BE NEEDE	ED TO	COMPLE	TE FIEL	D OPE	RATION	1S.							
LABOR													
SUMMARY	JAI	N FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
OWNER LABOR													
PROVIDED	84	1 65	102	77	92	101	169	162	89	102	75	71	1,118
TOTAL HOURS													
REQUIRED	0.00	0 19	7	2	19	23	5	23	3	0.00	0.00	0.00	101
HIRED LABOR													
HOURS													
REQUIRED	0.00	0 0.00	0 00	0 00	0 00	0 00	0.00	0 00	0 00	0 00	0.00	0 00	
COST OF HIRE	יס <b>י</b> סי חיז	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LABOR	0.00	0 0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0.00		
	2.00	DREC T		U.UU	(FS T	5.00 F C	DEDAT	D T TTT	0.00 Ener	T 17		C /m	
COSI RESULIS	11 .	PREC.II	C16 574	• IAZ	10 21	.1.0.	ALPAL	R LUE	D. FUEL	. 1.0.0	. 1.0	.C./Ti	RACTOR
TRACIOR #1	11 <b>,</b> .	120 8,		1,6	20 0 13 51	,935	2/6	50	336	001			22,396
TRACTOR #2	0.0					.00	0.00	0.00			,		0.00
TRACTOR #3	0.0	00 0.	0.0	0.0.0	0 0	.00	0.00	0.00	0.00	0.00	)		0.00
			TOTAI	FIXE	D COS	rs 2	21,935.	10 T	OTAL V	ARIABI	LE COS	TS (	560.64
TOTAL OPERAT	TING C	COST IN	CLUDING	HIRE	D LABC	DR 2	22,595.	74		COST 1	PER AC	RE 4	426.33

Figure 23. (Continued)

CROP ACTIVIT	IES		i	ACRES			T (	RACTOR IN PTO	SIZES HP)					
					-		-		 95		-			
ALFALFA		3	3					10	05					
GRAIN SORGHU	м	1						12	25					
CORN		1						14	40					
PEANUTS		2	2					15	55					
SOYBEANS		5	5					1	75					
COTTON		C	)					20	00					
SUDAN HAY		32	2											
	#1	#2		<del>#</del> 3										
TRACTOR HP	95	0					С	OST DAI	CA ENTR	Y				
MACHINE		SPI	ECIFI	===== ED			=	URRENT	FUEL C	OST	 0.	.80		
OPERATION		TRA	ACTOR	USAGE			I	NTEREST	RATE		0.0	0.090		
							С	URRENT	TAX RA	TE	0.0	010		
OFFSET	100%	0%		0%			I	NSURANC	CE RATE		0.0	006		
CHISEL	100%	08	1	08			Н	IRED WA	AGE RAI	Έ	5.	00		
LAND PLANE	100%	0%		0%										
SWEEP PLOW	100%	0%		08										
M.B. PLOW	100%	0%		08										
SWEEP COND.	100%	0%	(	08										
CULTIPACKER	100%	08		08										
TANDEM DISK	100%	08	1	0%										
SPRINGTOOTH	100%	08	1	08										
S.HARROW	100%	08	. 4	08										
DRILL	100%	08	1	08										
PLANTER	100%	08	1	08										
CULTIVATOR	100%	0%	1	0%										
ROTARY HOE	100%	0%	(	0%										
SPRAYER	100%	08	1	98										
S.SHREADER	100%	0%	1	08										
ROT.MOWER	100%	0%	. (	0%										
WINDROWER	100%	08	1	0%										
BALER	100%	0%	(	08										
OWNER-OPERATO MONTHLY LABO	OR R JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL	
HOURS														
AVAILABLE	84	65	102	77	92	101	169	162	89	102	75	71	1,118	
MAXIMUM TRAC	IOR HOU	JRS												
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200		

Figure 24. Machinery Complement Selection Results for Medium Southeast.

TOTAL		
· · · · · · · · · · · · · · · · · · ·		T
	TO TA	

INACION													
HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
95	0.00	16	6	3	18	21	8	21	5	0.00	0.00	0.00	97
TRACTOR #2													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR #3													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE: IF NA	A (NOT	AVALI	ABLE) I	S REL	AYED 1	N THE	RESULT	S ROW	,				
CHECK HORSEN	POWER	REQUIR	EMENTS	FOR P	TO DRI	VEN E	QUIPMEN	г.					
TRACTORS USE	ED WIT	H 540	PTO EQU	IPMEN	T CANN	IOT EX	CEED 14	0 HORS	SEPOWER	R.			
IN ADDITION	, S.HA	RROW I	S NOT C	FFERE	D FOR	TRACT	ORS EXC	EEDING	5 155 H	IP.			
TRACTOR HOUL	R												
REQUIREMENT													
SUMMARY J	JAN	FEB	MAR	APR	MAY	JU	NE JU	JLY	AUG	SEPT	ост	NOV	/ DEC
MAXIMUM TRAG	CTOR												
HOURS PER													
MONTH (HP)	200	200	200	200	200	20	0 20	0	200	200	200	200	200
EXCESS CAPA	TTY				200				200	200	200	200	200
TRACTOR #1									•				
95 2	200	184	194	197	182	17	9 10	22	179	195	200	200	200
TRACTOR #2		101	101	101	102	· · · ·	·	2	115	195	200	200	200
1KACIOK #2 0	0	0	0	0	0		0	0	0	0	0		
TRACTOR #3	0	•	0	0	0		0	0	. U	0	0	0	0
110001010 #5 0	0	0	0	0	0		0	0	0	0	0	C	
NOTE TE N	FCATI	TE NUME	AFRS AD	DFAR.	ты тиғ	TPAC	U TOR HOU		TDEMEN			ט זפווד תא	
MAY BE NEED	ED TO	COMPLE	ля 576. Тятя эт	D OPE	RATION	19	ION HOU		JIRBNE	1 300		10003	IMENIS
LABOR		00111 11		011	14111101								
SUMMARY		ם שים ד	MAD	λοο	MAY	TIME		AUC	CEDT	000	NOV	DEC	TOTAL
OWNER LABOR			MAK	AFK	MAI	JUNE	0011	AUG	SEPI	001	NOV	DEC	TOTAL
DROUTDED	0 /	65	102	77	02	101	1.60	1.60	0.0	100	75	71	1 1 1 0
TOTAL HOURS	04	65	102	11	92	101	169	102	89	102	/5	/1	1,118
DECUIPED		10	6	2	20	22	0	22	F	0 00	0 00	0 00	107
NEQUINED	0.00		0	3	20	23	9	23	5	0.00	0.00	0.00	107
HIRED LABOR													
HOURS	0.00		0.00	A AA	0 00	0 00	0 00						
REQUIRED	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LADOD	5D		~ ~ ~										
LABOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST RESULTS	5 DEE	PREC.IN	T. INS	. TAX	KES T	.F.C.	REPAI	R LUE	. FUEL	T.V.0	C.T.O.	C./TR	ACTOR
TRACTOR #1	11,6	563 9,1	.50 610	1,7	32 23	,154	275	53	354	682		2	23,836
TRACTOR #2	0.0	0.0	0.0	0 0.0	0 0	.00	0.00	0.0	0.00	0.00	)		0.00
TRACTOR #3	0.0	0.0	0.0	0 0.0	0 0	.00	0.00	0.0	0.00	0.00	)		0.00
			TOTAL	FIXE	D COSI	IS a	23,154.	27 T	OTAL V	ARIABI	LE COS	TS 6	682.09
TOTAL OPERAT	CING C	OST INC	CLUDING	HIRE	D LABC	R	23,836.	35		COST H	PER AC	RE 4	118.18

Figure 24. (Continued)

CROP ACTIVITIE	ACTIVITIES ACRES						T) (1	RACTOR IN PTO	SIZES HP)				
									 95		-		
ALFALFA			0					10	05				
GRAIN SORGHUM		2	8					12	25				
CORN			0					14	10				
PEANUTS			0					15	55				
SOYBEANS			0					1	75				
COTTON			0					- 20	00				
SUDAN HAY			3					2					
	#1	#2		#3									
TRACTOR HP	95	0					C	OST DAI	A ENTR	Y			
MACHINE				====== סק			-	IDDENT	FUEL C			80	
ODEDATION				USACE			С. ті	URRENI	FOLL C	051	0.0	00	
OPERATION							C1	TODENT	TAY DA	ጥፑ	0.0	10	
0FF8F	1009	08		08			. т	UCUDANC		112	0.0	006	
CUISEI	100%	0 TO 0 Se		03 08			ц. Т	TOFD WA	CE DAT	F	U.U	00	
LAND DIANE	100%	0.6		0.8			п	IKED WA	IGE KAI	L	5.	00	
CAND PLANE	100%	0 °		0.8									
SWEEP PLOW	1005	0.6		0.6									
M.B. PLOW	100%	015		0.5									
SWEEP COND.	100%	0.5		0.5									
CULTIPACKER	100%	0.8		0.5									
CANDEM DISK	1005	0.8		0.8									
SPRINGTOOTH	1008	0.8		0.8									
S.HARROW	100%	0.8		0.8									
DRILL	100%	0.8		0*									
PLANTER	100%	0*5		0*6									
CULTIVATOR	100%	0*		0*									
ROTARY HOE	100%	0*		0%									
SPRAYER	100%	0%		0%									
S.SHREADER	100%	0%		0%									
ROT.MOWER	100%	0%		0%		• • •							
WINDROWER	100%	0%		0%									
BALER	100%	0%		08									
							. *						
OWNER-OPERATOR	<b>۲</b>									_			
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS													
AVAILABLE	143	123	109	151	162	158	167	167	133	159	120	133	1,592
MAXIMUM TRACTO	OR HOU	RS											
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200	

Figure 25. Machinery Complement Selection Results for Small Panhandle.

TRACTOR

TRACTOR													
HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
95	0.00	14	5	0.00	14	29	50	28	23	0.00	0.00	0.00	162
TRACTOR #2													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR #3													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE: IF NA	A (NOT	AVALI	ABLE) I	S REL	AYED 1	IN THE	RESULT	S ROW					
CHECK HORSER	OWER	REQUIR	EMENTS	FOR P	TO DRI	IVEN E	QUIPMEN	NT.					
TRACTORS USE	ED WIT	H 540	PTO EQU	IPMEN	T CANN	NOT EX	CEED 14	10 HORS	SEPOWER	R.			
IN ADDITION.	S.HA	RROW I	S NOT C	FFERE	D FOR	TRACT	ORS EXC	CEEDING	5 155 H	IP.			
TRACTOR HOUS	2												
REQUIREMENT	`												
SIIMMARY	TAN	FFB	MAD	ADD	MAY		NF .TI	V.T.V	AUG	SEDT	007		DEC
		1.60	LIMAN	ALK	1.17.1			011	AUG	0111	001		
MAXIMUM IRAC	LIOR												
HOURS PER	200	200	200	200	200		o 0.	~~	200	200	200		000
MONTH (HP)	200	200	200	200	200	20	0 20	00	200	200	200	200	200
EXCESS CAPAC	CITY												
TRACTOR #1													
95 2	200	186	195	200	186	5 17	1 1	50	172	177	200	200	200
TRACTOR #2													
0	0	0	0	0	0		C	0	0	0	0	0	0
RACTOR #3													
0	0	0	0	0	0		0	0	0	0	0	0	0
NOTE: IF N	EGATIV	/E NUME	BERS AP	PEAR	IN THE	TRAC	FOR HOU	JR REQU	JIREMEN	IT SUM	IMARY	ADJUSI	MENTS
MAY BE NEEDE	ED TO	COMPLE	TE FIEI	D OPE	RATION	1S.							
LABOR													
SUMMARY	JAI	N FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
OWNER LABOR													
PROVIDED	143	3 123	109	151	162	158	167	167	133	159	120	133	1,592
TOTAL HOURS													
REQUIRED	0.0	00 16	5	0.00	15	32	55	31	25	0.00	0.00	0.00	179
HIRED LABOR			-										
HOURS													
REQUIRED	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST OF HIRE	ED												
LABOR	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST RESULTS	5 DEF	PREC.IN	T. INS	. TAX	ES T	.F.C.	REPAT	R LUF	. FUEL	T.V.(	с. т.о	.C./TE	ACTOR
TRACTOR #1	10.0	)47 7.8	373 525	1.4	76 1	9,921	326	89	592	1.00	)7	,	0.929
TRACTOR #2	0.0			0 0.0	0	0.00	0.00	0.00	0.00	0.00	)	2	0.00
TRACTOR #3	0.0			0 0 0	00	0.00	0.00	0.00			)		0.00
			TOTAT	FTYP		10	921 20		TAT. 1/2			S 1 0	07 21
	TNC C	OST TN	CLUDINC			10 20	, 221.35 020 60	, 10	TAT A			5 I,U	50 76
TOTAD OF REAL	THO C	COT TH	CHODING	1111/6		/n 20	, 220.00	/	C	USI PI	DR ACK	L L	

Figure 25. (Continued).

CROP ACTIVITIES	ACRES	TRACTOR SIZES (IN PTO HP)
	65	95
ALFALFA	0	105
GRAIN SORGHUM	0	125
CORN	0	140
PEANUTS	0	155
SOYBEANS	0	175
COTTON	0	200
SUDAN HAY	5	

	#1	#2	÷	#3									
TRACTOR HP	95	0					CC	DST DAI	A ENTR	Y			
MACHINE		SPI	ECIFIE	==.=== ED			== CI	JRRENT	FUEL C	OST	 0.	.80	
OPERATION		TRA	ACTOR	USAGE			II	TEREST	RATE		0.0	90	
							Ct	JRRENT	TAX RA	TE	0.0	010	
OFFSET	100%	0%	I	0%			II	ISURANC	E RATE		0.0	006	
CHISEL	100%	0%	1	0%			H	IRED WA	GE RAT	E	5.	00	
LAND PLANE	100%	0%	(	0%									
SWEEP PLOW	100%	0%	(	0%									
M.B. PLOW	100%	0%	(	0%									
SWEEP COND.	100%	0%	(	08									
CULTIPACKER	100%	0%	. (	0%									
TANDEM DISK	100%	0%	(	0%									
SPRINGTOOTH	100%	0%	(	0%									
S.HARROW	100%	0%	(	0%									
DRILL	100%	0%	(	0%									
PLANTER	100%	0%	(	0%									
CULTIVATOR	100%	0%	. (	60%									
ROTARY HOE.	100%	0%	. (	0%									
SPRAYER	100%	0%	. (	0%									
S.SHREADER	100%	0%	(	08									
ROT.MOWER	100%	0%	(	08									
WINDROWER	100%	0%	(	08									
BALER	100%	0%	(	08									
OWNER-OPERATO	DR .												
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS													
AVAILABLE	121	106	123	130	132	138	169	167	117	128	105	118	1,436
MAXIMUM TRACI	OR HOU	JRS											
PER TIME													
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200	

Figure 26. Machinery Complement Selection Results for Small Northwest.

RACTOR														
HOURS	HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR	<b>#1</b>													
	95	0.00	2	0.78	0.00	1.90	17	30	20	15	0.00	0.00	0.00	86
TRACTOR	#2													
	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR	#3													
····	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE:	IF NA	(NOT	AVALI	ABLE) I	S REL	AYED 1	IN THE	RESULT	IS ROW	•				
CHECK H	IORSEP	OWER	REQUIR	EMENTS	FOR P	TO DRI	IVEN E	QUIPMEN	NT.					
TRACTOR	S USE	D WIT	H 540	PTO EQU	IPMEN	T CANN	NOT EX	CEED 14	10 HORS	SEPOWER	ł.			
IN ADDI	TION,	S.HA	RROW I	S NOT C	FFERE	D FOR	TRACT	ORS EXC	CEEDING	<u>5 155 E</u>	IP.			
TRACTOR	HOUF	R												
REQUIRE	MENT													
SUMMARY	J	AN	FEB	MAR	APR	MAY	JU	NE JI	ULY	AUG	SEPT	OCT	NOV	DEC
MAXIMUM	TRAC	TOR												
HOURS P	PER													
MONTH (	HP)	200	200	200	200	200	20	0 2	00	200	200	200	200	200
EXCESS	CAPAC	CITY												
TRACTOR	₹ <b>#</b> 1													
9	95 2	00	198	199	200	198	8 18	3 1	70	180	185	200	200	200
TRACTOR	R #2													
	0	0	0	0	0	0		0	0	0	0	0	0	0
TRACTOR	₹ #3													
	0	0	0	0	0	0		0	0	0	0	0	0	0
NOTE:	IF N	EGATIV	E NUM	BERS AP	PEAR	IN THE	TRAC	TOR HOU	JR REQ	UIREMEN	NT SUM	MARY	ADJUST	TMENTS
MAY BE	NEEDE	D TO	COMPLE	TE FIEI	D OPE	RATION	NS.							
LABOR														
SUMMARY		JAI	N FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
OWNER L	ABOR													
PROVIDE	D	12:	1 106	123	130	132	138	169	167	117	128	105	118	1,436
TOTAL H	IOURS													
REQUIRE	D	0.0	00 3	0.85	0.00	2	19	32	22	16	0.00	0.00	0.00	95
HIRED L	ABOR													
HOURS														
REQUIRE	D	0.0	0.0	0 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST OF	HIRE	D												
LABOR		0.0	0.0	0 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST RE	SULTS	DEI	PREC.IN	NT. INS	. TAX	KES T	.F.C.	REPAI	R LUE	B.FUEL '	r.v.c.	т.о	.C./TF	RACTOR
TRACTOR	#1	8,7	763 6,	991 466	5 1,3	806 17	,527	125	47	314	486		1	18,013
TRACTOR	#2	0.0	0. 0.	00 0.0	0.0	0 0	.00	0.00	0.0	0.00	0.00	)		0.00
TRACTOR	#3	0.0	00 0.	00 0.0	0.0	0 0	.00	0.00	0.0	0.00	0.00	)		0.00
				TOTAI	FIXE	D COST	rs 17	,526.71	L T	OTAL V	ARIABI	LE COS	TS /	186.38
TOTAL O	PERAT	ING C	OST IN	CLUDING	HIRE	D LABC	DR 18	,013.09	9		COST	PER AC	RE 2	257.33

Figure 26. (Continued)

,

CROP ACTIVITIES	ACRES	
	62	
ALFALFA	2	
GRAIN SORGHUM	3	
CORN	0	
PEANUTS	0	
SOYBEANS	0	
COTTON	10	
SUDAN HAY	5	

	#1	#2	1	#3									
TRACTOR HP	95	0					C	COST DA	TA ENTR	Y			
MACHINE		SPE	ECIFIE	===== ED			=	URRENT	FUEL C	OST	0.	80	
OPERATION		TRA	ACTOR	USAGE			3	NTERES	T RATE		0.0	90	
					-		C	URRENT	TAX RA	TE	0.0	10	
OFFSET	100%	0%	(	08			. 3	NSURAN	CE RATE		0.0	06	
CHISEL	100%	0%	(	08			H	HIRED W	AGE RAI	Έ	5.	00	
LAND PLANE	100%	08	(	0%									
SWEEP PLOW	100%	08	(	0%									
M.B. PLOW	100%	08	(	0%									
SWEEP COND.	100%	08	(	0%									
CULTIPACKER	100%	08	(	0%									
TANDEM DISK	100%	08	(	0%									
SPRINGTOOTH	100%	0%	(	0%									
S.HARROW	100%	0%	. (	0%									
DRILL	100%	0.8	(	0%									
PLANTER	100%	08	(	0%									
CULTIVATOR	100%	0%	(	0%									
ROTARY HOE	100%	08	Ì	0%									
SPRAYER	100%	0%	(	0%									
S.SHREADER	100%	0%	(	0%									
ROT.MOWER	100%	0%	(	08									
WINDROWER	100%	08	(	0%									
BALER	100%	0%	(	0%									
OWNER-OPERATOR	ર												
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS													*****
AVAILABLE	100	89	137	110	101	119	171	167	102	96	90	104	1,282
MAXIMUM TRACTO	DR HOU	RS											
PER TIME													
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200	

TRACTOR SIZES (IN PTO HP)

Figure 27. Machinery Complement Selection Results for Small Southwest.

TRACTOR													
HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
95	3	4	1.24	0.00	13	20	32	20	16	0.00	0.00	5	112
TRACTOR #2													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR #3													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE: IF I	NA (NOI	AVALI	ABLE) I	S REL	AYED 1	IN THE	RESULI	S ROW	•				
CHECK HORS	EPOWER	REQUIR	EMENTS	FOR P	TO DRI	VEN E	QUIPMEN	ит.					
TRACTORS U	SED WIT	H 540	PTO EQU	IPMEN	T CANN	OT EX	CEED 14	0 HORS	SEPOWER	R.			
IN ADDITIO	N, S.HA	RROW I	S NOT C	FFERE	D FOR	TRACT	ORS EXC	EEDING	G 155 H	IP.			
TRACTOR HO	UR												
REOUIREMEN'	т												
SUMMARY	JAN	FEB	MAR	APR	MAY	JU	NE JU	JLY	AUG	SEPT	OCT	NOV	/ DEC
MAXIMUM TR	ACTOR												
HOURS PER													
MONTH (HP)	200	200	200	200	200	20	0 20	00	200	200	200	200	200
EXCESS CAP	ΔΟΤΨΥ		200	200					200				
TRACTOR #1													
INACION #1	100	106	100	200	197	10	0 1	69	190	195	200	200	105
	190	190	199	200	107	10	0 10	00	190	105	200	200	195
TRACIOR #2	0	0	0	0	0		<b>`</b>	0	0	0	0		
	0	0	0	0	0		5	0	0	0	0	0	, 0
IRACIOR #3	0	0	0	0	0		<b>`</b>	0	0	0	0		
	NECATI		EDC AD	0 	ט דאו ייניד	י שטאכי			UTDEMEN	ייים אידי פיזא		ט יפווד ת ג	TMENTO
MAY BE NEEL	NEGAIL	COMPIE	TERS AF	D ODF		Je IRAC.	IOK HOU	IN NEQ	JIKEMEI	NI SOM	MARI	AD003	IMENIS
LABOR		COMINE	10 1101		NA1101								
	<b>TA</b> 1		MAD		MAY	TIME	TITT	ALIC	CEDW	005	NOV	DEC	TOTAL
SUMMARI		N FED	PIAK	AFK	MAI	JUNE	0011	AUG	JEF I	001	NOV	DEC	IOIAL
OWNER LABO	К 1.0		107	110	101	110	1 7 1	1.67	100	0.0	0.0	104	1 000
PROVIDED	101	5 89	137	110	101	119	1/1	101	102	96	90	104	1,282
TOTAL HOUR	5 ·		1 27	0 00	1.4	~~	25	2.2	17		0 00	-	100
REQUIRED		4	1.37	0.00	14	22	35	22	1/	0.00	0.00	5	123
HIRED LABO	R												
HOURS													
REQUIRED	0.0	0.00	0 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST OF HI	RED												
LABOR	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST RESUL	IS DEI	PREC.IN	T. INS	. TAX	KES T	.F.C.	REPAI	R LUE	B. FUEL	T.V.	C. T.O	.C./TH	RACTOR
TRACTOR #1	11,	390 8,8	379 592	1,6	574 2	2,535	194	61	408	664		ź	23,199
TRACTOR #2	0.0	0.00	.00 0.0	0.0	00	0.00	0.00	. 0.0	0.00	0.00	)		0.00
TRACTOR #3	0.0	0 0.	.00 0.0	0.0	00	0.00	0.00	0.0	0.00	0.00	)		0.00
			TOTAI	. FIXE	D COST	rs 22	,535.44	I T	OTAL V	ARIABI	LE COS	TS e	663.71
TOTAL OPERA	ATING C	OST IN	CLUDING	HIRE	D LABO	DR 23	,199.14			COST 1	PER AC	RE	282.92

Figure 27. (Continued)

CROP ACTIVITIES	ACRES	TRACTOR SIZES (IN PTO HP)
WHEAT	73	95
ALFALFA	2	105
GRAIN SORGHUM	2	125
CORN	0	140
PEANUTS	0	155
SOYBEANS	0	175
COTTON	0	200
SUDAN HAY	5	

	Ψ⊥	#2	1	5									
TRACTOR HP	95	0					CC	ST DAT	A ENTR	Y			
MACHINE		SPE	CIFIE		-		CU	IRRENT	FUEL C	ost	0.	80	
OPERATION		TRA	CTOR	USAGE			IN	ITERESI	RATE		0.0	90	
					-		CU	IRRENT	TAX RA	TE	0.0	10	
OFFSET	100%	08	(	)୫			IN	ISURANC	E RATE		0.0	06	
CHISEL	100%	0%	(	)%			HI	RED WA	GE RAT	Е	5.	00	
LAND PLANE	100%	08	(	) %									
SWEEP PLOW	100%	08	(	)%									
M.B. PLOW	100%	0%	(	)%									
SWEEP COND.	100%	08	(	) <b>%</b>									
CULTIPACKER	100%	0%	(	)%									
TANDEM DISK	100%	0%	(	J <b>%</b> (									
SPRINGTOOTH	100%	08	. (	D&									
S.HARROW	100%	0%	(	<b>3</b> 8									
DRILL	100%	0%	(	<b>)</b> %									
PLANTER	100%	0%	(	<b>J</b> &									
CULTIVATOR	100%	0%	(	<b>J</b> &									
ROTARY HOE	100%	0%	(	<b>8</b> C									
SPRAYER	100%	0%	(	<b>3</b> 60									
S.SHREADER	100%	0%	(	<b>%</b> C									
ROT.MOWER	100%	0%		<b>8</b> C									
WINDROWER	100%	0%	(	<b>2</b> 80									
BALER	100%	0%		38									
OWNER-OPERATO	R												
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAI
HOURS													
AVAILABLE	100	99	142	103	101	126	153	185	117	119	94	98	1,339
									·				
MAXIMUM TRACT	OR HOU	JRS											
PER TIME													
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200	

Figure 28. Machinery Complement Selection Results for Small North Central.

TRACTOR

TRACTOR													
HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
95	0.00	3	1	0.00	4	21	34	23	18	0.00	0.00	0.00	103
TRACTOR #2													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR #3													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE . TE NZ		ΔΥΔΤ.Τ	ABLE) T	S RFL	AVED	N THE	RESULT	WOR 21					
CHECK HODSEL	OWED I	FOUTD	EMENTS	FOR D	נ סבות	VEN E	OUTDMEN	10 I.O.	•				
TRACTORS USE		LOUIK	EMENIS	FOR P			QUIPMER						
TRACTORS USE	LD WITH	1 540 1	PIO EQU	TPMEN	T CANF	UT EX	CEED 14	IU HOR:	SEPOWER				
IN ADDITION,	S.HAI	KROW IS	S NOT C	FFERE	D FOR	TRACTO	ORS EXC	SEEDING	3 15 <b>5</b> H	<u>.</u>			
TRACTOR HOUF	ર												
REQUIREMENT													
SUMMARY J	IAN I	EB	MAR	APR	MAY	JU	NE JI	ULY	AUG	SEPT	OCI	NOV	DEC
MAXIMUM TRAC	CTOR												
HOURS PER													
MONTH (HP)	200	200	200	200	200	20	0 2	00	200	200	200	200	200
EXCESS CAPAC	TTY												
TRACTOR #1													
95 2	200	197	199	200	196	: 17	a 1	66	177	182	200	200	200
			1 ) )	200	1.70	, 1,	<i>,</i> 1	00	1,1	102	200	200	200
IRACIOR #2	•	•	•	•			•	0	0	•	0		•
U	0	0	U	0	0		0	0	0	0	0	0	0
TRACTOR #3		-	_	-									-
0	0	0	0	0	0	. (	0	0	0	0	0	0	0
NOTE: IF N	EGATIV	E NUME	ERS AP	PEAR	IN THE	TRAC	TOR HOU	JR REQ	UIREMEN	NT SUM	MARY	ADJUSI	IMENTS
MAY BE NEEDE	ED TO (	COMPLE	TE FIEI	D OPE	RATION	1S.							
LABOR													
SUMMARY	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
OWNER LABOR													
PROVIDED	100	99	142	103	101	126	153	185	117	119	94	98	1,339
TOTAL HOURS													
REQUIRED	0.0	0 4	1	0.00	4	23	37	25	19	0.00	0.00	0.00	113
HIRED LABOR					1.1								
HOURS													
PEOULPED	0 0	0 0 00		0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
COST OF HIDE	0.0 m	0 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LABOD	- 0 0	0 0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
DABOK	0.0			0.00	0.00	0.00	DEDAT	D 100	0.00		0.00	0.00	
COST RESULTS	DEP	REC.IN	T. INS	5. TAZ	CES I		REPAI	R LUE	S. FUEL	. 1	. 1.0		CACIOR
TRACTOR #1	11,1	26 8,6	5/4	1,6	519 2	1,935	1/2	. 56	3/6	604		4	42,339
TRACTOR #2	0.0	0 0.0	0.0	0.0	00	0.00	0.00	0.00	0.00	0.00	)		0.00
TRACTOR #3	0.0	0 0.0	0.0	0.0	00	0.00	0.00	0.00	0.00	0.00	)		0.00
			TOTAI	L FIXE	D COS	IS 21	,935.10	D T	OTAL V	ARIABI	LE COS	TS 6	504.10
TOTAL OPERAT	ING CO	OST INC	CLUDING	HIRE	D LABO	DR 22	,539.21	L	C	OST PI	ER ACE	E 2	274.87

Figure 28. (Continued)

'

PERIOD

CROP ACTIVITI	ES	ACF	RES				(1	N PTO	HP)				
WHEAT		1	.2					ç	95				
ALFALFA			2					10	05				
GRAIN SORGHUM			0					12	25				
CORN			0					14	40				
PEANUTS			0					15	55				
SOYBEANS			0					1	75				
COTTON			0					2	00				
SUDAN HAY			4										
	#1	#2	4	<del>#</del> 3									
TRACTOR HP	95	0					cc	ST DAT	TA ENTR	Y			
MACHINE		SPI	CIFIE	2D			CU	JRRENT	FUEL C	OST	٥.	80	
OPERATION		TRA	ACTOR	USAGE			IN	ITEREST	TAX PA	ጥፑ	0.0	90	
OFFSET	100%	0%	(	0%			IN	ISURANC	CE RATE		0.0	006	
CHISEL	100%	0%	(	D&			HI	RED WA	AGE RAI	E	5.	00	
LAND PLANE	100%	08	(	) <b>%</b>									
SWEEP PLOW	100%	0%	(	<b>)</b> %									
M.B. PLOW	100%	0%	(	) <b>%</b>									
SWEEP COND.	100%	0%	(	) <del>%</del>									
CULTIPACKER	100%	0%	(	)¥									
TANDEM DISK	100%	0%	(	) <b>%</b> (									
SPRINGTOOTH	100%	0%	(	28									
S.HARROW	100%	0%	. (	<b>)</b> %									
DRILL	100%	0%	(	<b>)</b> %									
PLANTER	100%	0%	(	)%									
CULTIVATOR	100%	0%	. (	) <del>%</del>									
ROTARY HOE	100%	0%	(	)%									
SPRAYER	100%	08	(	<b>)</b> %									
S.SHREADER	100%	0%	(	)%									
ROT.MOWER	100%	0%	(	) <b>%</b>									
WINDROWER	100%	0%	(	)%									
BALER	100%	0%	(	98									
OWNER-OPERATO	R JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS													
AVAILABLE	95	84	127	97	98	115	164	171	103	106	86	91	1,246
MAXIMUM TRACT	OR HOU	IRS											

TRACTOR SIZES

Figure 29. Machinery Complement Selection Results for Small South Central.

TOTAL

TOTAL													
TRACTOR													
HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
95	0.00	2	0.62	0.00	2	6	6	6	4	0.00	0.00	0.00	27
TRACTOR #2													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR #3													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE: IF NA	(NOT	AVALIA	BLE) I	S REL	AYED I	N THE	RESULI	S ROW.					
CHECK HORSEPO	OWER F	REQUIRE	MENTS	FOR P	TO DRI	VEN E	QUIPMEN	IT.					
TRACTORS USED	O WITH	1 540 P	TO EQU	IPMEN	T CANN	IOT EX	CEED 14	0 HORS	SEPOWER				
IN ADDITION,	S.HAF	ROW IS	NOT C	FFERE	D FOR	TRACT	ORS EXC	EEDING	5 155 H	IP.			
TRACTOR HOUR													
REQUIREMENT													
SUMMARY JA	AN F	EB 1	IAR	APR	MAY	JUI	NE JU	JLY	AUG	SEPT	OCT	NOV	DEC
MAXIMUM TRACT	FOR												
HOURS PER						,							
MONTH (HP) 2	00 2	00	200	200	200	20	0 20	00	200	200	200	200	200
EXCESS CAPACI	ΓTΥ												
TRACTOR #1													
95 20	0 1	.98	199	200	198	19	4 19	94	194	196	200	200	200
TRACTOR #2													
0	0	0	0	0	0	(	)	0	0	0	0	0	0
TRACTOR #3													
0	0	0	0	0	0	C	)	0	0	0	0	0	0
NOTE: IF NEO	GATIV	E NUMBI	ERS AP	PEAR	IN THE	TRAC	FOR HOU	R REQU	JIREMEN	IT SUM	MARY	ADJUS	TMENTS
MAY BE NEEDED	тос	OMPLEI	E FIEL	D OPE	RATION	ıs.							
LABOR													
SUMMARY	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
OWNER LABOR													
PROVIDED	95	84	127	97	98	115	164	171	103	106	86	91	1,246
TOTAL HOURS													
REQUIRED	0.0	0 2	0.68	0.00	3	6	6	7	4	0.00	0.00	0.00	29
HIRED LABOR													
HOURS													
REQUIRED	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST OF HIRED	)												
LABOR	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST RESULTS	DEPI	REC.INT	C. INS	. TAX	ES T	.F.C.	REPAI	R LUB	. FUEL	T.V.0	C. T.O	.C./TH	RACTOR
TRACTOR #1	9,8	42 7.7	34 516	1,4	49 1	9,540	36	15	97	148			19,688
TRACTOR #2	0.0	0.0	0.0	0 0.0	0 0	0.00	0.00	0.00	0.00	0.00	)	-	0.00
TRACTOR #3	0.00	0.0	0.0	0 0.0	0 0	0.00	0.00	0.00	0.00	0.00	)		0.00
			TOTAL	FIXE	D COST	IS 19.	,540.43	TO	TAL VA	RIABLE	COST	s ·	47.95
TOTAL OPERATI	ING CO	ST INC	LUDING	HIRE	D LABO	R 19,	688.38		С	OST PH	ER ACR	E 1,0	93.80

Figure 29. (Continued)

129

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CROP ACTIVITIES	5	ACRES		TRACTOR (IN PTO	SIZES HP)
WHEAT		8			95
ALFALFA		2		1	05
GRAIN SORGHUM		4		1	25
CORN		0		1	40
PEANUTS		0		1	55
SOYBEANS		3		1	75
COTTON		0		2	00
SUDAN HAY		9			
	#1	#2	#3		

	#1	#2		#3									
TRACTOR HP	95	0					CC	DST DAT	FA ENTR	Y			
MACHINE		SP	ECIFI	====== ED			Ct	JRRENT	FUEL C	OST	0.	80	
OPERATION		TR.	ACTOR	USAGE			II	ITERES	r RATE		0.0	90	
							Ct	JRRENT	TAX RA	TE	0.0	010	
OFFSET	100%	09	8	0%			I	ISURANC	CE RATE		0.0	06	
CHISEL	100%	05	8	08			HI	IRED WA	AGE RAT	E	5.	00	
LAND PLANE	100%	09	8	0%									
SWEEP PLOW	100%	09	8	0%									
M.B. PLOW	100%	09	8	08									
SWEEP COND.	100%	09	8	0%									
CULTIPACKER	100%	0	8	0%									
TANDEM DISK	100%	09	8	0%									
SPRINGTOOTH	100%	09	8	0%									
S.HARROW	100%	05	8	0%									
DRILL	100%	05	8	0%									
PLANTER	100%	0	8	0%									
CULTIVATOR	100%	05	8	08									
ROTARY HOE	100%	0	8	0%									
SPRAYER	100%	0	8	0%									
S.SHREADER	100%	0	8	08									
ROT.MOWER	100%	0	8	0%									
WINDROWER	100%	05	8	0%									
BALER	100%	05	8	0%									
OWNER-OPERATO	2												
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS													
AVAILABLE	93	85	112	91	97	113	162	173	103	110	84	83	1,223
MAXIMUM TRACTO	OR HOU	IRS											
PER TIME													
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200	

Figure 30. Machinery Complement Selection Results for Small Northeast.

HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
95	0.00	6	2	0.87	7	8	5	8	3	0.00	0.00	0.00	41
TRACTOR #2													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR #3													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE: IF N	IA (NO	T AVALI	ABLE)	IS REL	AYED 1	IN THE	RESULT	S ROW	,				
CHECK HORSE	POWER	REQUIR	EMENTS	FOR P	TO DRI	VEN EQ	DUIPMEN	т.					
TRACTORS US	SED WI	TH 540	PTO EQU	JIPMEN	T CANN	OT EXC	CEED 14	0 HORS	SEPOWER	۲.			
IN ADDITION	I, S.H.	ARROW I	S NOT (	OFFERE	D FOR	TRACTO	ORS EXC	EEDINC	G 155 F	IP.			
TRACTOR HOU	JR												
REQUIREMENT	2												
SUMMARY	JAN	FEB	MAR	APR	MAY	JUL	NE JU	JLY	AUG	SEPT	OCI	NOV	/ DEC
MAXIMUM TRA	ACTOR		•					-					
HOURS PER													
MONTH (HP)	200	200	200	200	200	200	20	00	200	200	200	200	200
EXCESS CAPA	ACITY												
TRACTOR #1													
95	200	194	198	199	193	192	2 19	95	192	197	200	200	200
TRACTOR #2													
0	0	0	0	0	0	Ċ	)	0	0	0	0	C	0
TRACTOR #3													
0	0	0	0	0	0	C	)	0	0	0	0	C	0
NOTE: IF N	NEGATI	VE NUM	BERS AP	PEAR	IN THE	TRACI	OR HOU	R REQU	JIREMEN	NT SUM	MARY	ADJUS	IMENTS
MAY BE NEED	DED TO	COMPLE	TE FIEI	LD OPE	RATION	IS.							
LABOR													
SUMMARY	JA	N FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
OWNER LABOR	2		-										
PROVIDED	9	3 85	112	91	97	113	162	173	103	110	84	83	1,223
TOTAL HOURS	5												
REQUIRED	ο.	00 7	2	0.96	8	9	6	9	3	0.00	0.00	0.00	45
HIRED LABOR	2												
HOURS													
REQUIRED	ο.	00 0.0	0 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST OF HIR	RED												
LABOR	ο.	00 0.0	0 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST RESULT	S DE	PREC.IN	NT. INS	5. TAX	KES T	.F.C.	REPAIL	R LUB	. FUEL	T.V.	с. т.о	.C./TI	RACTOR
TRACTOR #1	11,	126 8,	616 574	1,6	518 2	1,935	70	22	148	240			22,175
TRACTOR #2	0.	00 0.0	0.0	0.0	00	0.00	0.00	0.00	0.00	0.00	)		0.00
TRACTOR #3	ο.	00 0.0	0.0	0.0	00	0.00	0.00	0.00	0.00	0.00	)		0.00
			TOTAL	L FIXE	D COST	rs 21,	935.10	Т	OTAL V	ARIABI	E COS	TS 2	240.36
TOTAL OPERA	TING	COST IN	CLUDING	HIRE	D LABC	R 22,	175.47			COST	PER AC	RE 8	352.90

.

Figure 30. (Continued)

CROP ACTIVITIES	ACRES	TRACTOR SIZES (IN PTO HP)
	4	 95
ALFALFA	0	105
GRAIN SORGHUM	0	125
CORN	0	140
PEANUTS	0	155
SOYBEANS	2	175
COTTON	0	200
SUDAN HAY	12	

	#1	#2	ł	<del>#</del> 3									
TRACTOR HP	95	0					==	DST DA1	A ENTR	.I 			
MACHINE		SPE	CIFIE	D			Ct	JRRENT	FUEL C	OST		0.80	
OPERATION		TRA	ACTOR	USAGE			IN	ITERESI	RATE		0	.090	
							CL	JRRENT	TAX RA	TE	0	.010	
OFFSET	100%	08	(	<b>3</b> 8			IN	ISURANC	E RATE		0	.006	
CHISEL	100%	0%	(	<b>S</b>			HI	IRED WA	GE RAT	Έ		5.00	
LAND PLANE	100%	0%	(	98									
SWEEP PLOW	100%	0%	(	0%									
M.B. PLOW	100%	08	(	<b>8</b> C									
SWEEP COND.	100%	0%	(	08									
CULTIPACKER	100%	0%	(	60									
TANDEM DISK	100%	0%	(	0% (									
SPRINGTOOTH	100%	0%	(	08									
S.HARROW	100%	0%	(	08									
DRILL	100%	0%	(	0%									
PLANTER	100%	0%	(	0%									
CULTIVATOR	100%	0%	(	0%									
ROTARY HOE	100%	08	(	0%									
SPRAYER	100%	0%	(	08									
S.SHREADER	100%	0%	(	0%									
ROT.MOWER	100%	0%	(	08									
WINDROWER	100%	0%	(	08									
BALER	100%	0%	(	0%									
OWNED-ODEDATO	5												
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS													
AVAILABLE	84	65	102	77	92	101	169	162	89	102	75	71	1,118
MAXIMUM TRACTO	OR HOU	RS											
PER TIME													
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200	

Figure 31. Machinery Complement Selection Results for Small East.

TRACTOR HOURS HP JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC TOTAL TRACTOR #1 95 0.00 6 2 0.58 5 7 2 7 0.90 0.00 0.00 0.00 30 TRACTOR #2 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0 0.00 0.00 TRACTOR #3 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0 NOTE: IF NA (NOT AVALIABLE) IS RELAYED IN THE RESULTS ROW. CHECK HORSEPOWER REQUIREMENTS FOR PTO DRIVEN EQUIPMENT. TRACTORS USED WITH 540 PTO EQUIPMENT CANNOT EXCEED 140 HORSEPOWER. IN ADDITION, S.HARROW IS NOT OFFERED FOR TRACTORS EXCEEDING 155 HP. TRACTOR HOUR REQUIREMENT SUMMARY MAR APR MAY JUNE JULY AUG SEPT OCT NOV JAN FEB DEC MAXIMUM TRACTOR HOURS PER 200 200 200 200 200 200 200 200 200 MONTH (HP) 200 200 200 EXCESS CAPACITY TRACTOR #1 95 200 194 198 199 195 193 198 193 199 200 200 200 TRACTOR #2 0 0 0 0 0 0 0 0 0 0 0 0 0 TRACTOR #3 0 0 0 0 0 0 0 0 0 0 0 0 0 NOTE: IF NEGATIVE NUMBERS APPEAR. IN THE TRACTOR HOUR REQUIREMENT SUMMARY ADJUSTMENTS MAY BE NEEDED TO COMPLETE FIELD OPERATIONS. LABOR SUMMARY JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC TOTAL OWNER LABOR PROVIDED 84 65 102 77 92 101 169 162 89 102 75 71 1,118 TOTAL HOURS 8 REQUIRED 0.00 2 0.64 8 2 0.99 0.00 0.00 0.00 6 6 33 HIRED LABOR HOURS REQUIRED 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 COST OF HIRED  $0.00 \quad 0.00 \quad$ LABOR COST RESULTS DEPREC.INT. INS. TAXES T.F.C. REPAIR LUB. FUEL T.V.C. T.O.C./TRACTOR TRACTOR #1 10,047 7,873 525 1,476 19,921 55 17 111 183 20,104 TRACTOR #2 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 TRACTOR #3 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 TOTAL FIXED COSTS 19,921.39 TOTAL VARIABLE COSTS 182.51

Figure 31. (Continued)

TOTAL OPERATING COST INCLUDING HIRED LABOR 20,103.90

TOTAL

133

COST PER ACRE 1,116.88

CROP ACTIVITIES	ACRES	
	4	
ALFALFA	1	
GRAIN SORGHUM	0	
CORN	0.	
PEANUTS	0	
SOYBEANS	2	
COTTON	0	
SUDAN HAY	10	

TRAC	TOR	SIZES
(IN	РТО	HP)
	0	95
	10	05
	12	25
	14	40
	15	55
	1	75
	20	00

	#1	#2		#3									
TRACTOR HP	95	0					CC	DST DAT	FA ENTF	RY			
MACHINE		SP	ECIFI	===== ED			== Ct	JRRENT	FUEL C	COST		0.80	
OPERATION		TR	ACTOR	USAGE	5		II	TERES:	r rate		(	0.090	
							Ct	JRRENT	TAX RA	TE	(	0.010	
OFFSET	100%	0%		0%			II	SURAN	CE RATE	2	(	0.006	
CHISEL	100%	0%		0%			HI	IRED WA	AGE RAI	Έ		5.00	
LAND PLANE	100%	0%		08									
SWEEP PLOW	100%	0%		0%									
M.B. PLOW	100%	0%		0%									
SWEEP COND.	100%	0%		08									
CULTIPACKER	100%	0%		0%									
TANDEM DISK	100%	0%		08									
SPRINGTOOTH	100%	08		0%									
S.HARROW	100%	0%		08									
DRILL	100%	0%		0%									
PLANTER	100%	08		0%									
CULTIVATOR	100%	0%		0%									
ROTARY HOE	100%	08		08									
SPRAYER	100%	08		0%									
S.SHREADER	100%	0%		0%									
ROT.MOWER	100%	08		08									
WINDROWER	100%	08		0%									
BALER	100%	08		0%									
OWNER-OPERATO	R												
MONTHLY LABOR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
HOURS					*****								
AVAILABLE	84	65	102	77	92	101	169	162	89	102	75	71	1,118
MAXIMUM TRACT	OR HOU	JRS											
PER TIME													
PERIOD	200	200	200	200	200	200	200	200	200	200	200	200	

Figure 32. Machinery Complement Selection Results for Small Southeast.

HOURS HP	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
TRACTOR #1													
95	0.00	5	2	0.58	5	7	2	7	2	0.00	0.00	0.00	29
TRACTOR #2													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTOR #3													
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOTE: IF N	IA (NO	T AVALI	ABLE)	IS REL	AYED 1	IN THE	RESULT	S ROW					
CHECK HORSE	POWER	REQUIR	EMENTS	FOR P	TO DRI	IVEN EQ	QUIPMEN	т.					
TRACTORS US	SED WI	TH 540 1	PTO EQU	UIPMEN	T CANN	NOT EXC	CEED 14	0 HORS	SEPOWER	R			
IN ADDITION	I, S.H	ARROW I	S NOT	OFFERE	D FOR	TRACTO	ORS EXC	EEDING	G 155 H	IP.			
TRACTOR HOU	JR												
REQUIREMENT	2												
SUMMARY	JAN	FEB	MAR	APR	MAY	្រ ្សបា	NE JU	ILY	AUG	SEPT	OCI	NOV	/ DEC
MAXIMUM TRA	CTOR												
HOURS PER													
MONTH (HP)	200	200	200	200	200	200	20	0	200	200	200	200	200
EXCESS CAPA	ACITY												
TRACTOR #1													
95	200	195	198	199	195	5 19:	3 19	8	193	199	200	200	200
TRACTOR #2													
0	0	0	0	0	0		)	0	0	0	0	C	0
TRACTOR #3													
0	0	0	0	0	0		)	0	0	0	0	C	0
NOTE: IF N	NEGATI	VE NUMB	ERS AP	PEAR	IN THE	TRACT	TOR HOU	R REQU	JIREMEN	IT SUM	MARY	ADJUS	IMENTS
MAY BE NEED	ED TO	COMPLE	TE FIEL	LD OPE	RATION	NS.							
LABOR													
SUMMARY	JA	N FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
OWNER LABOR	{ · ·												
PROVIDED	8	4 65	102	77	92	101	169	162	89	102	75	71	1,118
TOTAL HOURS	;		•										
REQUIRED	0.0	0 5	2	0.64	6	7	2	7	2	0.00	0.00	0.00	32
HIRED LABOR													
HOURS													
REQUIRED	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST OF HIR	ED												
LABOR	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST RESULT	'S DE	PREC.IN	T. INS	S. TAX	ES T	.F.C.	REPAIR	R LUB	. FUEL	T.V.0	с. т.о	.C./TH	RACTOR
TRACTOR #1	11,	126 8,6	16 574	1 1,6	519 2	1,935	53	16	105	173		:	22,108
TRACTOR #2	Ο.	00 0.	00 0.0	0.0	0	0.00	0.00	0.00	0.00	0.00	)		0.00
TRACTOR #3	0.	00 0.	00 0.0	0.0	0	0.00	0.00	0.00	0.00	0.00	)		0.00
			TOTA	L FIXE	D COST	rs 21,	935.10	Т	OTAL V	ARIABI	LE COS	TS :	173.34
TOTAL OPERA	TING	COST INC	CLUDING	G HIRE	D LABC	DR 22,	108.44			COST 1	PER AC	RE 1,	300.50

Figure 32. (Continued)
# VITA

## Ross Ernest Sestak

#### Candidate for the Degree of

### Master Of Science

## Thesis: A DECISION AID FOR SELECTING FARM EQUIPMENT AND ESTIMATING COSTS OF MACHINERY COMPLEMENTS

Major Field: Agricultural Economics

Biographical:

- Personal Data: Born in Shawnee, Oklahoma, January 25, 1965, the son of Mr. and Mrs. Richard E. Sestak.
- Education: Graduated from El Reno High School, El Reno, Oklahoma in May, 1983; received Bachelor of Science Degree in Agriculture from Oklahoma State University, Stillwater, Oklahoma in December, 1987, with a major in Agricultural Economics; completed requirements for the Master of Science degree at Oklahoma State University in December, 1990.
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