AN ECONOMIC EVALUATION OF FARM LABOR

INCENTIVE AGREEMENTS IN OKLAHOMA

By

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PREFACE

This study is concerned with the use of farm labor incentive programs to attract, motivate and retain good full-time labor. Using a multiple linear regression procedure, hypothesized variables which have a significant effect on employee wages are determined. The additional costs of incentive programs are estimated and partial budgeting is used to evaluate incentive programs.

Finally, sincere gratitude and appreciation are expressed to my parents, Mr. and Mrs. James Wolfe for their encouragement and assistance throughout my educational career.

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CHAPTER I

INTRODUCTION

Changing Importance of Hired Agricultural Labor

The agricultural industry has experienced a revolutionary change in
its combination of inputs over the past two decades. Since the early
1950's there has been a continuous increase in the use of fertilizer
and machinery, a stable level of real estate, and a continuous decrease
in the amount of labor inputs (Figure 1). During the same time period
these major inputs have experienced an increase in their prices (Figure
2). The amount of labor input has decreased to 47 percent of the 1950
level, while the wage rates have increased to 272 percent of their 1950
level.[1] Tweeten (1970) in Foundations of Farm Policy stated that from
1947 to 1966 the decrease in hired labor input was exactly offset by
the rise in wages and total hired labor expense remained at $2.8
billion.[2] Bishop (1967) indicated that the most important determinant
of manpower needs in farming has been changes in technology. While
capital substitutes for manpower, the growing size of farms tends to
increase demand for manpower. The aggregate affect is that capital
substitution for manpower exceeds the size effect and there is a sharp
reduction in employment of manpower in farming.[3]

A farm worker in 1950 was able to produce enough for himself and
14.5 others, in 1971 this figure had risen to 47.2.[4] In 21 years the
productivity of each farm worker has increased over three times. This
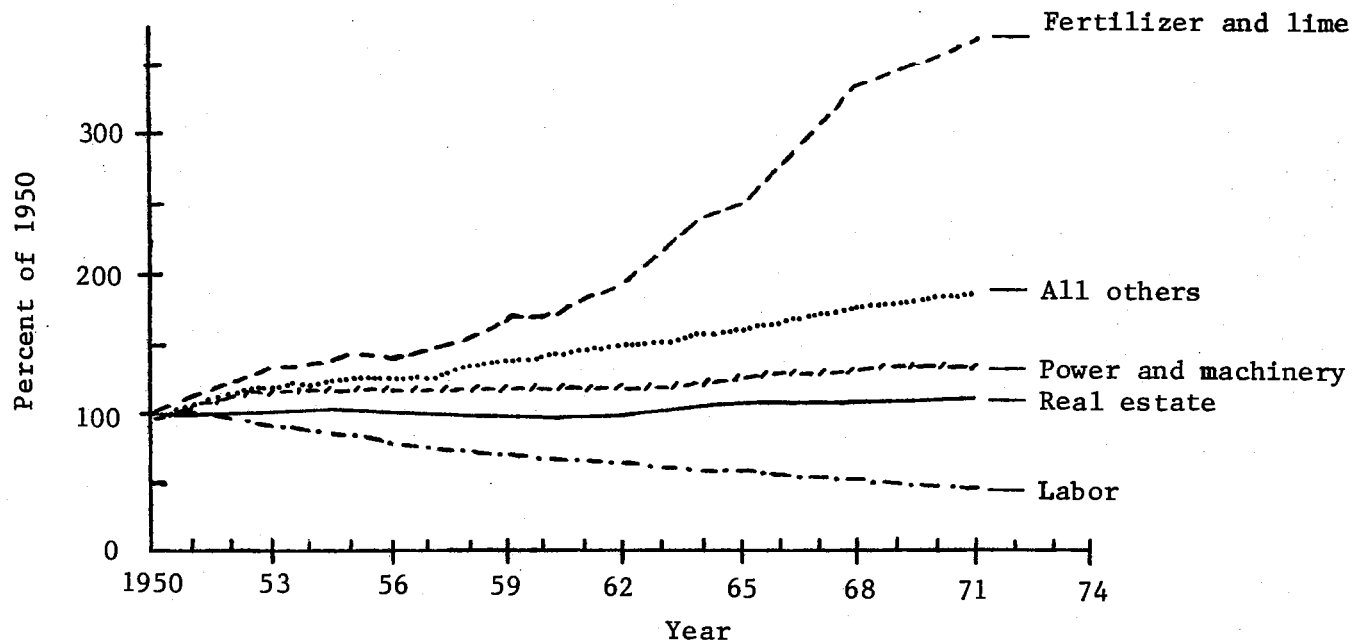
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Figure 1. Quantities of Selected Farm Inputs
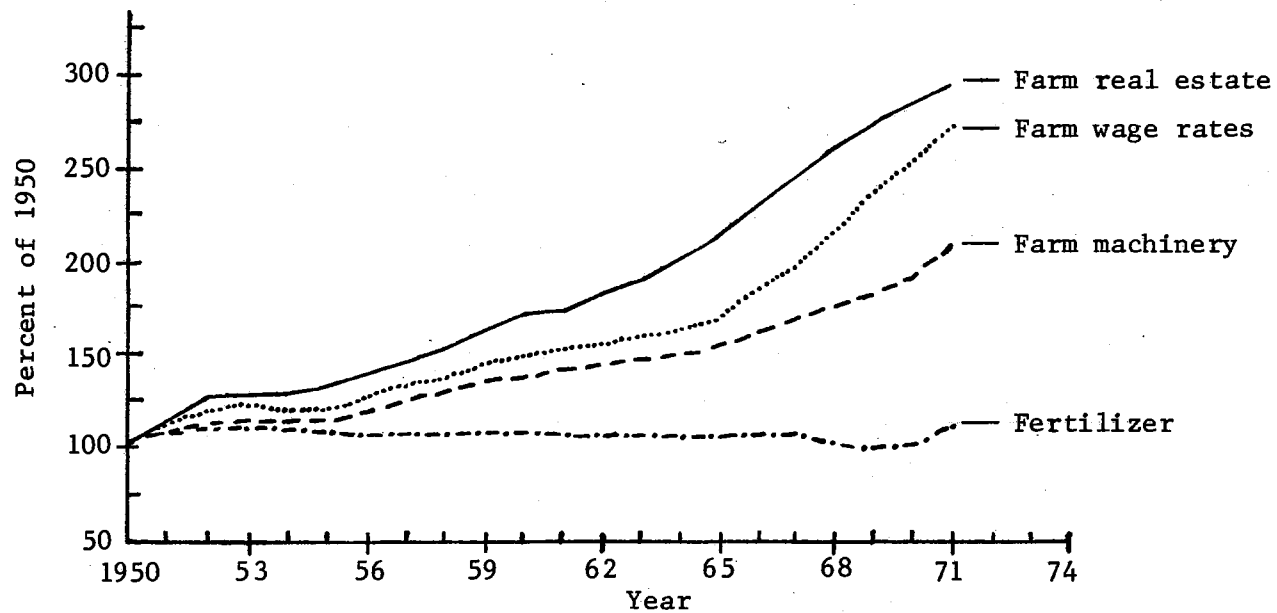
Source: USDA Economic Research Service, 1971 Handbook of Agricultural
Charts, Agricultural Handbook No. 423 (Washington, 1971), p. 10.

Figure 2. Prices of Selected Farm Inputs

Source: USDA, Economic Research Service, 1971 Handbook of Agricultural Charts, Agricultural Handbook No. 423 (Washington, 1971), p. 9.

increase in productivity has caused much of the labor supply to be redundant and a mass migration of farm workers to off-farm jobs has resulted. In Oklahoma alone the total number of workers on farms has decreased from 255,000 persons in 1950 to 125,000 in 1968 (Figure 3).[5,6]

Even with this decrease in the number of farm workers, a situation exists where there is still excess labor while some job orders go unfilled.[7,8] The labor needs in agriculture have made a transition from physical energy and brute power to the more highly skilled labor, which is needed to operate machinery and make management decisions. The larger operations of modern agriculture require individuals who have technical skills in mechanics, agronomy, animal science and the other areas of agriculture production. Hired labor is needed to perform the mechanical and biological operations in their proper sequence, and solve the day-to-day problems which require decisions that enable the operation to continue in a timely and efficient manner.

Some farm workers possess these abilities or have been able to acquire the needed skills to accept the managerial responsibilities. Other farm workers have left agriculture for jobs in other businesses or related agri-business firms. This transition has released large numbers of farm workers as the farming operations become more capitalized and managers profitably substitute machinery for labor. The transition has also brought about a growing need for highly skilled employees on the larger farms.

Statement of The Problem

Many of the farm workers who are leaving agriculture are the young and more productive segment of the working force.[9] These are the individuals who would be capable of learning a skill and contributing
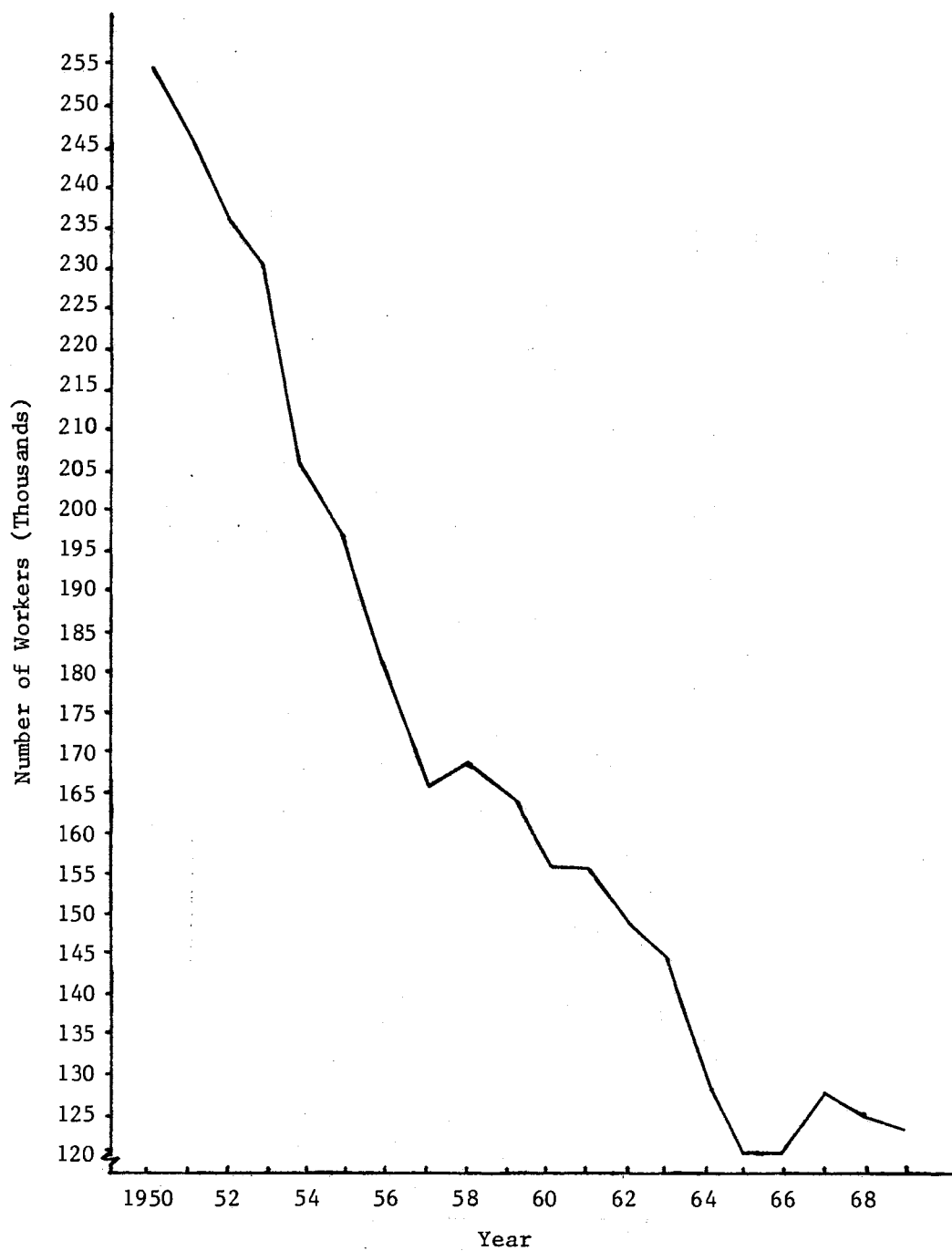
Figure 3. Total Number of Farm Workers on Oklahoma
Farms, 1950-1969

the most to agricultural production for years to come. The low average
wage rate in agriculture is one reason that the younger and more mobile
workers are seeking other jobs which provide higher incomes. The aver-
age agriculture wage rate in Oklahoma has risen from $0.62 per hour in
1950 to $1.32 per hour in 1969, but still lags behind the average manu-
facturing wage rate which, in Oklahoma, was $3.09 per hour in 1970.[10,11,12]

If farm operators hope to compete with industry for the needed
skilled labor, they will have to offer competitive wages and provide
labor programs that will attract and hold good full-time help. In many
cases industry provides better working conditions, more uniform working
hours, insurance policies, paid vacations and many other benefits that
may make working in agriculture relatively unattractive. Farmers are
turning to new labor programs in order to attract qualified help into
agriculture. One of the more widely used and successful programs is
the incentive agreement. As good full-time labor becomes more difficult
to locate and hold, an incentive agreement will become more valuable.
Kilbridge (1954) indicated that by 1954 between 50 and 60 percent of
employees in manufacturing were covered by incentive payment plans.[13]
If this is an indication of the potential use for incentive agreements,
farm operators will need to become familiar with the application and
advantages of the different incentive agreements in agriculture.

Objectives of The Study

The major objective of this study is to delineate information
about incentive agreements which can be helpful to farm operators.
It is hoped that the information will enable the operator to implement

an incentive program which could attract, motivate and retain skilled
help. The specific objectives include:

1. To specify and describe the major types of incentive agreements
   and their provisions being used on Oklahoma farms,

2. Identify farm characteristics that lend themselves to the use
   of incentive agreements,

3. Identify the major problems faced by operators in the develop-
   ment and execution of the different types of incentive
   agreements,

4. Estimate the probable operator costs of using incentive
   agreements,

5. Utilizing information provided in objective 4, estimate the
   benefits needed to make an incentive agreement profitable on
   representative farms in Oklahoma.

Theory

For purposes of this study the concept of a production function
and marginal physical product will be presented to establish a theo-
retical background for the analysis. In agriculture, the term produc-
tion function refers to the physical relation between a firm's inputs
of resources and its output of goods per unit time.[14] The law of
diminishing returns determines the shape of this function. The law
states that if the input of one resource is increased by equal incre-
ments per unit of time while the inputs of other resources are held
constant, total product output will increase, but beyond some point
the resulting output increases become smaller and smaller.[15] An
example of this relationship is seen when the labor input is increased

while holding the level of land, capital and other inputs constant. The total product will increase up to a point where increased labor would lead to diminishing returns.

The marginal physical product of labor is defined as the change in total product resulting from a one-unit change in the quantity of the resource used per unit of time.[16] An economically rational firm will hire units of labor as long as it adds more to total revenue than to total cost.

To determine the correct level of an input which will maximize profits one can establish a demand curve for the input. In a purely competitive buyer situtation the price of the inputs is constant since an individual firm cannot affect the price of an input. The profit maximizing relationship can be written:

$$\frac{MPP_a}{P_a} = \frac{1}{P_x} \tag{1.1}$$

where

MPP_a = marginal physical product of input a,

P_a = price of input a,

P_x = price of product x.

It can be shown that

$$P_a = MPP_a \cdot P_x \tag{1.2}$$

also, $MPP_a \cdot P_x = VMP_a$ (value of the marginal product of a).[17] The downward sloping portion of the VMP_a curve is also the demand curve for input a. The profit maximizing level of input a is where $P_a = VMP_a$. This is graphically shown in Figure 4.

The profit maximizing criteria is met where the price of input a intersects the value marginal product of input a which, in Figure 4, is

Figure 4. Demand Curve for Labor
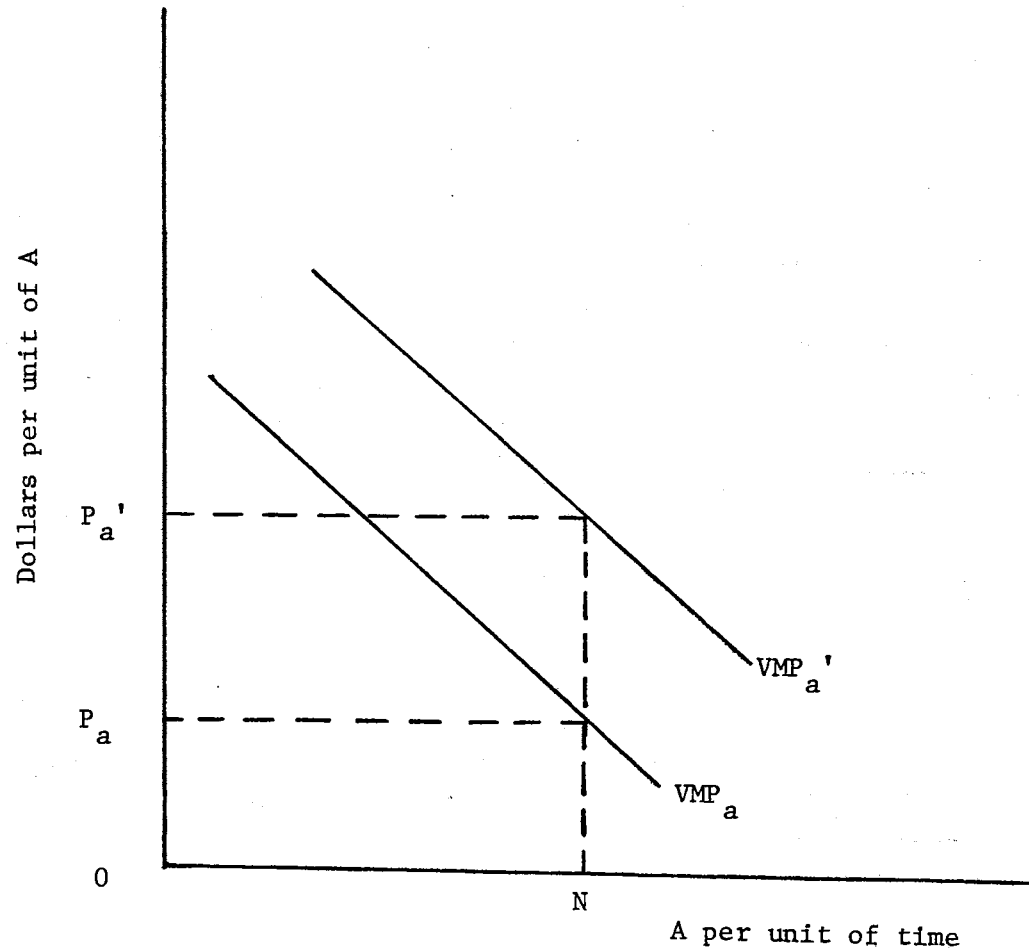
Source: Richard H. Leftwich, The Price System and Resource Allocation, (New York, 1964), p. 288.

ON units of input a. If the marginal productivity of labor increased, thus shifting VMP_a to VMP_a', while the price of labor and the product remained constant, the marginal cost of the product would decrease, thus providing more profit to the firm. All the additional profit could be used to increase the employee's wage thus leaving none for the employer. This is considered the breadeven amount which neither increases nor decreases the employer's profit. If the employer chose to pay a portion of the profit to the employee in the form of an incentive payment, both the employer and employee would benefit from the employee's better performance. This could also induce further increases in the employee's productivity which would again increase the employee's wage and the employer's profits.

An alternative way to use this relationship is where an employer is paying the employee a fixed wage and would like to initiate an incentive program. The employer can assume an incentive payment which would raise the wage from P_a to P_a'. This would then define how much the VMP_a curve would have to shift to return to the profit maximizing position using ON units of a. Recognizing these relationships between prices of inputs, prices received for output, and marginal productivity, one can determine the change needed in one variable given changes in the other variables to remain at the profit maximizing position. Using this theory one can assume an increase in productivity and solve for the breakeven incentive payment or assume an incentive payment and solve for the breakeven productivity.

Review of Literature

Research on incentive agreements has been done in a limited number of states. Schaffer, Casler and Smith (1959) found 23 of the 38 New

York farms interviewed using some type of incentive payment program.[18]
These programs were found on the larger operations managed by the above
average farmers. When ranking factors important to the hired labor,
incentive plans were fifth behind good labor relations, good wages,
adequate housing, and good buildings and equipment to work with.
Robbins (1966) found 37 of 132 farms in Indiana using incentive pro-
grams.[19] When 116 farm operators were asked to rank factors important
to successful employment of hired labor, incentive plans were sixth
behind good labor relations, good wages, adequate housing, good build-
ings and equipment, and vacation. An important conclusion of the
Indiana study is that incentive payments should be in addition to and
not a substitute for the more important factors of successful employment.

In Delaware, Knorr and Elterich (1971) found that increasing levels
of incentive pay tended to increase the years of tenure of farm workers.[20]
Weightman (1966) indicated that incentive payments in New York were
about 10 percent of total earnings.[21] Although not as large a part of
total earnings as some recommend, Weightman found that the incentive
payment had a disproportionate effect on employees in terms of the
interest and motivation engendered.

An underlying hypothesis of this study is that incentive agreements
provide a means of attracting, motivating and retaining good full-time
employees in agriculture.

<center>Procedures Used</center>

To accomplish the objectives, information is needed which
identifies and describes the incentive programs presently used in
Oklahoma. To obtain this information, 11 counties were selected as

a sample. Selection of the counties was based upon geographic disper-
sion, number of farms hiring labor, number of regular farm employees
and the type of agriculture predominant in the county. In each county
approximately 10 percent of those farms hiring full-time labor were
interviewed. The sample of 107 farms is considered an adequate sample
size for statistical purposes.

The questionnaire used to gather data included questions designed
to identify characteristics of the farm, operator and employees (see
Appendix A). Sections of the questionnaire covered provisions of the
incentive programs, employer satisfaction with the program and problems
encountered with the employees. Another section of the questionnaire
provided information on the pay package of employees. This included
base wages, perquisites, bonuses and incentive payments.[22] For
employees on incentive agreements another questionnaire (see Appendix
A) was designed to obtain detailed information on employee characteris-
tics and employee satisfaction with the incentive agreement. For
objective five, farm budgets for representative farms were used to
determine the needed production or sales increases to make incentive
agreements profitable to the employer.

Organization of Thesis

Chapter II of the thesis indicates the procedure used in selecting
sample counties, the source of sample farms and the interviewing proce-
dure. The questionnaires for both employers and employees are discussed
and the general information obtained from sections of the questionnaires
are given.

Chapter III of the thesis indicates the major characteristics of the population sample. The first section deals with the agricultural operation and characteristics such as type of operation, size of the operation, legal organization, enterprises of the operation and their use of incentive agreements. The second section is concerned with characteristics of the farm operator. This includes the age, level of formal education, farming and hired labor experiences and other occupations of the operators. The last section presents the socio-economic characteristics of the employees, the employee's skill level, the amount and composition of employee wages, amount of responsibility entrusted by the operator and amount of labor the employee provides to the farm.

Chapter IV presents the findings on incentive programs used by Oklahoma farm operators. After an introduction, each of the four types of incentive programs is discussed in detail. Each section presents a description of the individual incentive program and information is given about the operation, employers, employees, amount of incentive payment, and total earnings of the employees. An evaluation is included on each of the four general incentive programs.

Chapter V of the thesis reports the statistical analysis of employee wages for alternative labor programs. The statistical procedure used in the analysis is discussed and the empirical results are given for selected models. Also partial budgeting is presented as a method of evaluating incentive programs. Finally Chapter VI presents the summary and findings of the study and the possible direction of further study.

FOOTNOTES

[1]USDA Economic Research Service, 1971 Handbook of Agricultural Charts, Agricultural Handbook No. 423 (Washington, 1971), pp. 9-10.

[2]Luther Tweeten, Foundations of Farm Policy (Lincoln, 1970), p. 251.

[3]C. E. Bishop, "Dimensions of the Farm Labor Problem," Farm Labor in the United States (New York, 1967), pp. 1-17.

[4]USDA, "Changes in Farm Production and Efficiency," Statistical Bulletin No. 233 (Washington, 1972), p. 29.

[5]Oklahoma Crop and Livestock Reporting Service, 1964 Oklahoma Agriculture Annual Report, ed. Harold R. Rector (Oklahoma City, 1964), p. 175.

[6]Oklahoma Crop and Livestock Reporting Service, 1969 Oklahoma Agriculture Annual Report, ed. Harold R. Rector (Oklahoma City, 1969), p. S-97.

[7]Richard B. Smith and Earl O. Heady, "Paradox of Farm Labor," 1970 Iowa Farm Science, II (1970), p. 3.

[8]Luther Tweeten, Foundations of Farm Policy (Lincoln, 1970), p. 250.

[9]Varden Fuller, "Farm Manpower Policy," Farm Labor in the United States, ed. C. E. Bishop (New York, 1967), p. 97.

[10]Oklahoma Crop and Livestock Reporting Service, 1964 Oklahoma Agriculture Annual Report, ed. Harold R. Rector (Oklahoma City, 1964), p. 175.

[11]Oklahoma Crop and Livestock Reporting Service, 1969 Oklahoma Agriculture Annual Report, ed. Harold R. Rector (Oklahoma City, 1969), p. S-97.

[12]U. S. Department of Labor, Employment and Earnings, U. S. Department of Labor Bulletin 1370-8 (Washington, 1971), p. 466.

[13]M. D. Kilbridge, "The Management of Wage Incentive," (Unpub. Ph.D. dissertation, State University of Iowa, 1945).

[14]Richard H. Leftwich, The Price System and Resource Allocation, (New York, 1964), p. 116.

[15]Ibid, p. 117.

[16]Ibid, pp. 118-119.

[17]Richard A. Bilas, Microeconomic Theory: A Graphical Analysis, (New York, 1967), p. 249.

[18]W. Harry Schaffer, George L. Casler and Robert S. Smith, "Incentive Payment Plans for Hired Men," New York State College of Agriculture (Ithaca, 1959), pp. 7, 14.

[19]Paul R. Robbins, "Keeping Good Hired Farm Labor," Purdue University Cooperative Extension Service EC-306 (Lafayette, 1966), pp. 8, 16.

[20]A. Lawrence Knorr and Joachim G. Elterich, "Analysis of Delaware's Full-time Hired Farm Labor Situation," Agricultural Experiment Station, University of Delaware Bulletin 385 (Newark, 1971), p. 19.

[21]Paul Wesley Harrison Weightman, "Financial Incentive Plans for Farm Labor in New York State," (unpub. Ph.D. dissertation, Cornell University, 1966), p. 193.

[22]For purposes of this study the base wage is the guaranteed amount of cash which is based upon the predetermined pay period and rate; perquisites are the non-cash benefits received by the employee; bonus is a cash payment not guaranteed by the employer and incentive income is either cash or revenue which is derived from an incentive program.

CHAPTER II

THE SAMPLING PROCEDURE AND QUESTIONNAIRES

Introduction

To achieve the study objectives stated in Chapter I, an analysis of empirical data was required. Such data was obtained by personal interviews with a representative sample of Oklahoma operators hiring full-time labor. Employees working under an incentive program of a sample operator were also interviewed. The procedure for selecting sample counties and for interviewing the employers and employees is presented in the first part of this chapter. The second section of the chapter indicates factors considered in the development of both the employer and employee questionnaires.

Sampling and Interviewing Procedure

Sample Counties

The 1969 Agricultural Census was used to identify the number of farms hiring full-time labor and the number of farm employees for each county in Oklahoma.[1] The state was then divided into four areas which appeared to represent different types of agricultural settings. Two or three counties in each area were identified as containing a large number of farms hiring full-time labor in relation to their size. To obtain a representative sample of farms and ranches, counties containing

or adjacent to large metropolitan areas were avoided. Each county considered contained a cross section of the agriculture found in each area. Also considered was the anticipated success of locating and interviewing those farms hiring full-time labor.

A sample size of at least 100 farms was felt desirable to produce a representative sample of the state. A 10 percent success in sampling was considered reasonable and 11 counties were selected from across the state that would yield the target sample size of 100 farms. These 11 counties contained 1,013 farms which hired full-time labor during 1969 (Figure 5). The 11 counties selected include: Northeast Area--Mayes and Muskogee; Southeast Area--Pittsburg, Johnston and Pottawatomie; Southwest Area--Grady, Tillman and Washita; Northwest Area--Garfield, Woodward and Texas.

Sample Farms or Ranches

After the counties to be sampled were selected, attention was directed to obtaining for each county a list of farmers who hired full-time labor. Corresponding with the Oklahoma Employment Security Commission and Social Security officials it was found that no list was available on a county basis. Without a list of the entire population, a random sample could not be selected. Since only those farms that hire full-time labor were needed, an alternative was to seek the cooperation of county extension directors and area farm management specialists. They assisted in compiling a list for each county that included at least 20 percent of the farms hiring full-time labor as indicated in the 1969 Agriculture Census.

Northwest

Northeast

Southwest

Southeast

Sample Counties

(xxx)   Number of full-time
         employees

xxx   Number of farms hiring
         full-time labor

Source: U.S. Bureau of the Census, Census of Agriculture
         1969.

Figure 5. Distribution by County of Farms Hiring Full-time Labor and the
           Full-time Employees in 1969

Pretesting and Interviewing

After determining sample counties, the questionnaires were pre-tested in Garfield County during March, 1972. This county was selected for pretesting due to its close location to Stillwater. The questionnaires were revised after pretesting to improve the order and understanding of the questions. From the lists of names compiled by county extension directors, one-half, or 10 percent of the population, was interviewed during the months of June and July, 1972. Each respondent was first contacted by phone to verify that the farm currently employed full-time labor and, if so, an appointment was arranged for the interview. In many counties a large number of the sample operators no longer hired labor. Occasionally these operators were asked to supply names of other farmers who employed full-time help and they were unable to indicate any operators that had not been contacted or interviewed. This, along with the general decline in hired labor, leads one to feel that the number interviewed was actually a larger percentage than the 10 percent originally planned.

The author and another graduate student conducted all interviews so enumerator bias would be minimized. The interviews took about 30 minutes to complete when operators were knowledgable of needed figures. Some interview were longer when records had to be consulted for the accurate information.

After each interview or at the end of the day each questionnaire was studied to correct any discrepancy or complete any ommissions. The section of the questionnaire for general observations of the enumerator was also completed at this time. This provided the enumerator an

opportunity to indicate the respondent's degree of cooperation and the general validity of the figures given.

Questionnaire Design

Employer Questionnaire

A copy of the employer questionnaire is presented in Appendix A. The questionnaire was designed to gather the following specific information:

1. Personal information about employer,

2. Farm or ranch characteristics,

3. Employer's experience with regular hired labor,

4. Employee skills,

5. Employee work hours,

6. Wages received by employee,

7. Bonus programs,

8. Incentive programs,

9. Future labor needs.

Personal information about the employer such as age and level of formal education will enable a comparison of those using and not using incentive programs. The number of years the employer had operated a farm will give an indication of experience in agriculture and the relation between experience and the different labor programs.

Farm characteristics such as size, enterprise, and type help to locate those conditions under which incentive programs are successful. Size which was measured in acres, gross farm receipts and market value of assets, excluding land, can be used to explain the different wages and different labor requirements of the farms. Land value was excluded

due to the large variation of land prices in Oklahoma and the potential biases that could result from estimating land values. Thus, a capital per hour of labor variable, which included livestock, buildings and machinery, was used in the analysis. In minimizing the biases of individual operators each unit of livestock was assigned a standard value when determining value of assets. Without complete inventories for each farm no standard values could be assigned to machinery and buildings which would yield unbiased estimates of assets. Therefore, the judgment of the operator was called upon to indicate the current value of machinery and buildings. It was also felt that since the amount of land has been a relatively constant resource in agriculture, its substitution for labor has not occurred to the extent that capital has been substituted for labor.

The number of men and length of time the employer has employed regular hired labor gives an indication of the employer's labor experience and ability to attract and retain full-time help.

To indicate the employee's skill level a section of the questionnaire was developed which enabled the employer to rate the employee's skill in four possible areas of the farm: crops, livestock, mechanic and managerial. The skill level in each skill area is defined as follows:

1. Crops

   Semiskilled (operate tillage equipment)

   Skilled (operate planting, harvesting and chemical
     application equipment)

   Highly Skilled (determines when to perform operations,
     varieties to plant, fertilizer level, and chemical
     levels)

2. Livestock

   Semiskilled (move livestock, haul hay and feed)

   Skilled (castrating, vaccinating, dehorn, milk cows, care
       for livestock when calving, lambing, farrowing, and
       mix feed)

   Highly Skilled (select breeding stock, develop rations)

3. Mechanic

   Skilled (change oil, replace plugs and points)

   Highly Skilled (replace rings, grind valves, set timing,
       adjust tappets, weld)

4. Managerial Ability

   Skilled With Managerial Ability (responsible for making
       decisions in place of the operator)

   Not Skilled With Managerial Ability (unable to make
       decisions in place of the operator)

The employer rated each employee in one or more of the skill areas
depending upon the responsibilities of the employee. Thus, the skill
rating was based upon the employee's skill in his specific area of
responsibility and not what his skill level would be in the other areas
of the operation. For example, a herdsman could be rated as highly
skilled in the livestock and managerial areas, but have no skill rating
in the crops or mechanic areas.

Following the section indicating skill levels, the employers were
asked to indicate the number of days they would trust each employee with
full responsibility of the farm or their individual skill areas. This
again helped to quantify the amount of responsibility that the employer
would give the employee. An employer may justify a larger wage to an
employee who can assume responsibilities and thus enable the employer
to leave the operation knowing that the work will get done and problems
will be handled.

The average number of hours worked per week and the amount of time the employee spends on activities other than farming can also explain part of the difference found in total wages. In determining the amount of labor supplied per year an adjustment was made for the amount of time off to take care of personal matters and vacations.

To determine the total amount of wages each employee receives, information was required on the cash wage, perquisites, bonuses and incentive payments. Questions were designed to gather information on each segment included in total wages. One question obtained information on the amount of cash wages and the time period used in calculating the wage rate. The value of perquisites was given by the employer and includes such benefits as housing, transportation, utilities, milk and other home-grown products. If a bonus program was used, the employer was asked to give the average value and the reasons behind the bonus payment. The value was needed in computing wages and the reasons may indicate that a policy very similar to an incentive was being used in the form of a bonus.

If the employer was not presently using an incentive program but had used one sometime in the past, a description of the program and reasons for discontinuing the program were acquired. Information on incentive programs that had been discontinued for various reasons will help to inform interested operators of the weaknesses or problems to avoid which have been discovered by other operators who had at one time used an incentive program.

If an employer was not presently using an incentive program but had considered the possibility, he was asked to give the advantages and disadvantages he considered before making his decision. Such an

individual could provide valuable information on the major considerations which brought him to the conclusion that an incentive program would not benefit his operation.

For employers presently using an incentive program, questions were designed to obtain the specific arrangements, recent changes in the program, value to the employee and the employer satisfaction with the program. It was this particular information that was needed to describe incentive programs being used on Oklahoma farms. Recent changes may indicate means of altering a program which would allow it to serve the farm's needs more satisfactorily. The value of the program to an employee indicated the costs of the farm and thus the minimum benefits needed to make the incentive program profitable. The employer's satisfaction will indicate how the incentive program was performing in relation to his initial expectations.

The employer was then asked to comment on future labor needs of the operation and the wage rate needed to obtain this labor. This could help direct future vocational training in agriculture and also explain why some skills were receiving premium wages. If there had been any employer-employee misunderstandings, the emoloyer was asked to describe the type of misunderstanding. These answers will be informative to operators hiring or preparing to hire full-time labor. Also of an informative nature was the closing question which seeks advise the operator might have on keeping good full-time hired men.

Employee Questionnaire

When a farm was found using a labor incentive program, the employee was interviewed after receiving permission from the employer.

The employee questionnaire is also found in Appendix A and was designed to acquire information about the following areas:

1. Personal information about employee,

2. Formal education and work experience of employee,

3. Preference for agricultural employment,

4. Importance of perquisites,

5. Employee opinion of incentive program.

Personal information about the employee will indicate characteristics which are representative of individuals working with an incentive program. These characteristics may be valuable in determining whether to initiate an incentive program for an employee. Additional questions concerning formal education and work experience also provide information on employee characteristics.

The next section of the employee questionnaire was designed to determine if the employee prefers farm work. If farm work was preferred, then the employee was asked to indicate the major reasons underlying the preference. This information will distinguish those aspects of farm employment which employees feel affect their decisions to remain on the job. Each employee interviewed was also asked what type of employment was planned for the future. This will give another indication of the employee's satisfaction with the incentive program.

The fourth group of questions on the employee questionnaire dealt with the perquisites presently received and perquisites the employee would like to receive. After listing these perquisites, the employee was asked to rank them in the order of their importance. Previous studies had found that employees have a tendency to assign a value to perquisites which was less than the cost to the employer.[2] By ranking

perquisites one can determine the importance of perquisites to employees and compare this to the costs of these perquisites. The ranking of perquisites will also indicate how well perquisites received compare to perquisites desired by the employee.

The last section of the questionnaire includes mirror image questions of an incentive program section in the employer questionnaire. In general, these questions ask for the employee's opinion of the program. Where the employer questionnaire was designed to find if the program rewards the employee for better work, the employee questionnaire was designed to find if the employee felt he was being rewarded for better work. This information will allow evaluation of the incentive program from both the employer's and employee's points of view.

Refusals to Cooperate and Other Possible Biases

Out of approximately 200 farm operators contacted only two refused to provide information for the study. There were two operators interviewed who would not complete the section on employee wages and thus were not included in the subsequent analysis of the factors influencing wages received by employees. One farm was so large it was decided that to be a representative study the information would not be used. The farm hired an amount of labor over 30 times the state average. The individual interviewed was also unable to give the detailed information needed to add the observation to the sample.

FOOTNOTES

[1]The 1969 Agriculture Census defines full-time labor as individuals working 150 days or more on farms.

[2]Lauren H. Brown, "Making Farm Employment Competitive," Michigan State University, Rural Manpower Center Special Paper No. 1 (East Lansing, 1967), p. 5.

CHAPTER III

DESCRIPTION OF THE DATA

The objective of this chapter is to describe the data obtained from interviews with the sample employers who hire full-time labor and the employees who work under an incentive program. The data are presented in three sections, the first dealing with characteristics of the sample farms or ranches. The second section describes the characteristics of the farm operators while the last section of this chapter presents the socio-economic characteristics of employees working with an incentive program. Since this chapter is not concerned with the validity of hypothesized relationships, detailed statistical analysis of the variables affecting employee income will be presented in Chapter V.

Characteristics of the Sample Farms or Ranches

Type of Farm

According to the Census of Agriculture the type of farm or ranch classification represents a description of the major source of income from farm sales.[1] To be classified as a particular type, a farm must have sales of a particular product or group of products amounting in value to 50 percent or more of the total value of all farm products sold during the year. One exception that applies to the sample is that a farm is considered a dairy farm if milk cows represent 50 percent

or more of total cows and milk sold accounts for over 30 percent of the total value of products sold. The classification "General" type farm is given to those farms with three or more major products or product groups of which no one product accounts for more than 50 percent of the total value of products sold. Using these definitions the sample included 56 livestock, 19 general, 15 crop, 9 dairy and 8 cotton farms. Table I presents the distribution of farms according to their location and type. Livestock is the predominate type of farm, representing over 50 percent of the farms in the sample.

TABLE I

DISTRIBUTION OF FARMS ACCORDING TO
LOCATION AND FARM TYPE

Area of State	Number Interviewed	Type of Farm				
		Livestock	Crop	Cotton	Dairy	General
Northeast	15	6	3	4	1	1
Southeast	17	12	--	--	2	3
Southwest	49	21	5	4	4	15
Northwest	26	17	7	--	2	--
Total	107	56	15	8	9	19
% of Total		52	14	8	8	18

Size of Farm

The size of a farm is measured in three different ways: First, by the number of acres used in the farm, both owned and rented; second, by

the value of machinery, farm buildings and livestock which is combined
with the farm's labor resource; third, by the value of sales generated
by the farm. The average number of acres in the farms interviewed
included 1,715 acres of pasture land and 898 acres of cropland for a
total of 2,614 acres (Table II). The average size ranged from 1,698
acres in the Southwest area to 4,080 acres in the Northwest. The com-
bination of pasture and cropland also varied with each area. The South-
west area averages 734 acres of pasture land compared with 964 acres of
cropland, whereas sample farms in the Southeast area averaged 241 acres
of cropland and 2,119 acres of pasture land.

TABLE II

SIZE OF FARMS IN ASSETS AND ACRES
ACCORDING TO AREA OF STATE

Area of State	Value of Assets Excluding Land ($)	Type Land (Acres)		Average Total Acres
		Pasture	Crop	
Northeast	130,488	1,738	579	2,317
Southeast	132,927	2,119	241	2,360
Southwest	87,756	734	964	1,698
Northwest	208,189	2,271	1,809	4,080
Sample Average	139,840	1,715	898	2,614

Another measure of the farm's size is the current value of assets
excluding the value of land. The sample average as indicated in Table

II is $139,840 with a range from $87,756 in the Southwest to $208,189 in the Northwest.

The last measure of size is the average gross sales of the farm. The distribution of farms by gross sales is given in Table III according to area of the state and type of farm. The Northwest and Southwest areas of the state have 14 farms with over $200,000 in gross sales. There are no farms in the Northeast or Southeast areas with gross sales over $200,000. Looking at the type of farm, the six operations with the largest amount of gross sales are livestock farms. The gross sales for all other farm types did not exceed $250,000.

Legal Organization of the Farm

The legal organization is divided into three types: sole proprietorship, corporation and partnerships. Of the 107 farms interviewed 72 are sole proprietorships, 11 are corporations and 24 are partnerships. Ten of the 11 corporations are family-owned corporations.

Enterprises of the Farm

The 107 farms are engaged in 20 different enterprises. Table IV presents the enterprises, number of farms that have the enterprise, total number of units (acres or head) for the sample, average number of units per farm, range of units per farm, and the percent of the sample farms that have each enterprise. Wheat is the enterprise found most often in the sample and represents the largest number of acres of all crops. There is a total of 50,586 acres of wheat on the sample farms. This includes both harvest and graze-out wheat. The average number of acres in wheat for those farms raising wheat is 648 acres. The amount

TABLE III

SIZE OF FARM MEASURED IN GROSS SALES ACCORDING TO AREA OF STATE AND TYPE OF FARM

	Number Interviewed	Sales ($)											
		0–24,999	25,000–49,999	50,000–74,999	75,000–99,999	100,000–149,999	150,000–199,999	200,000–249,999	250,000–299,999	300,000–399,999	400,000–499,999	500,000–749,999	More Than 750,000
Area of State													
Northeast	15	2	2	4	2	4	1	--	--	--	--	--	--
Southeast	17	1	6	3	2	4	1	--	--	--	--	--	--
Southwest	49	4	23	10	1	4	4	1	--	--	1	--	1
Northwest	26	--	3	2	4	3	3	7	2	1	--	1	--
Total	107	7	34	19	9	15	9	8	2	1	1	1	1
Type of Farm													
Livestock	56	5	10	10	4	9	7	5	2	1	1	1	1
Crop	15	1	5	2	2	1	2	2	--	--	--	--	--
Cotton	8	--	3	2	1	2	--	--	--	--	--	--	--
Dairy	9	--	1	2	2	3	--	1	--	--	--	--	--
General	19	1	15	3	--	--	--	--	--	--	--	--	--
Total	107	7	34	19	9	15	9	8	2	1	1	1	1
Sales Class as Percent of Total		7	32	18	8	14	8	7	2	1	1	1	1

TABLE IV

DISTRIBUTION OF OPERATIONS ACCORDING TO ENTERPRISES

Enterprise	Units	No. of Operations Having Enterprise	Total Units in All Operations Interviewed	Average Units	Range Low	Range High	Percent of Operations With Enterprise
Wheat	Acres	78	50,586	648	55	2,000	73
Cotton	Acres	38	10,482	276	50	900	36
Corn	Acres	11	7,480	680	50	1,600	10
Alfalfa	Acres	40	6,805	170	30	650	37
Oats	Acres	14	1,853	132	40	680	13
Sudan or Hay Grazer	Acres	11	1,500	136	10	400	10
Peanuts	Acres	5	227	45	25	80	5
Milo	Acres	21	5,935	283	50	1,000	20
Barley	Acres	11	1,898	173	50	400	10
Soybeans	Acres	9	3,620	402	40	900	8
Hay	Acres	10	3,010	301	30	1,200	9
Cow-Calf	Head	72	8,586	119	20	1,000	67
Stockers	Head	47	21,728	463	28	1,500	44
Feeders	Head	8	17,860	2,233	60	9,000	7
Sows	Head	2	372	186	72	300	2
Feeder Pigs	Head	5	4,410	882	60	3,000	5
Dairy	Head	10	1,129	113	45	250	9
Sheep	Head	3	1,220	407	300	500	3
Poultry	Head	1	65,000	--	--	--	1
Horses	Head	1	16	--	--	--	1

of wheat per farm ranged from a low of 55 acres to a high of 2,000

acres. Of the 9 livestock enterprises, the most frequent is the cow-

calf enterprise found on 67 percent of the farms.

Use of Incentive Agreements

There are 15 farms out of the 107 interviewed using an incentive

program. Seventeen employees are on some type of an incentive program.

The programs range from crop or livestock incentives where additional

income comes from sales of the employee's production, to production and

percentage of income incentives where additional income is a cash

amount determined by the production or profit of the farm. Further

discussion of the programs will be presented in Chapter IV.

Characteristics of Operators

Education of Operators

The farm operators were asked to indicate the highest level of

formal education which they had attained. Table v summarizes the level

of formal education for each area of the state. The survey responses

are grouped into six frequently given levels of education. These

classes include less than 8 years of education, 8 to 11 years, comple-

tion of high school, education beyond high school, a college degree,

and more than 4 years of college. Eighty-four of the 107 operators

interviewed had completed high school. Of the 84 who graduated from

high school, 48 attended college. Of those attending college 29 re-

ceived their B.S. degrees and 12 went beyond the B.S. degree to com-

plete over four years of college. The last column in Table V indicates

the percent of operators in each area with a twelfth-grade or higher

TABLE V

HIGHEST LEVEL OF FORMAL EDUCATION FOR EMPLOYERS
ACCORDING TO AREA OF STATE

Area of State	Number Interviewed	Less Than 8th Grade	8-11	High School	Over 12	B.S.	Over 4 Years of College	Percent With 12th Grade or Higher
Northeast	15	4	1	6	--	3	1	67
Southeast	17	2	2	3	4	2	4	76
Southwest	49	3	7	21	8	4	6	80
Northwest	26	2	2	6	7	8	1	85
Total	107	11	12	36	19	17	12	

level of formal education. The Northwest area of the state has 85
percent of the operators attaining a high school degree or higher
level of education; this is the greatest percentage of any area of
the state.

Experience of Operators

To give an indication of the operators' experience in agriculture
each is asked the number of years he has operated a farm, including the
present farm and any prior farms he may have had. The total amount of
experience compiled by the 107 operators is 2,858 years. The average
operator experience is 26.7 years with a range from 1 to 56 years of
experience. The average amount of experience did not vary a great deal
from area to area. Operators in the Northwest have the lowest average
with 24.5 years experience, while those in the Southwest have the most
experience with a 27.8-year average. Operator experience is 52 percent
of the Northwest operators' age and 54 percent of the Southwest operators'
age.

Other Occupations of Operators

Farming is the only business for 67 of the 107 operators inter-
viewed. The other 40 operators have income from additional sources
that, on the average, account for 42.5 percent of their income. For
some operators their non-farm business made as little as 1 percent of
their total income, for others it accounts for as much as 95 percent of
their total income. The non-farm business activities of the 40 operators
include oil enterprises, farm supply and machinery businesses, insur-
ance agents, bank holdings, custom work, school employees, elevator

operators, rental property and investments. These farm owners did not devote their full interest to the farm operation since there were other business activities which required attention. In fact, six of the operators did not spend any time working on their farm. They gave the foreman control of the farm and primarily spent time going over records. The other operators spent some time working on the farm, but much of it is spent supervising work or keeping records. Those who receive income from investments are not required to spend any time away from the farm.

Age of Operators

The average age of the operators is 50.8 years. The area averages are: Northeast, 51.5 years; Southeast, 51.6 years; Southwest, 51.6 years; and Northwest, 46.8 years. Based on averages, these operators have operated a farm over half of their lifetimes.

Socio-Economic Characteristics of Employees

Skill Level of Employees

Each employer rated his employees' skill levels in the areas of crop, livestock, mechanic and managerial skills. There are 173 employees on which skill ratings are available. Each employee is rated in all areas of responsibility, therefore, some are rated in more than one area of the operation. If an employee is responsible for maintenance of equipment and crop activities, then he is rated in both the mechanic and crop areas. Table VI presents the distribution of employees among the alternative skill areas. The second column of Table VI indicates the percent of employees in each area of the farm which are rated in one of

TABLE VI

THE NUMBER OF EMPLOYEES POSSESSING THE
DIFFERENT SKILL RATINGS

Area and Skill Level	Number	Percent of Farm Area	Percent of Total
Crops			
Semiskilled	46	35	27
Skilled	61	46	35
Highly Skilled	26	19	15
Total		100	77
Livestock			
Semiskilled	70	48	40
Skilled	52	35	30
Highly Skilled	25	17	14
Total		100	84
Mechanic			
Skilled	121	82	70
Highly Skilled	26	18	15
Total		100	85
Managerial			
Skilled	55	32	32
Not Skilled	118	68	68
Total		100	--

the skill levels. The third column of Table VI gives the percent of the total number of employees in each level of the different skill areas. Skilled mechanic is the most frequently given skill level and area. There are 121 individuals with this skill rating which represents 70 percent of all employees rated. The Total row for each area in Table VI gives the percent of all employees who possess some degree of skill in that particular area. For the managerial area the total is not applicable since an employee either is skilled or not skilled. Seventy-seven percent of the employees have some degree of skill in crops, 84 percent have some degree of skill with livestock, 85 percent possess mechanical skills, and 32 percent have managerial ability.

Table VII gives the number of employees in each skill level according to the different areas of the state and the percent each skill level is of the individual area. The skill level assigned to an employee responsible for more than one area is the highest level of skill considering all skill areas of the farm. For example, if an employee is semiskilled in crops, highly skilled in livestock and has managerial skill, he is assigned the managerial skill which is the highest possible. The distribution of employees consists of 9 percent semiskilled, 47 percent skilled, 12 percent highly skilled and 32 percent has managerial skill. The Northwest area of the state has 21 of 52 employees (41 percent) who are managerially skilled. The Southwest area has 40 of 69 employees (58 percent) who are rated as skilled. The Northeast area has the largest number of semiskilled employees with 8 of 24 employees (33 percent) rated as semiskilled. The Highly Skilled skill level is not predominate in any area, partially because many of

TABLE VII

DISTRIBUTION OF EMPLOYEES ACCORDING TO HIGHEST
SKILL LEVEL AND AREA OF STATE

Area of State	Total Number	Semiskilled		Skilled		Highly Skilled		Managerial	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Northeast	24	8	33	11	46	1	4	4	17
Southeast	29	1	3	13	45	6	21	9	31
Southwest	69	4	6	40	58	4	6	21	30
Northwest	51	2	4	18	35	10	20	21	41
Total	173	15		82		21		55	
Percent of Total		9		47		12		32	

those with managerial ability are also highly skilled in another area of the farm operation.

Amount of Entrusted Responsibility

Information was received from the employer on the number of days each employee would be trusted with the farm or his particular area of responsibility. Employer response ranges from none to indefinitely. Table VIII gives the distribution of employees according to days of entrusted responsibility and skill level. It can be seen that as the skill level increases so does the number of days the employer would trust the employee with the farm. There are no semiskilled employees that would be trusted indefinitely with the farm and there are no employees with managerial skills that would not be trusted for at least a few days.

TABLE VIII

DISTRIBUTION OF EMPLOYEES ACCORDING TO THE DAYS OF ENTRUSTED
RESPONSIBILITY AND THE EMPLOYEE'S SKILL LEVEL

| Skill Level | Number of Days Employee Would be Trusted With Farm | | | | | |
	None	1-7	8-14	15-30	Over 30 But Not Indefinitely	Indefinitely
Semiskilled	6	8	0	2	0	0
Skilled	20	35	20	4	0	2
Highly Skilled	3	7	4	4	1	2
Managerial	0	5	16	8	1	25

Amount of Labor Provided by Employees

The average number of days worked per week and the average number of hours worked per day are used to determine the amount of labor provided by the employees. Table IX gives the averages according to the area of the state and type of farm. The number of days and hours are given by the employer who considers both the summer and winter work loads. The number of days worked per week ranges from 5.5 days in the Northeast and Southeast areas of the state to 5.8 days in the Southwest. The hours worked per day averages 8.6 for the Southeast area compared to a high of 9.7 hours in the Northwest. Using a 50-week work year, an employee in the Northwest would average working 372 hours more than an employee in the Southeast.

Looking at the amount of labor employees provide according to the type of farm, the crop and cotton farms average 5.1 days per week while the dairy farms average 5.7 days per week. The livestock farms average 7.3 hours per day and the general type farms average 9.3 hours per day. Again using a 50-week work year, an employee on a general farm would average working 447 hours more than an employee on a livestock farm.

Wages Received by Employees

The total wage received by an employee is composed of four parts. As indicated in Chapter I the base wage, perquisite, bonus and incentive payments make up the total wage. Wages are calculated on different time periods or activities. The time period that wages are calculated with most frequency is the hour. Of the 173 employees on which information is available the hour is used for 64 (37 percent) of the employees.

TABLE IX

LABOR PROVIDED BY EMPLOYEES ACCORDING TO
AREA OF STATE AND TYPE OF FARM

	Average Days Worked Per Week	Average Hours Worked Per Day	Total Hours Provided[a]
Area of State			
Northeast	5.5	8.7	2,392.5
Southeast	5.5	8.6	2,665.0
Southwest	5.8	9.5	2,755.0
Northwest	5.7	9.7	2,764.5
Type of Farm			
Crop	5.1	8.9	2,269.5
Livestock	5.4	7.3	1,971.0
Cotton	5.1	8.9	2,269.5
Dairy	5.7	7.5	2,137.5
General	5.2	9.3	2,418.0

[a]Assumes a 50-week work year.

The month is used for 55 (32 percent) of the employees and the week is the time period used for 49 (28 percent) of the employees. Other employees are paid by the day or number of milkings, and one employee is paid according to the hundredweight of milk produced.

In determining the value of perquisites to arrive at a total wage value, the employer's judgment is used. The employer is asked to indicate all the non-cash benefits provided to the employee and to estimate the value of these benefits. Housing is the perquisite provided most often to employees. The average value of housing ranges from a low of $45.52 per month in the Southwest to a high of $70.71 per month in the Northwest. This benefit is received by 106 (63 percent) of the employees. Other perquisites provided by many of the employers include transportation, utilities, meat or dairy products, insurance and payment of the employee's part of Social Security.

Thirteen of the 17 employees with incentive programs were interviewed and provided additional information about perquisites. They identified the perquisites received, the perquisites they would like to receive, and a ranking of these benefits. Housing is received by 10 of the employees with each ranking their housing as the most important perquisite (Table X). Transportation is received by seven employees ranking it from first to fourth in importance. Food is received by eight employees ranking it from second to fifth. Utilities are received by seven employees and desired by one employee. They ranked utilities second and third in importance. Insurance is mentioned by three employees as a perquisite they would like to receive; two employees are receiving insurance and the five employees ranked it third to fifth in importance. The employee's part of Social Security is paid by the

employer in two cases; the employees ranked this benefit first and
second in importance.

TABLE X

RANKING OF PERQUISITES BY EMPLOYEES
WITH INCENTIVE PROGRAMS

| Perquisite | Number Receiving Item | Number of Recipients Giving Respective Rankings | | | | |
		1	2	3	4	5
Housing	10	10	–	–	–	–
Transportation	7	2	2	2	1	–
Food	8	––	3	1	3	1
Utilities	8	––	5	3	–	–
Insurance	5	––	–	2	2	1
Social Security	2	1	1	–	–	–

The bonus payment, a part of the employee's total wage, is also
estimated by the employer. A bonus is given in many instances as a
Christmas or year's end gift. Most employers commented that the rea-
sons for giving a bonus include the employee's performance and his
willingness to work overtime. Some bonuses are given after harvest as
a means of rewarding the employee for staying on the job.

The wages of employees without incentive programs are presented in
Table XI. The wages are separated into their three components and are
listed by area of the state and type of farm. Also listed are the total

TABLE XI

INCOME DISTRIBUTION OF EMPLOYEES WITHOUT INCENTIVE PROGRAMS
ACCORDING TO AREA OF STATE AND TYPE OF FARM

| | Total Number of Employees | Wage Components | | | Total Wage |
		Base	Perquisite	Bonus	
Area of State					
Northeast					
Number	22	22	16	12	22
Average ($)		4,134	1,043	364	5,091
Southeast					
Number	26	26	18	14	26
Average ($)		4,158	1,183	188	5,079
Southwest					
Number	55	55	51	10	55
Average ($)		3,958	852	170	4,780
Northwest					
Number	47	47	43	16	47
Average ($)		5,349	1,230	466	6,633
Type of Farm					
Crop					
Number	19	19	18	7	19
Average ($)		5,107	1,375	636	6,642
Livestock					
Number	84	84	71	28	84
Average ($)		4,488	1,018	185	5,410
Cotton					
Number	13	13	10	5	13
Average ($)		4,066	916	694	5,037
Dairy					
Number	13	13	10	6	13
Average ($)		4,479	1,090	238	5,427
General					
Number	21	21	19	6	21
Average ($)		3,954	909	267	4,852

number of employees in each classification and the number of employees receiving the component. The lowest average total wage is found in the Southwest area of the state. Employees receive an average of $3,958 in base wages, $852 of perquisites and $170 in bonuses. Each figure represents the lowest value received by employees in the four areas of the state. The highest average total wage is found in the Northwest area. Not only is the highest total wage found in this area, but each component's average value is the largest of the four areas. The average base wage is $5,349, the value of perquisites is $1,230 and the average bonus is $466 in the Northwest.

The second part of Table XI summarizes the components and total wage according to the type of farm. The highest average total wage is found on crop farms. The employees receive an average base wage of $5,107, the value of perquisites is $1,375 and the average bonus is $636 for an average total wage of $6,642. The base and perquisite components are the highest values for crop farms, but the crop bonus is second in value to the bonus received on cotton farms. The lowest average total wage is received by employees on general farms. The employee wage on these farms include a $3,954 base wage, $909 of perquisites and $267 in bonuses for an average total wage of $4,852. The base wage and value of perquisites are lowest for general farms, whereas livestock farms have the lowest amount of bonuses.

The wages received by employees with incentive programs are presented in Table XII. Again the wages are separated into their components which, in this case, include the value of the incentive program. These components are presented according to area of the state and type of farm. Employees in the Northwest area receive the highest wages as

TABLE XII

INCOME DISTRIBUTION OF EMPLOYEES WITH INCENTIVE PROGRAMS
ACCORDING TO AREA OF STATE AND TYPE OF FARM

| | Total Number of Employees | Wage Components | | | | Total Wage |
		Base	Perquisite	Bonus	Incentive	
Area of State						
Northeast						
Number	2	2	2	0	2	2
Average ($)		2,600	645	0	1,500	4,745
Southeast						
Number	3	3	3	0	3	3
Average ($)		4,167	1,740	0	1,300	7,207
Southwest						
Number	8	8	8	2	8	8
Average ($)		3,636	1,071	150	1,468	7,456
Northwest						
Number	4	4	4	1	4	4
Average ($)		5,835	1,200	200	2,588	9,672
Type of Farm						
Crop						
Number	3	3	3	0	3	3
Average ($)		2,600	654	0	1,923	5,177
Livestock						
Number	7	7	7	1	7	7
Average ($)		5,270	1,149	200	2,229	8,676
Cotton						
Number	1	1	1	0	1	1
Average ($)		2,288	696	0	650	3,634
Dairy						
Number	3	3	3	1	3	3
Average ($)		5,290	2,520	200	1,333	8,470
General						
Number	3	3	3	1	3	3
Average ($)		5,200	1,620	100	1,192	8,045

did employees without incentive programs. The average total wage in this area is $9,672 which consists of a $5,835 base, $1,200 in perquisites, $200 of bonuses and $2,588 from incentive programs. The highest value of base, bonus and incentive payments are found in the Northwest. The Northeast area has the lowest average total wage for employees with incentive programs. The total wage of $4,745 includes the lowest base of $2,600 and lowest perquisite value of $645.

Comparing employee income according to the type of farm indicates that employees with an incentive program working on a livestock farm receive the highest total wage of $8,676 and the highest incentive payment of $2,229. Dairy farms have the highest base payment of $5,290 and also the highest perquisite value of $2,520. Cotton farm employees with incentive programs receive the lowest average total wage of $3,634. There is only one individual in this class so conclusions about this farm type cannot be made without reservations. A more detailed statistical analysis will be made of the major variables affecting the employee's income, such as the employee's skill level. This and other variables will be given attention in Chapter V of this thesis.

FOOTNOTES

[1]U. S. Bureau of the Census, Census of Agriculture, 1964, Volume III, Special Report, Part 4, Farm Debt (Washington, 1968), pp. 24-25.

CHAPTER IV

INCENTIVE PROGRAMS ON OKLAHOMA FARMS

In Chapter I, the major objective of this study was stated as
delineating information about incentive agreements which can be helpful
to farm operators. To accomplish this objective it is necessary to
first describe the major types of incentive agreements being used on
Oklahoma farms. In determining which labor arrangements would be
classified as incentive programs, three criteria were utilized. First,
the program must provide payment above and beyond the base wage and
perquisites. Second, the employee is aware of the program beforehand.
Third, the employee understands that the manner in which he performs
his job may influence the size of payment.[1]

Interviews with Oklahoma operators revealed that there are four
basic types of incentive programs being used. They include a produc-
tion incentive, a crop incentive, a livestock incentive and a percentage
of income incentive program. Before discussing the different incentive
programs it is helpful to indicate the basic principles of a successful
incentive program. Numerous authors have suggested a number of incen-
tive program principles, but the ones used here are commonly found in
the literature. The eight basic principles which will be used as
criteria to evaluate the individual programs are:[2]

1. The program should be simple and easily understood by the
    employee. There is a danger that oversimplification may

lead to uneconomical practices, but a point of reasonable balance is needed.

2. The program should be based on factors largely within the employee's control. This in most situations is hard to attain, but some degree of control is desired.

3. The program should aim at rewarding work that is in the best interests of the employer. A good program is designed so that outstanding performance benefits both the employer and employee.

4. The program should provide a cash return large enough to provide a motivation for improved performance. Individuals in industry have found that 15-20 percent of an employee's wage should be incentive payment if it is to encourage better performance.[3,4]

5. The incentive payment should be made promptly or as soon after the completion of the work as possible.

6. The incentive program should be written, contain provisions for arbitration of misunderstandings and indicate the duration of the program. Written copies of the program which are provided to both parties will help minimize misunderstandings from the beginning.

7. The incentive program should set forth employee responsibilities and be administered equitably.

8. The incentive payment should not be considered as a substitute for competitive base wages and good labor relations.

The remainder of this chapter will present a general description of the incentive programs found in use on Oklahoma farms, the characteristics

of the farms, employers and employees using the program, the earnings

of the employees and an evaluation of the program in relation to the

basic principles set forth above. A detailed description of the incen-

tive programs found in use on Oklahoma farms is presented in Appendix B.

In Chapter III the discussion of employee earnings was based on 17

observations since the data was taken from employer questionnaires.

However, due to incomplete information on four employees, this chapter's

discussion of the individual incentive programs will be based on the

remaining 13 observations with complete information. This is necessary

so the characteristics of each incentive program are taken from the same

number of observations and are comparable to the other programs. Three

of the deleted observations were working with livestock incentives; the

fourth employee received a crop incentive. Any significant changes

these observations would have had on the employee earnings or charac-

teristics of the employer and farm will be noted in the respective

sections.

Production Incentive

Description

Production incentives provide a means of rewarding an employee for

performance which increases production or sales of an enterprise. The

incentive payment is based upon a measure of production that will ensure

an increase in net income of the entire operation rather than an increase

in one enterprise at the expense of others. Production incentives are

frequently used to make growth or change in an enterprise more accept-

able to the employee. The addition of cows to a milk herd may mean a

larger work load, but an employee who realizes that milking more cows

means increased income may welcome the change. Whenever the goals of both employer and employee are in agreement, change within the farm will be smoother and less troublesome. Production incentives can be adapted to any size or type farm where the increased output can be measured and attributed to the employee's performance.

Characteristics of Farms Using
Production Incentives

Three of the farms with incentive programs are using some form of a production incentive. These farms employ four men who receive incentive payments based on dairy and livestock enterprises. Table XIII presents the characteristics of the farms using production incentives. The capital investment of $193,667 is the largest capital investment of the four types of incentive programs analyzed. The average number of men providing labor for each farm is 2.67 men, and they provide 3.05 man equivalents of labor per farm. This indicates that the average employee provides well over 2,000 hours of labor per year.

Characteristics of Operators Using
Production Incentives

Characteristics of the operators are summarized in Table XIV. This is the youngest group using incentive programs and they have operated a farm the shortest period of time. The formal education of these operators include one with a tenth grade eduaction, one with a high school degree and one with three years of college.

TABLE XIII

CHARACTERISTICS OF FARMS USING
PRODUCTION INCENTIVES

Factor	Unit	Average
Pasture Land	Acre	1,080
Cropland	Acre	527
Herd Size	Cows	193
Gross Income From Farm	Dollars	104,167
Capital Investment	Dollars	193,667
Labor Used in Operation	Men	2.67
Man Equivalent[a]	Number	3.05

[a]Equivalent based on 2,000 hours/year.

TABLE XIV

CHARACTERISTICS OF OPERATORS USING
PRODUCTION INCENTIVES

Factor	Unit	Average
Age	Year	44.0
Operator Farm Experience	Year	23.7
Operator Labor Experience	Year	19.6
Education	Year	12.3
Amount of Time Spent With Farm Operation[a]	Percent	100.0

[a]This is an estimate made by the enumerator after interviewing the operator.

Characteristics of Employees

Of the four employees in this group three are primarily involved with dairy enterprises. Table XV presents the characteristics of the farm employees. All employees are married and one of the wives works off the farm in paid employment.

TABLE XV

CHARACTERISTICS OF FARM EMPLOYEES
WITH PRODUCTION INCENTIVES

Factor	Unit	Average
Age	Year	35.5
Education	Year	9.5
Children Under 13	Number	2.75
Children Over 13	Number	0.5
Time Doing Farm Work	Year	21.75
Time With Present Employer	Year	3.5

All employees indicated that they had been raised on a farm and preferred farm work. Two of the employees have done only farm work during the past ten years, while the other two have been employed at different jobs. One employee spent one year as a farm operator and two years in construction work. The second employee spent one year as a carpenter. Reasons for preferring farm to nonfarm work included being out of doors, a feeling that rural life is better for their children,

health reasons, and the variety of farming. One individual felt his educational level has limited him to farm work.

The four employees have been engaged in farm work of some kind an average of 21.75 years and have been employed at their current jobs an average of 3.5 years. This is the shortest period of employment at their current jobs for any type of incentive program. The employer's estimate of total hours worked per year by these employees averages about 2,400 hours. The employees average working 6 days a week, 7.8 hours a day, for 51 weeks. Each employee receives a one-week paid vacation per year. When asked how long they would trust the employee with management of the farm, the employers' responses ranged from 14 days to indefinitely, with the remaining two responses being 30 days. The employers' estimates of skill levels for these four employees indicates that two are considered skilled with livestock and two are considered highly skilled with livestock.

Earnings of Employees

The average total wage for this group is $9,277.50 per year. This includes an average base wage of $5,917.50, average perquisites of $2,085, average bonuses of $50 and an average incentive payment of $1,225 (Figure 6). Both a bonus and incentive payment are made to one employee in this group. However, employees typically receive either a bonus or an incentive payment and not both in the same year.

The time interval used to calculate base wages and perquisites is the month. The bonus is given at the year's end and the incentives for milk production are paid on a monthly basis along with wages. One employee receives his incentive payment as he sells livestock for a
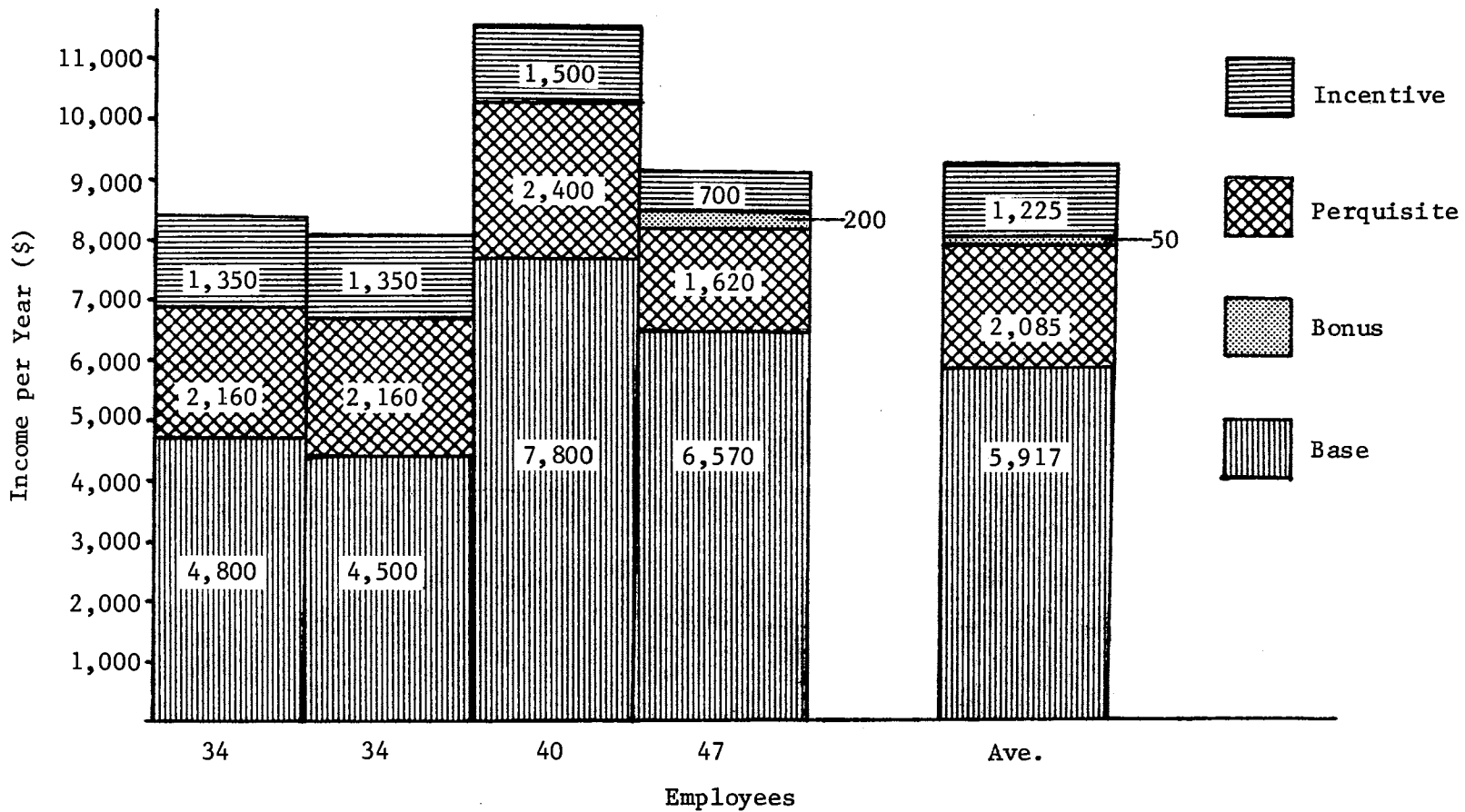
Figure 6.   Total Income of Employees with Production Incentives Broken
Down Individually and as an Average

premium price. On a percentage basis, 63 percent of the total wage is base wages, 23 percent is perquisites, 0.5 percent is bonuses, and 13.5 percent is incentive payments. The incentive payment ranges from a low of 8 percent to a high of 17 percent for these four production incentive programs.

Evaluation of Production Incentive Programs

Production incentive programs are probably the simplest and easiest to understand of all incentive programs. Since employees deal with production activities each day, they usually do not mind having payment coincide with the end of a production process such as weaning or harvest. Dairies have the advantage of continuous sales which allows the incentive payment to be made regularly, thus reinforcing the employee's incentive to increase production. Another advantage of this program is that since payments are based on production, the amount can be easily calculated in a straightforward manner.

In calculating production incentives different units can be used for the different enterprises. On dairies, where milk is sold weekly or more often, the hundredweight of milk can be used. Crops are usually measured in bushels per acre while livestock is measured in hundred-weights. Other production measures could include the reduction of death loss before weaning or an increase in the percent of animals producing offspring.

The average size of the incentive payment for employees on production incentives is $1,225. This payment represents 13.5 percent of the employee's income. This is the smallest percent to be allocated to the incentive payment of the four types of incentive programs. In each case

the payment is made more promptly than is practiced by the other incentive programs. Three employees are paid monthly in addition to their base wage and the fourth is paid after the employer receives payment for livestock sold at premium prices.

Only one of the three production incentive programs is in written form with a copy provided to the employee. None of the programs have provisions for arbitration of misunderstandings and do not have a specified duration or time of renegotiation.

Each of the programs set forth the responsibilities the employee is to assume and the employer allows each employee to use his own judgment in meeting these responsibilities. One employee who is being paid by the hundredweight of milk, hires additional help when he finds it necessary and pays the help from his own incentive earnings. Another employee is responsible for a show herd and sells animals in order to receive an incentive payment.

The average base wage and value of perquisites for these employees are above the average amounts received by employees without incentive programs. This indicates that the incentive payment is not intended to replace a good base wage.

A weak point of the production incentive program is that costs are not considered by the employee since he is concerned only with output. In this situation there may be times when the employee makes uneconomical decisions which are not in the best interests of the employer. If an employee is concerned with only one crop, he may tend to apply more fertilizer on this crop than others grown on the farm. This type of problem can be eliminated when the operator establishes, with the help of the employee, the correct combination and level of inputs for

each enterprise.

Another disadvantage of the production incentive program is finding
an enterprise with factors of production that an employee's performance
can significantly influence. If an incentive program is used with a
production process that does not depend heavily on the employee's per-
formance, the employer can expect other factors, such as disease and
weather to largely determine the output. The program may act as a dis-
incentive if, for example, the employee's payment depends on total yield
and this year's rainfall has been unusually low. Any employee who has
devoted extra hours preparing the ground or assuring timely seeding and
fertilizer application, only to have his incentive payment diminish due
to a lack of moisture, will probably be unhappy with the incentive
program.

Employer and Employee Opinions of the Programs

Each employer expressed satisfaction with his production incentive
program. Two employers indicated increased physical production from
the program and the third indicated an increased quality of production.
The employers felt the program rewards employees for good work and helps
to retain the employees by creating interest in their jobs.

Three of the four employees felt the incentive program has encour-
aged them to produce more. One employee felt the program is not en-
couraging production because he could not handle any additional cows
without additional help. Each employee felt the program is rewarding
him for better work. Three of the employees indicated that the incen-
tive program made it less likely he would change jobs. They prefer the

opportunity to raise their income while at the same time have a base wage guaranteed.

Livestock Incentive

Description

A livestock incentive program gives an employee the opportunity to raise a limited number of livestock and receive a share or all of the income from the enterprise. This is sometimes referred to as an equity accumulation program designed to retain a good employee. It is most useful on farms which have extra buildings or equipment that are not being utilized. The program may require the employee to purchase the livestock and pay a minimal fee for grass and feed. Alternatively, the employee may receive the animals as the incentive, with all operating costs paid by the employer. A livestock incentive program will satisfy the desire for ownership of many employees.

Characteristics of Farms and Ranches
Using Livestock Incentives

Of the farms and ranches using incentive programs, three are using livestock incentives with their employees. The farm characteristics are given in Table XVI. The herd size of ranches with livestock incentives are larger than herds of the other type incentive programs. The narrow margin between average men per operation and man equivalents indicates each individual contributes close to 2,000 hours per year.

TABLE XVI

CHARACTERISTICS OF FARMS USING
LIVESTOCK INCENTIVES

Factor	Unit	Average
Pasture Land	Acre	1,015
Cropland	Acre	708
Herd Size	Cows	220
Gross Income From Farm	Dollars	54,167
Capital Investment	Dollars	127,667
Labor Used on Operation	Men	2.3
Man Equivalents[a]	Number	2.4

[a]Equivalent based on 2,000 hours/year.

Characteristics of Operators Using

Livestock Incentives

Table XVII gives the characteristics of the operators using livestock incentives. This incentive group has operated farms the longest of the four groups.

The formal education of the operators includes one individual with a Master's degree, one had attended college for two years and the third operator had completed high school. One employer taught school and could not devote his full attention to the farm. The other two employers did not have any non-farm interests. This resulted in a 77 percent average for the amount of time spent with the farm.

TABLE XVII

CHARACTERISTICS OF OPERATORS USING
LIVESTOCK INCENTIVES

Factor	Unit	Average
Age	Year	53.0
Operator Farm Experience	Year	31.3
Operator Labor Experience	Year	24.3
Education	Year	14.7
Amount of Time Spent With Farm Operation[a]	Percent	77

[a]This is an estimate made by the enumerator after interviewing the operator.

Characteristics of Employees With

Livestock Incentives

Employee characteristics are summarized in Table XVIII. All employees with livestock incentives are married, and as a group have the largest family size.

The average formal education of the employees is eight years, which is seven years less than the average amount of formal education received by their employers. In addition to the education in public schools, one employee has taken course work at a vocational technical school and has attended adult farm group meetings. Another employee has received training in artificial breeding of cattle which is needed in his work with a registered cattle herd. All three employees had been raised on a farm and two of them preferred farm to non-farm work.

However, all three planned to continue working on a farm in the future. Two of the employees have done only farm work in the past 10 years; one employee served two years with the military prior to beginning his work with the present employer.

TABLE XVIII

CHARACTERISTICS OF FARM EMPLOYEES
WITH LIVESTOCK INCENTIVES

Factor	Unit	Average
Age	Year	44.0
Education	Year	8.0
Children Under 13	Number	3.3
Children Over 13	Number	2.3
Time Spent Working on Farms	Year	30.7
Time With Present Employer	Year	10.7

The employees with livestock incentives have worked on farms and been with the present employer the longest period of time. The average amount of labor provided by these employees is 2,515 hours per year. This consists of 9.3 hours a day, 5.3 days per week for 51 weeks a year. The amount of time off for vacation ranges from two weeks paid vacation to no time off for paid vacation. The amount of time the employer would trust the employee with the farm ranges from 10 days to 60 days with an average of 33 days.

The skill levels of the employees, as indicated by their employers, includes one that is skilled with livestock and two that are managerially skilled. As would be expected, the employee with the lowest skill level is also the employee who would be trusted the least amount of time with the farm.

Earnings of Employees

The average total wage of employees with livestock incentives is $5,912. This is composed of an average base wage of $3,667, average perquisites of $1,120, average bonuses of $33 and an average incentive of $1,092 (Figure 7). The incentive payment to employees with livestock incentives is the smallest in value of the four types of programs.[5]

The time interval used to calculate base wages includes the hour, week and month. One individual receives a bonus payment at Christmas each year which in effect is an incentive to remain on the job until the payment is made. Typically, individuals with livestock incentives receive their incentive pyament when they choose to sell the livestock produced. On a percentage basis, 62 percent of the total wage is the base wage, 19 percent is perquisites, 0.5 percent is bonuses, and 18.5 percent is incentive payments. The size of the incentive payment ranges from a low of 15 percent to a high of 23 percent for these employees with livestock incentives.

Evaluation of Livestock Incentive Programs

The livestock incentive program may have the least direct cost to the employer of the four incentive programs being used on the sample farms. If there are unused resources on the farm, the direct costs of
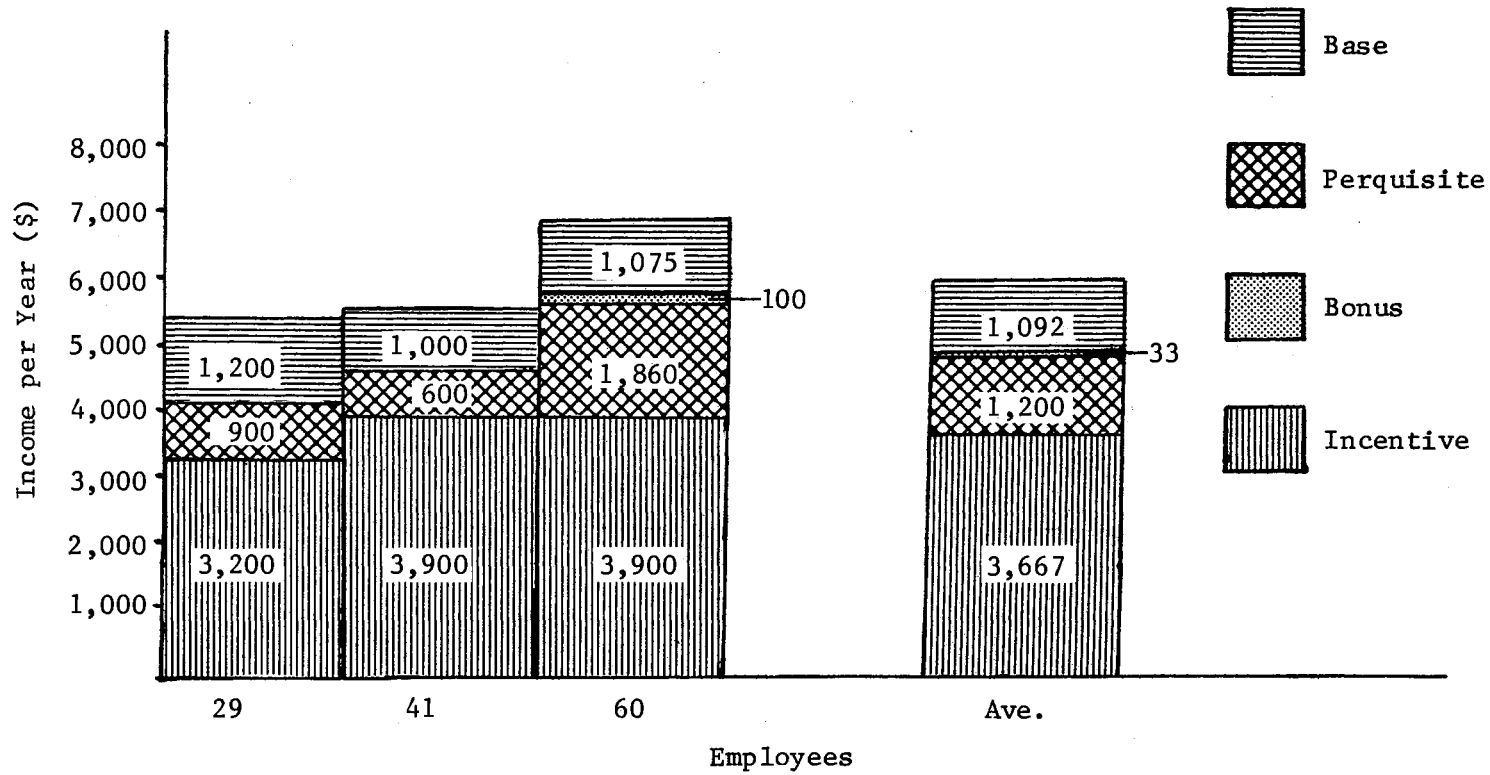
Figure 7. Total Income of Employees With Livestock Incentives
Broken Down Individually and as an Average

these resources are small or none to the employer and the employee may
benefit from their use. An advantage of this program to the employee
is that he controls the source of the payment and thus can time the
sale of livestock to meet his own financial needs. Another advantage
is that this type of program is simple, and it is easy to understand
how the employee receives payment. Programs where the number of animals
kept by the employee is determined by the size of the herd allows the
employee's herd to grow at the same rate as the employer's and thus
makes the increased work load beneficial for both.

The major disadvantage of the livestock incentive program is the
difficulty in making the payment dependent on performance. Since it
would be difficult to change from month to month the number of animals
the employee can run, the size of payment becomes a function of price
and the number of animals he begins with and not his performance. This
also makes it more difficult to reward the employee for work done in
the best interest of the employer. Other disadvantages include the
possible conflict of interest and the problems created when the employee
has animals that are kept with the employer's herd. Also, when a live-
stock incentive is used, it allows the employee to accumulate capital
and thus be in a better position to farm on his own. This incentive
program helps to satisfy the employee's desire for ownership but may
be self-defeating in the long run.

In each case analyzed there are no additional responsibilities
required of the employee except to purchase and sell the livestock for
the incentive payment. None of the livestock incentive programs are
written and there are no provisions for arbitration of any misunder-
standings. Many may feel the program is too simple to merit a written

agreement. However, it is still wise to put the basis of the agreement in writing for the benefit of both employee and employer protection. The size of the payments average 18 percent of the total wage, which should be an adequate amount to induce superior performance. However, the base wage of these employees is below the average base wage of those without an incentive program. This indicates that some substitution of the incentive payment for adequate base wages occurs.

Employer and Employee Opinions of the Program

Each employer expressed satisfaction with his livestock incentive program. Two employers felt the program has increased production or reduced costs. All three employers felt the program rewarded the employee for good work. When asked to give specific examples of improved work, the employers gave general answers such as the employee has more interest in the farm's success, the employee is better satisfied and the employee can grow with the farm. On the subject of retaining the employees, each employer commented that additional income from the livestock improves the retainment of employees.

Each employee felt the program is encouraging him to increase production or reduce costs. Employee comments indicated the program brought about increased interest in the livestock. Two employees felt the program rewards them for better work. One employee indicated that he was doing his best before the program was established. When asked if incentive programs make it less likely they would change jobs, two of the three employees indicated the programs did encourage them to stay with the current employer. The one employee who felt the program did not help in job retention is also the employee who did not care for farm work.

Crop Incentive Programs

Description

A crop incentive program gives an employee the opportunity to grow
a specified amount of crops and receive a share or all of the income
from the enterprise. This is similar to the livestock incentive in
that it is most useful on farms that have buildings or equipment which
are not being utilized. Crop incentive programs usually require the
employee to pay for some part of the operating expenses and receive
some part of the income and government payment. The employee may grow
the same crop on the same acreage or the program may allow him to select
a crop and choose one of alternative locations specified by the employer.
This program can also satisfy the desire of ownership or control and
possibly retain some employees who otherwise would quit and attempt to
farm on their own. On occasion the crop and livestock incentive pro-
grams can be the beginning of a farm's transition from the present
owner to an outstanding young employee who wants to purchase the farm.

Characteristics of Farms Using Crop Incentives

Four of the farms with incentive programs are using crop incentive
programs. The average size of these farms is summarized in Table XIX.
The average gross income of these farms is $40,625 which is the smallest
amount of the four incentive groups. The farms with crop incentives
also have the smallest amount of capital investment, excluding land,
with an average amount of $60,750. The principal reason why these farms
have the lowest amount of gross income and capital investment is the
small number of livestock that are included in the farm. The average

herd size of farms with crop incentives is 29 cows compared to a
220-cow average for the livestock incentive farms. These farms with
crop incentives have the majority of their capital investment in
buildings and machinery. Income is primarily from crop enterprises
where the expense and income per unit is not as large as that of
livestock enterprises.

TABLE XIX

CHARACTERISTICS OF FARMS USING
CROP INCENTIVES

Factor	Unit	Average
Pasture Land	Acre	115
Cropland	Acre	916
Herd Size	Cows	29
Gross Income From Farm	Dollars	40,625
Capital Investment	Dollars	60,750
Labor Used on Operation	Men	2.0
Man Equivalents[a]	Number	1.9

[a]Equivalent based on 2,000 hours/year.

The average number of men providing labor, including operators, is
2.0 men per farm. The man equivalents provided by these men averages
1.9 which indicates that these men did not provide an average of 2,000
hours of labor per year. This is the only incentive group not providing

more than a 2,000-hour man equivalent per year. This again can be partially explained by the farms which do not require a lot of labor during the winter and thus lowers the yearly average.

Characteristics of Operators Using
Crop Incentives

Table XX presents the characteristics of operators using crop incentives. These operators have the least amount of experience with hired labor, having employed help an average of 18.7 years. The average formal education of the operators is 12.5 years. One had received a Master's degree, two had finished high school and one had less than eight years of formal education. None of the operators have any non-farm business interests and, therefore, could devote 100 percent of their time to the farm.

TABLE XX

CHARACTERISTICS OF OPERATORS
USING CROP INCENTIVES

Factor	Unit	Average
Age	Year	53.0
Operator Farm Experience	Year	27.0
Operator Labor Experience	Year	18.7
Education	Year	12.5
Amount of Time Spent With Farm Operation[a]	Percent	100.0

[a]This is an estimate made by the enumerator after interviewing the operator.

<u>Characteristics</u> <u>of</u> <u>Employees</u> <u>With</u>

<u>Crop</u> <u>Incentives</u>

Employees with crop incentives are the oldest group of employees with incentives, averaging an age of 47 years (Table XXI). This is six years younger than their employers' average age. Three of the four employees are married and have an average of five children per family. One employee's wife is employed as a nurse's aid.

TABLE XXI

CHARACTERISTICS OF FARM EMPLOYEES
WITH CROP INCENTIVES

Factor	Unit	Average
Age	Year	47.0
Education	Year	9.5
Children Under 13	Number	1.3
Children Over 13	Number	3.6
Time Spent Working on Farms	Year	30.0
Time With Present Employer	Year	9.7

In addition to the formal education, one employee had received vocational agricultural training in high school. Three of the employees had been raised on a farm; the other had grown up in a small rural community. All four employees preferred farm to non-farm work. However, three planned to remain in farm employment and the fourth planned to

get further education and become a heavy equipment mechanic. During the past ten years two of the employees have done only farm work; one had worked five years for a construction company and the last had worked one year as a mechanic.

The amount of labor these employees provide to the farm averages 1,817 hours per year. This consists of 8.5 hours per day, 4.25 days a week for 50.5 weeks per year. The amount of paid vacation averages 1.67 weeks per year for three of the employees. One employee receives a one-week vacation without pay. The amount of time the employers would trust the employees with the farm ranges from one week to indefinitely. Skill levels of the four employees includes one skilled as a mechanic, one skilled with crops and two with managerial ability.

Earnings of Employees With Crop Incentives

The average total wage of employees with crop incentives is $4,791. This is the lowest total wage of the four types of incentive programs. Primary cause of the low total wage is the low average base wage which is $1,000 less than the next lowest base wage. Perquisites also exhibited the lowest value of the four types of incentives. Components of the total wage are shown in Figure 8. The base wage averages $2,522, the value of perquisites averages $665, and the incentive payment is an average of $1,604. The time period used to calculate base wages includes the week and the day. Employees with crop incentives receive their incentive payment at harvest time or any time they choose to sell the crop. Viewing the earnings on a percentage basis, 53 percent of the total wage is in the form of base wages, 14 percent is perquisites, and 33 percent is incentive payments. The part of total wages in the form
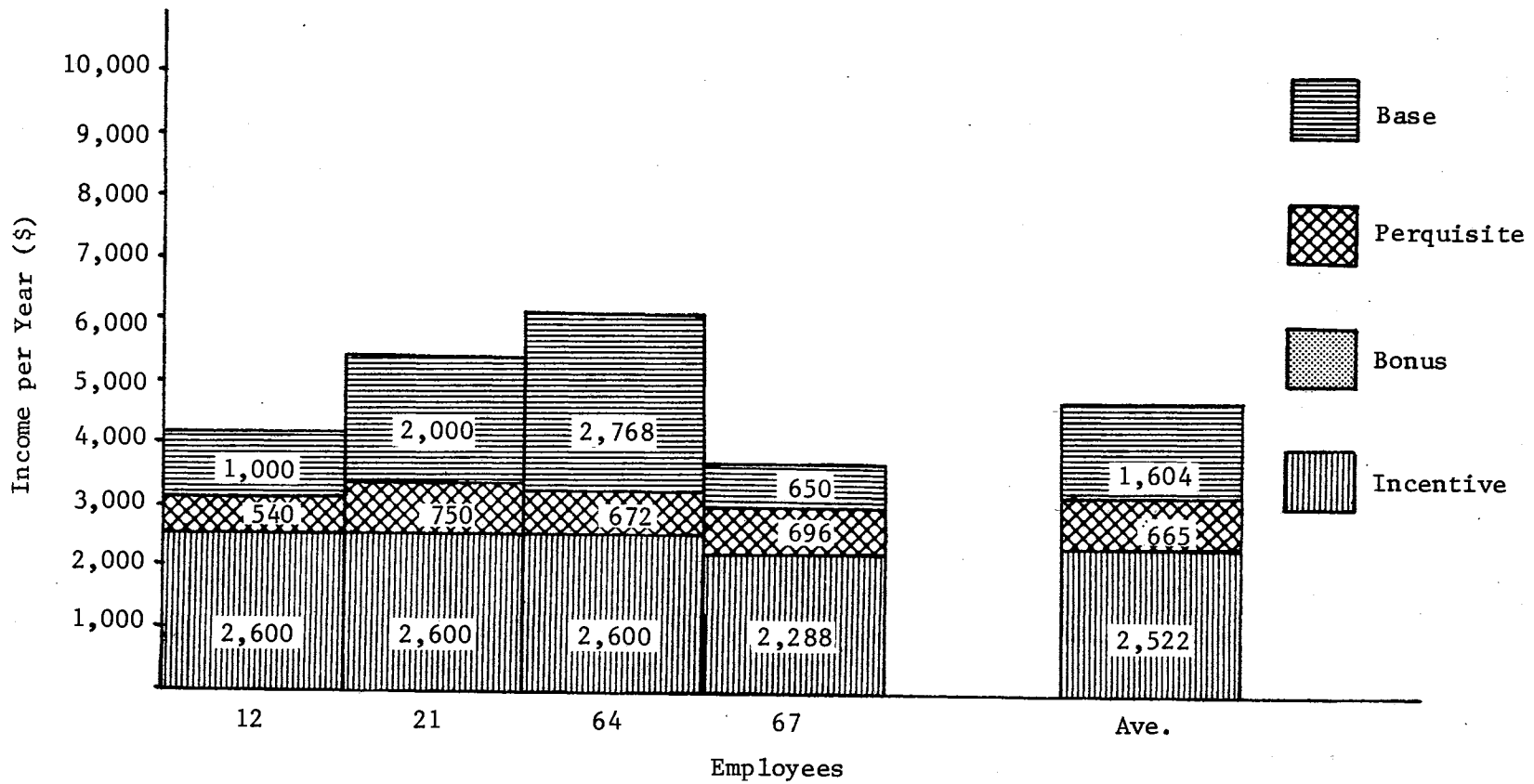
Figure 8.   Total Income of Employees With Crop Incentives Broken
Down Individually and as an Average

of an incentive payment ranges from 18 percent to 46 percent for these
employees with crop incentives.

Evaluation of Crop Incentive Programs

An advantage of the crop incentive program is that it is usually
simple and easily understood by the employee. This program allows the
employee to collect the payment after harvest providing an incentive
for the employee to remain on the farm until the critical harvest period
is over. The proportion of total wages in the form of incentive payment
is the largest for crop incentives. Thirty-three percent of the
employee's total income is from the incentive program. This is well
over the recommended 15 percent minimum and should help retain the
employee until after harvest. However, the magnitude of the incentive
payment may also be a source of problems to the employer.

One major disadvantage of this program is the difficulty in basing
the payment on factors within the control of the employee. For the
employee there is the financial risk of a price change; some years it
may be favorable, but others it may be unfavorable and the payment could
decrease in size very rapidly. This financial risk may prevent the per-
formance of the employee from affecting the payment's size.

None of the programs analyzed are written and there are no provi-
sions for arbitration of misunderstandings. Again this may be due to
the programs' relatively simple provisions and a feeling that no docu-
mentation is needed. Only one program includes additional responsibil-
ities for the employees. This program contains a stipulation that any
machinery damaged due to the employee's neglect would be paid for by
the employee.

The total wage of the employees with crop incentive arrangements is well below the $6,642 total wage of employees on crop farms. Thus there may be some substitution of the incentive payment for competitive base wages and perquisites.

Employer and Employee Opinions of the Programs

Three of the four employers felt the program increases production or reduces costs. Each employer mentioned the increased interest of the employee and one commented that his machinery repair costs have decreased. Three employers felt the employees are being rewarded for good work. One employer stated that better performance is the reason for increasing the number of acres the employee could use to grow crops. Each employer indicated that the program helps to retain the employees either by satisfying the employee's desire for ownership or additional income.

Employees are very satisfied with the crop incentive programs. Each felt the program encourages increased production or reduced costs. Employee comments indicated that the program increased their efforts to produced more and one said that he is more interested in the problems of the farm. All four employees felt the program rewards them for better work and also made it less likely they would change jobs. The additional income is given as the reason for remaining on the job.

Percentage of Income Incentives

Description

With this incentive program the employee receives a percentage of the farm's income. Gross income or net income may be used to calculate

the payment. This program can be used with one enterprise or the whole farm if the payment is based on profit. The program usually considers all operating costs as expenses when determining profits. However, taxes, depreciation and operator salaries may not always be treated as operating expenses.

Characteristics of Farms and Ranches Using Percentage of Income Incentives

Two farms are using percentage of income programs with their employees. Table XXII summarizes the characteristics of these farms. The acreage and gross income of these farms are substantially larger than the average farm size of the other type incentive programs. There is a total of five individuals providing labor to these ranches. This is an average of 2.5 men per ranch which provides an average of 3.6 man equivalents per ranch. The difference between the number of men and the man equivalents indicates that each individual provides much more than 2,000 hours per year. These men average working more hours than employees with the other types of incentive programs.

Characteristics of Operators Using Percentage of Income Incentives

The operators using percentage of income programs are the oldest with an average of 60 years (Table XXIII). Of the four groups of incentive programs discussed, these operators have hired labor the largest portion of their farming career.

TABLE XXII

CHARACTERISTICS OF FARMS USING PERCENTAGE
OF INCOME INCENTIVES

Factor	Unit	Average
Pasture Land	Acre	3,490
Cropland	Acre	1,110
Herd Size	Cows	150
Stockers	Number	225
Gross Income From Farm	Dollars	150,000
Capital Investment	Dollars	185,000
Labor Used on Operation	Men	2.5
Man Equivalents[a]	Number	3.6

[a]Equivalent based on 2,000 hours/year.

TABLE XXIII

CHARACTERISTICS OF OPERATORS USING
PERCENTAGE OF INCOME INCENTIVES

Factor	Unit	Average
Age	Year	60.0
Operator Farm Experience	Year	27.0
Operator Labor Experience	Year	25.5
Education	Year	16.0
Amount of Time Spent With Farm Operation[a]	Percent	50.0

[a]This is an estimate made by the enumerator after interviewing the operator.

The formal education of these operators averaged 16 years which is a college degree. This is the most formal education any group of employers had received. One employer did not spend any time working on the ranch since he has a full-time job in a nearby town. The other employer devoted 100 percent of his time to the ranch activities.

Characteristics of Employees With

Percentage of Income Incentives

Characteristics of the employees are given in Table XXIV. Both employees are married and neither wife is employed off the farm. Of the four types of incentive programs, employees with percentage of income programs average the smallest number of dependent children.

TABLE XXIV

CHARACTERISTICS OF FARM EMPLOYEES WITH
PERCENTAGE OF INCOME INCENTIVES

Factor	Unit	Average
Age	Year	34.5
Education	Year	12.0
Children Under 13	Number	1.0
Children Over 13	Number	1.0
Time Spent Working on Farms	Year	21.0
Time With Present Employer	Year	8.5

The formal education of the employees is the highest level of education of the four incentive types. In addition to formal education, one employee had received vocational agricultural training in high school; the other employee had attended, within the past five years, short courses and extension programs.

During the past ten years, one employee has been with the present employer; the other had served two years with the military and done farm work the past eight years. Both employees were raised on farms and preferred farm work; the enjoyment of country living and working with livestock are mentioned as the major reasons for staying with farm employment. Both employees had been with the farm three years before the percentage of income program was initiated by the employer.

The amount of labor provided by these employees averages 3,186 hours per year, which is the most hours averaged by employees with one of the four types of incentive programs. This average consists of 10.5 hours a day, 6 days a week, 50.5 weeks a year. Their vacation with pay averages 1.5 weeks per year.

The skill level of the employees as rated by the employer indicates that both are skilled with managerial ability. They are also rated highly skilled in both the crop and livestock areas. The employers commented that they would trust both employees indefinitely with the management of the farm.

Earnings of Employees With Percentage
of Income Incentives

The average total wage of employees with percentage of income incentive programs is $12,720. The wages of the employees are broken

down individually and as an average in Figure 9. The total wage

includes a $6,750 base wage, $2,070 average value of perquisites, $100

bonus, and an average incentive payment of $3,800. This total wage is

$3,400 larger than the total wage of those with production incentives

which have the second highest average total wage of the four incentive

types. The percentage of income incentive payment is twice as much as

the crop incentive which is second in value. The average bonus payment

is also the largest of the four incentive programs.

The time interval used to calculate the base wages is the month

for both employees. Of the total wage 53 percent is the base wage, 16

percent is the value of perquisites, 0.7 percent is bonuses, and 30

percent is from incentive payments. The incentive payment is made at

the end of the ranches' business year. It is interesting to note that

these two employees, who are on a percentage of income incentive,

receive the two highest wages of the 167 employees with wage information

available.

Evaluation of Percentage of Income Incentives

This program gives the employee the greatest number of opportu-

nities to influence the size of the incentive payment. When using net

income as a basis for payment, costs are considered and the employee

should perform in the best interests of the employer. This should

eliminate uneconomical practices and encourage higher production. The

employees' responsibilities are not in one specific area, but include

the entire operation. The employee is responsible for more economical

production, which is increased production with the costs constant or

constant production with decreased costs. The size of the incentive
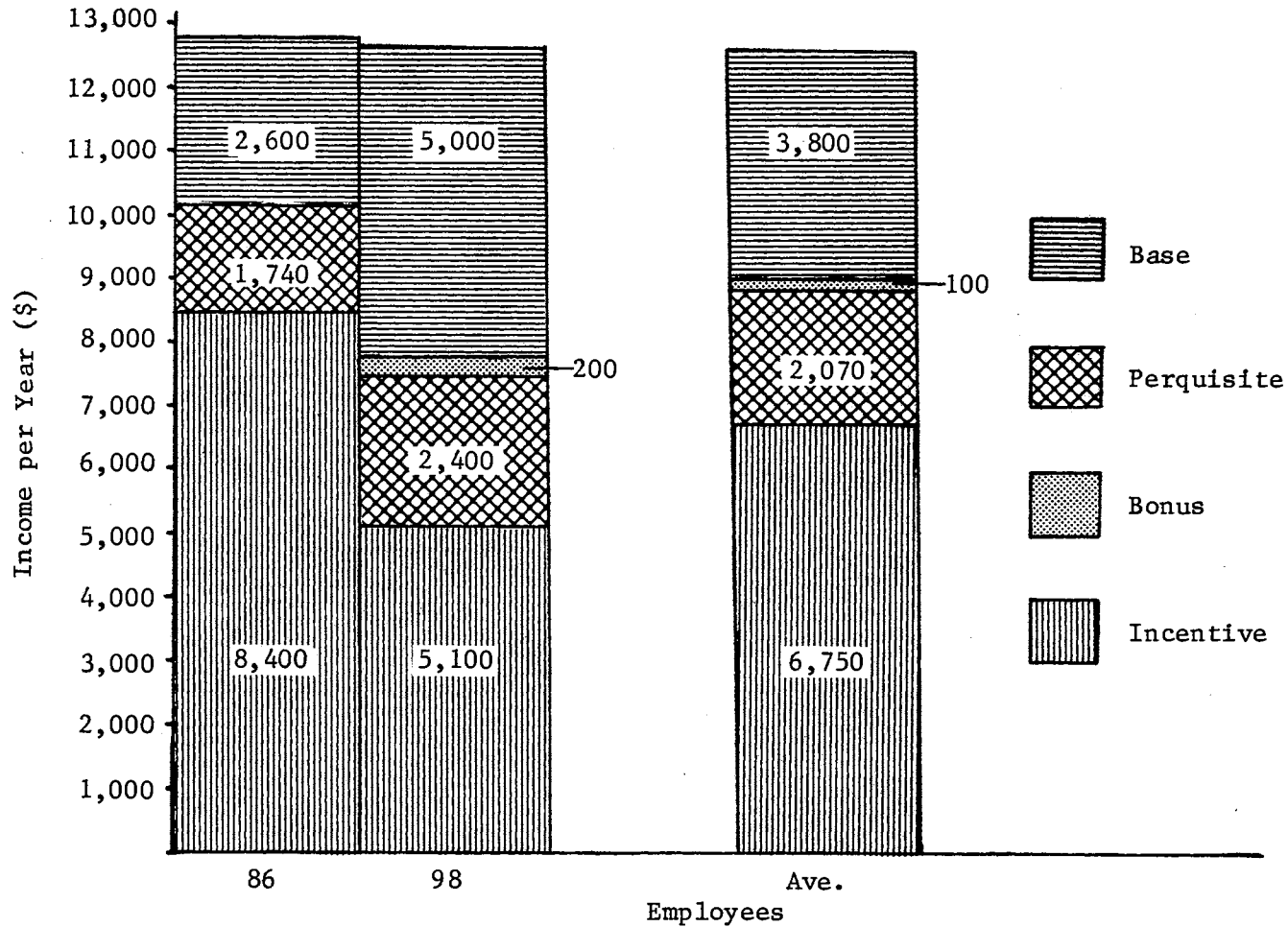
Figure 9. Total Income of Employees With Profit Sharing Incentives
Broken Down Individually and as an Average

payment is 30 percent of total wages which is well above the recommended
15 percent minimum. However, these employees are not in the same situa-
tion as those with crop incentives, since their base wage and perqui-
sites are large enough to provide a comfortable living even if the
incentive payment fluctuates. Considering the size of their base wage
and incentive, there is no reason to believe that the perquisite pay-
ment might be considered a substitute for competitive base wages and
perquisites.

The disadvantages of this type incentive begin with the program
being complex and difficult to understand. Payment may be difficult to
compute when only certain income and expenses are used in calculating
profits or gross income. The program may lead to a conflict of interest
if all sources of income are not used in determining the payment. Some
employers may not want the employee to know this much about his earnings.
Others may feel obligated to consult the employee before making certain
decisions; this can lead to conflicting opinions and problems. Payments
in these situations are not made as timely as other programs due to the
work involved in claculating the payment. One program is written, but
neither program has provisions for the arbitration of misunderstandings.
This type, more than any other, should merit a written agreement due to
the many factors of income and expenses involved.

Employer and Employee Opinions of the Program

Both employers feel the program is working well. The employer who
has a job in town turned the farm over to the employee and feels he is
doing an outstanding job; the other employer wants to keep the employee
and feels he is deserving of the large incentive payment. One employer

did not feel the program increases production because the employee was doing as well as he could before the program was initiated. Both employers did feel the program rewards the employees for better work and helps to retain them on the farm.

The employees feel the program increases production since the payment is dependent upon income. They also feel the program rewards them for better work and makes it less likely they would change jobs. The employees commented that the added income and interest are the major reasons they would not change jobs.

FOOTNOTES

[1] W. Harry Schaffer, George L. Casler and Robert S. Smith, "Incentive Payment Plans for Hired Men," New York State College of Agriculture (Ithaca, 1959), p. 1.

[2] Paul Wesley Harrison Weightman, "Financial Incentive Plans for Farm Labor in New York State" (unpub. Ph.D. dissertation, Cornell University, 1966), pp. 195-196.

[3] Phil Carroll, Better Wage Incentives (New York, 1957), p. 29.

[4] Van Dusen Kennedy, Union Policy and Incentive Wage Methods (New York, 1945), p. 221.

[5] When the three additional observations are considered the production incentive replaces the livestock as the program with the smallest incentive value.

CHAPTER V

EMPLOYEE WAGES AND PARTIAL BUDGETING

OF INCENTIVE PROGRAMS

It has been hypothesized that the employee's total wage is a
function of employee skill level, area of state, type of farm, hours
worked and gross income per hour of labor. Using the data presented
in Chapter III, a step-wise least squares regression analysis will be
utilized to determine those variables which significantly affect
employee wages. In addition, breakeven analysis and partial budgeting
will be presented as methods of evaluating alternative incentive
programs.

Statistical Analysis

Least Squares Regression

In least squares regression analysis a linear relationship is
assumed to exist between the dependent variable defined as Y and the
independent variables defined as X_1, X_2, ..., X_k. The general regres-
sion model is denoted as:

$$Y_i = \beta_o + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki} + \nu_i \qquad (5.1)$$

where

$i = 1, 2, \dots, n$ observations,

$Y_i = i^{th}$ observation of the dependent variable,

β_o, β_1, ..., β_k = unknown constants,

X_{1i}, X_{2i}, ..., X_{ki} = i^{th} observation of the k independent variables, and

v_i = unknown error.

Using the sample data, the β coefficients are estimated by the least squares method which minimizes the variance of the error term. The least squares procedure provides the best, unbiased, linear estimators of the β coefficients when certain assumptions about the observations are met.[1] These assumptions include:

1. The error terms are random variables with expected values of zero.

2. The error terms have a constant variance of σ^2 and are uncorrelated.

3. The observations X_{1i}, X_{2i}, ..., X_{ki} are fixed and not subject to random variation.

4. The number of observations (n) exceeds the number of parameters to be estimated (k) and no exact linear relations exist between any of the X_k variables.

In estimating the β coefficients the least squares procedure gives the following estimation equation:

$$\hat{Y}_i = b_o + b_1 X_{1i} + b_2 X_{2i} + ... + b_k X_{ki} \qquad (5.2)$$

where

$\hat{Y}_i$ = estimates of Y_i for the ith observed values of the X_k's,

b_o, b_1, b_2, ..., b_i = estimates of β_o, β_1, β_2, ..., β_k.

The observed value of the ith Y is then the estimated value $\hat{Y}_i$, plus an error value, or

$$Y_i = b_o + b_1 X_{1i} + b_2 X_{2i} + ... + b_k X_{ki} + e_i \qquad (5.3)$$

where

$$e_i = Y_i - \hat{Y}_i \text{ is the error value.}$$

The dependent variable used in all regression equations is employee total wage. Separate equations are estimated for employees without incentive porgrams and employees with incentive programs. In addition, an equation is estimated using all 167 employee observations as a representative sample of full-time employees in Oklahoma.[2] The following independent variables are included in the analysis:[3]

<u>Continuous Variables</u>

X_4 = Average hours per week worked by the employee,

X_5 = Number of employees working on the farm,

X_7 = Gross income of farm per hour of total labor (operator plus hired),

X_8 = Capital investment (excluding land) per hour of labor,

<u>Dummy Variables</u>

Area of the State:

X_{10} = Northeast,

X_{11} = Southeast,

X_{12} = Southwest,

X_{13} = Northwest,

Employee Skill:

X_{14} = Semiskilled,

X_{15} = Skilled,

X_{16} = Highly Skilled,

X_{17} = Managerial,

Farm Type:

X_{18} = Livestock,

X_{19} = General,

X_{20} = Crop,

X_{21} = Dairy,

X_{22} = Cotton,

Incentive Program:

X_{23} = No Incentive Program,

X_{24} = Production Incentive,

X_{25} = Crop Incentive,

X_{26} = Livestock Incentive,

X_{27} = Percentage of Income Incentive.

Variables X_{10} through X_{27} are dummy variables representing four characteristics of the farm and employee. These dummy variables take a (0,1) form in the regression model. For example, different areas of the state are represented by four dummy variables. If an observation is from the Southwest, variable 12 has a value of 1 and variables 10, 11, and 13 have values of 0.

The dummy variables are potential independent variables which allow for intercept (b_o) changes only. Because each characteristic is represented by a group of variables, one variable is deleted from each group to prevent a singular matrix.[4,5] The effects of the deleted dummy variables are thus represented by the intercept value. The effects of the remaining dummy variables representing areas of the state, skill levels, farm types and incentive programs are indicated by the values of their respective regression coefficients.

Selection of Regression Equations

A computer multiple regression routine using a step-wise backward elimination procedure is used to estimate regression equations for each of the employee groups. The step-wise procedure is described by Hallberg (1969).[6] In general, the first regression equation includes a set of k independent variables hypothesized to be highly correlated with the dependent variable. The regression is then rerun with that variable omitted for which the ratio of the regression coefficient to its standard error is the smallest of all such ratios. This elimination of one variable each iteration continues until the regression coefficients of all remaining variables are significantly different from zero at some prespecified significance level.[7]

In selecting the final regression equation the coefficient's sign and significance are the primary considerations. Also considered is the precision of the estimates which can be evaluated using the adjusted R^2, F-ratio and standard error of the estimate.

Empirical Results

Income of Employees Without Incentive Programs

The regression equation selected to estimate the income of 150 employees without incentive programs includes nine independent variables. The estimated regression equation is:[8]

$$\hat{Y} = \underset{(578.952)^d}{837.259} + \underset{(10.687)^a}{56.510X_4} + \underset{(8.112)^b}{19.779X_7} + \underset{(310.917)^c}{576.385X_{10}} + \underset{(304.344)^b}{735.328X_{13}}$$

$$+ \underset{(372.004)^b}{854.310X_{15}} + \underset{(464.138)^b}{1076.533X_{16}} + \underset{(399.620)^a}{1810.858X_{17}} + \underset{(347.172)^a}{948.612X_{20}} \qquad (5.4)$$

This equation has an adjusted R^2 of 0.4560 with the F-ratio significant at the 0.001 probability level. The standard error of the estimate is 1209.5288 or 22 percent of the mean response $(\bar{Y})$, which indicates that the estimates provided by the equation may not be very precise. The R^2 value indicates that the variables included in the equation explain 45.60 percent of the variation in the income of employees without incentive programs. To prevent a singular matrix variables X_{12}, X_{14}, and X_{18} are deleted.

The coefficients of the variables representing hours worked per week (X_4), managerial ability (X_{17}), and crop farm (X_{20}) are statistically significant at the 0.01 level. The positive signs of X_4 and X_{17} support the hypothesis that additional hours of work and managerial ability increase the employee's income. If an employee works 50-hour weeks instead of 40-hour weeks, he can expect an average increase in total wages of $565.10. Employees with managerial ability can expect an average total wage $1,810.86 greater than the semiskilled employee. Variable X_{20} is the only dummy variable representing type of farm to have a significant affect on employee income. According to the equation an employee working on a crop farm will have a $948.61 higher income than if he worked on a livestock farm.

Variables significant at the 0.05 level include gross income per hour of labor (X_7), Northwest area of the state (X_{13}), skilled ability (X_{15}), and highly skilled ability (X_{16}). The positive signs on variables X_7, X_{15} and X_{16} support the hypothesis that a farm with high gross income can afford to pay employees a larger wage, and a higher level of skill will mean increased income for the employee. The coefficient for X_7 indicates that for every dollar increase in gross income

per hour of labor used on the farm, an employee will receive a $19.78

increase in total wages. Variables X_{15} and X_{16} indicate that a skilled

employee will receive $854.31 more in total wages than the semiskilled

employee, and an employee who is highly skilled will receive $1,076.53

more than the semiskilled employee. The regression analysis also indi-

cates that total income of employees in the Northwest area of the state

(X_{13}) is $735.32 larger than the income of employees in the Southwest.

It is interesting to note that the coefficient values of the three

skill levels are substantially different from the wage of semiskilled

employees. A skilled employee's income is $854.31 above the semi-

skilled employee. The income of highly skilled employees is $222.22

greater than skilled employees, and managerial ability will command

$734.33 additional income over highly skilled employees.

The dummy variable representing the Northeast area of the state

(X_{10}) is significant at the 0.10 level. The regression coefficient

indicates that income of an employee in the Northeast area of the state

is $576.38 larger than if the same employee was working in the Southwest.

The constant term is significant at the 0.20 level and represents the

income of a semiskilled employee working on a livestock farm in South-

west Oklahoma. If the employee works 40 hours per week and the farm's

gross income averages $20.00 for each hour of labor used, his estimated

total income is:

$$\hat{Y} = \$837.26 + 40(56.51) + 20 \ (19.78) = \$3,493.26 \qquad (5.5)$$

Using equation (5.4) the predicted income of employees without incen-

tive programs for alternative situations is summarized in Table XXV.

The income could range from $4,048 to $7,158 depending upon an employee's

skill level, hours worked per week, and area of the state.

TABLE XXV

INCOME OF EMPLOYEES WITHOUT INCENTIVE PROGRAMS
UNDER ALTERNATIVE SITUATIONS[a]

Area of State	Skill Levels							
	Semiskilled		Skilled		Highly Skilled		Managerial	
	50-hour Week	60-hour Week	50-hour Week	60-hour Week	50-hour Week	60-hour Week	50-hour Week	60-hour Week
Southeast and Southwest	$4,048	$4,613	$4,902	$5,467	$5,125	$5,690	$5,858	$6,423
Northeast	4,624	5,189	5,478	6,043	5,701	6,266	6,434	6,999
Northwest	4,783	5,348	5,637	6,202	5,860	6,425	6,593	7,158

[a]Figures are calculated assuming $20 gross income per hour of labor.

Income of Employees With Incentive Programs

The regression equation selected to estimate the income of 17 employees with incentive programs includes five independent variables.[9] The estimated regression equation is:

$$\hat{Y} = 4632.960 + 1393.658X_{13} + 2640.366X_{16} + 3849.357X_{24}$$
$$(478.613)^a \quad (783.951)^c \quad (818.810)^a \quad (826.541)^a$$

$$+ 1517.650X_{26} + 7390.122X_{27}$$
$$(751.196)^c \quad (977.441)^a \quad\quad\quad\quad (5.6)$$

This equation has an adjusted R^2 of 0.8770 which is about two times larger than the R^2 of equation (5.4). The F-ratio is significant at the 0.005 probability level. The standard error of the estimate is 1070.2112 or 14 percent of the mean response $(\bar{Y})$ which indicates that this equation is more precise than equation (5.4). Since there are no semiskilled employees on incentive programs, the intercept includes the skilled employee. The intercept also includes the effects of crop incentives.

The coefficients of the variables highly skilled ability (X_{16}), production incentive (X_{24}) and percentage of income incentive (X_{27}) are significant at the 0.01 probability level. The positive signs on the X_{24} and X_{27} variables support the hypothesis that incentive programs will increase the employee's income. An employee working with a production incentive (X_{24}) will receive $3,849.35 more income than an employee with a crop incentive. If the employee works with a percentage of income incentive (X_{27}), he would have a $7,390.21 higher income than an employee with a crop incentive.

The only variable representing skill level to have a significant effect on employee income is X_{16}, representing highly skilled ability.

The regression coefficient indicates that a highly skilled employee will receive $2,640.36 more income than a skilled employee.

The Northwest area (X_{13}) and livestock incentive (X_{26}) variables are both significant at the 0.10 probability level. An employee working in the Northwest area would make $1,393.66 more than an employee not in the Northwest. The Northwest area variable was also significant in equation (5.4). An employee working under a livestock incentive program would command $1,517.65 in additional income over the employee with a crop incentive. Table XXVI presents the predicted income of employees with incentive programs for alternative situations. Differences in the significant variables cause income to range from $4,632 to $16,055.

TABLE XXVI

INCOME OF EMPLOYEES WITH INCENTIVE PROGRAMS
UNDER ALTERNATIVE SITUATIONS

Type of Incentive Program	Area of State			
	Areas Other Than Northwest		Northwest	
	Not Highly Skilled	Highly Skilled	Not Highly Skilled	Highly Skilled
Crop Incentive	$ 4,632	$ 7,272	$ 6,025	$ 8,665
Production Incentive	8,481	11,121	9,874	12,514
Livestock Incentive	6,149	8,789	7,542	10,182
Percentage of Income Incentive	12,022	14,662	13,415	16,055

Income of Sample Employees

A regression equation is also estimated for the income of the

entire sample of 167 employees. Ten variables are included in the

selected equation which is:

$$\hat{Y} = \begin{array}{l} 1140.2818 + 56.3900X_4 + 20.1669X_7 + 811.3342X_{13} \\ (564.8414)^b \quad (10.6870)^a \quad (7.9198)^b \quad (279.8575)^a \end{array}$$

$$\begin{array}{l} + 617.7316X_{15} + 1010.4280X_{16} + 1481.0344X_{17} + 818.7315X_{20} \\ (355.9691)^c \quad (441.6832)^b \quad (378.5162)^a \quad (320.0798)^b \end{array}$$

$$\begin{array}{l} + 4872.8868X_{24} + 1383.8580X_{26} + 5659.5618X_{27} \\ (643.4001)^a \quad (633.3738)^b \quad (908.4755)^a \end{array} \qquad (5.7)$$

The equation has an adjusted R^2 of 0.6035 and the F-ratio is

significant at the 0.001 probability level. The standard error of the

equation is 1234.9760 or 22 percent of the mean response $(\bar{Y})$, which

indicates the equation is not as precise as equation (5.6) but has

about the same precision as equation (5.4). Again to prevent a singu-

lar matrix, variables X_{12}, X_{14}, X_{18}, and X_{23} are deleted and their

effect on income is represented by the intercept value.

Coefficients for hours worked per week (X_4), Northwest area (X_{13}),

managerial ability (X_{17}), production incentive (X_{24}), and percentage of

income incentive (X_{27}) are all significant at the 0.01 probability

level. The coefficient values for hours per week, Northwest area, and

the managerial ability variables are smaller than the values estimated

for those employees without incentive programs (equation 5.4). The pro-

duction incentive coefficient is larger while the percentage of income

coefficient is smaller than the values estimated for those employees on

incentive programs (equation 5.6).

The remaining variables are significant at the 0.10 probability level. The effect of gross income per hour as estimated by this equation on employee income is very near the value estimated by equation (5.4). The effect of an employee's skill level on income is somewhat lower for this equation than indicated by equations (5.4) and (5.6). The crop farm coefficient is smaller in this equation than in equation (5.4), while the livestock incentive also has a smaller value in this equation than it did in equation (5.6).

Partial Budgeting of Incentive Programs

Partial budgeting can be used to test the profitability of a labor agreement with an incentive program compared to one without an incentive program. The basic consideration is to make only those changes that add more to revenue than to costs. In partial budgeting the total credits of a change include additional receipts and reduced costs. The total debits include additional costs and reduced receipts.[10] When total credits are greater than total debits the change would be profitable to the farm operation.

In evaluating an incentive program, the additional receipts would come from the higher level of production which should be the result of improved employee performance in his areas of responsibility. Reduced costs would add to total credits when feed loss is minimized or repair costs are decreased by employee performance. Additional costs of the incentive program would include the incentive payment itself and the cost of resources needed for the employee to increase production. Reduced receipts will occur when a crop or livestock incentive is used. In these situations the operator will not receive total income from

those units which the employee operates.

The basic partial budgeting concepts can be used to define the following breakeven relationship:

Additional Receipts	Reduced Costs		Additional Costs		Reduced Receipts	
$P \Delta Q^a$	$+ \quad c^r Q$	$=$	$(I + c^o)\Delta Q^a + FC^a$	$+$	$P Q^r$	(5.8)

where

P = price of product,

Q = quantity of product produced,

ΔQ^a = additional quantity of product,

Q^r = reduced quantity of product,

FC^a = additional fixed costs,

c^r = reduced costs per unit of product,

c^o = operating costs per unit of product,

I = incentive payment rate per unit of product.

This relationship can be used to analyze the breakeven incentive rate or incentive quantity for one enterprise or for a number of enterprises. An example of the formula's use may be helpful in explaining its application to a farm situation.

Illustration of Breakeven Analysis for Production Incentive

A simple situation involving one enterprise will be discussed first. Assume a dairy operator has one employee presently milking 100 cows. The average production per cow is 99 hundredweight of milk each year, which is sold for $6.00 a hundredweight. The employer feels that over the next few years the employee could be instrumental in raising the herd average to 120 hundredweight per year and increasing the herd

size to 125 cows. As a production incentive the employee would receive
a monthly payment based on production over the present monthly average
of 825 hundredweight (100 x 99 cwt. ÷ 12 months). The question the
employer would like answered is how much can he afford to pay in the
form of an incentive payment. Assuming the employee meets the proposed
goals, another question is what will the employee receive and what will
the employer gain from the program.

A typical dairy budget is used to estimate costs and returns of the
dairy enterprise. The additional receipts from the increased production
and herd size would be 425 hundredweight per month [(100 x 21 cwt. ÷ 12
months) + (25 cows x 120 cwt. ÷ 12 months)]. There are no reduced costs
assumed so total credits would be $2,550 per month. Additional costs
are the incentive payment and expenses involved with more cows and
higher production. The incentive payment will be some rate I multiplied
by the increased production of 425 hundredweight. Additional expenses
include the prorated fixed costs of 25 additional cows which is $186.75
per month and a variable cost of $2.89 per hundredweight for additional
milk. Since the change does not affect other enterprises, there are no
reduced receipts. The breakeven incentive rate can then be calculated
using equation (5.8).

$$P \ \Delta Q^a + C^r \ Q = (I + C^o) \Delta Q^a + FC^a + P \ Q^r$$

$$(6 \times 425) + (0 \times 1250) = (I + 2.89)425 + 186.75 + (6 \times 0)$$

$$2550 \quad + \quad 0 \quad = 425 \cdot I + (2.89 \times 425) + 186.75 + 0$$

$$2550 = 425 \cdot I + 1228.25 + 186.75$$

$$2550 = 425 \cdot I + 1415$$

Solving for I:

$$I = \frac{\$2550 - \$1415}{425} = \$2.67$$

If the employer pays the employee $2.67 per hundredweight for production over the present level, his profit would remain the same. If the employer paid a lower incentive rate, he would increase profits. Assuming an incentive rate of 25 cents per hundredweight for monthly production over the present monthly average, a 125-cow herd, and an average production of 120 hundredweight, the employee would receive $106.25 and the employer $1,028.50 per month in additional profits.

By rearranging the formula and assuming a specific incentive rate, the breakeven level of production can be obtained. Assuming a 25-cent incentive rate, the increased quantity required would be:

$$P \, \Delta Q^a + C^r \, Q = (I + C^o)\Delta Q^a + FC^a + P \, Q^r$$

$$(6 \times \Delta Q^a) + (0 \times Q) = (.25 + 2.89)\Delta Q^a + 186.75 + (6 \times 0)$$

$$6\Delta Q^a = (.25 + 2.89)\Delta Q^a + 186.75$$

$$6\Delta Q^a = 3.14\Delta Q^a + 186.75$$

$$2.86\Delta Q^a = 186.75$$

$$\Delta Q^a = 65.30 \text{ cwt.}$$

Thus, an additional 65.3 hundredweight of milk per month is required to cover the incentive payment and the increased fixed and variable costs of a larger herd.[11]

Illustration of Breakeven Analysis for
Percentage of Income Incentives

A more complex example involves the percentage of income incentive program. Using data gathered by the Economic Research Service in the summer of 1970 for the High Plains area, a representative irrigated farm was established.[12] The farm has a total acreage of 1,600 acres with 1,440 acres of cropland and 160 acres of native range. There are

788 acres of irrigated corpland on the farm with the remainder of the

cropland being dryland graze-out. The number of units of each enter-

prise on the farm are:

> 381 acres of irrigated graze-out small grain,
>
> 51 acres of irrigated wheat,
>
> 248 acres of irrigated grain sorghum
>
> 108 acres of irrigated corn,
>
> 652 acres of dryland graze-out small grain,
>
> 10 cow-calf units,
>
> 500 October-February stockers,
>
> 1,000 March-May stockers.

Using typical budgets for the Oklahoma Panhandle, Table XXVII

presents the current net income of each enterprise. The total income

of the present organization is $18,435.03. Also presented is the net

income of the farm assuming a two-percent increase in production and

operating costs. This increase in production is assumed to be a result

of the present labor being utilized to a greater extent with additional

variable inputs. The increased profit for each enterprise can be deter-

mined by using equation (5.8). Summing the breakeven profit values of

each enterprise provides the breakeven value of the entire operation.

An example of one enterprise is the graze-out small grain. Assuming a

current production of 6 animal unit months (AUM) per acre and a 381-acre

enterprise, current production would be 2,286 AUM's. With at two-percent

increase, total production would be 6.12 AUM per acre and for 381 acres

additional production would be 45.72 AUM (0.12 AUM x 381 acres). The

price per AUM is $10.00 and the operating expenses per AUM is $3.00.

Under these assumptions the relationship can be expressed as:

TABLE XXVII

INCOME, COSTS AND PROFITS OF REPRESENTATIVE IRRIGATED FARM
FOR PRESENT AND TWO-PERCENT INCREASE IN LABOR PRODUCTIVITY

	Gross Income/ Unit	Total Costs/ Unit	Profits Per Unit	Total Enterprise Profit
Small Grain Grazeout				
Present	$ 60.00	$ 60.49	$ -.49	$ -186.69
Two-percent Increase	61.20	60.85	.35	133.35
Wheat for Grain				
Present	81.50	72.40	9.10	464.10
Two-percent Increase	83.13	73.05	10.08	514.08
Grain Sorghum				
Present	114.70	95.66	19.04	4,721.92
Two-percent Increase	116.99	96.66	20.33	5,041.84
Corn				
Present	156.00	130.02	25.98	2,805.84
Two-percent Increase	159.12	131.72	27.40	2,959.20
Dryland Wheat				
Present	19.00	7.62	11.38	7,419.76
Two-percent Increase	19.30	7.67	11.63	7,582.76
Cow-calf				
Present	181.90	77.89	104.01	1,040.10
Two-percent Increase	186.39	78.34	108.05	1,080.50
October-February Stockers				
Present	210.41	207.25	3.16	1,580.00
Two-percent Increase	214.50	210.92	3.58	1,790.00
March-May Stockers				
Present	238.79	238.20	0.59	590.00
Two-percent Increase	243.42	242.72	0.70	700.00
Grand Total			Present	$18,435.03
		Two-percent	Increase	19,801.73
			Difference	$ 1,366.70

$$P \, \Delta Q^a + C^r \, Q = (I + C^o) \Delta Q^a + FC^a + P \, Q^r$$

$$(\$10 \times 45.72 \text{ AUM}) + (C^r \times 6.12 \text{ AUM}) = (I \times \$3.00) 45.72 \text{ AUM}$$
$$+ FC^a + \$10 \, Q^r$$

$$\$457.20 + (0 \times 6.12 \text{ AUM}) = (I \times 45.72 \text{ AUM}) + (\$3.00 \times 45.72 \text{ AUM})$$
$$+ 0 + 0$$

$$\$457.20 = 45.72 \cdot I + \$137.16$$

$$\$320.04 = 45.72 \cdot I$$

$$I = \$7.00 \text{ per AUM}$$

where additional profit of the enterprise is

$$45.72 \text{ AUM} \times \$7.00 = \$320.04.$$

The 381 acres produced 45.72 additional animal unit months which have a value of $320.04. This is the breakeven profit for graze-out small grain. Desiring a total for the farm, the procedure is repeated for each enterprise. For the example farm the breakeven value is $1,366.70 which, if paid to the employee, would leave the operator with no change in his profit. However, if the operator were to pay the employee five percent of the yearly net income as an incentive payment, the employee would receive $990.00 and the operator would receive $376.61 in additional profits.

The formula can again be rearranged so the rate is assumed and the needed increase in labor productivity can be calculated. This procedure might be used for particular enterprises the employee has control over instead of the entire farm. When the operator feels the employee can raise production in one enterprise more than the others, the formula would use different levels of increased productivity for the various enterprises.

Illustration of Breakeven Analysis for
Crop and Livestock Incentives

Crop and livestock incentives can also be analyzed with the same
basic concepts. With these incentive programs the operator incurs two
kinds of costs, the direct cost of inputs used on the employee's enter-
prise and the opportunity cost of not receiving any profits from those
units which the employee operates. The additional receipts of these
programs are also the result of increased labor productivity and are
determined in the same manner as the percentage of income incentive
program. For example, selecting irrigated grain sorghum as the enter-
prise from which the employee receives his incentive income, one can use
equation (5.8) to determine the breakeven incentive acreage. There are
no reduced costs and the incentive rate is zero since the number of
units is the unknown. The reduced receipts of the program are the
$116.99 of gross income not received by the employer for each acre of
grain sorghum operated by the employee. The total operating cost of
$50.97 per acre of grain sorghum is included in the $116.99 of reduced
receipts. Using the sample farm, the formula is:

$$P \Delta Q^a + C^r Q = I \times \Delta Q^a + C^o \Delta Q^a + FC^a + P Q^r$$

$$\$8,352.61 + 0 \ Q = (0 \times \Delta Q^a) + \$6,985.91 + 0 + \$116.99 \ Q^r$$

$$\$8,352.61 + 0 = 0 + \$6,985.91 + \$116.99 \ Q^r$$

$$\$1,366.70 = \$166.99 \times \text{Breakeven Acres}$$

Solving for acres:

$$11.7 = \text{Breakeven Acres}$$

This is the number of acres the employer could allow the employee to
receive income from and not affect the employer's profit. If the

employer allowed the employee five acres, the employee's payment would

be $584.95 and the employer would receive $781.75 in additional profits.

FOOTNOTES

[1] J. Johnston, Econometric Methods (New York, 1972), p. 122.

[2] The data for the dependent variable were obtained from questions 21, 22, 23 and 24B (see Appendix A).

[3] The computer routine which was used allowed variables X_1, X_2, X_3 and X_6 to be edited into the four groups of dummy variables.

[4] Johnston, p. 178.

[5] If all dummy variables representing a characteristic are used in a regression equation with a b_o term, the estimation procedure breaks down because the matrix cannot be inverted. For each characteristic, the effect of the deleted variable is found in the b_o term.

[6] M. C. Hallberg, "Statistical Analysis of Single Equation Stochastic Models Using the Digital Computer," (University Park, Pennsylvania, 1969), p. 15.

[7] A t test for the null hypothesis H_o: $\beta_o = 0$ against the alternative H_1: $\beta_o \neq 0$ with the appropriate degrees of freedom is used to determine the significance level.

[8] The standard errors are given in parentheses and the significance levels (α) of the coefficients are denoted by: a if $\alpha \leq 0.01$; b if $0.01 < \alpha \leq 0.05$; c if $0.05 < \alpha \leq 0.10$; d if $0.10 < \alpha \leq 0.20$ and e if $0.20 < \alpha \leq 0.30$. Similar notations are used with the other equations presented in this chapter.

[9] Due to the limited number of observations and insignificance of many variables in equation (5.4), the Northeast area, Northwest area and crop farm variables were the only area and farm type dummy variables included in the regression.

[10] Emery N. Castle, Manning H. Becker and Frederick J. Smith, Farm Business Management (New York, 1971), p. 112.

[11] If there are no additional fixed costs or reduced receipts, then marginal revenue per unit will be greater than marginal costs and there would not be a breakeven quantity.

[12] Roy Hatch and Wyatt Harman, "Description of South-Central Plains Farm," unpublished survey data, 1969 (to be published as an Oklahoma Experiment Station - USDA publication).

CHAPTER VI

SUMMARY AND CONCLUSIONS

The Problem and Procedure

What has been called the paradox of farm labor is the phenomenon
where decreasing farm numbers suggest excess farm labor, yet many farms
are experiencing a shortage of labor.[1] Due to technological advances
capital has been substituted for labor, causing farmers to seek the more
highly skilled employees who are capable of operating expensive equip-
ment and making sound decisions. In an effort to attract, motivate and
retain this type employee, farm operators are turning to new types of
labor programs. The incentive agreement is one program which may
attract the better farm emoloyees, motivate them to improve performance
and help retain them on the farm.

The major goal of this study was to delineate information about
incentive agreements which can be helpful to farm operators. To accom-
plish this goal, the following five objectives were identified: (1) to
describe the major types of incentive agreements and their provisions
being used on Oklahoma farms, (2) to identify the farm characteristics
that lend themselves to the use of incentive agreements, (3) to identify
the major problems faced by operators in the development and execution
of the different types of incentive agreements, (4) to estimate the
probable operator costs of using incentive agreements, and (5) to

estimate the benefits needed to make an incentive agreement profitable on representative farm situations in Oklahoma.

To accomplish these objectives primary data were gathered during June and July of 1972. Eleven counties were designated as sample counties and 107 employers hiring 173 employees were interviewed. Employees with incentive programs were also interviewed to help identify any unique characteristics. Characteristics of the farm, operator and employees were described and compared for both incentive and non-incentive situations. Next, utilizing a multiple linear regression procedure, the effect of selected farm and employee characteristics on employee income was empirically estimated for both employees without incentives and employees with incentives. To estimate the benefits needed to make an incentive agreement profitable, the partial budgeting method was used to calculate breakeven rates and units for different incentive programs.

<div align="center">Summary of Empirical Results</div>

Farm Characteristics

Of the sample farms 52 percent were classified as livestock farms. Size of the farm measured by the value of assets ranged from $87,765 in the Southwest area to $208,189 in the Northwest area. Total acres of the sample farms averaged 2,614 acres consisting of 1,715 acres of pasture land and 898 acres of cropland. The gross sales of these farms ranged from less than $25,000 to in excess of $750,000. The largest number of farms averaged from $25,000 to $50,000 in gross sales. Fifteen of the 107 farms had an incentive program with at least one employee.

Operator Characteristics

Education of the 107 farm operators ranged from less than eight years to over four years of college. Seventy-eight percent of the employers had at least a high school education. The farming experience of the operators averaged 26.7 years while their experience with hired labor averaged 19.2 years. Forty of the operators were engaged in some kind of non-farm business. The age of the operators averaged 50.8 years, the youngest being in the Northwest.

Employee Characteristics

Skill ratings on 173 employees were obtained. Approximately 77 percent of the employees had some skill with crops, 84 percent had some skill with livestock, 85 percent possessed mechanical skills and 31 percent had managerial ability. Considering the highest skill rating given by the employer, 47 percent of the employees were evaluated as skilled, 9 percent were semiskilled, 12 percent were highly skilled, and 32 percent were managerially skilled. Eighty-two percent of the employees could be trusted with the farm or their area of responsibility for a period of time ranging from one day to indefinitely. Of the employees with managerial ability, 45 percent would be trusted indefinitely with the farm. The average annual hours of labor provided by the employees ranged from 2,392 hours in the Northeast to 2,764 hours in the Northwest. Comparing the type of farm, 1,971 hours were provided by employees on livestock farms and a high of 2,418 hours were provided by general farm employees.

The total wage of employees without incentive programs averaged $5,458. The Northwest area had the highest average wage of $6,633

compared to a low of $4,780 in the Southwest. Employees on general type

farms were paid the lowest wage of $4,852, while those on crop farms had

the highest total wage of $6,642.

The total wage of employees with incentive programs averaged

$7,614. The Northwest area again had the highest average wage of

$9,672 compared to a low of $4,745 in the Northeast. Total wage by

type of farm ranged from a low of $3,634 on cotton farms to a high of

$8,676 on livestock farms.

Income Analysis

A multiple linear regression procedure was utilized to develop

equations which estimate employee income under alternative situations.

Variables found to significantly affect the income of employees without

incentive programs included hours worked per week, gross income per hour

of labor, Northeast and Northwest areas of the state, crop type farm and

the skill ratings of skilled, highly skilled and managerial. Managerial

ability was found to influence an employee's income the most. With this

skill rating the employee's wage is estimated to be $1,810 above a semi-

skilled individual. The variable with the second largest impact was the

highly-skilled skill rating, which will increase total employee wages

$1,076 above the semiskilled employee. Crop type farm was ranked third

in size and was estimated to increase wages $948 above the employee

working on another type farm.

Variables which significantly affect the income of employees with

incentive programs were Northwest area of the state, a highly skilled

rating, production incentive, livestock incentive and percentage of

income incentive. The variable that affected employee income the

greatest amount was the percentage of income incentive, which increased

estimated income $7,390 above an employee with a crop incentive. The

second largest influence was by the production incentive, raising income

of the employee $3,849 above the employee with a crop incentive. Also

influencing income to a large extent was the highly-skilled ability

rating. This rating would increase estimated income of the employee

$2,640 above the skilled employee.

The equation estimating income of the total employee sample

indicated that all but one of the varibles significant in the previous

two equations were also significant in this equation. Northeast area

of the state was the only variable not significant in the total employee

equation which was significant in the equation for employees without

incentives. In this equation, percentage of income incentive and pro-

duction incentive were the two variables influencing employee income

the most. A percentage of income incentive would raise estimated income

$5,659 while the production incentive would raise estimated income $4,872

above the employee without an incentive.

Incentive Programs

The small number of observations using incentive programs prevented

statistical tests which would have indicated the significant variables

influencing the use of a particular type program. However, the infor-

mation obtained does allow a presentation of the relationships found

existing among the available observations. Farms using production

incentives had the largest amount of capital investment while farms

using percentage of income incentives had the largest amount of gross

income. Farms with crop incentives required the least amount of labor

from each employee while farms with percentage of income incentives required the greatest amount of labor. The percentage of income incentives were employed by the oldest, the most experienced with labor, and the best educated of the operator groups.

Employees with livestock incentives had been with the present employer the longest period of time. They also had spent the most time working on farms and had the least amount of formal education. Employees with production incentives had been with the present employer the shortest time. Employees with percentage of income incentives were the youngest, best educated, possessed the highest skills and had the smallest family of the incentive groups. Employees with crop incentives had the lowest total wage of the four groups. The employees receiving a percentage of income incentive received the largest incentive payment and total wage. Livestock incentive employees received the lowest incentive payment.

The production, livestock and crop incentives were found to be simple and easily understood by the employee while the percentage of income incentive was the most complex of the four programs. On the other hand, percentage of income programs give the employee the greatest opportunity to affect the size of the payment, while it may be difficult with a production incentive to locate factors within the employee's control which the payment can be based upon. The size of livestock and crop incentives were found to be subjectively determined by the employer in some instances and others tried to make the size of payment correspond with work load.

To induce employee performance in the best interests of the employer, the crop and percentage of income incentives were found to

be most appropriate. The production incentive is the most difficult program to design, such that employees perform in the best interest of the employer. However, the production incentive payments were made nearer the time of better performance than the other incentive payments and thus reinforced the employee's incentive to increase production. The only programs found in a written form were a production incentive and a percentage of income incentive. However, there was no information gathered which indicated that any of the programs could not be written. Specific responsibilities were given some employees with production and crop incentives. There were no additional responsibilities given employees with livestock incentives and the employees with percentage of income incentives accepted responsibilities concerned with the entire operation. Employees with livestock and crop incentives were receiving base wages below their counterparts without incentives. This may indicate some substitution of incentive payments for base wages which decreases the program's ability to induce better performance.

Opinions of the individuals interviewed varied when asked about the incentive program. Only 60 percent of the employers felt the program was increasing production or reducing costs, while 92 percent of the employees felt it encouraged them to do so. When asked if the program rewards the employee for better work, 93 percent of the employers and 92 percent of the employees felt it did. Finally, those interviewed were asked if the program affected retainment of the employee, 100 percent of the employers felt it improved retainment and 84 percent of the employees felt the program made it less likely they would change jobs.

Conclusions and Implications

Methodological Issues

Because of the inability to identify all farms using incentive

programs or even all farms hiring full-time labor, the sample of incen-

tive programs was not as large as would have been possible with addi-

tional information. Access to Social Security records could have

improved the location of farms hiring full-time labor. If information

identifying those operators using some type of incentive program had

been available in the state labor agency's records, this would have

increased the sample size of incentive programs and the reliability of

the empirical analysis. Sampling error may have occurred during iden-

tification of those farms hiring full-time labor since each county

extension director used a different source in compiling a list of

farmers to be contacted. The accuracy of the results are also subject

to the measurement and memory of the employers. For example, some

employers may have reported bonus or perquisite values which were the

historical extremes rather than the present values.

The questionnaires were relatively short; thus the operators and

employees interviewed did not appear to lose interest in the questions.

The questionnaires were arranged in sections so most questions flowed

from the previous answer. This made the interview more of a conversa-

tion and not an interrogation of the operator. Wording of the questions

was designed to be straightforward and prevent confusion. To prevent

biases any needed interpretation from the enumerator took the form of

a standard example or comment that was used in each similar situation.

More detailed information on the amount of labor provided by the
operator and family would have been useful. This information would have
increased the accuracy of the estimates of hours of total labor used on
the farm. Net income on an enterprise basis would have facilitated the
classification of farms by type. However, the net income figures may
not have been estimated with the same accuracy as gross income for many
farms.

With respect to empirical analysis, the accuracy of predicted
values for the employee's income is dependent upon the accuracy of the
estimated relationships between the employee's income and the hypothe-
sized variables. Other variables such as the operator's personal char-
acteristics or the supply and demand for labor could have a significant
impact on the income of farm employees. However, due to the difficulty
in quantifying their values, some variables suggested by theory were
not included in the analysis. Not all of the hypothesized variables
were statistically significant in explaining changes in employee income.
The lack of statistical significance may have resulted from a high
degree of linear dependence between some of the hypothesized variables.

Use of Incentive Programs

Incentive programs were found in use on 14 percent of the sample
farms. No evidence was found to suggest that either the type of farm
or area of the state had any effect on the probability of a farm using
an incentive program. The data also indicated that little difference
existed between the total acreage, gross income and capital investment
of a farm with an incentive and a farm without an incentive program.
This suggests that incentive programs were not predominate on large or

small farms.

It has been hypothesized that employers with above average educations will more frequently develop and use incentive programs. This hypothesis appears to be supported by the data since the employers using incentive programs were better educated than the employers not using an incentive. Eighty-seven percent of the employers using an incentive program had a high school, or higher, level of education, while only 77 percent of the employers without incentives had the same level of education. With an average age of 48 years, the employers using incentive programs were slightly younger than the employers not using an incentive, who averaged 50 years of age. The employers with incentive programs had two years less farming experience and three years less labor experience than employers without incentive programs. Thus, it might be hypothesized that farm or labor experience was not as important as education and other personal characteristics when an incentive program was developed.

The data also suggests that employees working with an incentive program have a higher skill rating than the employees without an incentive. Approximately 46 percent of the employees on incentive programs had managerial ability compared to 32 percent of the employees without incentives. Employers would probably be hesitant to use an program with an employee they did not feel was skilled enough to accept the additional responsibility.

When the average number of hours worked per week was compared for the incentive and non-incentive employees, there was less than an hour's difference between the two groups. This may indicate that the amount of labor provided by the employee changes very little, if any, when incentive programs are used.

Employee Income

It was hypothesized at the beginning of the study that for incentive programs to be effective, incentive payments must be in addition to competitive base wages and perquisites. Thus the total income of employees with incentives would be expected to be larger than the total income of employees without incentives. This hypothesis was supported by the data which indicated that the average total income of an employee with an incentive program was $2,321 above the employee without an incentive.

To determine the amount of additional income each type of incentive program would provide an employee, a regression procedure was used. The estimated equations contained those variables which significantly affect the employee's income. There was not a statistically significant difference found between the income of employees with crop incentives and the income of employees without incentives. An employee with a production incentive had an estimated income $4,872 above an employee without an incentive. The wage of an employee with a livestock incentive was estimated to be $1,383 above the non-incentive employee. An employee with a percentage of income incentive had an estimated wage $5,659 above an employee without an incentive. This suggests that a crop incentive does not raise an employee's income, while the other three programs were found to increase the total income. The statistical results showing no difference between the income of employees with a crop incentive and no incentive supports the hypothesis that the crop incentive payments were substituted for competitive base wages. The large income value associated with the percentage of income incentive appears to indicate that additional income was directly related to the additional responsibility

assumed by employees with this type of program.

The Northwest area of the state and highly-skilled ability were found to have a significant effect on the income of both employees with and without incentives. This suggests that some phenomenon may exist in Northwest Oklahoma which causes employee wages to be higher than other areas of the state. This has possible implications concerning the mobility of farm labor within the state. The labor supply and demand in Northwest Oklahoma may be a significant factor of employee wages. Since the highly-skilled ability was significant in each equation, the value of training appears to be great enough to justify additional employee education. This could either be on-the-job training or short courses to improve the employee's skill level.

The hours worked per week and gross income per hour variables were significant in the equation for non-incentive employees. This suggests that the influence of these variables were overshadowed or included in the influence of incentive programs on employee income.

Further Research

This study emphasized the description and evaluation of incentive programs being used in Oklahoma. Also emphasized was the identification of farm, employer and employee characteristics which lend themselves to incentive programs. Further analysis is needed to determine the specific relationship between the incentive program and the employee's performance. Identification of the observations where the incentive program induced better performance versus the observations where the outstanding performance is rewarded by an incentive payment may indicate why one type of program was chosen instead of an alternative.

Additional research effort is needed to specify measures of performance so additional income or reduced costs which occur as a result of better performance can be credited to the employee. Theoretical and empirical analyses are needed to determine the factors which promote better performance.

Research effort should also be directed to determining the major reasons which prompted employers to develop an incentive program for their particular situation. Hypothesized reasons include an effort to attract employees, increased production and improve performance of the employee. Additional reasons may be to replace a wage raise which was not possible with the present cash flow of the farm, or a means of satisfying the employee's desire for ownership, thus retaining him until his accumulated equity allows him to own a farm. A knowledge of the program's major objective may provide information which will help explain some of the variation in employee wages and indicate which programs are being successful in accomplishing certain objectives. While determining the objectives of the programs, efforts should also be directed to obtaining data which could provide information on why some programs are successful and others are not.

Another area of research was emphasized by the regression equations. Evidently an employee's skill level is important to his expected income. Therefore, information concerning the source of these skills could indicate needs for future labor training and motivation programs.

Additional research is also needed to determine the best use of the farm operator's funds which purchase labor. It has been suggested in some literature that the value, as measured by the employee, of some perquisites may be less than the cost of the perquisite to the employer.[2]

If this is substantiated by further research, then the use of these funds for an incentive program may prove to be beneficial to the employer. Not only could the program motivate the employee to perform better, but the program could also improve profits of the farm and retainment of the employee. A competitive base wage or perquisites should not be replaced by an incentive. However, perquisites valued less than the cost to the employer should possibly be substituted by an incentive payment. Additional research effort in the areas discussed above would provide important information which could assist farm employers in decisions concerning incentive programs.

FOOTNOTES

[1]Richard B. Smith and Earl O. Heady, "Paradox of Farm Labor," 1970
Iowa Farm Science, II (1970), p. 1.

[2]Lauren H. Brown, "Making Farm Employment Competitive," Michigan
State University (East Lansing, 1967), p. 5.

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           York).

APPENDIX A

THE QUESTIONNAIRES

To obtain data concerning incentive programs and associated characteristics, the following questionnaires were used to interview farm operators and employees with incentive programs. The interviews were conducted in 11 counties during June and July, 1972.

DEPARTMENT OF AGRICULTURAL ECONOMICS
OKLAHOMA STATE UNIVERSITY
STILLWATER, OKLAHOMA

QUESTIONNAIRE FOR FARM LABOR EMPLOYERS

CONFIDENTIAL: For Statistical Use Only   Date _____

1. Name _____

2. Address _____ City _____ County _____

3. How old were you on your last birthday? _____ years

4. What was the highest level of formal education completed?
   8 or less 9 10 11 12   College 1 2 3 4 More than 4

5. a. For how many years have you operated a farm? _____ years

   b. Is this agricultural operation a partnership ____, corporation ____,
      or sole proprietorship ____

6. Number of acres in operation: Pasture, ____ acres; cropland, ____ acres.

                                                        No. of Units

7. What are your enterprises?   _____   _____

                                 _____   _____

                                 _____   _____

                                 _____   _____

8. What was the total value of agricultural products you sold last year? (Do
   not include government payments, receipts from custom work, rent from real
   estate or any other receipts not derived from the sale of agricultural
   products.)

   _____ Less than $25,000   _____ $100,000-$149,999   _____ $300,000-$399,999

   _____ $25,000-$49,999   _____ $150,000-$199,999   _____ $400,000-$499,999

   _____ $50,000-$74,999   _____ $200,000-$249,999   _____ $500,000-$749,999

   _____ $75,000-$99,999   _____ $250,000-$299,999   _____ $750,000 and over

9. a. What activities other than farming were you engaged in last year?

      ____ Processing agricultural products   _____ Custom Work (other than
           not produced by this operation   trading work)

      ____ Selling farm supplies   _____ Labor contractor or crew
                                                      leader

      ____ Other (Specify) _____

   b. What part of your total income is from activities other than farming?

      _____ %

10. What is the current market value of your machinery, farm buildings, and livestock? \$_____

11. How long have you employed regular hired labor? _____ years

12. How many regular hired men do you employ? (Regular refers to those working 150 days or more per year.) _____

13. How many have you had in the recent past? _____ How recent? _____

14. Indicate the skill level of each employee in one or more of the four areas.

1	2	3	Crops
____	____	____	Semiskilled (operate tillage equipment)
____	____	____	Skilled (operate planting, harvesting and chemical application equipment)
____	____	____	Highly Skilled (determines when to perform operations; varieties to plant, fertilizer level, chemical levels)

Livestock

1	2	3	
____	____	____	Semiskilled (move livestock, haul hay, feed)
____	____	____	Skilled (castrating, vaccinating, dehorn, milk cows, care for livestock when calving, lambing or farrowing, mix feed)
____	____	____	Highly Skilled (select breeding stock, develop rations)

Mechanic

1	2	3	
____	____	____	Skilled (change oil, replace plugs and points)
____	____	____	Highly Skilled (replace rings, grind valves, set timing, adjust tappets, weld)
____	____	____	Skilled with Managerial Ability (responsible for making decisions in place of the operator)

15. How many days would you trust him with management of the farm if you wanted to attend a business meeting, take vacation, etc.? 1) _____ 2) _____ 3) _____

16. Number of days employee works per week. 1) _____ 2) _____ 3) _____

17. Number of normal employee work hours per day. 1) _____ 2) _____ 3) _____

18. Part of employee's time that is devoted to activities other than farming.

   1) _____ 2) _____ 3) _____

19. What provision is made for time off so the employee can take care of

   personal matters? _____

   _____

20. What vacation plan, other than time off for personal matters, is provided

   for your employee? _____

   _____

21. What is the wage rate received by (each) employee?

   1) _____ per _____ 2) _____ per _____ 3) _____ per _____

22. What non-cash benefits does your employee receive and what are their

   approximate dollar values per month?

1	2	3	
_____	_____	_____	Housing
_____	_____	_____	Meals
_____	_____	_____	Transportation or Fuel
_____	_____	_____	Milk and/or Food
_____	_____	_____	Room, Board and Washing
_____	_____	_____	Utilities
_____	_____	_____	Other _____
_____	_____	_____	_____

In the next section we distinguish between a bonus and an incentive program.

For purposes of our survey we define:

   A bonus as a payment in cash or goods that the employee does not know
   about beforehand and thus does not know how he can influence the size
   of the benefit.

   An incentive is a payment in cash or goods that the employee knows about
   beforehand and knows that his performance will influence the size of the
   benefit.

23. Do you have a bonus program? Yes _____ No _____

If yes, when and for what reason do you usually give a bonus? _____

_____

_____

24. Are any incentive programs presently used: Yes _____(B) No _____(A)

A. If no,

    1.) Have you ever used an incentive program in the past? Yes _____

       No _____ (Go to Q. #2)

       a.) If so, describe arrangements and indicate how long it was

          used. _____

          _____

       b.) Was it a written agreement? Yes _____ No _____

       c.) Were there arrangements for arbitration of misunderstandings?

          Yes _____ No _____

       d.) Why did you discontinue using the incentive program? _____

          _____

          _____ (Go to Q. #25)

    2.) Have you ever considered using an incentive program? Yes ___ No ___

       Do you have plans for an incentive program in the future? Yes _____

       No _____

       a.) If yes, what benefits do you feel an incentive program would

          have? _____

          _____

       b.) If no, for what reasons do you not intend to use an incentive

          program? _____

          _____ (Go to Q. #25)

24. B. If yes,

    1.) Describe and give approximate values. _____

    _____

    _____

    2.) How many years have you had this incentive program? _____ years

    3.) Did you use another program before adopting the present one?

    Yes _____ No _____ If yes, describe. _____

    _____

    4.) Why did you change to the present program? _____

    _____

    5.) Is a copy of the incentive program provided to the employee?

    Yes _____ No _____

    6.) Does the incentive program contain provisions for arbitration of

    misunderstandings? Yes _____ No _____ If so, how? _____

    _____

Incentive plans are sometimes considered to increase production or

reduce costs, reward employees for good work, and retain workers.

    7.) Do you feel your program has been successful in increasing

    production or reducing costs? Yes _____ No _____ Specify which

    enterprises and in what way there has been an effect. _____

    _____

    _____

    8.) Do you feel your program rewards employees for good work? Yes __

    No _____ In what specific operations of your program have you

    noticed improved work? _____

    _____

    9.) Do you feel your program helps retain employees? Yes ____ No ___

    What aspect of your program improves retainment? _____

    _____

25. a.) Is the employee required to work over time and nights? Yes ____ No ___

    b.) How is overtime pay figured? _____

26. At what skill level will your future labor needs be the greatest? _____

    _____

27. What wage would be needed to hire a regular worker with this skill level?

    _____ per _____

28. Could you productively use more or less labor in your operation? More ____

    Less ____

29. What types of employer-employee misunderstandings occur most often? _____

    _____

30. What is the best advice you can give in keeping good regular hired men?

    _____

    _____

    _____

31. (Those with incentive programs) Would you allow me to interview your

    employee? Yes _____ No _____

32, General observations by enumerator: _____

    _____

    _____

    _____

    _____

DEPARTMENT OF AGRICULTURAL ECONOMICS
OKLAHOMA STATE UNIVERSITY
STILLWATER, OKLAHOMS

QUESTIONNAIRE FOR FARM LABOR EMPLOYEES

CONFIDENTIAL: For Statistical Use Only   Date _____

1. Name _____

2. Present Address _____ City _____

3. How old were you on your last birthday? _____ years

4. a.) Are you married? Yes _____ No _____ b.) Is your wife employed?

    Yes _____ No _____ c.) If yes, what type employment? _____

5. How many dependent children do you have? _____ Under 13 _____ 13 or older

6. a.) Were you raised on a farm? Yes _____ No _____ b.) If not raised on

    a farm, what size of town were you raised in? _____

7. Number of years you have done farm work of some kind. _____ years

8. Number of years you have been employed on present farm. _____ years

9. Are you related to this employer? Yes _____ No _____ If yes, what

    relation? _____

10. a.) Do you have a part-time job or work anywhere other than this farm?

    Yes _____ No _____ b.) If so, what is the yearly value of this work?

    $_____

11. a.) What was the highest level of formal education completed?

         8 or less 9 10 11 12   College 1 2 3 4 More than 4 _____

    b.) If you attended college what was your major? _____

12. Did you have any vocational agricultural training in high school?

    Yes _____ No _____

13. Have you attended any of the following in the last five years?
    Adult Farm Group Meeting Yes _____ No _____
    Short Courses   Yes _____ No _____
    Extension Programs Yes _____ No _____
    Other Agricultural Education Courses Yes _____ No _____

14. During the last 10 years your employment and educational experience has included:

Number of years

Farm Operator   _____ years

School   _____ years

Military   _____ years

Nonfarm Work, please specify type _____   _____ years

Other, please specify type _____   _____ years

15. a.) Do you prefer to work as a farm worker or a nonfarm worker? Farm _____

Nonfarm _____ b.) If you prefer farm employment, what is the major reason? (Health, family, trained in farm work, steady work, etc.) _____

_____

16. What type of work do you plan to do in the future? _____

_____

17. What non-cash benefits do you presently receive?

House _____   Room, board and washing _____

Meals _____   Utilities _____

Transportation or Fuel _____   Other _____

Milk and/or food _____   _____

18. What are some non-cash benefits you would like to receive which you are not now receiving? _____

_____

19. Rank in order of their importance the non-cash benefits you have mentioned in the previous two questions.

House _____   Vacation With Pay _____

Meals _____   Retirement Plan _____

Transportation or Fuel _____   Sick Leave with Pay _____

Milk and/or Food _____   Health insurance _____

Room, board and washing _____   Life insurance _____

Utilities _____   Other _____

Social Security _____   _____

20. Incentive plans are sometimes considered to increase production or reduce costs, reward employees for good work, and retain employees.

a.) Do you feel this incentive program encourages you to increase production or reduce costs? Yes _____ No _____ Specify which enterprises and in what way there has been an affect. _____

_____

b.) Do you feel the present program rewards you for better work? Yes _____ No _____ If yes, how? _____

_____

If no, how? _____

_____

c.) Do you feel the incentive program makes it less likely that you would change jobs? Yes _____ No _____ If yes, what features of the incentive program makes it less likely that you would change jobs? _____

_____

_____

APPENDIX B

INCENTIVE PROGRAMS ON SAMPLE FARMS

Details of the incentive programs found in use on Oklahoma farms
are presented in this appendix.

Examples of Production Incentive Programs

Farm 34

This was a 250-cow dairy farm employing two full-time men. The incentive arrangement provided for a payment of 25 cents per hundredweight of milk over 1600 hundredweight per month. This incentive was paid monthly and divided by the two employees.

Farm 40

This operation included a 200-head cow-calf enterprise and three crop enterprises. The employee was in charge of the show string which was designed to promote the sale of registered cattle for breeding purposes. Any sale the employee made of breeding stock was used for calculating the incentive payment. If an animal was sold for less than $500, the employee received 2 percent of the price. If he sold an animal for over $500, the payment was 25 percent of the price. Also any stocker-feeder calves sold were used to calculate a payment of 1 percent of the price received which was over the market price.

Farm 47

This farm included a 130-cow dairy operation as well as crops to supplement feed needs. The employee with the incentive was paid a wage of 40 cents per hundredweight of milk and was guaranteed a base wage on 4,500 pounds of milk per day. The program had previously used a price of 35 cents per hundredweight, but this was raised to 40 cents when the present employee started milking two years ago. The employee paid Social Security as a self-employed individual and at times hired

additional help to milk. The employer commented that during the past six years the 305-day average increased from 12,000 to 14,000 pounds of milk per cow.

Examples of Livestock Incentive Programs

Farm 29

The program is used on a 500-cow livestock farm. The employer lived and taught school at a distant town and could help on the farm only on weekends and during the summer months. Up to 12 cows were kept with the herd and the employee had no expenses except the initial pruchase of the cows. The employee's income from his livestock averaged about $100 per cow or an additional $1,200 per year.

Farm 41

This program was used on a general type farm which had cattle and crop enterprises. Eight years before when the program began, the employee was allowed to keep 5 steers. Over time the number had increased to 10 and finally 15 steers. The employer signs the note necessary for the employee to borrow money and purchase the steers. The employer pays for all feed, veterinary fees and other operating expenses associated with the steers. The main reason for increasing the number of steers was the employee's need for more income.

Farm 60

This program was used on a general type farm which had a 100-cow registered beef herd and large acreages of wheat and cotton. The

employee with the livestock incentive was responsible primarily for the registered beef herd. He could keep cows with the employer's herd and the employer paid all operating costs. The number of cows the employee could have was 10 percent of the current herd size. With 100 cows in the herd he could have kept 10 cows; however, due to the cost of purchasing livestock, he was keeping 6 cows with the herd. Another incentive that was used could be classified as a production incentive since it was directly related to the number of calves weaned. The employer would pay him $5.00 for each calf born and subtract $5.00 for each that died before it was weaned. This was kept on paper until all calves were weaned and the amount of the payment could be determined. The total amount of income from the incentive program averaged $1,075 per year.

Examples of Crop Incentive Programs

Farm 12

One program was used on a cash grain farm growing 1,000 acres of crops. The employee could choose a 10-acre plot that could be easily distinguished from the rest of the field. He planted any crop he wanted and was provided all seed, fertilizer and machinery that was needed. He received all income which averaged about $1,000 per year.

Farm 21

Another cash grain farm was found using a crop incentive. This employee received the use of 45 acres to grow crops and again was provided all necessary inputs. He received the entire income which was

averaging $2,000 per year. This program had been used for eight years and the amount of cropland had increased from an original 10 acres to the present 45 acres.

Farm 64

A program was found on a cash grain farm with over 1,300 acres of cropland. The employee had a choice of growing wheat or cotton on 160 acres; again the employer pays for operating expenses. The employee receives one-third of the wheat income or one-half of the cotton income. His income depends on the crop chosen but he should average about $2,768 per year.

Farm 67

A crop incentive was used on a cotton farm raising over 700 acres of crops. The employee received one-half the income from 25 acres of cotton. The employer provides all inputs and even pays the employee for his labor while farming the cotton. The program began 15 years before with 15 acres of cotton. The income is presently averaging $650 for the employee.

Examples of Percentage of Income Incentives

Farm 86

A livestock ranch with 300 head of stockers and 620 acres of cropland used the percentage of income incentive. The employee received 10 percent of the net profits. All operating expenses including taxes, interest and depreciation were used in calculating

the payment. The program had been in effect one year and the employee had received a payment of $2,600.

Farm 98

A livestock ranch with 300 cows, 150 stockers and 1,600 acres of cropland, some under irrigation, also used this program. The employee received 5 percent of the gross income. The sale of cows and bulls were not considered income since they were capital items. This program had been used for 10 years and the employee's incentive payment had averaged over $5,000 per year.

VITA

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