AN ABSTRACT OF THE THESIS OF

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Title: AN ECONOMIC ANALYSIS OF ENTERPRISE COMBINATIONS

ON FARMS IN THE WILLAMETTE VALLEY

Abstract approved_____ Redacted for privacy _____
                Dr. Frederick J. Smith

Questionnaires were mailed to farmers in six counties of the

Willamette Valley requesting the kind and size of enterprises and the

gross income received from the enterprises on each farm.

Enterprises were defined both as general livestock or crop cat-

egories and as individual crop or livestock enterprises. Two compu-

ter programs were used to determine all the possible enterprise com-

binations and the number of times each occurred on the sample farms.

Regression analysis was used to determine the economic relationships

between enterprises in the predominant combinations.

Livestock and hay, and grain and hay were each complementary

combinations regardless of the size of the enterprises. Livestock and

grain were complementary on farms with less than 38 acres of grain,

and supplementary on farms with more than 38 acres. Hay was com-

petitive with grass seed, livestock supplementary, and on farms with

less than 120 acres of grass seed, grain was a complementary enterprise. When more grass seed was planted, grain became competitive. Small fruit and vegetables were supplementary enterprises, and clover seed was a complementary enterprise with grain and hay.

Farms within the counties tended to combine enterprises in different ways, with the result that few enterprise combinations were found on a significant number of the sample farms. Significant combinations on Benton County farms were barley and wheat, and sheep and barley. Farms in Clackamas County which had strawberries, often had blackberries or raspberries, and alfalfa was usually grown with dairy or wheat. Farms in Linn County had rye grass in combination with wheat, feeders, tall fescue, and/or other seed crops. Marion County farms with sweet corn, pole beans, bush beans, or blackberries usually had strawberries, and wheat was often found with barley, feeders, alfalfa, sweet corn, and strawberries. Farms in Polk County which had barley and wheat usually raised sheep, oats, and/or alfalfa. Also, cherries and prunes were often found together. Enterprise combinations were the same on many of the farms in Yamhill County. Alfalfa, sheep, oats, clover hay, and/or clover seed were often found with the combination of barley and wheat, which was found on 65 percent of the sample farms.

Conclusions reached in this study were that farmers in the Willamette Valley combine enterprises in such a way that risk and

uncertainty are reduced through diversification, but not to the extent that enterprise competition for farm resources significantly reduces long run net farm income.

An Economic Analysis of Enterprise Combinations
on Farms in the Willamette Valley

by

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INTRODUCTION

Problem Situation

One of the traditional and recurring problems facing the farm manager is that of determining what to produce (what combination of enterprises). His alternatives are limited by available resources and markets, and his income opportunities determined by product prices and yields. The broader the resource base and available markets, the greater the number of possible enterprises.

The Willamette Valley is unique in providing climatic, soil, and market conditions conducive to producing more than 100 different enterprises. Therefore, the problem of what to produce is important and complicated for the Willamette Valley farmer. Out of all the possibilities, he must pick the enterprises that will satisfy his objectives (minimize loss or maximize long run net income, etc.). This can be accomplished by combining enterprises that are not subject to the same adverse climatic conditions or market price variations, and thereby evening out income over time. On the other hand, specialization in fewer enterprises tends to make more efficient use of certain resources. The former is referred to as diversification, and is

thought to reduce risk, while the latter is referred to as specialization, and is thought to increase net farm income over time.

Because of the climatic, soil, and market conditions in the Willamette Valley and the desire to reduce the risk and uncertainty caused by variations in price and yield, farms have tended to be diversified, i.e., have several different enterprises. However, recent changes in the capital structure of agriculture, developments in production technology, and advances in management techniques have offset many of the advantages of diversification. For example, seasonal price variation has been reduced through the use of contract farming, which also has provided a new source of finance for certain farming operations. The variability in yields due to weeds, insects, and diseases has been reduced by the increased use of herbicides, insecticides, and fungicides. Larger and more efficient machines enable one man to handle larger acreages of a given crop.

Because of the increased amount of information available and the development of modern budget procedures, the farmer's role as a laborer is becoming relatively less important than his role as a manager. With specialization there may be times during the year when the farmer does not need to be a laborer. This time can be profitably used to evaluate current production and marketing information, and to keep accurate farm records so that budgeting techniques can be used in the evaluation of any changes which might be made in the

organization of the farm business. It may be that by reducing the number of enterprises, the farmer will be able to manage his resources more efficiently and will be able to obtain a higher long run net income.

Purpose

The purpose of this study is to determine the kinds and sizes of enterprise combinations on farms in the Willamette Valley, and to explain the economic relationships which exist between and cause these enterprise combinations. This study will also provide some basic data for future research which will be concerned with the general hypothesis that the long run net farm income position of Willamette Valley farmers will be significantly improved through increased farm and area specialization, i.e., reducing the number of different enterprises. The end result of this future research will be to determine optimum enterprise combinations for farms with different resource bases.

Physical Characteristics

The Willamette Valley is characterized by a wide range of soil types and a mild climate, and is conducive to the production of a variety of agricultural products.

The valley has more than thirty separate soil series, each

consisting of several different soil types. Since these soils vary in their productivity and are capable of producing a wide range of crops, one would expect considerable diversification on valley farms. The soils map in Figure 1.1 shows the Willamette Valley soils broken into broad classifications according to the kinds of crops which can normally be grown on each land type.

Land Type 1 is a fertile soil and is better adapted to intensive cultivation (small fruit and vegetables) than any of the other soil types. Chehalis, Cloquato, and Newberg are the main soil series in this group and are all well drained, though the latter two are subject to seasonal flooding.

Land Type 2, mainly suited for general farming (grain, seed, and fruit), is largely comprised of Willamette and Woodburn soils. Willamette and scattered plots of Salem soil are well drained and can be farmed intensively. Woodburn is less well drained and is better suited to general farming.

The soil series in Land Type 3 include Amity and Wapato, which are only fairly well drained. These soils are capable of producing hay, grain, and seed crops.

The soils in Land Type 4 are characterized by poor drainage. Dayton, Concord, and Holcomb are the main soil series in this class, with Dayton being the most predominant. Holcomb is a little better drained than either of the other two series. The main crops which can

be grown on this Land Type are grass seed and pasture, though hay and grain can be grown in some places.

The hill soils in Land Type 1H are largely of the Willakenzie, Nekia, and Jory series. The soil is moderately deep, but the slope of the land limits crop production to tree fruit and general farming.

Land Type 2H is comprised of about the same soil series as Land Type 1H, the difference being that the former has steeper slopes and more shallow soil. This Land Type is mainly suited to pasture production, though extensive crops can be grown in some places.

The Willamette Valley has a mild, seasonal climate, free from temperature extremes which range from a low of 16 degrees to a high of 98. Usually temperatures reach above 90 degrees on only six to eight days per year. Normal monthly temperatures average a low of 38 degrees in January and a high of 65 in July. The growing season, from the last killing frost in the spring to the first in the fall, usually ranges from 150 to over 200 days.

The average rainfall for the valley is from 40 to 60 inches per year, with an overall mean of 52 inches (refer to Figure 1.2). Forty to 50 percent of this rain falls in the three winter months, December through February. Twenty to 25 percent falls in both the spring and fall, but only six percent or less falls during the summer months.

LEGEND

Symbol	Land Type	Land Capability
	1	Fruit, Vegetable
	2	Grain, Seed, Fruit
	3	Hay, Grain, Seed
	4	Seed, Pasture
	1H	Tree Fruit, Hay, Pasture
	2H	Pasture
		Non-agricultural
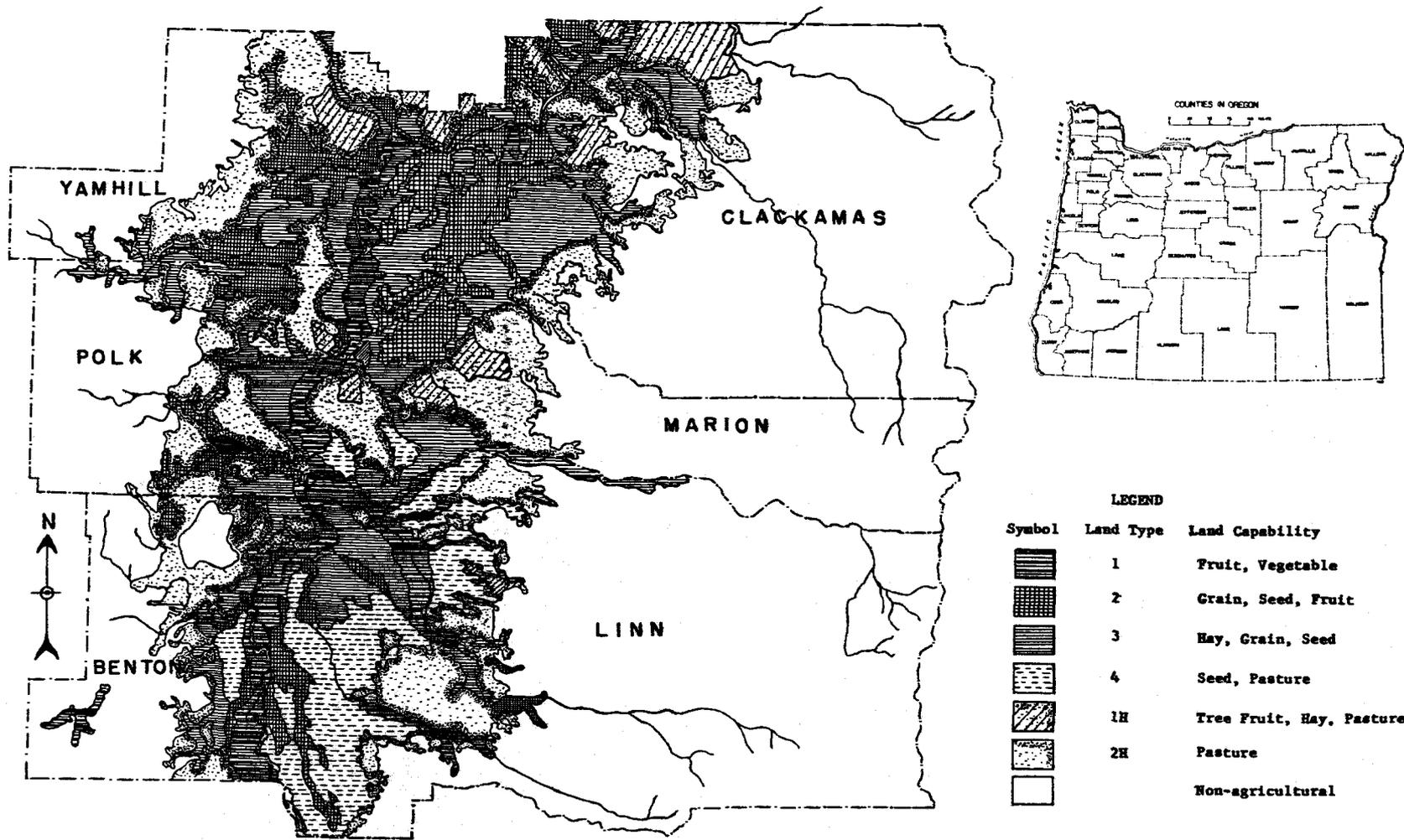
Figure 1.1. Agricultural land capability in the six sample counties (9).
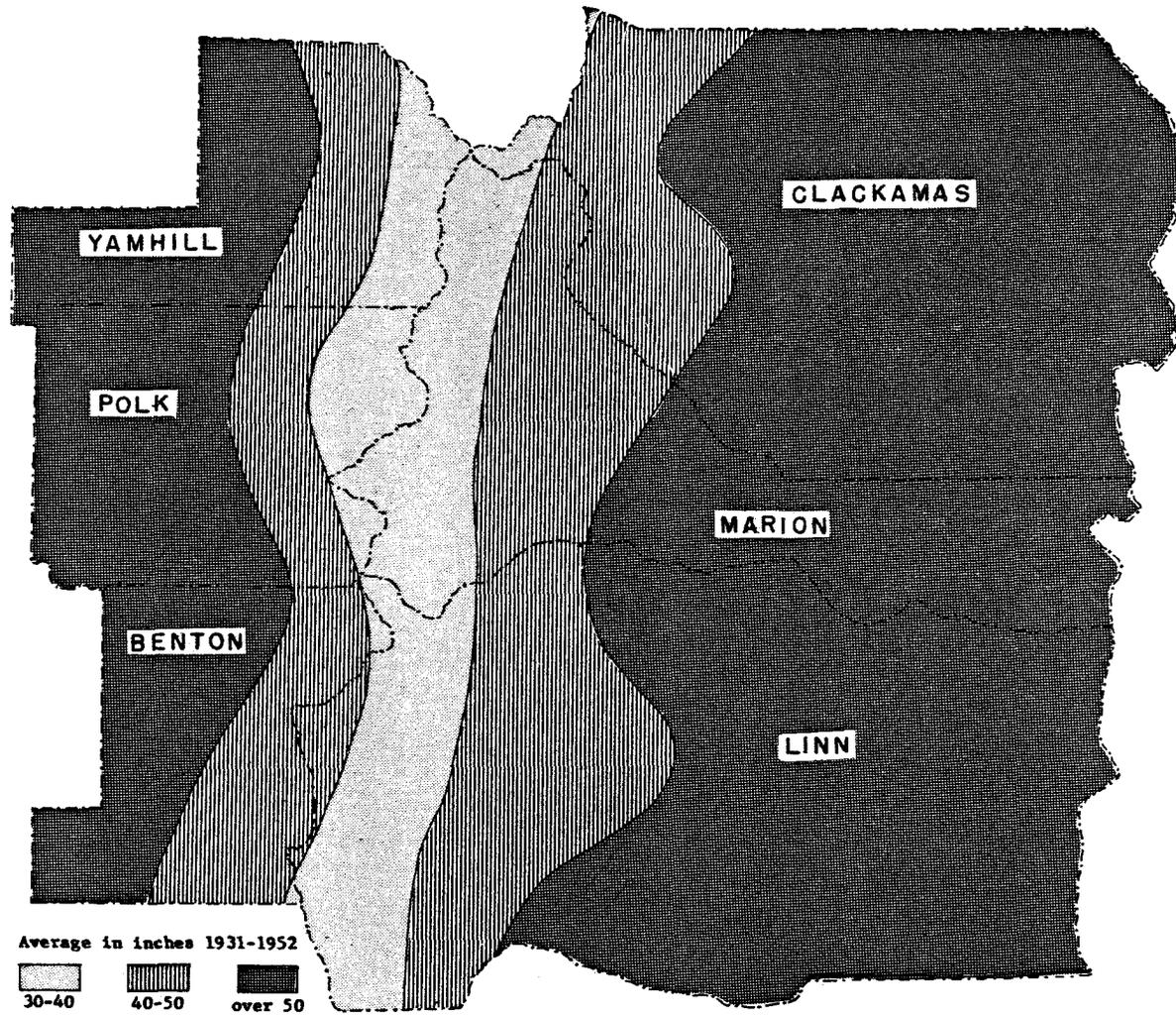
Figure 1.2. Annual precipitation in the six sample counties (7, p.6).

Previous Work

Past work with different surveys in the valley have been concerned chiefly with setting up cost data and production practices for one specific enterprise at a time. Only one study, which was done in 1938-9, worked with different enterprise combinations on valley farms (5).

This study used a sample of 333 farmers, the names of which were obtained from the Federal Land Bank. (These farmers had obtained loans from the FLB.) The objectives were to determine the nature of farm organization in the valley, classify farms by major enterprise and soil class, and measure the financial returns of each group and the gain in net worth of each operator since he had purchased his farm.

Another study concerned with enterprise combinations was done at Montana State College (1). This study was concerned with cattle farms and the different enterprises which were in combination with the beef enterprise. The sample farms were divided into four geographic areas and into seven beef-cow-number classifications. The beef industry was described by comparing each additional enterprise, either by size or by whether or not it occurred, with the different classifications of cattle farms.

METHODOLOGY

Since the primary purpose of this study was to obtain, summarize, and analyze survey data, the methodology consisted of traditional statistical sampling, analysis, and regression techniques. In addition, a technique was developed to utilize the computer in systematically arranging enterprise combinations. These are discussed below.

Sample Selection

Soil, topography, and population density were criteria used to help define the counties from which the sample would be taken. The six counties selected--Benton, Clackamas, Linn, Marion, Polk, and Yamhill--comprise the major portion of the Willamette Valley. Their locations are shown on the map in Figure 1.1.

A sample of commercial farms was taken from these six counties. Commercial farms were defined as those having a gross income of 15,000 dollars or more. An approximate figure for the number of farms in each county in this income group was obtained from the 1959 census. The Agricultural Stabilization and Conservation Service and County Extension Agents cooperated in compiling a mailing list of 3768 farmers in the sample area.

Questionnaire

Since it was not possible to determine whether each of the 3768 farmers operated a commercial farm, a questionnaire was designed both to assist in the sample selection and to obtain the maximum amount of information for the study in the most efficient way possible. Because of the large sample size, a double postcard was used for the questionnaire (refer to Appendix A).

A sample mailing was sent to 68 farmers in Polk County to test the design of the questionnaire and to provide an estimate of the percent return which could be expected from the total sample. Appropriate changes were made as suggested by the returns of the sample mailing, and the questionnaire was sent to the 3700 farmers in the other five counties. A three week campaign was conducted via letter, newsletter, and radio with the cooperation of County Extension Agents to encourage farmers to return the questionnaire.

A second mailing of 1305 questionnaires was sent because information received from the first mailing showed that it had omitted certain classes of farmers.

About 19 percent of the questionnaires were returned. Forty percent of these were adequately filled out and were used in the analysis of this study. Questionnaires were sorted on the basis of a computed gross income because the gross income figure was omitted on

many of the returned cards. Explanation of some special problems,
and additional detail on questionnaire response are provided in Appen-
dix A.

Definitions

For the purpose of this study, enterprises were defined in two
ways. First, all the different crops and livestock found on the sam-
ple farms were classified into twelve broad categories (refer to Tab-
le 2.1), with related or similar items being grouped together. For
example, the enterprise category GRAIN included barley, wheat, and
oats, and the enterprise category TREE FRUIT included prunes,
cherries, pears, peaches, and apples.

Secondly, each individual kind of crop or livestock was defined
as an enterprise (refer to Table 2.2). For example, barley, wheat,
and oats were each different enterprises. Some items were found on
only one or two sample farms and were classified under the enter-
prise heading OTHER CROPS.

Table 2.1. Enterprise Categories

1.	Livestock	7.	Vegetables
2.	Grain	8.	Hay and Silage
3.	Poultry	9.	Pasture
4.	Small Fruit	10.	Other Crops
5.	Tree Fruit	11.	Grass Seed
6.	Nuts	12.	Clover Seed

Table 2.2. Enterprises

1. Sheep	24. Peaches	47. Pasture
2. Feeders	25. Apples	48. Holly and Nursery
3. Cow-calf	26. Filberts	49. Dill
4. Dairy	27. Walnuts	50. Other Crops
5. Hogs	28. Sweet Corn	51. Hops
6. Horses	29. Pole Beans	52. Beet Seed
7. Barley	30. Bush Beans	53. Mint
8. Wheat	31. Broccoli	54. Tall Fescue
9. Oats	32. Cauliflower	55. Penlawn Fescue
10. Field Corn	33. Brussels Sprouts	56. Chewing Fescue
11. Rye	34. Cabbage	57. Creeping Fescue
12. Layers	35. Cucumbers	58. Other Small Fescue
13. Broilers	36. Squash	59. Bent Grass
14. Turkeys	37. Carrots	60. Annual Rye Grass
15. Strawberries	38. Potatoes	61. Perennial Rye Grass
16. Raspberries	39. Onions	62. Orchard Grass
17. Blackberries	40. Grass Hay	63. Bluegrass
18. Boysenberries	41. Clover Hay	64. Lotus
19. Blackcaps	42. Grass and Clover Hay	65. Vetch
20. Other Berries	43. Alfalfa Hay	66. White Clover
21. Prunes	44. Oat and Vetch Hay	67. Red Clover
22. Cherries	45. Other Hay	68. Crimson Clover
23. Pears	46. Silage	

Analysis

Two computer programs were written to enumerate all possible enterprise combinations and the number of farms with each combination. The first program was used to determine all the possible enterprise combinations (single enterprises, pairs of enterprises,..., combinations of eight enterprises) for each sample farm. The second program was used to count the number of times each combination

occurred. Each count and combination was printed, the count representing the number of sample farms which had each particular enterprise combination. Four sets of output were obtained giving the frequency with which combinations of enterprises and combinations of enterprise categories were found, considering all the sample farms together and the sample farms in each county separately.

The output was ranked according to the number of farms which had each particular combination--individual enterprises grouped together, pairs of enterprises together, etc. The number of farms with each combination was converted to a percent, based on either the number of sample farms in the valley or the number in a particular county. A combination was considered to be of significant importance if the lower limit of a 95% confidence interval for its percent occurrence did not extend below ten percent. In most cases, the enterprises in the other combinations were considered to be randomly grouped together.

The confidence interval was computed using the following formula:

$$p \overset{+}{-} 2\sqrt{\frac{pq}{n}}$$

where

    p = the percentage of farms which had a particular combination

    q = 1 - p

    2 = the approximate t value of a 95% confidence level

n = the number of sample farms in the valley or county; the

base used in computing p.

Enterprise Relationships

The economic relationship between enterprises in a combination

was determined by regression analysis. A complementary relation-

ship was said to exist if as the size of one enterprise was increased,

the size of a second enterprise was also increased. For example,

when all the hay needed to feed livestock is raised on the farm, an

increase in the amount of hay raised will allow the livestock enter-

prise to be expanded.

A supplementary relationship was said to exist between two en-

terprises if a change in the size of one did not affect the size of the

other. Supplementary enterprises are usually added to make better

use of a fixed resource, such as hired labor or an expensive machine.

A winter feeder steer operation may be added to a crop farm which

uses the hired hand mainly in the spring and summer, thus keeping

him busy the year around. A corn picking attachment may be pur-

chased so a combine can be used to harvest both grain and corn. As

these two crops are harvested at different times, the expensive ma-

chine can be used more days of the year and the cost per unit har-

vested will be lower.

A competitive relationship was said to exist between two

enterprises if as the size of one was increased, the size of the other was decreased. Different crops are competitive with respect to the fixed amount of land on a farm. The acreage of one crop cannot be increased without decreasing the acreage of another. A competitive situation also exists when heavy demands for labor or operating capital are made by two enterprises at the same time. If fertilizer is needed for two crops, and the farmer has a limited supply of operating capital with which to purchase the necessary amount of fertilizer, the crops will compete for the amount of fertilizer actually purchased.

Two enterprises may be complementary or supplementary over some range, but if the size of one is increased enough, eventually it will become competitive with the other enterprises. At some size, at least one of the inputs (land, labor, capital, or management) will become limiting, thus causing competition for the limited resource. When this occurs, the only way to expand one enterprise further is to decrease the size of the other.

These relationships were shown graphically by plotting the sizes (acres, animal units) of two enterprises on a graph, and fitting a regression line $[y = f(x)]$ to the points. A line with a positive slope (indicating that the size of one enterprise increased as the size of the other also increased, $\frac{dy}{dx} > 0$) was defined as a complementary relationship. A line with a negative slope (indicating that the size of one enterprise decreased as the size of the other increased, $\frac{dy}{dx} < 0$)

was defined as a competitive relationship. A horizontal line (indicating that a change in the size of one enterprise had no effect on the size of the other, $\frac{dy}{dx} = 0$) was defined as a supplementary relationship.

The computer was used to fit a line to the points on selected graphs, using the method of least squares. Three models were considered in order to obtain the equation of a line which best explained how the size of one enterprise affected the size of the other enterprise being considered. The square of the correlation coefficient (r^2) was used to determine which model explained the most size variation, i.e., an r^2 of .25 meant that 25 percent of the variation in the size of the enterprise on the Y axis was explained by changes in the size of the enterprise on the X axis. The equation which gave the highest r^2 was used.

The three models used in the analysis are the following:

$$\hat{y} = b_0 + b_1 x$$

$$\hat{y} = b_0 + b_1 \left(\frac{1}{x}\right)$$

$$\hat{y} = b_0 + b_1 x + b_2 \left(\frac{1}{x}\right)$$

where

y = the dependent variable (for purposes of regression only)

$\hat{y}$ = the value of y obtained from the regression equation of the

    sample

x = the independent variable (for purposes of regression only)

b_i = the partial regression coefficient of y on x obtained

    from the sample.

The formula for computing r^2 is

$$\frac{\sum\limits_{i=1}^{n} (\hat{y}_i - \overline{y})^2}{\sum\limits_{i=1}^{n} (y_i - \overline{y})^2}$$

where

    $\hat{y}_i$ = the value of y obtained from the regression equation

        at $x = x_i$

    $\overline{y}$ = the mean of the sample y values

    y_i = the observed y value at $x = x_i$

    n = the number of observations in the sample

$\sum\limits_{i=1}^{n} (\hat{y}_i - \overline{y})^2$ = the sum of squares in y accounted for by the regression

        line

$\sum\limits_{i=1}^{n} (y_i - \overline{y})^2$ = the total sum of squares in y.

ANALYSIS AND CHARACTERISTICS OF SELECTED ENTERPRISE CATEGORY COMBINATIONS ON WILLAMETTE VALLEY FARMS

Combinations of enterprise categories and the number of categories found on the sample farms are discussed in this chapter. Statistical and economic analysis are used to help explain why selected enterprise categories are combined in various ways on the sample farms.

Number of Enterprise Categories per Sample Farm

The average number of enterprise categories on the sample farms in the Willamette Valley was 3.47. The sample farms in Clackamas County tended to have fewer enterprises, while those in Polk and Yamhill Counties had well above the average number of enterprises (refer to Figure 3.1). The results of this study indicate that 63 out of 100 farms in the valley would have two, three, or four enterprises in a given year. Also, ten out of 100 sample farms had more than five enterprises, indicating a high degree of diversification.

Livestock, Grain, and Hay

On 91 out of 100 sample farms, enterprise combinations included livestock, grain, and/or hay. These enterprises were often found

together in pairs, and 32 percent of the sample farms had all three.
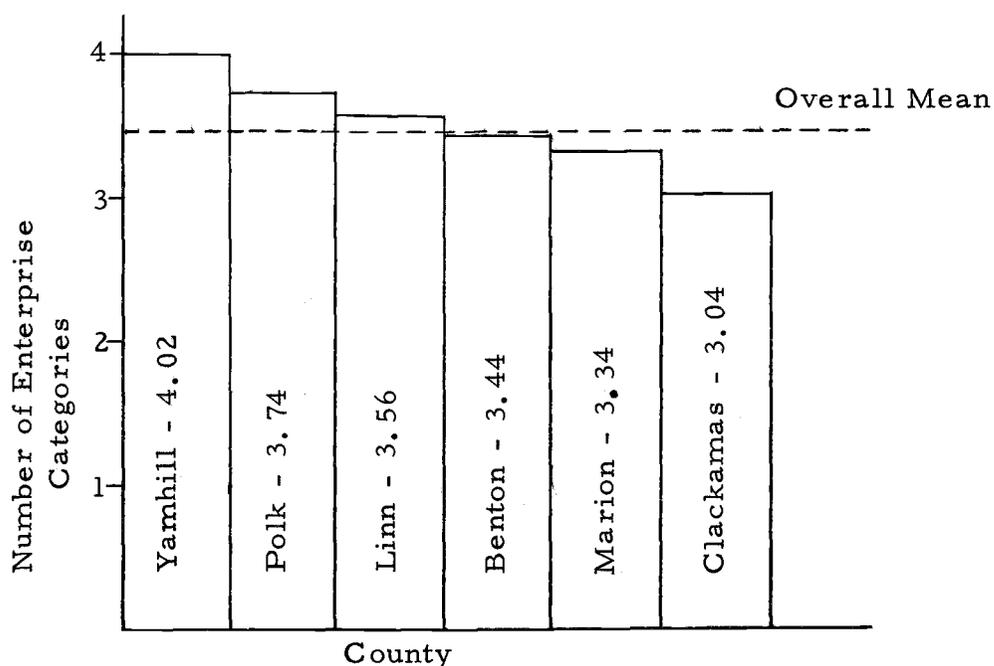
Figure 3.1. Mean number of enterprise categories on farms in six sample counties.

Sixty-three percent of the farms with livestock had less than 50 animal units, and 81 percent had less than 100 animal units. Forty-five percent of the farms with grain harvested less than 50 acres, and 69 percent harvested less than 100 acres. Forty-six percent of the farms with hay raised less than 25 acres.

Since farmers tend to raise part or all of the hay needed to feed their livestock, one would expect these enterprises to be found together in a complementary relationship on the sample farms. According to the sample taken, 70 percent of the farms which had livestock also

had hay. Statistical analysis showed that these enterprises were complementary and that 34 percent of the size of the hay enterprise was explained by the size of the livestock enterprise (refer to Figure 3.2).

Because of the variability in soils, many farms with land suitable for hay and grain may also have small sections of land which are too rough for cultivation but can be used as pasture for livestock. Therefore, one would expect to find combinations of grain and livestock on these farms in a complementary relationship. Because the rough land probably makes up a relatively small part of the farm, the size of the livestock enterprise would be limited and livestock would become supplementary with grain. Also, if grain is fed to livestock these enterprises would be complementary, but if grain is raised as a cash crop, livestock would be a supplemental enterprise. According to the sample taken, 41 percent of the sample farms had both grain and livestock. Statistical analysis showed that on farms with less than 38 acres of grain, a complementary relationship existed between livestock and grain (the slope of the regression line was positive, $\frac{dy}{dx} > 0$). Beyond this point, the slope of the regression line (refer to Figure 3.3) was negative ($\frac{dy}{dx} < 0$), but not statistically significant from zero, indicating a supplementary relationship. Analysis also indicated that only two percent of the size of the livestock enterprise was explained by the size of the grain enterprise.
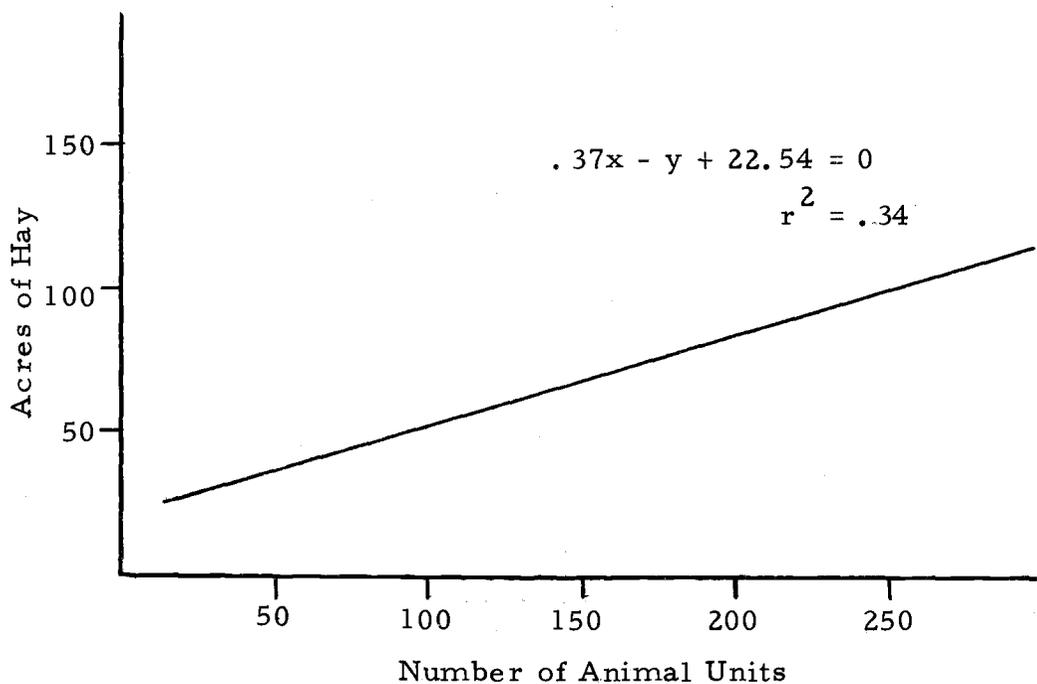
Figure 3. 2. Relationship between hay and livestock as determined
by regression.
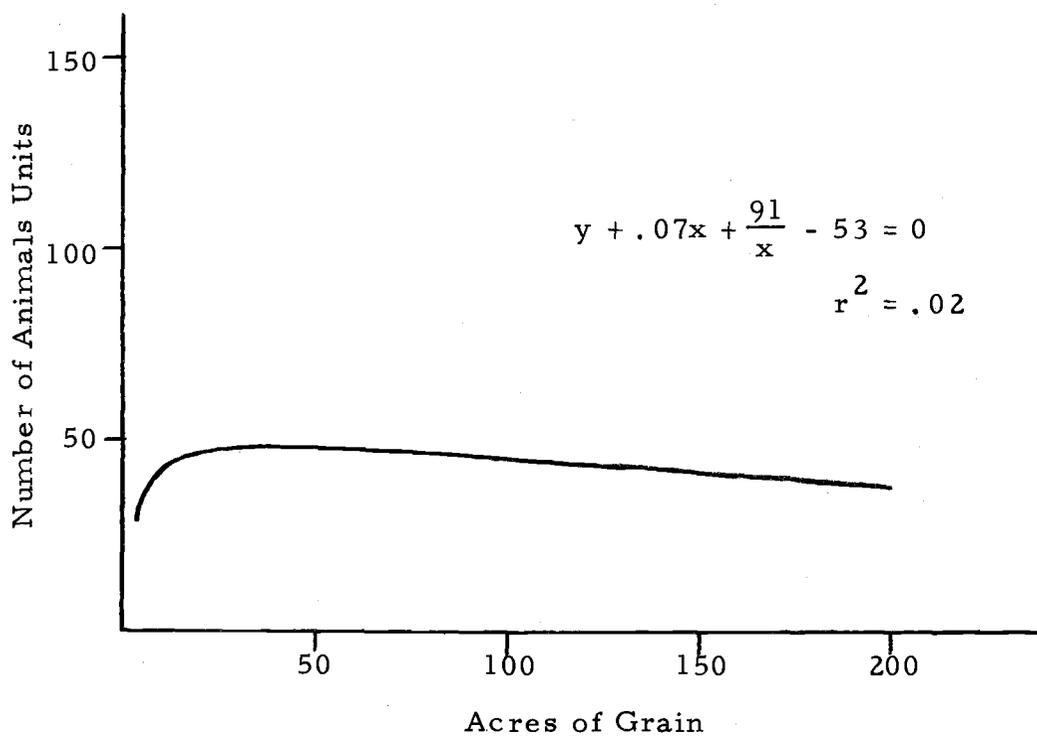
Figure 3. 3. Relationship between livestock and grain as determined
by regression.

Because much of the land on valley farms is suited to the production of extensive crops, one would expect to find hay and grain on farms, and in a complementary relationship as they use some of the same machinery and equipment. However, they are competitive for land. Forty-one percent of the sample farms had grain and hay in a complementary relationship, but only nine percent of the size of the hay enterprise was explained by the size of the grain enterprise. This indicates that grain and hay are grown together because they are extensive crops and are complementary, but that the size of the hay enterprise is determined more by the size of the livestock enterprise than by the size of the grain enterprise. Land did not seem to be a limiting factor.

Grass Seed

With the abundance of soils in Land Types 3 and 4 suited to the production of extensive crops, one would expect to find grain and hay grown with grass seed to help reduce risk and uncertainty of income caused by the price and yield variations of grass seed. Since grass seed, grain, and hay are all extensive crops requiring relatively large acreages of land, one would expect the latter two crops to be competitive with the former for land and complementary with regard to the use of machinery and equipment.

$$y + .06x - 45.2 = 0$$
$$r^2 = .15$$
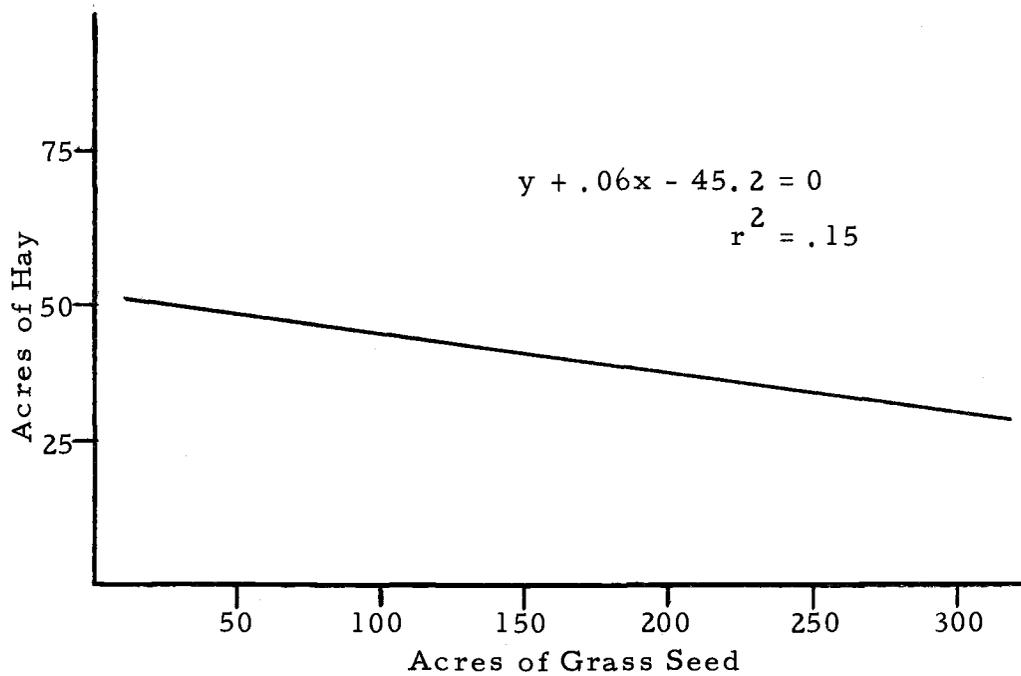
Figure 3.4. Relationship between hay and grass seed as determined by regression.

$$y + .095x + \frac{1385}{x} - 153 = 0$$
$$r^2 = .05$$
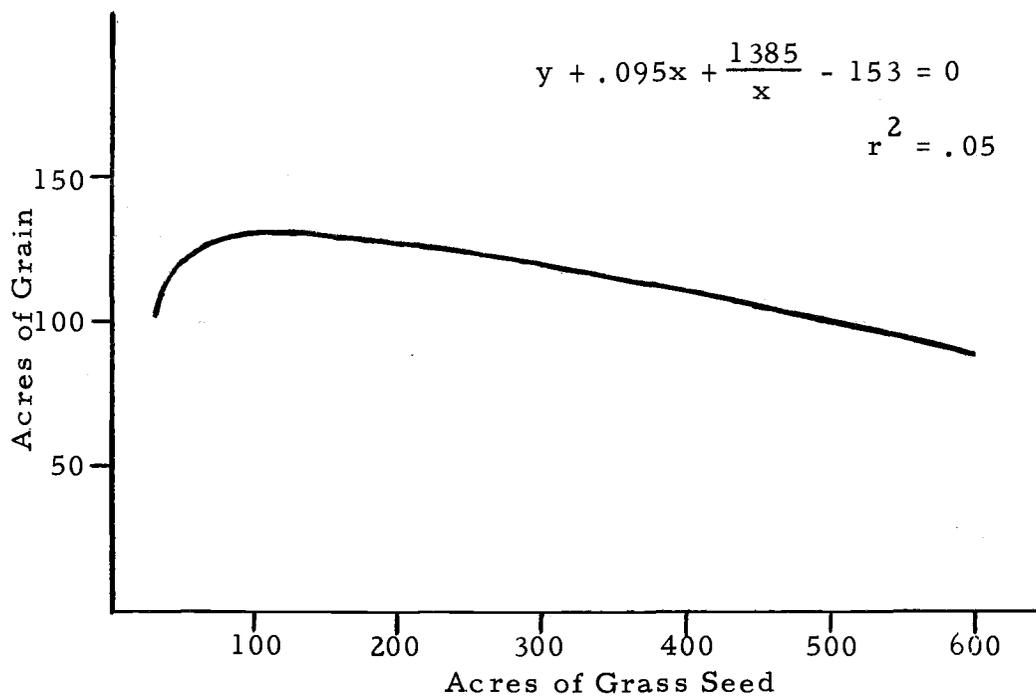
Figure 3.5. Relationship between grain and grass seed as determined by regression.

Grass seed was found on 35 percent of the sample farms and was the fourth most common enterprise category. Fifty-five percent of the farms with grass seed raised more than 100 acres, and 35 percent raised more than 200 acres of grass seed.

Hay, grain, and livestock were often found in combination with grass seed. Fifty-seven percent of the farms which had grass seed also had hay. These crops were competitive, and 15 percent of the size of the hay enterprise was explained by the size of the grass seed enterprise (refer to Figure 3.4). Land was apparently the limiting factor.

Seventy percent of the sample farms which had grass seed also had livestock. These enterprises were supplementary, and there was no significant relation between the sizes of the two enterprises $(r^2 = .005)$. The regression line denoting this supplementary relationship may actually be the result of two opposing relationships. The sizes of livestock enterprises are positively correlated with the sizes of hay enterprises, and since hay was competitive with grass seed, livestock should also be competitive with grass seed. The opposing relationship (complementary) would result from adding livestock to make use of aftermath grazing (pasturing grass fields after seed crops are harvested).

Seventy-seven percent of the sample farms which had grass seed also had a grain enterprise. On farms with less than 120 acres of grass seed these crops were complementary, but with larger

acreages of grass seed, land became limiting, and a competitive re-
lationship existed (refer to Figure 3. 5). Also, capital to buy addition-
al machinery and equipment may have been limited.

Small Fruit and Vegetables

Because of the large amount of soil in Land Types 1 and 2 suit-
able for intensive cultivation, one would expect both small fruit and
vegetables to be found on the sample farms, but in a competitive re-
lationship because both enterprises require relatively large amounts
of labor and capital. Obtaining adequate labor poses a major problem
especially at harvest time, though this situation is somewhat alleviat-
ed in cases of certain vegetables which are now being harvested by
machine. To market his vegetables, the farmer must often have a
contract with a processor who may also require the farmer to raise
small fruit. These two enterprises may therefore appear to be com-
plementary when in fact they are competing for the same resources.
From a marketing standpoint, the processor is able to reduce the
fixed cost per unit by keeping his plant operating over a longer period
of time by processing both vegetables and small fruit (these enter-
prises are harvested at different times).

Vegetables and small fruit were the fifth and sixth most common
enterprise categories on the sample farms. Fifty-three percent of
the farms with vegetables planted less than 100 acres, and 71 percent

of the farms with small fruit had less than 25 acres of this enterprise.
Small fruit and vegetables were found together in a supplementary re-
lationship on 15 percent of the sample farms. Ten percent of the size
of the small fruit enterprise was explained by the size of the vegetable
enterprise.

Small fruit was found in combination with livestock, grain, or
hay in a supplementary relationship on 18 percent of the sample farms.
Vegetables and grain were also supplementary. This indicates that
labor and capital may be the limiting factors, and not land. Market-
ing restrictions may also limit the amount of land planted to small
fruit and vegetables.

Poultry

A poultry enterprise needs relatively little land but is competi-
tive with other enterprises for labor and capital. Sample data showed
that poultry enterprises were found on 19 percent of the sample farms,
and that farms with large poultry operations generally did not have
other enterprises. Other farms with poultry usually had less than
100 layers as a supplemental enterprise with livestock, grain, or hay.

Tree Fruit

Tree fruit enterprises demand large amounts of capital and la-
bor and are competitive with other enterprises for these resources.

Sixteen percent of the sample farms had tree fruit, and those with large orchards generally did not have other enterprises. On other farms, hay, grain, and livestock were added as supplemental enterprises to utilize land not put into orchards because of scarce capital and labor.

Clover Seed

Clover seed is complementary with grain in that both use much of the same machinery and equipment, and are harvested at different times.

Ninty-three percent of the sample farms which had clover seed also had grain. These enterprises were complementary, and 32 percent of the size of the clover enterprise was explained by the size of the grain enterprise (refer to Figure 3.6). Clover seed and hay were also complementary, with 17 percent of the size of the hay enterprise being explained by the acreage of clover seed produced. This relatively low percentage may indicate that hay other than clover was produced on these farms. These relationships among hay, grain, and clover seed also help to explain why, as previously discussed, hay and grain are complementary.
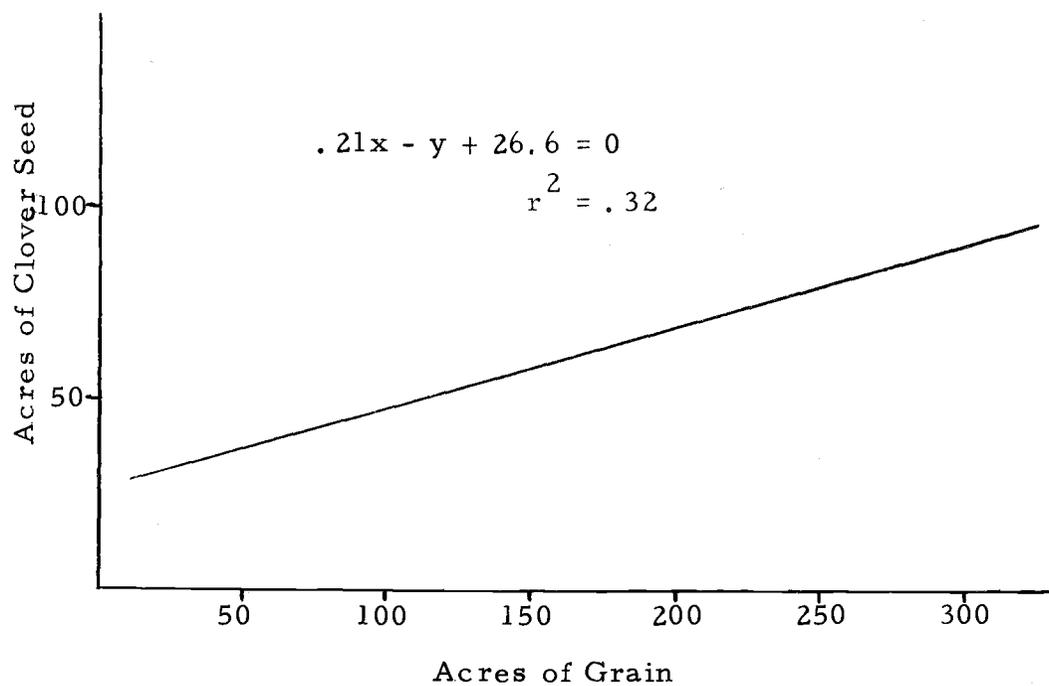
Figure 3.6. Relationship between clover seed and grain as determined by regression.

ANALYSIS AND CHARACTERISTICS OF ENTERPRISE
COMBINATIONS ON WILLAMETTE VALLEY FARMS

Enterprise combinations and the number of enterprises found on the sample farms are discussed in this chapter for all sample farms (Part I), and by sample farms within each of the six counties (Part II). The economic relationships between enterprises are similar to those between enterprise categories as discussed in the previous chapter.

Part I

More than 68 enterprises were found on the sample farms, but only eight enterprises and one enterprise combination were found on more than 20 percent of the sample farms. The following is a discussion of those enterprises found on a significant number of the total sample farms.

Number of Enterprises Per Sample Farm

The average number of enterprises on the sample farms in the Willamette Valley was 5.54. The averages for sample farms in Clackamas, Linn, and Marion Counties were below the valley average, while farms in the other three counties tended to have more than the average (refer to Figure 4.1). Sixty-two percent of the sample farms had three to seven enterprises, and ten percent had ten or more enterprises.
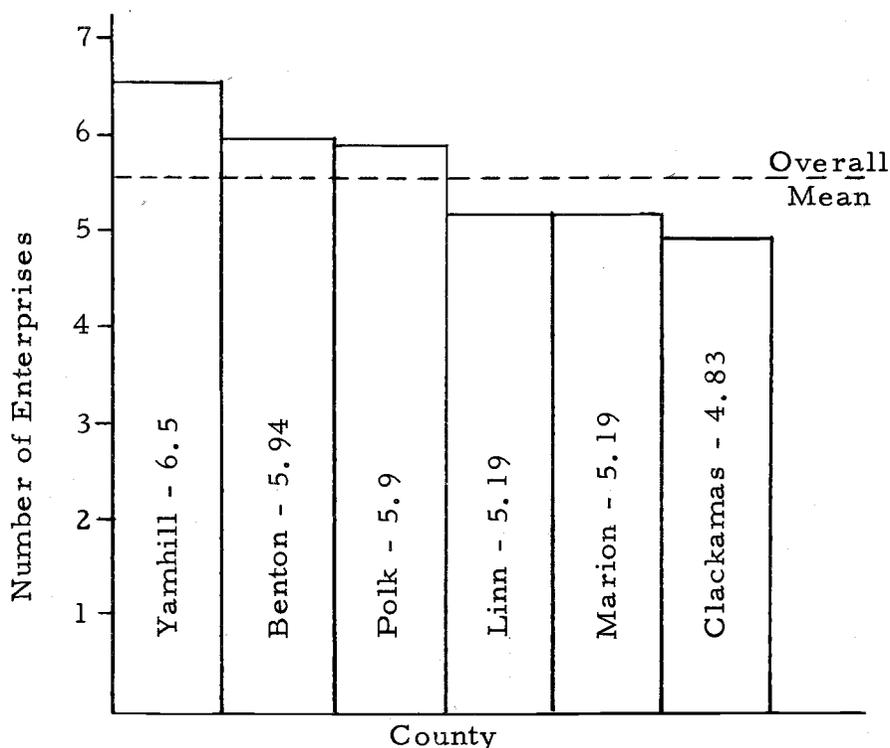
Figure 4.1. Mean number of enterprises on farms in six sample counties.

Grain Enterprises

Wheat and barley were found on 48 and 35 percent of the sample farms respectively, and were the most common enterprises (refer to Appendix B, Table B.4). Fifty-nine percent of the farms which raised grain produced wheat and barley, wheat and oats, or barley and oats. Since these enterprises were competitive for land, this relatively high percentage of farms with two or more grain enterprises was most likely due to wheat acreage allotments which limit the amount of wheat a farmer can plant. Additional land suited for grain production

was planted to barley or oats. Seventy-eight percent of the sample

farms which had barley also had wheat, and 88 percent of the sample

farms which had oats also had wheat (refer to Table 4.1).

Table 4.1. Occurrence of selected enterprise combinations.

Percent of farms with:							
Sheep that also had:		Feeders that also had:		Dairy that also had:		Barley that also had:	
feeders	34	sheep	34	sheep	20	sheep	32
dairy	17	dairy	27	feeders	33	feeders	33
barley	45	barley	47	barley	37	dairy	21
wheat	61	wheat	61	wheat	42	wheat	78
oats	30	oats	9	oats	33	oats	40
clover hay	15	clover hay	18	clover hay	15	clover hay	23
alfalfa hay	27	alfalfa hay	23	alfalfa hay	39	alfalfa hay	33

Percent of farms with:							
Wheat that also had:		Oats that also had:		Clover hay that also had:		Alfalfa hay that also had:	
sheep	32	sheep	37	sheep	27	sheep	30
feeders	32	feeders	45	feeders	33	feeders	25
dairy	18	dairy	30	dairy	24	dairy	35
barley	58	barley	69	barley	61	barley	51
oats	38	wheat	88	wheat	86	wheat	73
clover hay	24	clover hay	29	oats	45	oats	33
alfalfa hay	47	alfalfa hay	37	alfalfa hay	51	clover hay	30

Livestock Enterprises

The most common livestock enterprises, sheep and feeders,

were each found on 25 percent of the sample farms. Forty-seven per-

cent of the farms which had sheep had more than 100 head, and 54

percent of the farms which had feeders had less than ten head. Dairy,

cow-calf, and hogs were found on 21, 14, and 11 percent of the sample farms respectively. Livestock enterprises were usually in combination with barley, wheat, oats, alfalfa, and clover hay.

Hay Enterprises

Alfalfa and clover were the principal hay crops and were found on 23 and 13 percent of the sample farms. Enterprises most often in combination with alfalfa and clover hay were barley, wheat, oats, sheep, feeders, and dairy.

Grass Seed Enterprises

Rye grass, the predominant seed crop, was found on 12 percent of the sample farms. Other seed crops found were orchard grass, blue grass, bent grass, and various kinds of fescue. Enterprises most often in combination with rye grass were wheat, barley, sheep, and feeders.

Small Fruit and Vegetable Enterprises

Strawberries and blackberries were found on 67 and 33 percent of the sample farms which had small fruit. Forty-five percent of the farms with strawberries had less than ten acres of that crop, and 58 percent of the farms with blackberries had less than ten acres of blackberries. Sixty-three percent of the sample farms which had

blackberries also had strawberries. These crops are complementary with respect to machinery and irrigation equipment which are required in the production of each. In addition, they may be grown together to reduce the risk and uncertainty resulting from variations in price and yield. Strawberries and blackberries are competitive for the limited amount of good land on a farm, though labor and capital probably become limiting first.

Sweet corn and pole and bush beans were the principal vegetable crops on the sample farms. Seventy-three percent of the farms which had bush beans also had strawberries, and 66 percent of the farms which had pole beans also had strawberries (refer to Table 4.2).

Table 4.2. Occurrence of selected enterprise combinations.

Percent of farms with:			
Strawberries that also had:	Sweet corn that also had:	Pole beans that also had:	Bush beans that also had:
sweet corn 43	strawberries 60	strawberries 66	strawberries 73
pole beans 28	pole beans 29	sweet corn 50	sweet corn 77
bush beans 25	bush beans 36	bush beans 31	pole beans 38

Seventy-seven percent of the farms which had bush beans also had sweet corn. These crops are complementary if land is not limited, and since both can be planted, cultivated, and harvested by machines, labor availability does not significantly restrict size. The same irrigation equipment can be used for both crops, though this

may be a limiting factor if the acreage to be irrigated is too large for the existing system, and sufficient capital is not available for expansion.

Combinations of Three Enterprises

Oats, alfalfa, and feeders were each combined with barley and wheat on 12, 10 and 9 percent of the sample farms. Sheep and clover hay were each combined with barley and wheat on nine percent of the sample farms.

Several combinations of more than three enterprises were found on the sample farms, but none were found a significant number of times.

Part II

Data concerned with enterprises and enterprise combinations (using both enterprise definitions) found on a significant number of sample farms in each county is presented below. (refer to Appendix B.)

Enterprises on Farms in Benton County

Livestock, grain, hay, and grass seed were the predominant enterprise categories found on the sample farms in Benton County. The most common livestock enterprise, dairy, was found on 50

percent of the sample farms, though sheep and cow-calf enterprises were also important. Barley, wheat, and oats were each found on about 40 percent of the sample farms. Rye grass and fescue were the principal seed crops and were found on 33 and 38 percent of the sample farms.

Combinations of enterprises included sheep and wheat, and barley and wheat, each of which were found on 28 percent of the sample farms. Except for large dairies, farms tended to have more than one kind of livestock, usually sheep with a beef enterprise.

Enterprises on Farms in Clackamas County

Livestock, hay, grain, poultry, and small fruit were the predominant enterprise categories found on farms in Clackamas County. Feeders were found on 33 percent of the sample farms, and 57 percent of these farms had less than ten feeders. Sheep, dairy, and hogs were each found on about 22 percent of the farms. Wheat was found on 35 percent of the sample farms, and 80 percent of these farms had 25 or less acres of wheat. Oats were more common than barley. Alfalfa was the only significant hay crop and was found on 19 percent of the sample farms.

Only in Clackamas County were poultry enterprises found on a significant number of the sample farms (38 percent). The larger layer, turkey, and broiler enterprises were usually not found in

combination with other enterprises. About half of the laying flocks were under 100 birds and were always found with other enterprises.

Strawberries were found on 23 percent of the sample farms and were often combined with raspberries or blackberries.

Enterprises on Farms in Linn County

Grain, grass seed, livestock, and hay were the principal enterprise categories on farms in Linn County. Wheat, the principal grain crop, was found on 50 percent of the sample farms and half of these had less than 25 acres planted to wheat. Barley and oats were found on 29 and 24 percent of the sample farms, and the acreage planted to each was usually less than 25 acres.

More grass seed was raised on farms in Linn County than in any other county. Rye grass, the most common type raised, was found on 50 percent of the sample farms and 61 percent of these farms had more than 200 acres planted to rye grass. Other seed crops often found with rye grass were tall fescue, orchard grass, and blue grass.

Fewer farms had livestock as compared with farms in other counties. Feeders, sheep, and dairy were found on 26, 24, and 21 percent of the sample farms respectively. Sixty percent of the feeder enterprises had less than ten head, and 64 percent of the sheep enterprises had less than 100 head.

Some vegetable production was found because of the amount of

soil in Land Types 1 and 2. About 50 percent of the farms with veg-
etables had more than 100 acres. Sweet corn and snap beans were
found on 59 and 41 percent of the sample farms which produced vege-
tables.

Enterprises on Farms in Marion County

A wide diversity of enterprises was produced on farms in Marion
County, as shown by the fact that eight enterprise categories were
represented on over 23 percent of the sample farms. This was more
than in any other county and was in part due to the wide range of soil
types on farms in this county.

Only four specific enterprises were found individually on 20
percent or more of the sample farms. Wheat was the predominant
enterprise and was found on 41 percent of the sample farms. Other
significant enterprises found on 17 to 27 percent of the sample farms
were the following: strawberries, barley, feeders, sweet corn, al-
falfa hay, blackberries, and cherries. The only significant pair of
enterprises, barley and wheat, was found on 19 percent of the sample
farms.

Fifty-nine and 47 percent of the wheat and barley enterprises
were less than 25 acres in size. Fifty-six percent of the sheep en-
terprises were over 100 head, and only 33 percent of the feeder en-
terprises had less than ten head. Fifty-seven percent of the

strawberry enterprises were less than ten acres in size.

Enterprises on Farms in Polk County

Grain, livestock, hay, grass seed, and tree fruit were the enter-prise categories most often found on farms in Polk County. Fifty-five percent of the farms with grain had more than 100 acres planted in grain, and 63 percent of the farms with hay had between 50 and 100 acres in hay. This was largely because of the predominance of soils in Land Types 3 and 2H which are suited to the production of exten-sive crops and tree fruit.

Barley and wheat were the principal crops grown and were each found on over 55 percent of the sample farms. Sheep and feeders were found on 36 and 26 percent of the sample farms, and with the exception of alfalfa, which was found on 31 percent of the farms, no other hay enterprise was very important. Sixty-four percent of the sheep enterprises were over 100 head, and 70 percent of the feeder enterprises were less than ten head in size. Cherries and prunes were found on 31 and 26 percent of the sample farms respectively.

The most common pair of enterprises on farms in Polk County was barley and wheat, which was found on 45 percent of the sample farms. Thirty-eight percent of the farms which had grain had more than 250 acres of barley and wheat, a greater amount than on farms in the other counties. Barley, wheat, oats, sheep, and alfalfa were

combined in various ways to form other enterprise combinations.
Also, 57 percent of the farms which had either cherries or prunes had
both.

Enterprises on Farms in Yamhill County

Hay, grain, and livestock were the predominant enterprise cate-
gories on farms in Yamhill County, with each of the former two being
found on over 75 percent of the sample farms. Farms usually had
more hay than in the other counties as shown by the fact that 71 per-
cent of the farms which had hay had over 25 acres of it. Alfalfa and
clover hay were found on 53 and 32 percent of the sample farms, and
barley and wheat were each found on over 70 percent of the sample
farms. Thirty-nine percent of the barley enterprises were over 100
acres in size, but only 12 percent of the wheat enterprises were over
100 acres. Sheep were found on 35 percent of the sample farms, and
more than 100 sheep were found on 50 percent of these farms. Dairy
and feeders were each found on about 22 percent of the sample farms,
and crimson or red clover seed was raised on 33 percent of the
farms.

The sample farms in Yamhill County had an average of 6.5 en-
terprises, which was the highest average of any county. This along
with the widespread production of barley, wheat, and alfalfa was re-
sponsible for each of 15 pairs of enterprises being found on 20 percent

or more of the sample farms. Principal enterprises in these com-
binations were barley, wheat, alfalfa, sheep, clover hay, and clover
seed. Barley and wheat were found together on 65 percent of the
sample farms, and 88 percent of the farms which had barley also had
wheat. Wheat, barley, and alfalfa were found together on 40 percent
of the sample farms, and the following seven combinations were
found on over 20 percent of the farms:

        sheep-barley-wheat

        barley-wheat-clover hay

        barley-wheat-oats

        barley-wheat-crimson clover seed

        sheep-barley-alfalfa

        sheep-wheat-alfalfa

        wheat-clover hay-crimson clover seed.

SUMMARY AND CONCLUSIONS

Summary

The objectives of this study were to determine the kinds and sizes of enterprise combinations on farms in the Willamette Valley and the economic relationships which exist among selected enterprise combinations.

Five thousand questionnaires were mailed to farmers in six counties of the Willamette Valley requesting enterprise information and the gross income received from the enterprises on each farm.

Enterprises were defined in two ways: as general crop or livestock categories and as specific crop or livestock enterprises. All possible enterprise combinations (using both definitions) and the occurrence of each were determined, and the predominant enterprise combinations were explained in terms of complementary, supplementary, or competitive relationships as determined by regression analysis. An average of 3.47 enterprise categories were found on the sample farms and included livestock, grain, and/or hay on 91 percent of them. Livestock and hay, and grain and hay were each complementary regardless of the size of the enterprises. Livestock and grain were complementary on farms with less than 38 acres of grain and supplementary on farms with more than 38 acres.

Livestock, grain, and hay were often found with grass seed, which was the fourth most common enterprise category on the sample farms. Hay was competitive with grass seed, livestock supplementary, and on farms with less than 120 acres of grass seed, grain was a complementary enterprise. When more grass seed was planted, grain became competitive.

Small fruit and vegetables were supplementary enterprises and clover seed was found to be complementary with grain and hay.

Farms within the counties tended to combine enterprises in different ways with the result that few enterprise combinations were found on a significant number of the sample farms. Significant combinations on Benton County farms were barley and wheat, and sheep and barley. Farms in Clackamas County which had strawberries, often had blackberries or raspberries, and alfalfa was usually grown with dairy or wheat. Farms in Linn County had rye grass in combination with wheat, feeders, tall fescue, and/or other grass seed enterprises. Marion County farms with sweet corn, pole beans, bush beans, or blackberries usually had strawberries, and wheat was often found with barley, feeders, alfalfa, sweet corn, and strawberries. Farms in Polk County which had barley and wheat usually raised sheep, oats, and/or alfalfa. Also, cherries and prunes were often found together. Enterprise combinations were the same on many of the farms in Yamhill County. Alfalfa, sheep, oats, clover hay, and/or clover seed

were often found with the combination of barley and wheat, which was found on 65 percent of the sample farms.

Conclusions

Due to the nature of this study, its main contribution was to present data as to the kinds and sizes of enterprises and enterprise combinations found on farms in the Willamette Valley. However, from an economic standpoint, it was observed that farmers combined enterprises in ways which made efficient use of available resources. Enterprises found on the sample farms were usually combined in complementary and/or supplementary relationships.

Farms in the valley had a tendency to be diversified, but the degree of diversification depended on how an enterprise was defined. The number of enterprise categories found on the sample farms ranged from one to nine, but the number of specific enterprises ranged from one to 17. A farm producing barley, wheat, and oats may be considered diversified because it raises three crops, or specialized because it raises one crop - grain. This is a form of specialization which has some of the benefits of diversification. All three crops use the same kind of land, labor, capital, and management, but different factors may influence the price and yield of each in a given year, thus reducing risk. Many farms in the valley combine similar enterprises as shown by the large number of sample

farms with two kinds of grain, two livestock enterprises, or two veg-
etable, fruit, grass seed, etc. enterprises.

Therefore, farmers in the Willamette Valley combine enter-
prises in such a way that risk and uncertainty are reduced through
diversification, but not to the extent that enterprise competition for
farm resources significantly reduces long run net farm income.

Further Research

Though farmers tend to combine enterprises according to that
suggested by the economic rationale used in this study, it remains to
be shown whether or not enterprises are combined such that profit is
maximized (if that is the goal of the farmer). Some enterprises
found on the sample farms (such as oats) had a low yield and price,
and from a profit viewpoint, it seems that other crops (such as bar-
ley) should have been raised. Perhaps the main question to be ans-
wered is whether diversification is still needed on valley farms to re-
duce risk and uncertainty due to variations in the yield and price of
crops and livestock. It may be that with the new technology and in-
creased information available to the farmer, and with the changing
market conditions, variations in price and yield are not as large as
they once were. If so, the farmer may be able to obtain a higher pro-
fit by specializing in fewer enterprises.

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APPENDICES

APPENDIX A

Appendix A. 1. Directions for Completing Sample Questionnaire

Would you please fill in the attached card as direct-
ed below, and return as soon as possible? This informa-
tion is important for, and will be used only for research
and educational work, and will be strictly confidential.

Indicate acres or head, description or variety, for
each enterprise in your farming operation. Indicate only
those enterprises which are located in the Willamette Val-
ley.

For description, please put the kind of seed crop,
vegetable, caneberry, tree fruit, etc., such as broilers,
feeders, breed stock, ann. ryegrass, sugar beet seed,
sweet corn, pole beans, blackberries, rasp, boysen,
pears, apples, etc., and the number of acres of each.
Also indicate if the crop is not yet in production. (1st
year berries).

If you need more lines, cross out enterprises that
don't apply, and write in your enterprise.

Item A: Please show gross income (total receipts)
from this farm business for 1965.

Item B: Please indicate what portion of this farm-
ing business is owned by other parties and
their name.

Thank you for your cooperation.

Frederick J. Smith
Extension Farm
Management Specialist

Appendix Table A. 2.   Sample Questionnaire: Completed by Farmer

ENTERPRISE   ACRE/HEAD   Desc. or Var.

CATTLE_____

_____
DAIRY_____
SHEEP_____

_____
HOGS_____
CHICKENS_____
TURKEYS_____

_____
HAY_____

_____
GRAIN: Barley_____
        Wheat_____
        Oats_____
        Other_____
SEED CROPS_____

_____
MINT_____
VEGETABLES_____

_____
STRAWBERRIES_____
CANEBERRIES_____

_____
TREE FRUITS_____

_____
NUTS_____
OTHER_____

_____
A)$_____
B)_____

_____

Appendix Table A. 3.   Percent Return of Total Questionnaires Sent

County	Percent
Benton	15. 1
Clackamas	17. 7
Linn	16. 4
Marion	20. 0
Polk	24. 6
Yamhill	21. 4
Average return	18. 7

Appendix Table A.4.   Percent Distribution of Farms by Value of
Product Sold - 1964 Census Data

County Dollar Sales	Benton	Clackamas	Linn	Marion	Polk	Yamhill
15-19,999	17	22	23	21	26	20
20-29,999	26	27	28	28	26	29
30-39,999	20	14	17	17	16	20
40-59,999	15	17	16	16	19	15
60 and over	23	20	16	18	13	16

Appendix Table A.5.   Percent Distribution of Farms by Value of
Product Sold - Sample Data (Computed Sales)

County Dollar Sales	Benton	Clackamas	Linn	Marion	Polk	Yamhill
15,19,999	6	14	9	15	5	18
20-29,999	39	25	22	23	10	23
30-39,999	17	19	12	17	15	12
40-59,999	11	16	20	17	41	22
60 and over	27	26	37	28	29	25

Comparing Tables 3 and 4 indicated that the sample tended to
have a higher percentage of farms with sales of 60,000 dollars or
more, and a lower percentage of farms with sales of 15 to 19,999 dol-
lars, as compared with the 1964 census data.

Appendix A. 6. Problems of Obtaining Names of Commercial Farmers

There is no one list of commercial farmers available to the public. Such sources as the State and Federal Tax Commissions have the names of farmers and their incomes, but are unable to release this information.

Most of the names used in this study were obtained from the Agricultural Stabilization and Conservation Service. The ASCS mailing lists, which contained names of farmers who had participated in government programs (wheat allotment, wool subsidy, tile drainage, etc.), were thus biased toward certain classes of grain and livestock producers. Also, the ASCS mailing list included farms of all sizes, and since it was not possible in all cases to distinguish commercial from part-time farms, many questionnaires returned were not used, as they had been sent to part-time farmers.

Additional names of farmers producing those classes of agricultural products not represented by the ASCS mailing lists, were obtained from County Extension Agents. However, these names also included some part-time farmers.

Appendix A. 7.   Problems in Computing a Gross Income for Selected
Enterprises

Yield and price per unit, needed to compute the gross income

for a given enterprise on a per head or per acre basis, tend to vary

from year to year.   Yield is dependent upon weather and disease condi-

tions, and price is determined by the supply and demand in the market.

In computing the gross income for the enterprises found in this

study, yields and prices for 1965 were used because the information

returned on the questionnaires was based on the farmer's 1965 farm-

ing operation.

Most of the published yields and prices were state averages,

and for crops such as grass seed, which were seldom grown out of

the Willamette Valley, these figures were adequate.   However, be-

cause of the favorable growing conditions present, many crops such

as wheat and barley produce yields higher than the state average

when grown in the valley.   For some of these crops, the state was

divided into districts, one of which was the Willamette Valley, and

yields were given for each district.   However, when only state yields

were available or when published data was lacking (because some

crops were not produced on a large enough scale to warrant the col-

lection of data), Extension Specialists were consulted for yield and

price information.   They were able either to give appropriate figures

or to suggest other possible sources.

Appendix Table B. 1.   Percent Occurrence of Selected Enterprise Categories on Farms in the Six
Sample Counties*

| Enterprise | County | | | | | | Average of all sample farms |
	Benton	Clackamas	Linn	Marion	Polk	Yamhill	
Livestock	78	70	54	50	59	67	59
Grain	78	39	69	50	74	78	59
Hay	50	52	51	38	51	80	51
Grass seed	67	19	68	28	38	33	36
Small fruit	0	33	17	42	21	22	29
Vegetables	17	12	29	33	21	17	24
Poultry	0	38	19	12	15	20	19
Tree Fruit	0	7	7	24	36	17	17
Clover seed	0	7	8	12	13	38	14
Nuts	11	10	7	12	13	15	12
Pasture	11	10	7	5	21	8	9

*This table should be read as follows: Livestock was found on 70 percent of the
sample farms in Clackamas County.

Appendix Table B. 2. Percent Occurrence of Selected Combinations of Two Enterprise Categories on Farms in the Six Sample Counties*

Enterprise Combination	County						Average of all sample farms
	Benton	Clackamas	Linn	Marion	Polk	Yamhill	
Livestock - Hay	50	48	39	30	41	62	42
Livestock - Grain	61	35	42	33	46	55	41
Grain - Hay	39	32	42	30	51	67	41
Grain - Grass seed	61	12	53	18	38	30	28
Livestock - Grass seed	50	14	44	20	26	23	25
Hay - Grass seed	33	7	37	13	23	32	21
Grain - Small fruit	0	16	8	26	10	18	18
Small fruit - Vegetables	0	6	17	23	13	10	15

*This table should be read as follows: Livestock and hay were found together on 50 percent of the sample farms in Benton County.

Appendix Table B. 3. Percent Occurrence of Selected Combinations of Three Enterprise Categories of Farms in the Six Sample Counties*

Enterprise Combination	County						Average of all sample farms
	Benton	Clackamas	Linn	Marion	Polk	Yamhill	
Livestock-Grain-Hay	39	30	34	23	41	50	33
Livestock -Grain -Grass seed	50	10	36	14	26	20	20
Grain-Hay-Grass seed	33	6	36	10	23	28	19
Livestock-Hay-Grass seed	33	7	29	10	21	23	17

*This table should be read as follows: Livestock, grain, and hay were found together on 39 percent of the sample farms in Benton County.

Appendix Table B.4. Percent Occurrence of Selected Enterprises on Farms in the Six Sample Counties*

Enterprise	County						Average of all sample farms
	Benton	Clackamas	Linn	Marion	Polk	Yamhill	
Wheat	44	36	50	41	56	70	48
Barley	44	12	29	25	62	73	35
Sheep	33	22	24	18	36	37	25
Feeders	28	33	26	22	26	22	25
Oats	39	22	24	19	23	27	23
Alfalfa	0	19	12	18	31	53	23
Dairy	50	26	21	13	21	23	21
Strawberries	0	23	14	27	15	15	20
Cow-calf	33	14	17	11	13	15	14
Sweet corn	0	0	17	19	15	17	14
Clover hay	0	13	0	11	21	32	13
Annual rye grass	17	0	50	0	13	0	12
Blackberries	0	19	0	17	0	0	10
Prunes	0	0	0	17	31	10	11
Cherries	0	0	0	11	26	7	8

*This table should be read as follows: Wheat was found on 36 percent of the sample farms in Clackamas County.

Appendix Table B. 5.   Percent Occurrence of Selected Combinations of Two Enterprises on Farms in the Six Sample Counties*

Enterprise Combination	Benton	Clackamas	Linn	Marion	Polk	Yamhill	Average of all sample farms
Barley - Wheat	28	10	19	19	44	65	27
Oats - Wheat	22	20	10	16	21	25	18
Alfalfa - Wheat	0	12	5	13	23	43	17
Sheep - Wheat	28	10	12	9	26	30	15
Feeders - Wheat	17	20	16	13	8	20	15
Barley - Oats	22	6	14	11	21	25	14
Barley - Alfalfa	0	0	0	7	26	43	12
Wheat - Clover hay	0	10	0	10	18	27	12
Sheep - Barley	17	0	9	4	23	33	11

* This table should be read as follows: Barley and wheat were found together on 28 percent of the sample farms in Benton County.