

THE POSSIBILITIES OF GENERAL CROP INSURANCE

by

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INTRODUCTION

The purpose of this study has been to present the facts, in so far as they are known, regarding crop insurance and to give a clearer understanding of its possibilities as a means of stabilizing the farmer's income. Some of the important reasons for instability of the farmer's income are the uncertainties of weather, plant and animal disease, insect pests and price fluctuations. A distinct aid to the solution of the farmer's difficulties would be some device to minimize the effect of these hazards upon his income from year to year. The belief is held by a number of people that the solution to this problem lies in the field of insurance. The science of meteorology is unable to predict variations in the weather from one season to another. In a like manner, price forecasting has its limitations. Even if it were possible to exactly forecast weather and price, the farmer is not always able to readily change his program of production on short notice to meet changed conditions. There remains the possibility of solving this problem by insuring against these hazards so that a fairly stable income will result.

The area affected by the greatest number of natural hazards, and at the same time producing a large per cent of

our important grain crops, is the great plains region including Kansas, Nebraska, South Dakota, North Dakota, Minnesota, Iowa and parts of adjoining states. It is this area comprising the hard winter and spring wheat belts and the western half of the corn belt, where crops suffer greatly from the vagaries of weather, that has been considered as a possible field for the application of crop insurance. Some special consideration has been given to the application of crop insurance to Kansas conditions.

Source of Material and Method

The materials for this thesis are based on available literature and on personal interview with and communications from agents and officials of insurance companies. A study was made of insurance now available; of conditions relative to the need for a more complete form of crop coverage than is now available for the major field crops in the great plains area of the United States; and the experience, problems, difficulties and advantages relative to crop insurance.

Terms Used

The term "crop insurance" as used in this paper refers to that form of insurance on growing crops which

covers all unavoidable hazards to which the crop is subject to loss or damage. Other forms of insurance on growing crops are those covering a single hazard as frost or hail and are so designated.

PROTECTION AVAILABLE - HAIL INSURANCE

The only protection available at the present time against the uncontrollable hazards of crop production in the great plains region of the United States is through the medium of hail insurance. In some sections of the South and on the Pacific Coast, there is available to a very limited extent insurance protection against frost and storm damage to fruits and vegetables. However, at the present time, many of the companies offering this type of insurance are withdrawing because of the difficulties of getting sufficient spread of risks to keep the premium rates within reasonable limits. Hail insurance is almost universal in its application to agricultural crops. According to an international study made in 1926¹, hail insurance was found to be most widely diffused in Germany, with important organizations in several other countries covered by the study. Its diffusion was found to be proportionate to the intensiveness of agricultural production.

1. International Review of Agricultural Economics Sept. 1926 P.I.

American farmers spend annually, huge sums for insurance protection against hail. The high point in its use was reached in 1919 when total risks and premiums were approximately \$559,134,000 and \$30,330,000 respectively.¹ The years immediately following 1919 up to 1922 show a rapid decline in the amount of hail insurance business. Since 1922, there has been some recovery though not reaching the high point of 1919. The complete figures for the United States were not available but the following figures from the Kansas State Insurance Department are offered as an indication. In 1919 the total liability for hail insurance written in Kansas was \$69,119,063; in 1922, \$20,033,240; and in 1929, \$43,394,211.

This decline can be explained in part at least by the smaller income resulting from the declining value of the farmer's crops. Also the period since 1919 has shown a materially high ratio of losses paid to premiums received, resulting in companies either discontinuing this line or revising their policy and charging higher rates in an attempt to keep the business on a profitable basis. Types of companies writing hail insurance are; mutual hail insurance companies which usually limit their business to the

1. U.S.D.A. Bulletin 912, P.2, Hail Insurance on Farm Crops in United States.

insurance of growing crops against hail; joint-stock fire insurance companies, which write hail insurance more or less as a sideline; and State Hail Insurance Departments which administer state hail insurance funds.

State Hail Insurance Departments are found in operation in Oklahoma, Nebraska, North Dakota, South Dakota, and Montana. This type of service has been in operation only about ten years and still has many handicaps due to the slow process of adjustment under state control. The chief difficulty has been to obtain a volume of business. They must depend on the county assessor for applications, to be written at the time property is assessed and before the farmer is sure he will have a crop worth insuring against hail damage. Also the department is compelled to take all applications regardless of spread and cannot pay losses until near the end of the year. The Department of South Dakota has been more successful than some others in the hail insurance business. They report the following advantages:¹ (1) hail insurance furnished practically at cost; (2) other companies compelled to keep premium charges down within reasonable limits; (3) better system of adjust-

1. Statement of Deputy Commissioner of South Dakota Hail Insurance Department.

ing losses; (4) State rates 50 per cent to 60 per cent lower than Old Line rates.

Hail occurs in most of the farming areas of the United States and in some sections does serious damage. Over the entire country, hail is only a minor cause of crop damage, but even in sections where the damage is slight, total loss may occur to the crops of individual farmers. This hit or miss characteristic of the hail hazard, its irregular occurrence and variable intensity makes it both feared and respected for its destructive powers. The fact that hail damage can be readily distinguished from other forms of damage, and that it cannot be brought about by human action as in the case with most insurable risks, greatly reduces the moral hazard and may explain in part the wide application of this form of insurance.

The relative importance of the hail hazard in different parts of the country is shown in Figure 1, and is based on reports from United States Weather Bureau stations over a period of 14 years from 1906 to 1919. The lines on the chart connect the various points where the average annual frequency of hail was found to be the numbers inserted in the lines.

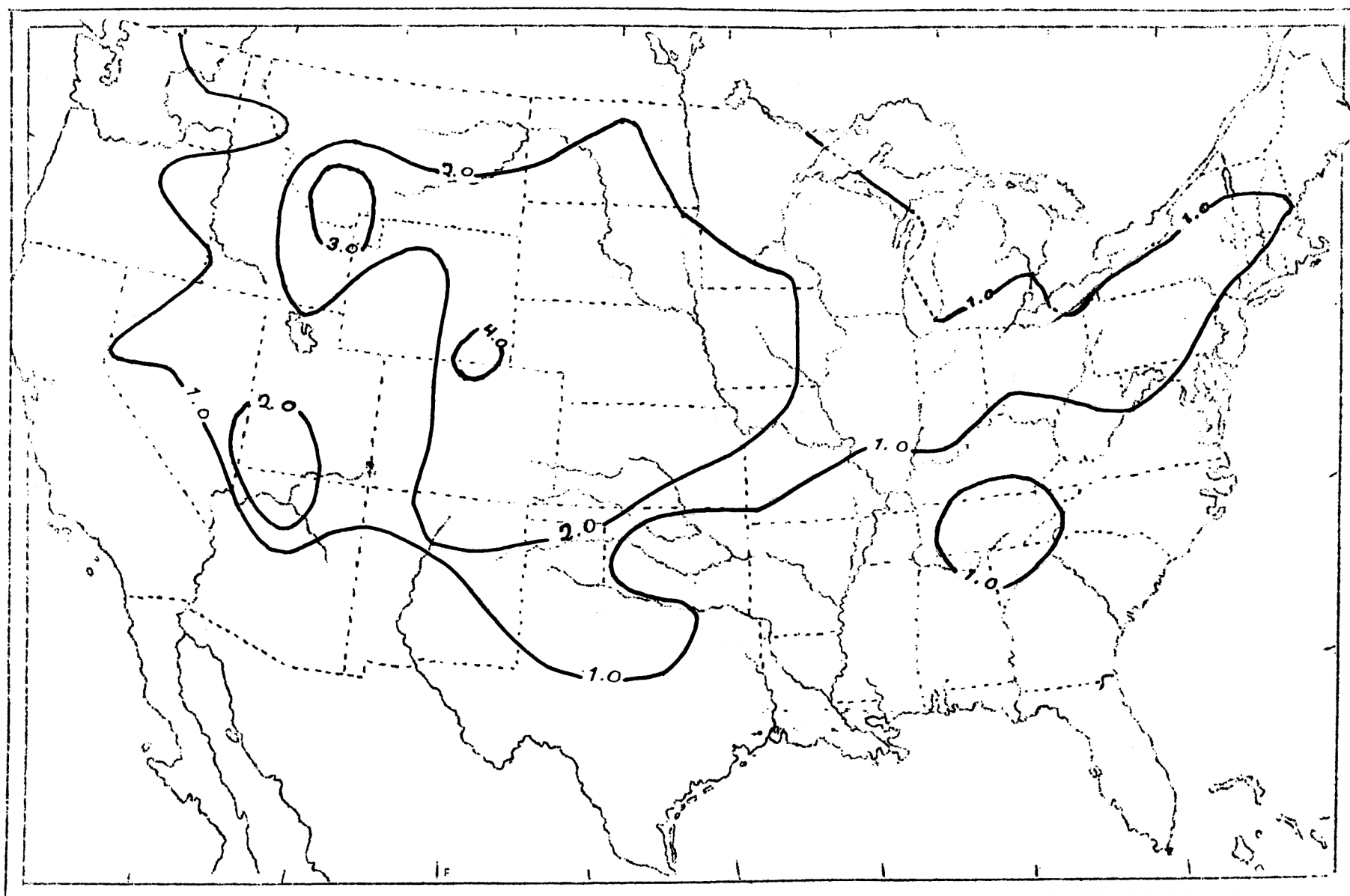


Figure 1. Average Number of Days with Hail, May to August Inclusive, 1906-19

U. S. Department of Agriculture Bulletin 912, P. 13.
Hail Insurance on Farm Crops.

No allowance was made for differences in the severity of the hail storms; and also the limited number of stations rather unevenly distributed would allow some error. On the other hand, the relatively long period of time covered by the reports would tend to eliminate the chance of error.

In the early development of hail insurance in this country, little was known of the hail hazard. A common rate of premium was 5 per cent of the insurance written. Experience in the business by numerous companies has resulted in graduated rates according to losses experienced. The rates in 1919 according to a study made in 1920, by the United States Department of Agriculture, varied from 3 to 16 per cent. These rates are indicated in Figure 2 showing the approximate location of various rates corresponding to the frequency of the hail hazard in different parts of the country as shown in Figure 1.

The hail insurance contract is written on growing crops and usually terminates when the crop is harvested or on a definite date, as September 15 which is used by some companies. No difference in the rate is made with any variation in the length of time the policy is in force. Aids in determining the exact location of the acreage are provided for in the application to avoid intent to defraud on the part of the insured. There is ordinarily a maximum

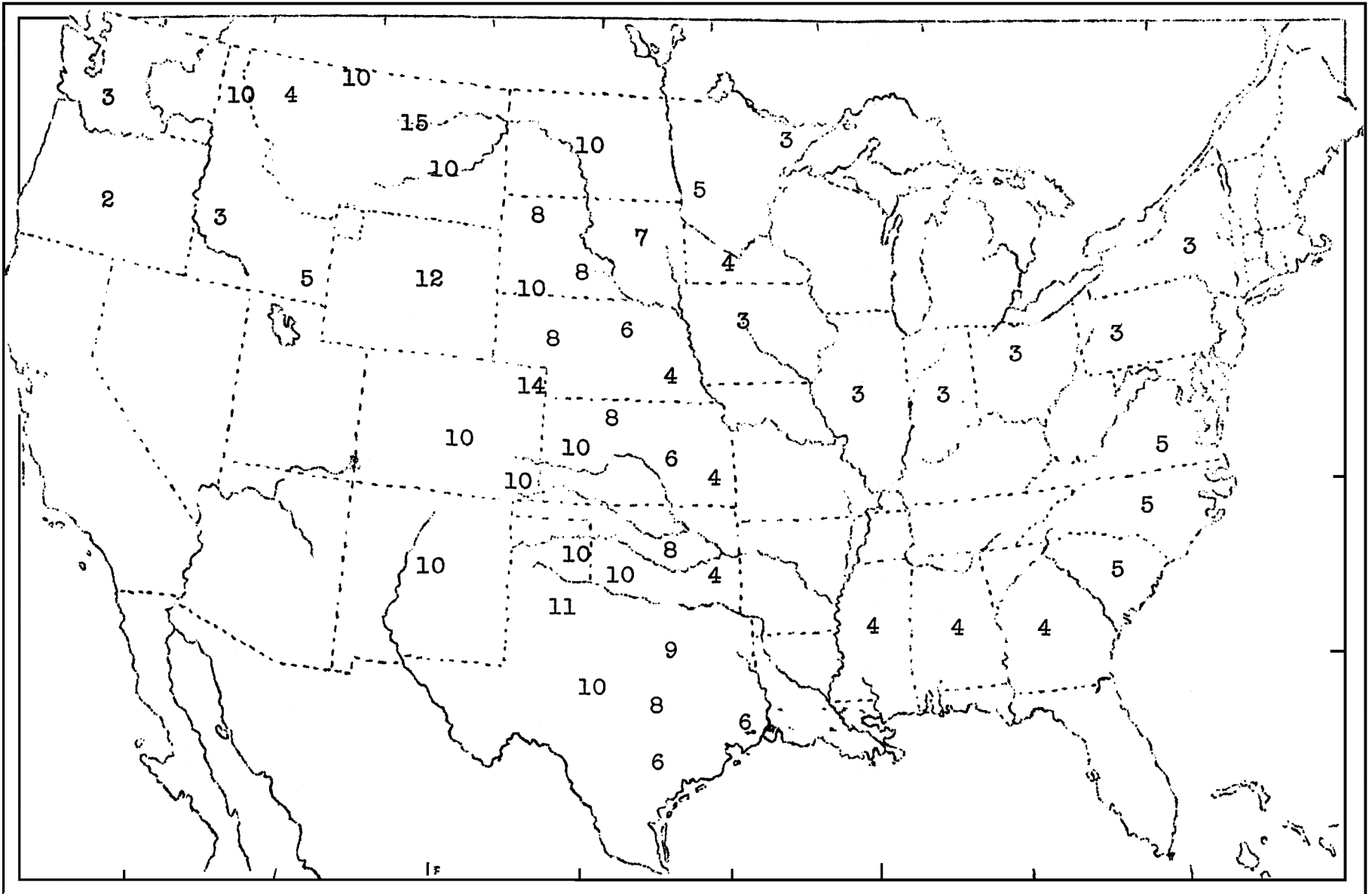


Figure 2. Prevailing Rates Charged for Hail Insurance by Joint-Stock Fire Insurance Companies, Dollars per Hundred per Year for 1919

U. S. Department of Agriculture Bulletin 912, P. 18.
Hail Insurance on Farm Crops.

amount of insurance per acre allowed, which in recent years has been increased from \$8.00 or \$10.00 to \$12.00 on cereal crop on non-irrigated land and to \$25.00 per acre on irrigated land. Provisions are included, naming conditions as to notice of loss, proof of loss, and payment of indemnity. Usually no liability is assumed if the loss does not equal 5 per cent or more of the insurance on the crop.

A recent development of hail insurance is the term policy, which is a blanket form covering all crops grown on a specified area, the rate varying with the crop. The insured makes a report as to the crops grown and pays a per cent of the principal sum as a premium each year. If the term is for five years the sum total of the five payments is a fair reduction from the average annual rate.

To estimate the value of hail insurance is very difficult because of the erratic nature of the hazard and the effect it can have on a farmer's prospects of a crop in an extremely short space of time. If reasonable rates are secured, with a fair and equitable adjustment of losses it is unquestionably worth the cost. Yet the fact remains that after paying a hail insurance premium and suffering no damage from this hazard the crop may be seriously damaged or entirely destroyed by one or more of a number of other hazards. In addition to this inadequacy, hail insurance

fails in the security of income in another particular. A reduced yield due to other hazards, coupled with a decline in market price, may leave the farmer with hardly enough return from his crop to pay for the hail insurance, leaving practically nothing to cover cost of production.

It seems evident that something more general in its nature of coverage is needed for the insurance of growing crops. Reference has been made to an international study of hail insurance, in which the following statement was made in conclusion: "Insurance against hail is only the first step in the insurance of agricultural crops, and that with a greater need for the intensification of agriculture in all countries the extension of the protection furnished by insurance will become a serious problem."

NEED OF MORE COMPLETE COVERAGE

Loss or Damage in Connection With Growing Crops

The farmers economic condition is dependent, to a degree, upon natural forces and agencies. He may do his part well, carefully planning, planting and cultivating, and look forward to a good harvest only to have some weather hazard or uncontrollable plant disease or insect pest turn his prospects into wasted effort and expense. Farming has unavoidable hazards that someone must assume. These hazards

may be reduced by diversification, control methods and other improved production practices but they cannot be entirely eliminated.

The United States Department of Agriculture has arbitrarily assumed that a crop exceeding by 10 per cent the normal yield is a perfect or no damage crop for a certain territory. Then the normal yield is that which actually occurs in good years over wide areas. The difference between a perfect or no damage yield and the actual yield is then taken as a measure of crop damage. Loss, to differentiate the term from damage, is used to indicate financial loss on the enterprise for the season, or the failure of the return from the crop to equal the cost of producing it.

The accompanying chart shows some of the hazards of farming. Not one of these hazards is entirely or at all times under control, and only one is insurable. The major risk involved in growing crops divides itself into three main groups: Weather; plant diseases and insect pests; and price fluctuation. If this risk could be shifted, at least in part, from the shoulders of individuals to those of the group some of the uncertainty would be removed from the farming business. This is the purpose of insurance on growing crops.

The importance of some of the hazards that affect the size of the crop is well illustrated by data collected by

Some Hazards of Farming

	(Drought
	(Hot winds
	(Excess moisture
	(Storms
(Physical	(Hail
(	(Frost
(	(Floods
(	(Freezing
(	(Miscellaneous
(
(	(Insects
(	(Plant diseases
(Biological	(Rodents
(	(Animals
(	(Animal diseases
(
(	(Local market
(	( hazards
(	(Glut
(	(Stoppage of trans-
(	( portation
(	(Competition from
(	( other sections
(Economic	(Competition or
(	( substitution of
(	( other products
(	(Competition of
(	( other industries
(	( for consumer's
(	( dollar
(	(Foreign competition
(	(Declining prices
(
(Personal factor, individual	
(efficiency, etc.	

the United States Department of Agriculture. In 1909 the Bureau of Crop Estimates began the practice of requiring of its many crop reporters in all parts of the United States estimates of the percentage of damage caused to the major crops from specified causes. The percentage reduction from normal yield is given in condensed form in Table 1. The purpose of these data is to show the relative degree of severity of the different causes of damage, with reference to some of the major field crops in the great plains area. Although hail is the only hazard for which insurance can be obtained on these crops, it will be noted that it is of only slight importance in causing reduction of yields over wide areas. But the importance of the hail hazard should not be minimized, for to the individual farmer, it can be as great or even greater cause of damage than any of the other hazards. The data show that deficient moisture, excessive moisture, frost, hot winds, plant diseases and insect pests are the most important causes of damage; though any one of the hazards might be the important cause of damage in a restricted area.

To show the actual effect of a hazard on the amount of crop obtained the rainfall for the months of July and August was charted against the crop yield of corn from 1901 to 1930 inclusive. The record of rainfall was used as observed by the Kansas State Agricultural College weather station and

Table I. Percentage Reduction from Full Yield Per Acre
from Stated Causes, 1909-1925¹

CORN

Year	Adverse weather conditions										Plant: dis- eases	Insect: pests	Ani- mal pests	Defec- tive seed	Other and un- known causes	Total
	Defi- cient mois- ture	Exces- sive mois- ture	Floods	Frost or freeze	Hail	winds	Storms	Other cli- matic	Total cli- matic							
1909.....	13.0	7.3	1.5	1.0	0.5	1.6	0.7	0.2	25.8	0.2	2.3	0.4	0.3	0.6	29.6	
1910.....	13.9	3.0	.8	.9	.4	1.6	.5	.2	21.3	.2	2.4	.4	1.2	.5	26.0	
1911.....	23.4	1.6		.4	.2	3.4	.1	.5	29.6	.2	2.3	.2	.4	1.0	33.7	
1912.....	8.7	4.6	.9	1.7	.5	1.0	.3	.4	18.1	.3	4.8	.3	2.3	.5	26.3	
1913.....	27.1	1.2	.4	1.0	.3	3.1	.4	.2	33.7	.1	3.7	.2	.4	.8	38.9	
1914.....	20.8	1.3	.4	.4	.5	2.1	.4	.2	26.1	.1	3.6	.1	.2	.5	30.6	
1915.....	3.0	11.9	2.1	6.9	.6	.2	1.1	.7	26.5	.3	2.1	.1	.2	.7	29.9	
1916.....	18.5	5.8	1.7	1.7	.4	1.7	1.1	.4	31.3	.3	2.0	.1	.6	.4	34.7	
1917.....	12.1	2.9	.6	13.5	.6	1.2	.3	.4	31.6	.2	1.4	.1	.2	.3	33.8	
1918.....	22.1	.9	.5	2.0	.4	6.3	.3	.3	32.8	.3	2.6	.1	1.5	.4	37.7	
1919.....	10.8	7.3	1.4	.1	.3	1.0	.4	.1	21.4	.3	3.1	.1	.2	.3	25.4	
1920.....	5.4	3.3	.6	.7	.5	.3	.4	.1	11.3	.3	3.7	.1	.3	.2	15.9	
1921.....	10.6	1.1	.3	.2	.4	.9	.6		14.1	.8	3.5		.1	.2	18.7	
1922.....	14.2	2.3	.5	.2	.9	1.0	.2		19.3	.3	3.0	.1	.2	.1	23.0	
1923.....	9.9	4.2	.7	2.7	.6	.7	1.1		19.9	.6	2.4	.1	.1	.3	23.4	
1924.....	11.2	10.7	1.3	9.7	1.4	.5	.5	.1	35.4	.4	2.6	.2	.8	.3	39.7	
1925.....	19.9	1.4	.2	1.0	.6	1.4	.2		24.7	.4	1.7	.1	.2	.1	27.2	
Av. 1916-25....	13.5	4.0	.8	3.2	.6	1.5	.5	.1	24.2	.4	2.6	.1	.4	.3	28.0	

Figures given in per cent of full yield per acre.

1. U.S. Department of Agriculture, Crops and Markets
V. 3, No. 10, P. 320.

WHEAT

Year	Adverse weather conditions										Plant dis- eases	Insect pests	Ani- mal pests	Defec- tive seed	Other and un- known causes	Total
	Defi- cient mois- ture	Exces- sive mois- ture	Floods	Frost freeze	Hail	Hot winds	Storms	Other cli- matic	Total cli- matic							

1909.....	8.5	3.2	: 0.7	: 2.4	:2.0	: 1.2	: 0.6	: 0.3	:18.9	: 1.6	: 1.1	: 0.3	: 0.1	: 0.8	: 22.8
1910.....	18.9	.9	: .2	: 6.6	: .5	: 2.6	: .2	: .1	:30.0	: .8	: 1.9	: .4	: .2	: .5	: 33.8
1911.....	25.5	.8	:	: 1.5	: .4	: 3.8	: .1	: .2	:32.3	: 1.9	: 1.9	: .2	: .2	: 1.3	: 37.8
1912.....	8.1	1.8	: .3	: 9.5	:1.5	: 1.8	: .4	: .6	:24.0	: 1.8	: 2.3	: .3	: .2	: .9	: 29.5
1913.....	14.1	.4	: .2	: 1.9	: .7	: 1.7	: .3	: .5	:19.8	: .3	: 2.2	: .1	: .1	: 1.0	: 23.5
1914.....	6.7	1.4	: .1	: 1.1	:1.0	: 2.7	: .2	: .2	:13.4	: 3.0	: 2.6	: .1	: .1	: .6	: 19.8
1915.....	1.3	7.3	: 1.0	: 1.2	:1.6	: .1	: .4	: .1	:13.0	: 2.4	: 3.6	: .1	: .1	: .5	: 19.7
1916.....	6.9	3.8	: .6	: 5.1	:1.3	: 2.7	: .2	: .6	:21.2	:12.5	: 4.0	: .1	: .1	: .8	: 38.7
1917.....	19.1	.4	: .1	: 11.8	:1.0	: 1.6	: .2	: .2	:34.4	: .7	: .7	: .1	: .1	: .3	: 36.3
1918.....	14.6	.3	: .1	: 3.8	:1.1	: 2.0	: .2	: .2	:22.3	: 1.5	: 1.1	: .2	: .1	: .5	: 25.7
1919.....	12.3	6.2	: .4	: 1.3	: .8	: 2.8	: .3	: .2	:24.3	:10.2	: 2.5	: .1	:	: .5	: 37.6
1920.....	8.1	2.3	: .2	: 4.2	:1.0	: 1.5	: .4	:	:17.7	: 9.5	: 4.4	: .1	: .1	: .4	: 32.2
1921.....	13.3	2.0	: .2	: 3.1	:1.4	: 3.6	: .3	:	:23.9	: 5.2	: 3.6	: .1	: .1	: .2	: 33.1
1922.....	13.1	2.0	: .4	: 2.2	:2.0	: 1.4	: .2	: .1	:21.4	: 3.4	: 3.4	: .1	: .1	: .3	: 28.7
1923.....	8.6	4.0	: .5	: 4.0	:1.4	: .8	: .2	:	:19.5	: 4.6	: 4.6	: .1	: .1	: .3	: 29.2
1924.....	9.4	2.3	: .2	: 3.6	:1.4	: .5	: .2	: .2	:17.8	: 1.5	: 2.1	: .2	: .1	: .2	: 21.9
1925.....	15.9	1.2	: .1	: 5.8	:1.2	: 1.9	: .1	:	:26.2	: 2.6	: 2.6	: .1	: .1	: .1	: 31.7
Av.1916-25...	12.1	2.4	: .3	: 4.5	:1.3	: 1.9	: .2	: .2	:22.9	: 5.2	: 2.9	: .1	: .1	: .3	: 31.5

Figures given in per cent of full yield per acre.

OATS

Year	Adverse weather conditions										Plant dis- eases	Insect pests	Ani- mal pests	Defec- tive seed	Other and un- known causes	Total
	Defi- cient mois- ture	Exces- sive mois- ture	Floods	Frost or freeze	Hail	Hot winds	Storms	Other cli- matic	Total cli- matic							
1909.....	7.9	5.2	0.6	0.8	1.1	0.9	0.8	0.4	17.7	2.4	0.5	0.1	0.4	1.1	22.2	
1910.....	17.0	.8	.2	.7	.4	1.7	.3	.3	21.4	.9	.6	.2	.2	.7	24.0	
1911.....	27.6	1.0		.5	.3	5.1	.1	.8	35.4	.8	1.5	.1	.2	1.5	39.5	
1912.....	7.2	3.1	.3	.5	1.0	1.1	.5	.4	14.1	1.6	.7	.2	.2	.9	17.7	
1913.....	22.7	.7	.2	.2	.6	1.8	.2	.8	27.2	.5	1.1	.1	.2	1.2	30.3	
1914.....	15.7	2.2	.2	.3	.8	2.6	.4	.5	22.7	2.0	1.6	.1	.1	1.0	27.5	
1915.....	1.4	8.5	.9	.4	1.0	.1	.8	.1	13.2	2.1	.3	.1	.1	.5	16.3	
1916.....	10.1	4.0	.4	.6	.8	2.8	.5	.5	19.7	5.2	1.3		.2	.8	27.2	
1917.....	11.8	1.2	.2	2.7	.8	1.0	.3	.2	18.2	.8	.4			.4	19.8	
1918.....	12.9	.5	.2	1.3	.9	1.8	.3	.2	18.1	1.1	.9	.1		.5	20.7	
1919.....	11.5	5.7	.4	.4	.7	2.8	.4	.4	22.3	4.8	2.2		.1	.5	29.9	
1920.....	6.4	2.7	.3	.5	.8	.9	.4	.1	12.1	2.3	1.4	.1	.1	.3	16.3	
1921.....	18.3	2.3	.2	2.7	.8	5.9	.6	.2	31.0	5.2	2.1		.1	.5	38.9	
1922.....	14.6	3.8	.3	.5	1.1	1.4	.3		22.0	3.2	1.8	.1	.1	.4	27.6	
1923.....	10.1	2.7	.2	1.5	.9	1.5	.5		17.4	3.0	1.0	.1	.1	.3	21.9	
1924.....	5.5	3.5	.5	1.2	1.2	.3	.6	.1	12.9	1.4	.6	.1	.1	.2	15.3	
1925.....	15.2	1.2	.1	1.3	1.0	1.0	.2		20.0	1.2	.4		.1	.2	21.9	
Av.1916-25..	11.6	2.8	.3	1.3	.9	1.9	.4	.2	19.4	2.8	1.2	.1	.1	.4	24.0	

Figures given in per cent of full yield per acre.

the corn yields used were for Riley County, the county in which the weather station is located. Figure 3 shows the very close relationship existing between the July and August rainfall and the yield of corn in Kansas, July and August being the critical months in the growing season for corn.

Of even greater importance than the variableness of weather and plant disease and pests is the uncertain course of prices. It is inherent in farming that planning and planting of crops must be done from four to twelve months before they are sold. During this period many things may happen causing a change from favorable prices at planting time to very unfavorable prices at harvest. The prices of some crops have a tendency to move in cycles, but as a general rule the crop price cycles are irregular and uncertain.

Need and Purposes of Protection

The farmer's greatest need is stability of income. At the present time low prices are not sufficient to cover the capital charges and interest payments previously contracted by many farmers. A large part of the farm debt incurred before the depression has not yet been paid and continues to be a heavier burden on income. Table II containing data gathered by the 1925 census of agriculture shows the extent of the farm mortgage debt in some of the agricultural states in the great plains area.

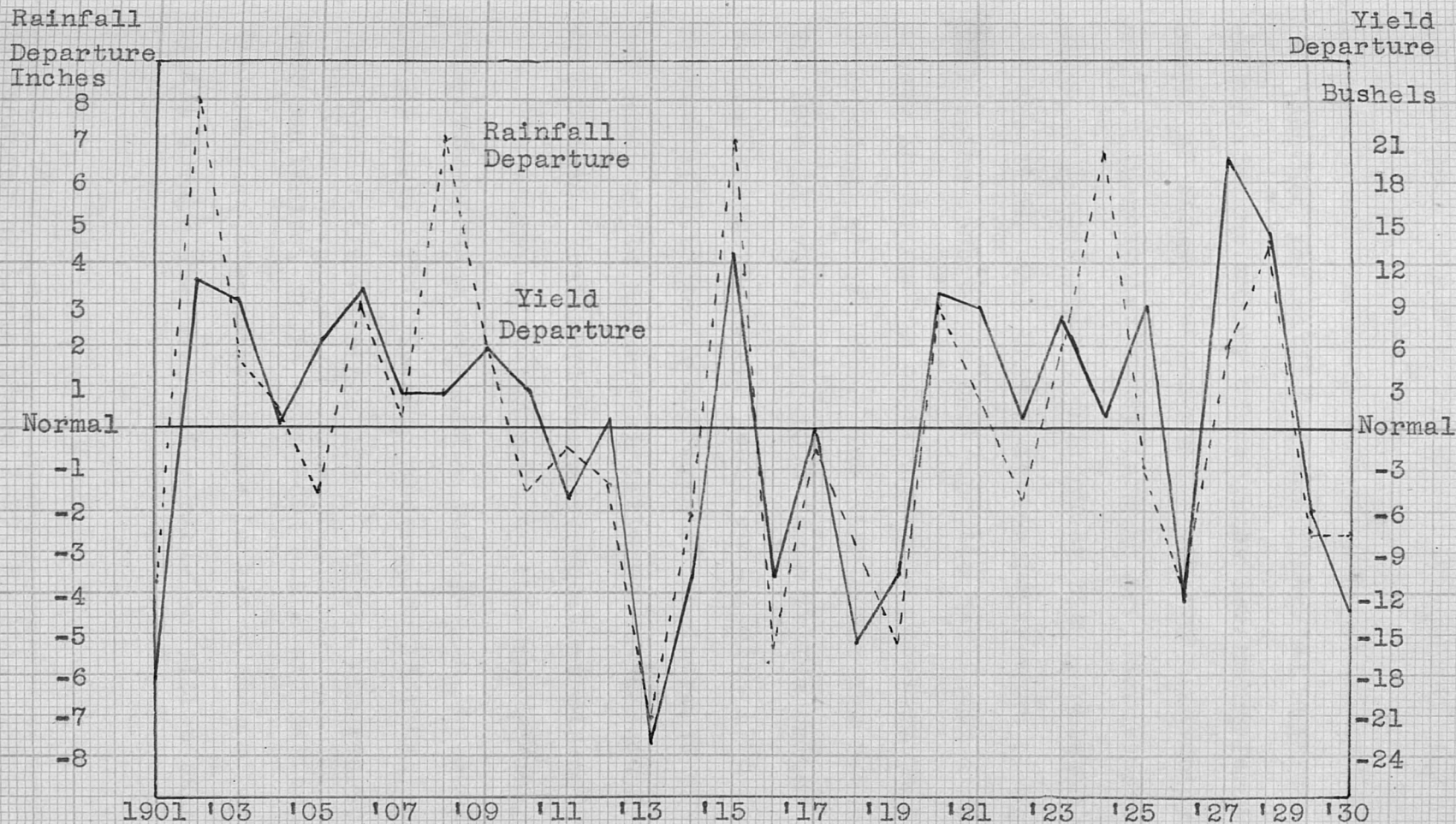


Figure 3. Influence of rainfall in July and August on the yield of corn in Riley County, Kansas.

Rainfall data from K.S.A.C. Weather Station, Manhattan, Kansas.

Yields from Biennial Reports of Kansas State Board of Agriculture 1901-28.

Another indication of the financial condition of agriculture is the number of bankruptcies among farmers. The number of farmers who normally use the bankruptcy courts is small. In most instances farmers are dispossessed of their farms by forced sales, delinquent taxes, related defaults and the like. The United States Department of Agriculture, in keeping records of bankruptcies has found a great increase in the number of farmers who resorted to bankruptcy proceedings since 1920. The high point was reached in 1925. The 1904-13 average per 1000 farms in the United States was 0.14. During the three years ending with 1926 there was an average of 1.22 per 1000 farms or an increase of almost 1000 per cent, while commercial failures have shown a much smaller increase.¹ Bankruptcies have declined since 1925.

The states affected most by this marked increase in farm bankruptcies were those included in the Northern great plains area. This is also the region that has suffered most from bank failures since 1920. In the six years, 1920 to 1925 inclusive, there were 2494 state and national bank failures and 67 per cent were in ten states of the great plains area.² The most unfavorable condition exists in Iowa

1. Yearbook of Agriculture 1927. P. 111.

2. Yearbook of Agriculture 1927. P. 112.

Table II. Farm Values¹ and Farm Mortgage Debt²; Total and by
Tenure of Land. January 1, 1925

State	Farm values Land and buildings 1000 dollars	Total mortgage debt 1000 dollars	Debt on owner- operated land 1000 dollars	Debt on tenant- operated land 1000 dollars	Debt on manager- operated land 1000 dollars
Minnesota	2393741	553784	326561	222930	4293
Iowa	4954446	1424352	765475	642254	16623
Missouri	2003286	449022	268564	174867	5591
North Dakota	1020103	226714	134326	89996	2392
South Dakota	1437288	372004	177858	190695	3491
Nebraska	2524073	617930	320628	291263	6039
Kansas	2197951	482596	206512	271762	4322

1. Census of Agriculture 1925. Table II, P. 22.

2. Yearbook of Agriculture 1929. Table 545, P. 1010.

and is probably due to the abnormal rise in land values during the war and the consequent drop in prices since the war. The following statistics,¹ presenting by index numbers the change that farm real estate values have passed through since 1913, may help to explain the financial difficulties of the farmers in the important agricultural states.

	<u>1913</u>	<u>1920</u>	<u>1930</u> ²
Minnesota	100	213	133
Iowa	99	213	113
Missouri	100	167	92
North Dakota	100	145	95
South Dakota	101	181	93
Nebraska	100	179	113
Kansas	99	151	113

In addition to being forced to meet principal and interest payments on debts, (many of them incurred during a period of expansion and high land values) farmers usually find themselves in need of ready cash to meet current expenses and carry through to completion the crop production process before a return can be realized. The added uncertainty of producing a crop or of realizing a financial

1. Yearbook of Agriculture 1929. Table 540, P. 1003.
 2. U.S.D.A. Circular 150, 1929-30.

return from it makes it increasingly difficult to secure credit. In 1920 the United States Department of Agriculture made a study of methods used in financing wheat production. The following conditions, with respect to security used, were found in Kansas and North Dakota.¹

Kansas, typical winter wheat state

- 45 per cent personal notes without endorsement.
- 13 per cent personal notes with endorsement.
- 29 per cent livestock mortgages.
- 10 per cent crop liens.
- 3 per cent miscellaneous security, stock, bonds, etc.

North Dakota, typical spring wheat state

- 27 per cent personal note without endorsement.
- 9 per cent personal note with endorsement.
- 43 per cent livestock mortgages.
- 12 per cent crop liens.
- 9 per cent miscellaneous security, stocks, bonds, etc.

This inquiry was made through the banks located in the wheat sections of the two states. The following statement was made summarizing the results of the investigation:

"Doubtless the crop to be produced should constitute the leading security for a loan obtained to assist in its production, as in effect the money is invested in the crop. Owing to hazards crop liens are an undesirable form of security. The thing needed to bring crops into use as security for loans is a suitable form of crop insurance."

1. Yearbook of Agriculture 1921, P. 120.

Possibilities of Reducing Risk

Although the farmer cannot control or safely predict the vagaries of the weather and often finds it impossible to control plant diseases or insect pests, he can with proper planning and effort materially reduce the loss from these causes. One might contrast the situation of a one-crop farmer who exposes himself to a total loss from a single hazard with a farmer who has a variety of crop and livestock enterprises each of which may have a different critical period with reference to any one hazard. All crops grown in a locality are rarely affected by the same plant disease or insect. Damage from such hazards as hail, frost, drought or excessive moisture do not often cause total or even serious loss to all crops in a region because of the difference in the seasonal period of growth and maturity of many of our crops. Diversification then is one important consideration in securing self-insurance.

Selecting varieties that are drought, disease, or insect resistant, testing and treating seed, selecting adapted crops and suitable rotations, are a few of the many ways the farmer may arrange his business enterprises so that the seriousness of damage from the hazards, which he cannot escape, will be materially lessened. The farmer may improve

his situation by obtaining information from publications of the United States Department of Agriculture, Agricultural Colleges, and other similar institutions. Furthermore, there is much to be gained from a study of price trends, changes in the general price level, and business conditions that will indicate a demand for the farmer's product.

Self-insurance may also be furthered by laying up a reserve in good years that can be drawn upon in years when the income is below normal. This reserve may take the form of saving accounts, life insurance, investment stocks and bonds or it may be used for the reduction of outstanding debts such as notes and mortgages on real estate or livestock.

CROP INSURANCE AS A POSSIBLE SOLUTION

Two main lines of approach have been used in the United States in insuring crops. First, by insuring the separate and single risks as hail or frost; and second, a blanket or all risk policy covering all the uncontrollable hazards to which the crop is subject. Some difference of opinion exists as to the feasibility of including the price hazard. Most authorities agree that no program of stabilizing income is more than a partial plan which does not include the effective handling of the price hazard. Quoting

from V. N. Valgren of the Bureau of Agricultural Economics;¹ "The ideal crop insurance will provide protection against all unavoidable hazards to which the crop is subject." From the President of the Company making the 1920 and 1921 experiment;² "Unfortunately, one of the things that the average farmer wants most out of his crop insurance is price insurance." The generally accepted interpretation and the one used here is a form of insurance which insures against all the unavoidable hazards which subject the crop to loss or damage.

Considerable attention has been given in the last decade to the possibilities of reducing the risk that the individual farmer bears in connection with growing crops. In April 1923 a select committee from the United States Senate held hearings for the purpose of investigating the subject of crop insurance particularly with reference to:

- (1) The kinds and costs of insurance obtainable
- (2) The adequacy of the protection afforded by such insurance
- (3) The desirability of any practical methods for extending the scope of such insurance
- (4) The availability and sufficiency of statistics necessary to properly and safely issue additional crop insurance.

1. U.S.D.A. Bulletin 1043, P. 19. Crop Insurance; Risks, Losses, etc.
2. Hearing of U.S. Senate Committee Investigating Crop Insurance, P. 39.

A mass of testimony was given by experts from insurance, farming, and government agencies, who testified before the committee. The combined testimony brought out the fact that to be successful, crop insurance covering the major crops must be based on more detailed data than were then available and must cover the entire area in regions where crops are to be insured.

Some knowledge and experience has been gained by insurance companies writing crop insurance, principally on grain crops in the great plains area of the United States. At the present time the field of crop insurance is entirely deserted. All attempts that have been made with this form of coverage have proven disastrous for the companies that tried them, or were discontinued because of large financial losses.

The fact that the field for crop insurance might be a large one is shown by the following table. For all crops for the year 1929 the value was more than nine billion dollars, and for the three major crops of corn, wheat, and cotton the value was more than four billion dollars.

Crop Summary 1929¹

Crop	Acreage	Production per acre	Total production	Total Value
Corn	98,018,000	26.8 bu.	2,622,189,000 bu.	\$2,048,134,000
Wheat	61,141,000	13.2 bu.	806,508,000 bu.	840,921,000
Cotton	45,981,000	155.3 lbs.	14,919,000 bales	1,225,032,000
Other Crops ²	161,565,000			5,612,735,000
All Crops (total)	356,705,000			9,726,822,000

1. U. S. Yearbook of Agriculture 1929.

2. Includes: oats, barley, rye, buckwheat, sweet potatoes, potatoes, tobacco, flax, rice, all hay, peanuts, grain sorghums, beans, broom corn, hops, cranberries.

Crop Insurance Experience with Grain

The earliest attempt with crop insurance in the United States of which information is known, was made by a Minneapolis company in 1899. The Company guaranteed that the farmer's crop of small grain, including all crops grown on a specified area, would be worth \$5.00 per acre at the time of harvest. A five per cent premium was charged. All uncontrollable hazards resulting from weather, plant diseases, insect pests and price decline were covered by the policy. Some additional provisions in the contract were: the farmer agreed to cultivate his crops in a husband-like manner; the farmer agreed to deliver his crop to the nearest market if requested to do so by the Company; the Company disclaimed liability due to damage done after September 15 or after crops were harvested.

Some insurance was written by this company in the states of North Dakota and Minnesota, just how much is not known. In any event the venture turned out to be a failure. The management of the company apparently was not what it should have been. Premium notes were given by the farmer and in turn were discounted by the company. The company failed during the summer leaving the notes to be paid by the farmer without a possibility of collecting insurance where it was due.

In addition to the apparent unreliability of the company the rate charged may have been too low, or the \$5.00 limit too high as a conservative estimate of the value of the crop.

Table III. The Price, Yield and Value Per Acre of the Wheat Crop, for North Dakota and Minnesota for Specified Years.

State and Year	Av. farm price per bu. Dec. 1 Cents ²	Av. yield per acre Bushels ¹	Av. farm value per acre Dollars
North Dakota			
1895	.38	21.0	7.98
1896	.64	11.8	7.55
1897	.75	10.3	7.62
1898	.51	14.4	7.34
1899	.51	12.8	6.53
Minnesota			
1895	.44	23.0	10.12
1896	.68	14.2	9.66
1897	.77	13.0	10.01
1898	.54	15.8	8.53
1899	.55	13.4	8.37

From the data in Table III it would appear that the \$5.00 limit may have been too high. With the average per

1. Yearbook of Agriculture 1900, P. 784.

2. Yearbook of Agriculture 1900, P. 794.

acre value in North Dakota for the year 1899 at \$6.53, there would, in all probability, be a large number of farmers whose acre value would be below \$5. The probable loss in a case of this kind would depend entirely on the selection, the number, and the spread of the risks.

In this first attempt at crop insurance, it was a case of guaranteeing that the ratio

$$\frac{\text{variable amt. of grain X variable price}}{\text{amount of insurance } (\$5)}$$

would be at least 1. The return on the crop and the liability of the company would depend on the personal factor or moral hazard, the price of the grain, the weather and the extent of damage by insects, animal pests and plant diseases.

Experience in 1917

The next major attempt to write crop insurance was in 1917 by Montana and Pennsylvania companies writing on small grain in Minnesota, North and South Dakota, and Montana. Both companies wrote practically identical contracts.

The companies proposed to insure the farmers' crops against all hazards except fire, flood, winter kill, price decline and failure on part of farmer to properly prepare the ground for seeding and properly seed, care for, harvest, protect and thresh the crop. The amount of insurance was

arbitrarily fixed at \$7 per acre. To prevent adverse selection of risks all of applicant's small grain must be insured, and an attempt was made to insure only crops on land on which a \$7 per acre value had been obtained during each of the three previous years. A premium of 10 per cent or 70 cents per acre was charged.

In case of total failure, the \$7 per acre was due the insured. In case of partial failure the indemnity was the difference between the value of the crop harvested and the total value of the policy. The partial crop was valued at \$1 per bushel for wheat; \$1.75 for flax; \$.70 for rye; and \$.50 for oats, barley and speltz. Although the insurance in this plan was written in terms of money, it covered yield only and not price. With the fixed price per bushel in the contract, the \$7 per acre in effect guaranteed 7 bu. of wheat, 4 bu. of flax, 10 bu. of rye and 14 bu. of oats, barley or speltz.

The year 1917 was a year of unusual drought especially in the western part of North and South Dakota and Montana. The Montana Company failed, having liabilities greatly exceeding its assets. The Pennsylvania Company withdrew from the field with a heavy loss. Realizing that it was going to lose heavily, the company by bringing charges of fraud in connection with taking applications, settled many

of its losses by a return of the premium.

The drought the year of these attempts was a factor but not the basic cause of the failures. The more important causes were: (1) a small company with insufficient reserve and a narrow spread of risks, and (2) poor management by the officials of the company in allowing insurance to be written with an apparent failure of the crop in sight. No provision was made for inspection or supervision of risks. The local agents for the companies were officers of the local banks. Almost all of the farmers were indebted to these banks with the agreement that the debt would be paid from the proceeds of the prospective crop. When it was certain there would be a failure, there was a flood of applications for insurance which was gladly written by the bank.

In the form of a ratio, the company's risk was that the fraction:

$$\frac{\text{variable amount of grain X fixed price (\$1 for wheat)}}{\text{fixed costs (\$7 per acre)}}$$

would be less than 1. When the market price is above the price stated in the contract, the farmer is insured only against part of the loss due to damage. When the market price is the same as the contract price, the farmer is insured against all of the loss due to damage. When the market price is below the contract price, the farmer is insured

against all loss due to damage and a sum in addition to cover part of loss due to decline in market price. The following data illustrate the three conditions:

7 bu. per acre at \$1 per bu. = \$7.00

Yield of 6 bu. -	\$2.00	-	\$1 available to meet	\$2.00 loss
Yield of 6 bu. -	1.00	-	1 available to meet	1.00 loss
Yield of 6 bu. -	.50	-	1 available to meet	.50 loss

Experience in 1920

Probably the most extensive attempt to write crop insurance was made in 1920 by a large fire insurance company writing crop insurance as a side line. This company overcame one difficulty of previous attempts in that they had a wide spread of risks. They assumed a liability of \$14,000,000¹, distributed with \$5,000,000 on the Pacific Coast, \$4,000,000 in the Southern States, \$4,000,000 in central belt, and a small amount in the Eastern States. All fields gave extremely disastrous results. Charging on the average a rate of about 6 per cent, they received in premiums \$800,000 and sustained losses to the amount of \$2,500,000. The ratio of losses to premiums was over 300 per cent, but it served to demonstrate the impracticability

1. Mr. R. M. Bissell, Hearings of U. S. Senate Committee Investigating Crop Insurance, Apr. 24-27, 1923, P.39.

of one or two features of their policy.

The contract was called a crop investment policy. The plan proposed to insure the farmer against the loss of his necessary expenses in putting in, caring for, and harvesting his crop and included a fair rental value, or interest charges on land investment. A conservative figure of this total was then taken as the amount of insurance. The company then insured the farmer against loss or damage to the growing crops when caused by frost, winter kill, flood, drought, insects or diseases, but excluding loss or damage caused by fire, hail, wind, tornado, failure of seed to germinate, and negligence on the part of the farmer. For convenience in presenting in greater detail the terms of this contract, a copy of the application and the policy stipulations and agreements are herewith presented.

While the statement of the company's liability seems to be clear, it does not show the extent of the risk assumed. The amount of insurance was fixed at a definite acreage investment. There was a definite statement of what hazards would and what would not be included with the exception of a fluctuating market price for the crop, which because of guaranteeing a return of fixed costs, would necessarily be assumed by the company.

Sample Copy of Application used in 1920 Plan.

COPY

Application for Acreage Investment Insurance
to the

PREMIUM, \$.....

AMOUNT, \$.....

I or we, of P.O. in the County of.....State ofhereby make application to the-----Company of-----, for insurance in the sum of.....DOLLARS, against loss or damage of every kind, except as hereinafter provided, to the growing crops hereafter described when caused by the elements, including frost, winter-kill, flood, drought, insects, or disease; to include also the loss of rental value of the ground whereon said crops are located, all as hereinafter provided, as follows:

1. On...int. in...acres ...in Sec....T...R...not to exceed \$...per acre. Amt.\$...
2. On...int. in...acres ...in Sec....T...R...not to exceed \$...per acre. Amt.\$...
3. On...int. in...acres ...in Sec....T...R...not to exceed \$...per acre. Amt.\$...
4. On...int. in...acres ...in Sec....T...R...not to exceed \$...per acre. Amt.\$...
5. On...int. in...acres ...in Sec....T...R...not to exceed \$...per acre. Amt.\$...
6. On...int. in...acres ...in Sec....T...R...not to exceed \$...per acre. Amt.\$...

Total No. AcresCovered. Total Insurance Applied For, \$.....

All situated in the County of State of

Loss, if any, payable to....., mortgagee....as.....interest may appear, subject nevertheless to all the conditions of this policy.

Applicant will fill such blanks in the following schedule as represent at prescribed rates the cost incurred and/or contemplated in raising above crops:

For....Acres of.....	For....Acres of.....	For....Acres of Corn
Plowing..... at...per acre	Plowing..... at...per acre	Plowing..... at...per acre
Discing..... at... " "	Discing..... at... " "	Discing..... at... " "
Harrowing..... at... " "	Harrowing..... at... " "	Harrowing..... at... " "
Rolling..... at... " "	Rolling..... at... " "	Rolling..... at... " "
Seeding..... at... " "	Seeding..... at... " "	Seeding..... at... " "
Seed..... at... " "	Seed..... at... " "	Seed..... at... " "
Harvesting..... at... " "	Harvesting..... at... " "	Cultivating..... times at... " "
Shocking at... " "	Shocking..... at... " "	..... at... " "
Twine at... " "	Twine..... at... " "	..... at... " "
Rental value.. at... " "	Rental value.. at... " "	Rental Value.at... " "

The following questions must be fully answered by the applicant in every case:

How many acres have been seeded in stubble?.... Was the land double disced?... When last plowed?... How many and what kinds of crops have been raised on this land since it was last plowed?... State kinds of crops raised on land preceding season... In preparing ground for seed were the methods usual to successful farming in your neighborhood employed?... If this application covers corn, how many times do you intend to plow it?... Do you own or operate a tractor?... How much of this land, if any is subject to overflow or so located as to retain and harbor standing water?... Is land level or rolling?... What is the average sale value of land?... How many total or partial crop failures have occurred on this land in past five years?... What portion of crops do you own?... Is any part of these crops seeded for ensilage, fodder, or roughage only?If so, which acreage?... How far is this land from your residence?. Are you interested in other like crops not shown in this application?... Have crops on this land been damaged by insects or disease in past two years? If so, state fully kind and what has been done to prevent recurrence... What part of this land is employed for dry farming?... When were the crops seeded?... Is the stand uniform or spotted?... Is it in a healthy and growing condition?... Do you agree to cultivate, harvest, and gather the crops herein described to the best of your ability and in the manner usual to the best farming methods in your neighborhood?.....

I hereby warrant that all the preceding questions are fully understood and that the answers are true and correct. I agree that this company shall not be bound by any act or statement made to or by its agents or representatives restricting its rights or waiving its written or printed contract unless inserted in this application.

I also agree that this application is made with specific reference to the "Policy Stipulations and Agreements," statements and representations above contained, and also as printed on the back hereof, a duplicate of which application is to be attached to my policy of insurance issued by the-----Company of-----, which in addition to the printed portion of said policy constitutes my contract with said company.

This application signed.....19.... Applicant

Application taken by.....Agent at.....

Policy Stipulations and Agreements

This policy of insurance is based upon all the statements, representations, and descriptions contained in the assured's application and diagram of even number herewith, which are hereby made parts of this contract, and it is further stipulated and agreed that any false statements or descriptions made in said application whether referring to amounts, limits per acre, ownership, location, description of crops, or otherwise, or any fraud or attempted fraud, false swearing, or misrepresentations, by the assured, whether made before or after a loss has occurred, relative to this insurance or to the amount or cause of any loss or damage to the crops herein described, or any endorsements, assignments, or changes in this policy without the consent of this company endorsed hereon shall in each and every case render this entire policy null and void.

The intent of this policy is to indemnify the assured for loss due to any cause or causes within the coverage of this policy of seeds and of labor in seeding, cultivating, and harvesting the crops herein described, including loss of the fair rental value of ground whereon said crops are located. It is accordingly understood and agreed in event of the total destruction or failure of such crops or of any portion thereof by reason of any cause or causes within the coverage of this policy that the liability of this company hereunder shall not exceed the limit per acre named herein as to the crop or portion thereof destroyed or rendered valueless, and in the event of the partial destruction or failure, due to any such cause or causes, of such crops or of any portion thereof the liability of this company as to each acre partially destroyed shall not exceed the difference between the actual market value of the damaged grain harvested from such acre and the limit of such insurance per acre herein named as to such partially damaged portion of the crop. For the purposes of this policy such actual market value shall be determined by the prevailing prices at the nearest recognized market for grain of like kind and quality at the time of harvesting but not later than the fifteenth day of September following the date of this policy.

The insurance under this policy shall attach from the date when application for same is approved by this company at its office in---, and shall cease when the crops hereby insured have been harvested, but in no event later than the fifteenth day of September following the date of this policy at twelve o'clock noon.

If the assured under this policy does not own the land upon which crops hereby insured are located there shall be no liability upon the part of this company on account of rental value of such land unless the lease of such land provides for a cash rental to be paid by the tenant.

This company shall not be liable hereunder for any loss or damage caused directly or indirectly by fire, hail, wind, tornado, failure of seed to germinate, or failure on the part of the assured to properly prepare the ground for seeding or to properly seed, cultivate, and harvest the crops insured hereunder.

In every case where loss or damage occurs within the provisions of this policy, the assured shall within ten days after such loss or damage occurs or becomes apparent sent by registered mail to this company at---notice of such loss or damage and shall fully comply with all the provisions contained in the following paragraphs relating to loss or damage.

In event of loss or damage to crops herein insured from any cause or causes within the coverage of this policy which warrant the abandonment of said crops or any acreage part thereof without further effort or expense on the part of the assured to cultivate, protect, and harvest said crops, the assured may elect to re-seed the land to other crops, but before preparations are begun for such re-seeding and within ten days after such loss or damage occurs or becomes apparent, the assured shall send to this company by registered mail at---a signed notice of loss, which shall state (1) post office address, (2) the number of this policy, (3) the total acreage and description of crops damaged, (4) the direct cause of damage, (5) a full and complete statement of the condition of the crops, and (6) statement of assured's intention as to the further disposition of the land for the current season.

It is further provided that should the assured elect to abandon crops or any part thereof herein described and to re-seed the land to other crops, this company shall have fifteen days after the mailing of notice by the assured as above declaring his intention to abandon and re-seed in which to investigate the claim for loss or damage hereunder and the condition of the crops insured.

If upon investigation on the part of this company as hereinbefore provided it shall be established and proven that the condition of the crops herein insured or of some portion or portions thereof does not warrant further labor and expense in the proper cultivation and salvage thereof, the company shall be liable on account of loss or damage to said crops or portions thereof for not exceeding the amount expended by the insured in seeding and cultivating such crops up to the date of such investigation, plus a ratable portion of the annual rental value of the land (less the remaining value of the abandoned crop, if any), but in no event for more than the limits per acre named herein.

If the assured shall claim that any part of the crops herein described has been so damaged as to warrant abandonment but shall not elect to reseed the land to other crops, it is understood that no claim for loss or damage shall be proven or become due or payable until the proper and usual time for harvesting such crops shall have arrived and in the interim the assured shall protect such crops as far as possible from further damage and deterioration from every cause whatsoever.

If the assured shall claim that any part of the crops herein described has been so damaged as to warrant abandonment and shall claim indemnity for loss or damage under the provisions of this policy, this company may at its option harvest, save, or otherwise dispose of for its own protection and account any part or all of said abandoned crops, and the assured shall not in any manner hamper or prevent this company from exercising the option and privilege herein provided.

If this policy covers corn as to which loss or damage is claimed, the assured shall file notice of such loss or damage in the manner herein provided but in no event later than the fifteenth day of September following the date of this policy.

If this policy covers grain other than corn and at the time of threshing the assured claims or has claimed loss or damage thereto such claim in the meantime not having been adjusted and/or paid, the assured shall send by registered mail to this company at----within five days after such grain has been threshed and upon blanks furnished by this company, a statement subscribed and sworn to by himself and the thresher, giving the total number of bushels of each kind of grain threshed from said crop on which claim is made, together with a statement showing the market value thereof at prevailing prices; provided, however, that this company shall have fifteen days from the time such notice is mailed in which to verify and investigate the claim, during which time the grain is not to be sold or otherwise disposed of.

It is further provided that in each and every instance where loss or damage within the coverage of this policy to crops hereby insured becomes apparent the assured shall notify this company within the time and in the manner provided herein. Within thirty days after the happening or ascertainment of any loss as provided by this policy, unless the time shall be extended in writing by this company, the assured shall furnish to this company at----a statement and proof of loss supplementing the notice of loss above required, signed and sworn to, setting forth the number and date of this policy, the location and acreage of the land upon which the crops are situate, a description of the crops damaged and the measure of damage sustained on each parcel of land herein described, together with a statement specifically detailing how and in what manner the amount claimed was determined and whether the crops or any portion thereof were damaged by causes not covered under this policy.

Failure to notify this company of loss and to furnish proof of loss within the time and in the manner prescribed shall render this entire null and void.

No act or statement on the part of any agent, adjuster, or other representative of this company shall waive or dispense with the obligations of the assured to furnish such sworn statement in proof of loss, and this company shall not be liable for any loss or damage where such statement in proof of loss has not been furnished to this company within the time prescribed herein.

Any loss or damage within the provisions of this policy ascertained, determined, and proven as herein provided shall be payable sixty days after said proof of loss as provided by this policy is received by this company at its office in----.

No suit or action at law or equity for the recovery of any claim for loss or damage under this policy shall be sustainable until after full compliance by the assured with all the foregoing requirements, nor unless commenced within six months next after the date of such loss unless otherwise provided by statute.

Expressed in the form of a ratio, the company assumed the risk that the

$$\frac{\text{variable amount of product X market price}}{\text{fixed costs}}$$

would be less than 1 for the season. If the costs for an individual farmer were \$10 per acre, then for a 100 acre field insured, the amount of insurance would be \$1000. Assuming a 20 bushel per acre crop or 2000 bushels and an estimated fall price of \$1.00 per bushel, the insurance company would start with a crop prospect of \$2000. But values may quickly disappear as the season advances. A 50 per cent crop with a 40 per cent drop in market price would result in a \$400 liability, and, with a premium payment of 6 per cent or \$60, a loss of \$340 on the contract.

Other important provisions were the method of determining the value of the crop by the market price at the nearest recognized market, and the stipulation that in case of total loss, the company's liability would cover costs up to date of loss, plus a ratable portion of rental value.

As mentioned above, the company suffered heavy losses due principally to the large decline in prices that occurred in 1920. Thus, the average price declines in 1920 for the major crops of corn, cotton, wheat, and oats were as follows:

- (1)*No. 3 yellow corn, Chicago, July price \$1.58, Dec. price \$.74
- (2)*No. 1 Northern spring wheat, Min., July price \$2.88
Nov. price \$1.79
- (3)*No. 2 Hard winter wheat, Kansas City, May price \$2.93
Oct. price \$2.07
- (4)*No. 3 White oats, Chicago, April price \$1.01, July price \$.91
- (5)*Middling cotton, New Orleans, May price \$40.31, Oct. price \$20.95.

Two main difficulties were encountered in this insurance plan. How could an accurate estimate of the cost of the operations of producing the crop be made? A great number of widely varying costs were encountered, apparently bearing an inverse ratio to the applicant's ability as a farmer and to the value of his land.

The other difficulty grew out of the fact that whether crops sustained a partial loss or not, the company found in adjusting claims that it was insuring the farmer largely against a decline in market price. A statement by the president of the company¹ emphasizes these points, "We had a loss on almost every policy. It convinced us of one thing, that the issuance of a policy which proposes to pay back to the farmer the total cost of production is fallacious, and that nobody can undertake it with safety and without the risk of bankruptcy to the strongest companies in the world."

* Yearbook of Agriculture, 1929. (1) P.637; (2) P.612; (3) P.612; (4) P.648; (5) P.688.

1. Hearings of U. S. Senate Committee.

Table IV well illustrates the difficulties of the company in attempting to insure production costs. This study made in 1920 was extensive enough to show definitely the extremely high cost per acre of producing winter wheat and the impossibility of any company, regardless of its financial strength, insuring the farmer his costs of production.

Another study which better illustrates the wide variation in cost of production of winter wheat was made by the Department of Agricultural Economics, Kansas Agricultural Experiment Station in cooperation with the Bureau of Agricultural Economics, United States Department of Agriculture. Results of data collected as follows:

Cost of producing one acre of wheat
in Kansas 1921.

20 farms in McPherson County Array of costs per acre		16 farms in Jackson County Array of costs per acre	
\$12.59	\$17.04	\$15.73	\$23.19
14.34	17.66	18.05	23.72
14.93	17.80	18.46	24.08
15.55	19.18	19.55	24.98
15.78	19.37	18.89	26.00
15.79	20.36	21.57	26.94
16.20	20.56	22.61	26.97
16.29	20.94	22.83	33.34
16.91	21.48		
16.96	22.54		

This study was made on farms operating under similar conditions in their respective counties. The items of cost included were - man labor, horse labor, machinery, interest

Table IV. Variation in Net Cost per Acre by
Counties, Winter Wheat, 1920
(216 owned farms)

State and County	Number of farms with an acre cost of			Total number of farms
	Under \$25	\$25 to \$35	\$35 and over	
Missouri				
Pike Co.	2	25	12	39
Carroll Co.	1	11	13	25
Nebraska				
Gage Co.		4	13	17
Clay Co.		8	5	13
Cheyenne Co.	4	12	2	18
Kansas				
Thomas Co.	18	1		19
McPherson Co.	2	8	1	11
Pawnee Co.	10	4	1	15
Oklahoma				
Garfield Co.	3	23	5	31
Woodward Co.	15	9	4	28
Total	55	105	56	216
Percentage of total farms	25.5	48.6	25.9	
Percentage of production	37.4	46.5	16.1	

United States Department of Agriculture Bulletin No. 1198.
"Cost of Producing Winter Wheat." Table 16, P. 23.

on land, taxes on land, manure, seed, use of car, twine, threshing, insurance, overhead, and miscellaneous costs.

The heavy losses incurred during the 1920 trial did not cause the company to fail. Due to ample reserve, the large fire insurance business handled, and the fact that crop insurance was only a side line gave the company sufficient financial strength to stand all losses. But crop insurance under the plan used in 1920 was discontinued by the company, not because of the losses, but because of the apparent impracticability of the plan.

The unusual decline in prices with its magnifying effect on the error of the large amount of insurance allowed per acre in the attempt to insure investment costs overshadowed other weaknesses in the plan that were also the cause of serious losses. No provision for inspection was included in the contract; and no investigation of the risk was made by anyone directly responsible to the company. Because of this defect in the plan, many policies were placed on crops that had already suffered damage from adverse weather conditions. As one observer, who was adjusting hail losses in the wheat belt at the time, expressed it, "The farmers were lined up at the agent's office waiting their turn to insure crops that could have been touched off with a match." While this is undoubtedly an exaggerated

statement, it does indicate a condition that could have been guarded against by proper inspection of risks.

Experience in 1921

In 1921 the same large fire insurance company that wrote crop insurance the previous year was again in the field with a radically changed policy contract. The purpose of the change was to eliminate the causes of the difficulties encountered in 1920. The changes incorporated into the new policy, may be summarized as follows:

(1) The amount of insurance was determined by taking the average yield of the land during the past five years times the average price per bushel during the same period. A conservative figure was used for both the average yield and the average price.

(2) In case of total loss of the crop, the company's liability was limited to 75 per cent of the cost of operations performed and not more than 75 per cent of the amount of insurance.

(3) In case of partial destruction of the crop, the company could either pay the difference between the market value of the crop harvested and the amount of insurance, or they could replace in bushels of grain the amount the actual yield fell below the yield as stated in the policy or pay

the market value of this difference. In effect, this allowed the company to take advantage of a change of price in either direction. When the price goes up, value is the determining factor; when the price goes down, number of bushels is the determining factor.

Table V illustrates the optionable liability of the insurance company under conditions of varying price and yields. In this illustration, the average price per bushel for the previous five years was assumed to be \$1 and the average yield 7 bushels. Then if the market price was equal to or above \$1, the amount of the insurance per acre was \$7, if below \$1 per bushel, the amount of insurance was 7 bushel times the market price per bushel. It will be noted from the table that in this policy the price hazard is not only eliminated but is taken advantage of to a certain extent. The justification for this was, according to a statement¹ of the president of the company; "That it was the only way in which a policy could be framed which would sell at a price that the farmer could afford to pay. If the price hazard is to be included, the premium would necessarily be so high that the contract would be unsalable everywhere but in bad districts. The initial demand is always from the arid and

1. Hearings before U. S. Senate Committee on Crop Insurance, P.41.

Table V. Optional Liability of Insurance Company with Variable Price per Bu. Assumed Conditions under the 1921 Experiment

Amount of (\$7.00 or
Insurance (7 bushels x market price per bushel
Price per bushel used in policy = \$1.00

Price per bushel	8 bu. per acre		6 bu. per acre		4 bu. per acre	
	Return to Insured	Liability of Company	Return to Insured	Liability of Company	Return to Insured	Liability of Company
2.00	16.	0	12.00	0	8.00	0
1.50	12.	0	9.00	0	7.00	1.00
1.00	8.	0	7.00	1.00	7.00	3.00
.75	7.	0	4.50	.75	5.25	2.25
.50	4.	0	3.50	.50	3.50	1.50
.25	2.	0	1.75	.25	1.75	.75

unfavorable districts and in the good districts from the careless type of farmer. In other words, the man who has always been a failure wants protection. The man who has always been a success does not care about it unless the cost is negligible."

Stated in the form of a ratio, the two guarantees mentioned above are:

- (1) When the market price is equal to or greater than the price used in the policy:

$$\frac{\text{Amt. of crop X mkt. price per bu.}}{\text{Amt. of Ins.}} = 1$$

- (2) When the market price is less than the price per bushel used in the policy:

$$\frac{\text{Amt. of crop X mkt. price per bu.}}{\text{Amt. of bu. in policy X mkt. price per bu.}} = 1$$

Very little insurance was placed under this contract in 1921 and 1922. A loss was sustained on that which was placed and the company did not again attempt to sell insurance covering the major grain crops.

The chief difficulty with this plan seemed to be the inability of the company to free itself from the moral hazard and at the same time retain a salable contract. And it is safe to say that any plan that does not to a large extent safeguard the company from the moral hazard is doomed to failure.

An Untried Plan

At the present time there is a company in Kansas ready to place crop insurance on the 1931 winter wheat crop in Oklahoma, Kansas, and Nebraska. Much time and effort has been spent in investigation, attempting to arrive at as nearly accurate figures as possible of the cost of the primary operations of production. This investigation of costs and a mortality table for wheat due to the hazards covered in the policy was made by counties, giving a more accurate basis for measuring the risk than has been used before in attempting crop insurance on one of the major field crops.

The company has tried in every possible way to profit by the experience of previous attempts to solve the problem of crop insurance. The policy contract was written with the idea of safeguarding the company and at the same time providing as great a service to the insured as safety will permit. The conclusion reached by the officials of the company that made the extensive experiment in 1920 was, that to be successful, crop insurance must be brought down to a basis of credit or calamity insurance. The plan of the Kansas company is built upon that basis.

For the purpose of providing the information in greater detail in regard to this plan, copies of the application,

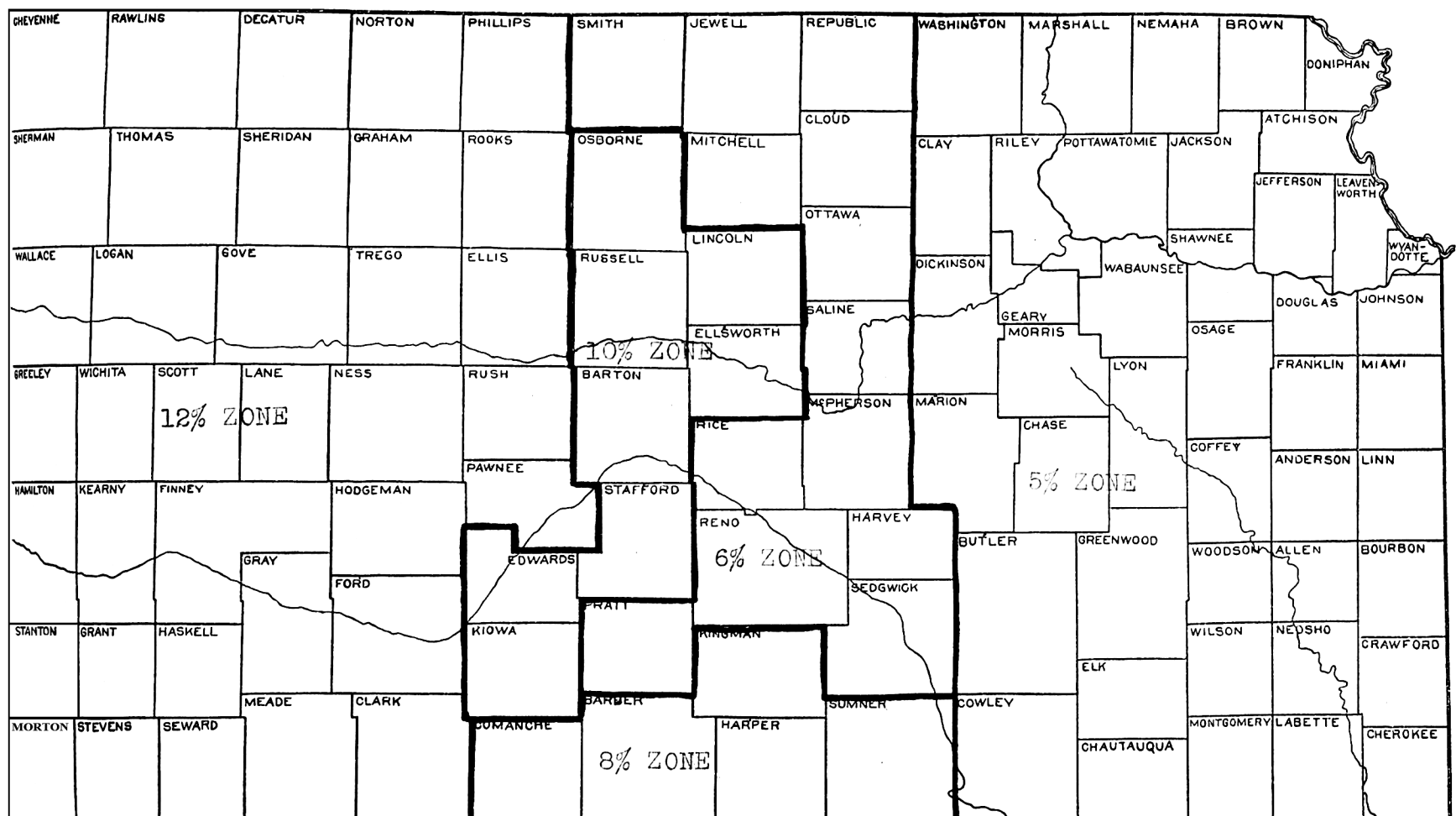


Figure 4. Zoning for Crop Insurance Rates Covering Wheat
The Kansas Crop Insurance Company

the policy stipulations and conditions, the inspector's report, and the rate sheet for Kansas showing the method of arriving at the amount of insurance to be allowed the insured, are included on the accompanying forms. The important provisions of the contract will be discussed briefly.

The plan proposes to insure the farmer against serious financial loss. To accomplish this, a definite cost is attached to each operation, as will be noted on the rate sheet including cost of seed. The cost of these operations vary with the locality and the type of farming practiced. Within any one division of the state, the amount of insurance is determined by the sum total of the cost of the operations, including seed. This amount cannot be exceeded but can be reduced if one or more of the operations have not been performed or if the insured so desires. In the eastern part of the state, the operations were given a higher value where the wheat acreage per farm is less and the machinery and power unit is smaller and the harvest operation a longer and more detailed process.

The policy then insures the farmer against loss or damage to the growing crop when caused by the hazards enumerated in the application, namely, drought, blow out, crinkle joint, flood, frost, hail, insects, rust, smut and winterkill. Although with this specific statement of the

Sample Copy of Application used in 1931 Plan.

COPY
Application for Crop Insurance
to

I,.....OF.....
(Name) (Postoffice) (Route or Street No.)
County of.....State of Kansas, hereby make application to the-----
Company of-----for Insurance upon WHEAT against loss or damage by the hazards of
DROUGHT, BLOWOUT, CRINKLE JOINT, FLOOD, FROST, HAIL, INSECTS, RUST, SMUT and WINTERKILL
only for the season of.....in a maximum amount ofDollars,
but in no event shall the applicant be entitled to an amount exceeding the actual cost
to him of producing the said crop upon each separate section of land described herein,
up to the time of loss, if any. The policy shall be in full force and effect as provid-
ed in Section 2 of "Policy Stipulations and Conditions."

(Acres of Wheat..Section..Qr.Sec...Township..Range...County..Month Plowed...Date Sown...
(.....
(Acres Acres Acres Acres Acres Acres Acres Cost Cost of
(Plowed Listed One Way Plow Disked Harrowed Drilled of Seed Harvesting
(Lines below show total cost of each operation: Grand Total
(..... of Each Sec.)

(Acres of Wheat..Section..Qr.Sec...Township..Range...County..Month Plowed...Date Sown...
(.....
(Acres Acres Acres Acres Acres Acres Acres Cost Cost of
(Plowed Listed One Way Plow Disked Harrowed Drilled of Seed Harvesting
(Lines below show total cost of each operation: Grand Total
(..... of Each Sec.)

(Acres of Wheat..Section..Qr.Sec...Township..Range...County..Month Plowed...Date Sown...
(.....
(Acres Acres Acres Acres Acres Acres Acres Cost Cost of
(Plowed Listed One Way Plow Disked Harrowed Drilled of Seed Harvesting
(Lines below show total cost of each operation: Grand Total
(..... of Each Sec.)

(Acres of Wheat..Section..Qr.Sec...Township..Range...County..Month Plowed...Date Sown...
(.....
(Acres Acres Acres Acres Acres Acres Acres Cost Cost of
(Plowed Listed One Way Plow Disked Harrowed Drilled of Seed Harvesting
(Lines below show total cost of each operation: Grand Total
(..... of Each Sec.)

TOTAL INSURANCE APPLIED FOR.... \$.....
All situated in the County of.....State of Kansas, as per diagram below.
Sec.....T.....R..... Sec.....T.....R..... Sec.....T.....R..... Sec.....T.....R.....

The above squares each represent one section, small squares 40 acres. Always show
the exact location of each risk, and how seed bed is prepared in each risk.

Average Condition of above Section %	Average Condition of Above Section %	Average Condition of above Section %	Average Condition of above Section %
---	---	---	---

What amount of seed was used per acre?... Who furnishes seed?... Is this being used for a
nurse crop?... Was seed treated for smut?... Are you interested in any other like crops
not shown in this application?... How much of this land is subject to overflow?... How
much of this land will retain standing water?... Has there been any total or partial crop
failure on this land during the past five years?... Cause and extent... What has been done
to prevent recurrence?... Are you owner or tenant?... How far is this land from your resi-
dence?... Is there now insurance of any kind on this crop?... If so, how much, and kind?...
Has any company refused to insure this crop?... Is the crop in a healthy growing condition?
Land Owner's Name and Address.....Any Mortgage?.....Amount \$.....
Mortgagee.....

Loss, if any, payable to....., Mortgagee, as interest may appear; subject, nevertheless, to all the conditions of this application and policy, if issued. IT IS UNDERSTOOD AND AGREED:

That this company shall not be bound by any act or statement made by its agents or representatives restricting its rights or waiving its written or printed contract unless inserted in this application or by indorsement of the company.

I, the undersigned applicant for insurance, and the owner of the wheat propose to be insured, and I warrant the foregoing application to contain a full, true and complete description and statement of the number of acres of wheat to be insured, the cost, the condition, method and amount of cultivation, plowing, harrowing and planting, amount of seed sown, and location and situation of the wheat proposed to be insured by ----and I warrant the answers to each of the foregoing questions to be true and are made by me or by my authority, and shall be taken as my act and this application shall be a part of the policy issued thereon, and taken together with the said policy shall constitute my contract with said company.

This application signed.....19....

.....o'clockM.Applicant.

Application taken on the day and hour above stated by.....Agent.

At.....

Policy Stipulations and Conditions

1. This policy of insurance is based upon the warranties, statements, representations and descriptions contained in the insured's application, a duplicate of which is attached hereto and made a part hereof.

2. This policy of insurance shall take effect from date of issue and shall cease when the crop or crops insured hereunder have been threshed, but in no event on Bound or Combined wheat later than August 1st and on stacked wheat policy will expire on the first day of November following the date of issue at twelve o'clock noon, unless otherwise provided by agreement in writing added hereto.

3. This entire policy shall be void if the insured has concealed or misrepresented any material fact or circumstance concerning this insurance or the subject thereof; or if the interest of the insured in the crop covered hereunder be not truly stated herein; or in case of any fraud or false swearing by the insured touching any matter relating to this insurance or the subject thereof, whether before or after a loss; or if the insured shall neglect to use all reasonable means to save and preserve the crop covered hereunder, whether before or after a loss.

4. This entire policy shall be void unless otherwise provided by agreement in writing added hereto if any change other than by the death of the insured take place in the interest, title or possession of the subject of insurance, or if this policy be assigned before a loss, on the crop covered in whole or in part of this policy. If at any time it is learned that the wheat described in the application and insured herein has been damaged by over pasturing this policy and insurance shall be and become null and void.

5. If at the time of harvest and/or threshing the crop yield by reason of any of the hazards insured against does not equal or exceed in money the amount set forth in insured's application attached hereto, the company shall not be liable for any loss or damage greater than the difference between the value, to be fixed as hereinafter provided, of the grain actually harvested or possible to harvest as described in the application and the amount of insurance provided for herein, and in computing same the loss shall be determined by threshers' receipts or elevators' receipts or by the standard measurements of bin or crib. All such receipts shall be sworn to by the claimant before a Notary Public. Price of grain shall be determined at the time of adjustment at the two nearest elevators, less transportation charges. All wheat owned by assured and insured in any one Section under this policy shall constitute one unit, and loss will be adjusted on the basis of all wheat owned by the assured in that unit. All losses must be directly traceable to the hazards against which the crop is insured.

6. In case the crop insured hereunder shall be totally destroyed and/or abandoned by reason of the hazards insured against, before the time of harvest, the liability of this company shall in no event exceed the cost of operations up to the time of loss and in the event there be any other insurance of substantially light character, exclusive of hail insurance, whether valid or not, on the crop or crops insured hereunder the liability of this company shall be limited to such part of the loss as the insurance provided herein bears to the total insurance in force.

7. In the event a total loss is claimed by the insured and that further cultivation and harvesting of the damaged crop or crops is unwarranted, this company shall have thirty days after the receipt of the notice of loss provided for herein in which to investigate the condition of the crop or crops insured and the claim for loss or damage thereunder, and may at its option, harvest, save, or otherwise dispose of the said crop or crops for its own account, but in no event shall there be any abandonment of any crop insured hereunder without the consent of this company.

8. In the event crop or crops insured hereunder warrant abandonment in time to put in spring crops, the company shall have until the first day of May in which to investigate the condition of the crop or crops insured in order to determine the value of the crop to be abandoned so that intelligent adjustment of loss may be made on the acreage to be abandoned.

9. In case of disagreement as to the correctness of the crop acreage set forth in the application of the insured, the insured shall furnish without cost to this company an accurate survey, made by a licensed surveyor, showing the exact area of the land which the insured crop actually covers. In case it shall be determined that the exact area covered by the crop insured hereunder is less than the total acreage stated in the application of the insured, the total amount of insurance under this policy shall be reduced in that proportion that the deficiency in acreage thus shown bears to the total acreage stated in said application.

10. The insured shall give immediate notice to this company at its home office at-- of any loss and within ten days from the date of loss shall furnish a proof of loss, subscribed and sworn to by himself and the person who threshed the crop if threshed, of any loss or damage by reason of any of the hazards insured against, stating: (1) The postoffice address of the insured, (2) The number of his policy, (3) The total acreage and description of the crop damaged, (4) The cause of loss or damage, (5) Complete statement of the condition of the damaged crop, (6) Whether the crop has been damaged by any cause not insured against by this policy, (7) Whether there is any other insurance on the crop covered by this policy, (8) If other insurance of substantially like character, exclusive of hail insurance, name of companies and amount of insurance, (9) Whether crop is harvested or unharvested, (10) The measures taken to protect the crop from further damage, or (11) If crop is unharvested, whether the crop is so damaged that further cultivation and harvesting would be unwarranted, and (12) If further cultivation of the damaged crop is unwarranted, the desire of the insured as to the use of the land for the remainder of the current season.

11. The insured as often as may be reasonably required shall exhibit to any person designated by this company all that remains of any crop, for which loss and damage has been made and submit to examination, under oath, by any person named by this company, and subscribed the same; and, as often as may be reasonably required shall produce for examination all books of account, bills, invoices, and other vouchers, or certified copies thereof, if originals be lost, as such reasonable time and place as may be designated by this company or its representatives and shall permit extracts and copies thereof to be made.

12. The company shall have the right to accept or reject this application within thirty days after its receipt at the home office of the company. When an inspection of the crop cannot be made within the thirty days herein provided for, because of conditions over which the company has no control, such thirty day period shall be extended until the company has had a reasonable time to make such inspection.

13. Failure on the part of the insured to notify this company of any loss and to furnish proof of this loss within the time and in the manner prescribed herein, or failure on his part to perform any other act required of him by any of the conditions or covenants hereof, or failure to comply with any of the terms, conditions, or covenants hereof, or failure to cut the crop or crops within a reasonable time after becoming ripe shall render this policy null and void.

14. The amount of loss or damage for which this company may be liable shall be payable sixty (60) days after due notice, ascertainment and satisfactory proof of loss and adjustment on said unit have been received by this company in accordance with the terms of this policy. But the company shall not be required to make any payment for losses claimed by the applicant until such time as the profit or loss of the entire acreage insured under any one unit shall have been ascertained.

INSPECTORS REPORT

Policy No. _____

Acres in	Section	Township	Range	County	Date Sown	Percentage of Stand	State of Kansas
_____	_____	_____	_____	_____	_____	_____	_____

Is this land upland or bottom land _____
 No. of acres 1st bottom land _____
 Does any part of land overflow _____
 Does any part retain standing water _____
 Does any of this land blow _____
 Has any of it blow at this time _____

No. of acres 2nd bottom land _____
 If so, how much _____
 If so, how much _____
 If so, how much _____
 Are there any adjoining fields
 that are blowing at this time _____

No. inches dry dirt on top _____
 No. inches subsoil moisture _____
 Is seed bed good, fair or poor _____
 Is there any fly or insects in
 wheat at this time _____
 If so, to what extent _____
 Give amount of volunteer wheat _____
 Give kind of crop grown on the
 land last season _____
 Give kind of soil _____

No. acres rough _____
 No. acres rolling _____
 No. acres level _____

Show location of wheat in section

REMARKS:

Acres in	Section	Township	Range	County	Date Sown	Percentage of Stand	State of Kansas
_____	_____	_____	_____	_____	_____	_____	_____

Is this land upland or bottom land _____
 No. of acres 1st bottom land _____
 Does any part of land overflow _____
 Does any part retain standing water _____
 Does any of this land blow _____
 Has any of it blow at this time _____

No. of acres 2nd bottom land _____
 If so, how much _____
 If so, how much _____
 If so, how much _____
 Are there any adjoining fields
 that are blowing at this time _____

No. inches dry dirt on top _____
 No. inches subsoil moisture _____
 Is seed bed good, fair or poor _____
 Is there any fly or insects in
 wheat at this time _____
 If so, to what extent _____
 Give amount of volunteer wheat _____
 Give kind of crop grown on the
 land last season _____
 Give kind of soil _____

No. acres rough _____
 No. acres rolling _____
 No. acres level _____

Show location of wheat in section

REMARKS:

Is this wheat being pastured _____
 If so, do you consider it being damaged in any way from over pasture _____
 Was the seed bed prepared as described in the application _____
 Has there been any loss by Hail on this land in the past three years _____
 If so, give the year and percentage of loss each season _____
 State whether there has been any crop failure on this land in the past 3 years _____
 If so, give the cause _____
 Does applicant own any wheat other than shown on application _____
 State how much and why it was not insured under same application _____
 Was seed treated for smut _____ Are legal numbers in application correct _____
 Do you FULLY RECOMMEND THIS RISK _____
 I do hereby declare I have made a thorough inspection on all of the risks
 shown in the above diagram.

Assured _____

Dated this _____ day of _____ 1929

Address _____

Inspected & Signed by _____

OFFICIAL CROP INSURANCE RATES

and

SCHEDULES SHOWING THE MAXIMUM COST OF EACH OPERATION THAT IS ALLOWED IN EACH ZONE

THESE ALLOWANCES CANNOT BE EXCEEDED BUT MUST BE REDUCED BY THE AGENT IN TAKING THE APPLICATION IF IN EXCESS OF ACTUAL COST OF OPERATIONS AS STATED BY APPLICANT

Rate \$5.00 Cash per each \$100 Insurance
Limit of Insurance \$10.00 per Acre

5% Zone		
Plow	2.00	Allen
Disc	1.00	Anderson
Harrow	.25	Atchison
Drill	.50	Bourbon
Seed	1.75	Brown
Harvest	4.50	Butler
	10.00	Chase
		Chautauqua
		Cherokee
		Clay
		Coffey
		Cowley
		Crawford
		Dickinson
		Doniphan
		Douglas
		Elk
		Franklin
		Geary
		Greenwood
		Jackson
		Jefferson
		Johnson
		Labette
		Leavenworth
		Linn
		Lyon
		Nemaha
		Neosho
		Marion
		Marshall
		Miami
		Montgomery
		Morris
		Osage
		Pottawatomie
		Riley
		Shawnee
		Wabaunsee
		Washington
		Wilson
		Woodson
		Wyandotte

Rate \$6.00 Cash per each \$100 Insurance
Limit of Insurance \$8.00 per Acre

6% Zone		
Plow	1.50	Cloud
Disc	.75	Harvey
Harrow	.25	Jewell
Drill	.50	McPherson
Seed	1.50	Mitchell
Harvest	3.50	Ottawa
	8.00	Pratt
		Reno
		Republic
		Rice
		Saline
		Sedgwick
		Smith

Rate \$8.00 Cash per each \$100 Insurance
Limit of Insurance \$8.00 per Acre

8% Zone		
Plow	1.50	Barber
Disc	.75	Comanche
Harrow	.25	Harper
Drill	.50	
Seed	1.50	Kingman
Harvest	3.50	Sumner
	8.00	

Rate \$10.00 Cash per each \$100 Insurance
Limit of Insurance \$7.00 per Acre

10% Zone		
Plow	1.50	Barton
Disc	.75	Edwards
Drill	.50	Ellsworth
Seed	1.25	Kiowa
Harvest	3.00	Osborne
	7.00	Lincoln
		Russell
		Stafford

Rate \$12.00 Cash per each \$100 Insurance
Limit of Insurance \$7.00 per Acre

12% Zone		
Plow	1.50	Clark
Disc	.75	Decatur
Drill	.50	Ellis
Seed	1.25	Graham
Harvest	3.00	Meade
	7.00	Norton
		Pawnee
		Phillips
		Rush
		Trego
		Ness

Rate \$12.00 Cash per each \$100 Insurance
Limit of Insurance \$7.00 per acre

12% Zone		
Plow	1.50	Cheyenne
Disc	.75	Finney
Drill	.50	Ford
Seed	1.25	Gove
Harvest	3.00	Grant
	7.00	Gray
		Greeley
		Hamilton
		Haskell
		Hodgeman
		Kearney
		Lane
		Logan
		Morton
		Rawlins
		Rooks
		Scott
		Seward
		Sheridan
		Sherman
		Stanton
		Stevens
		Thomas
		Wallace
		Wichita

hazards covered and the provision that all losses must be directly traceable to the hazards against which the crop is insured, it does not show the extent of the risk, for the very important hazard of a fluctuating market price is assumed by the company.

Expressed in the form of a ratio, the company assumed the risk that the

$$\frac{\text{variable amt. of crop X market price}}{\text{Fixed costs per acre}}$$

will be less than 1.

Two other provisions of the contract which are outstanding improvements over former attempts in this field of insurance, should be mentioned. The first deals with the inspection of risks. As will be noted on the inspector's report sheet information in regard to the topography of the land, the texture and kind of soil, the amount of subsoil moisture, condition of seed bed, etc. is collected by the inspector. It is intended that the inspector carry a soil auger and actually determine to the best of his ability, the number of inches of subsoil moisture.

The plan of organization for inspection of risks recognized by the company to be of vital importance to its welfare, is to secure the services of a responsible individual, preferably a stockholder in the company, for each congres-

sional district. The inspector will be in the direct employ of the company and will have nothing to do with the writing of the application. Then there will be a state inspector who will from time to time take a few applications from each county that the district inspector has passed on and make another inspection for the purpose of checking up on the local inspector. It is expected in this way to avoid the insuring of undesirable risks and to keep the inspection work uniform over the area covered by the company.

A second provision which is an improvement over previous contracts is in substance that all of the wheat owned and insured in any one section shall constitute one unit, and loss will be adjusted on the basis of all the wheat owned by the insured in that unit. In other words, one field may experience a partial or total failure due to one or more of the hazards mentioned in the policy, but if the return from the section or the insurance unit is equal to the amount of insurance covering the unit, no liability is due the insured.

In conclusion, the company by its policy plan is safeguarded to a much greater extent than had been accomplished before. The spread of risks covering the three states is probably sufficient under average conditions if a large reserve is maintained. The rates, showing a similarity to the

zoning of hail rates, in Kansas at least, are undoubtedly high as compared with charges in the earlier plans of crop insurance. The amount of insurance is comparatively low, and according to a statement by an official of the company, the amount will be reduced as the cost of operations decline.

The company has the advantage of all the experience gained by earlier attempts and it also is at an advantage in starting its operations during a period of comparatively low prices, in direct contrast to the conditions experienced by the company making the 1920 trial. Judging from secular price trends, the probability of a further decline in prices is relatively small, and any advance in prices would be an advantage to the company.

As a basis for closer comparison, the important details of the crop insurance policies, including the present Kansas company, have been brought together in the accompanying chart. There are many similarities in the five policies and several outstanding differences. It will be noted that the 1931 plan has several new features: it insures only wheat; all the crop on one section is insured as a unit; there is careful inspection of risks; and its basis is to be insurance against serious financial loss of a material part of the actual investment in the crop.

Resume' of Important Features of Policy Contracts.

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Attempt	Spread of Risks	Crops Covered	Basis for determining amount of insurance	Hazards Covered	Hazards excluded	Rate	Unit for insurance	Inspection of risks
1899	Narrow Minn. No. Dak.	Small grains	Probable return from crop \$5 per acre	All hazards covered	No hazards excluded	5%	Acre	No
1917	Narrow Mont. No. Dak. So. Dak.	Wheat Flax Oats Barley Speltz Rye	Return for three previous years \$7 per acre	Weather Plant diseases Animal & Insect pests	Fire Flood Winter-kill Price Negligence	10%	All small grain on farm ----- The acre for adjusting losses	No
1920	Wide most of U. States	Wheat Corn Oats Rye Barley Cotton	Costs of production	Weather Plant diseases Animal & Insect pests Price	Fire Hail Wind or tornado Failure of seed to germinate Negligence	Acreage of 6%	Acre	No
1921	Wide most of U. States	Wheat Corn Oats Rye Barley Cotton	Average yield and price for previous 5 years	Weather Plant diseases Animal & Insect pests	Fire Hail Wind or Tornado Failure of seed to germinate Negligence Price	Average of 6%	Acre	No
1931	Comparatively narrow Okla. Kansas	Wheat	Cost of principal crop operations \$7 to \$10 per acre	Drought Blowout Crinkle joint Flood Frost Hail Insects Rust Winter-kill Price	Weather hazards and plant diseases not mentioned	7% to 12%	All wheat in one section	Yes

Attempt	Type of Agency	Reserve strength of company	Basis for insurance	Total loss liability determined on basis of	Partial loss liability determined on basis of	Principal causes of failure
1899	Unknown	Small	Crop investment	Amount of insurance \$5 per acre	Amount of insurance, less yield times market price per bushel	Narrow spread of risks Low rates Unreliable concern
1917	Banks	Small	Crop investment	Amount of insurance \$7 per acre	Amount of insurance, less yield times fixed price per bushel in contract	Insurance written too late in season after failure in sight Banks wrote contracts to cover credit extended to farmers Drought
1920	Fire insurance agents	Large	Crop investment or production costs	Amount of insurance or outlay until crop was abandoned and ground reseeded	Amount of insurance less market value of damaged crop at harvest time	No inspection of risks; Amount of insurance too high; Price declines Moral hazard
1921	Fire insurance agents	Large	Crop investment	75% of cost of crop operations up to time of loss and not to exceed 75% of insurance	Difference between market value of crop and amount of insurance or replace difference in yield or market value of differences of yield.	No inspection Contract unsaleable Moral hazard too great
1931	Banks principally	Medium size	Credit and calamity	Cost of operations up to time of loss	Amount of insurance less value of damaged crop	

Principles and Problems

The farmer's need is for a form of insurance that will protect him from serious financial loss and at the same time a form that can be obtained at a reasonable cost. Although a company may realize this need and purpose of insurance, it must protect itself against serious depletion of its reserves if it is to perform this function for the farmer. As a basis for its plan of operations, certain problems will have to be at least partially solved. A few of these problems are:

- (1) An accurate measure of the risks assumed.
- (2) The amount of insurance that can be offered.
- (3) The hazards that can be safely covered.
- (4) The method of assuming the liability.

The uncertainty of the amount of risk to which the insurance company is exposing itself has been and still is the most important difficulty in the path of a successful plan of crop insurance. In past experience, very little or no accurate data useful to a plan of this type had been gathered which left the chances of success almost entirely to luck

In analyzing the various policies which have been used the risk to the insurance company has been expressed as a ratio, the measure of the risk being the probability that

the ratio would become less than one.

$$1899 \quad \frac{\text{variable amt. of grain X variable price}}{\text{amt. of insurance (\$5)}}$$

$$1917 \quad \frac{\text{variable amt. of grain X fixed price per bu.}}{\text{fixed costs (\$7)}}$$

$$1920 \quad \frac{\text{variable amt. of product X variable price}}{\text{cost of production}}$$

$$1921^1 \quad \frac{\text{variable amt. of crop X variable price}}{\text{amt. of insurance}}$$

$$1921^2 \quad \frac{\text{variable amt. of crop X variable price}}{\text{amt. of bu. in policy X variable price}}$$

$$1931 \quad \frac{\text{variable amt. of crop X variable price}}{\text{fixed costs}}$$

It will be observed:

- (1) That the larger the fixed demoninator is the greater the probability that the ratio will be less than one.
- (2) That in all five cases, the important hazards affecting the amount of the crop were assumed by the company and in three of the five, the important hazard of a variable market price was assumed.

-
1. Market price above price used in policy
 2. Market price above price used in policy.

Expressing the risk to which the company is exposed in the form of a ratio, it would be very desirable to know how often and to what extent the ratio will fall below one. The importance of this point is more fully appreciated when one realizes that the extent to which the ratio falls below one not only determines the amount of the liability on any one risk but also the number of risks on which a liability will be due.

To present more clearly this important difference between crop insurance and most other lines of insurance, the following table illustrating the results of a drop in price from \$1 to 80 cents has been prepared. The same results would be obtained with a drop in yield of 20 per cent over an area covered by the company. From the table, it is apparent that the drop in price not only increases the liability of risks number 1, 2, 3, and 4 but also extends the liability to risks 5 and 6.

To accurately measure the risk is impossible. Only from the broad average of what has occurred in the past can the possible future trend be determined, and this with the possibility of more or less wide fluctuations from normal. One approach that can be made is to determine a normal crop over a long term of years. And this does not mean for the United States or for a state, but for a county or township

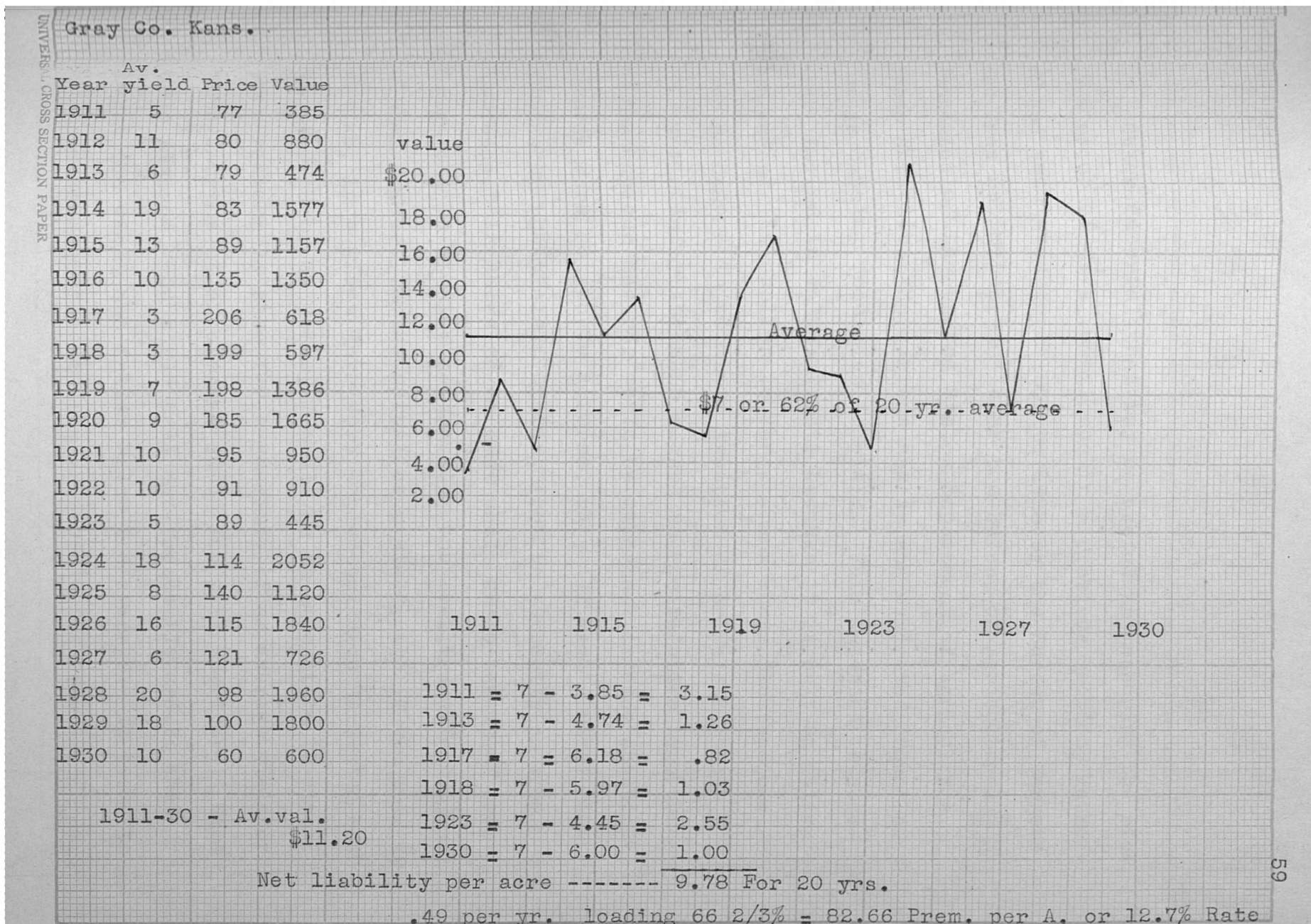
Amount of Insurance \$8.00 per Acre

Risk No.	Yield bu.	Price \$1.00 return	liability	Price 80¢ return	liability
1	4	\$ 4.00	\$ 4.00	\$ 3.20	\$ 4.80
2	5	5.00	3.00	4.00	4.00
3	6	6.00	2.00	4.80	3.20
4	7	7.00	1.00	5.60	2.40
5	8	8.00	----	6.40	1.60
6	9	9.00	----	7.20	.80
7	10	10.00	----	8.00	--
8	11	11.00	----	8.80	--
9	12	12.00	----	9.60	--
10	13	13.00	----	10.40	--

or perhaps a group of farms having similar characteristics. Then the number of times and the extent each time the yield falls below the percentage of normal yield that is to be used as a basis for the amount of insurance.

Figure 5 illustrates what might be done with a record of the yield and price over a term of years. But this is only an indication of liabilities the company may be called upon to assume. Even in the better years, some losses will be experienced and in the poor years, some farmers will have crop incomes equal to or greater than the amount of insurance. Selection of risks by careful inspection will greatly influence the extent of a company's liability.

Fig. 5 Suggested Method of arriving at amount of insurance and premium rate.



Other material that may be useful in measuring the risk is a group of data, mentioned in a previous section, gathered and tabulated from 1909 to 1925 by the Bureau of Markets and Crop Estimates and later the Bureau of Agricultural Economics of the United States Department of Agriculture. These data list the various causes and estimated amount of damage causing reduction in yield. This material is somewhat limited in value, first, because it is only an estimate and second, it applies to large areas where fluctuations from no damage to total destruction of crops will occur.

While information in regard to the relative importance of the various hazards would be important in case certain hazards were not to be covered, they all have a direct influence on the yield. Quoting from an authority on crop insurance, "It seems to me that while these causes of crop damage can be studied separately, the combined effect of all of them appears in the actual crop yield, and if you were to give me, in a given territory the actual crop harvested each year for 10 or 20 years, I would be in a position to give you a reasonable rate for a guaranty of an average yield or three-fourths of an average yield for that territory. From those figures, you could tell how frequently and to what extent the yield had fallen below the average. It seems to me the most significant data as a basis for crop insurance

premiums or rates is really the actual yield on a given farm over a long series of years."¹

In several of the attempts that have been made with crop insurance, the amount of insurance has been based on the cost of production or cost of crop operations. Without exception, difficulty was experienced because of the wide variation in the costs encountered, and the high total per acre cost. Experience would indicate the impracticability of guaranteeing cost of production to the farmer. Quoting from the official of the company that made the 1920 experiment; "The issuance of a policy which proposes to pay back to the farmer the total cost of production is impossible and would bankrupt the strongest company in the world."²

Suppose, for example, that in a given case, total costs were found to be \$12 per acre, and that the important primary costs of seed, plowing, disking, drilling and harvesting were found to be \$7 per acre. If the insurance is to serve as a basis for credit or to avoid financial loss, the amount need not be more than \$7 or \$8 per acre, and the rate could be relatively low; if the insurance is to cover his costs of production or return a profit, the rate will need to be much higher, since the probability of loss is greater.

1. Mr. V. N. Valgren, Hearings before U. S. Senate Committee on Crop Insurance, P.14.

2. Hearings of U. S. Senate Committee on Crop Insurance P.39.

A possibility in this connection is a graded rate plan whereby the farmer could name the amount of insurance, within certain limits, to suit his circumstances at the time. For example, the following amounts could be offered at their respective rates: \$5 at 3 per cent; \$8 at 6 per cent; or \$12 at 10 per cent. This plan would have the advantage in that it would enable the farmer to see that he was paying according to the benefits he might expect to receive. There would also be the incentive to take out the smaller amount instead of the larger. This would enable the insurance company to get a wide spread of risk and require loss payments less often than with the higher limits. In time it should result in a change of the farmer's viewpoint from insurance as a source of profit to insurance against unusual damage or financial loss.

A problem of equal difficulty to that of determining the amount of insurance, deals with what hazards are to be covered. In some cases in the past, only the hazards affecting the amount of crop were assumed, while in others both the amount of crop and the price risk were covered. To the farmer, the price hazard is perhaps the more important. What he desires to know is what his crop will be worth at harvest time. From the company's point of view, it is a question of being able to cover this additional hazard and

still keep the premium at a reasonable figure.

If the company assumes the price risk, the difficulty of measuring the risk assumed is materially increased; and the actual probability of loss may or may not be increased. In any given year, a small crop usually results in a higher price. But this condition does not always obtain, and when as it sometimes happens, yield and price move downward together, a heavy loss may be the result causing the company to fail. Table VI has been drawn up to show the effects of including, disregarding, or making use of the price hazard in the 1917, 1920 and 1921 experiments in crop insurance. It is obvious that in 1921 the company profitted most by its contract providing that liability should be determined by yield times market price when the price was equal to or above the price per bushel named in the policy and by the loss of yield below yield named in policy when the market price was below the price named in the policy. It will also be observed that in the 1917 contract, when the yield fell below the yield named in the policy, it was impossible to escape a liability regardless of the market price.

It is not possible here to enter into a separate study of methods of price insurance; but it seems evident that no insurance plan for the purpose of stabilizing the farmer's

Table VI. Showing the Effect of the Price Hazard on the Insured's
Return and the Company's Liability per Acre Under
Conditions of Varying Price and Yield

Yield	Price	1917		1920		1921	
		Price hazard not included amt. of ins. \$7. at \$1. per bu. return	liability	Price hazard included amt. of insurance \$7.00 per acre return	liability	Optional Liability Price hazard made use of amt. of ins. \$7. at \$1. per bu. return	liability
8	\$1.75	\$14.00	\$ 0	\$14.00	\$ 0	\$14.00	\$ 0
8	1.50	12.00	0	12.00	0	12.00	0
8	1.00	8.00	0	8.00	0	8.00	0
8	.75	6.00	0	7.00	1.00	6.00	0
8	.50	4.00	0	7.00	3.00	4.00	0
6	1.75	11.50	1.00	10.50	0	10.50	0
6	1.50	10.00	1.00	9.00	0	9.00	0
6	1.00	7.00	1.00	7.00	1.00	7.00	1.00
6	.75	5.50	1.00	7.00	2.50	5.25	.75
6	.50	4.00	1.00	7.00	4.00	3.50	.50
4	1.75	10.00	3.00	7.00	0	7.00	0
4	1.50	9.00	3.00	7.00	1.00	7.00	1.00
4	1.00	7.00	3.00	7.00	3.00	7.00	3.00
4	.75	6.00	3.00	7.00	4.00	5.25	2.25
4	.50	5.00	3.00	7.00	5.00	3.50	1.50
Total		\$119.00	\$20.00	\$114.50	\$24.00	\$118.00	\$10.00

income would be complete if it did not cover the price hazard. Unquestionably, if the price hazard is to be included in an insurance contract, it must be done by increasing the rate or reducing the amount of insurance.

The method of assuming the liability presents the problem of whether the insured is to receive protection against any and all amounts of damage, or against actual loss of a part of the investment in the crop. Assuming a fixed price per bushel, the company can in one case pay for all loss in crop yield below a fixed limit at the assumed price, or, in the other case, it can meet any loss which the farmer has in the same proportion of the amount of insurance that the damage bears to a normal crop.

In the first case, the plan might be applied to the 1917 ratio:

$$\frac{\text{variable amt. of grain} \times \text{fixed price per bu.}}{\text{fixed costs}}$$

The following conditions are assumed: undamaged crop, 20 bushels; price per bushel, \$1; amount of insurance, \$10; effect, 10 bushel per acre guaranteed. In this case, the crop may suffer 50 per cent damage before the liability of the company begins.

In the other case, where the company pays for any loss, the company's liability begins at once. The ordinary hail

contract being an example of this plan of assuming the risk.

Mr. V. N. Valgren, an authority on crop insurance, of the United States Department of Agriculture has named the following principles fundamental to a sound plan of crop insurance:¹

1. "The insurance must cover only such crop damage as will result in serious financial loss to the farmer.

2. "The insurance must cover any and all hazards which are beyond the farmer's control.

3. "In no case must the insurance protect against loss from carelessness or negligence on the part of the insured.

4. "The premium, or cost of insurance, must bear a reasonable relationship to the value of the protection that it purchases.

5. "The method of adjusting loss must be such that the insured will receive indemnity for crop damage in the amount or on the basis that he is led to expect from the figures indicating the amount of insurance an acre.

6. "An early adjustment should be provided for in case of total loss.

7. "All adjustments involving only partial loss should so far as possible, be left until after the crop has been harvested.

1. U.S.D.A. Bulletin 1043, P.26, Crop Insurance: Risks, Losses, etc.

8. "Lastly, there must be a certain degree of understanding between the farmers and the company offering the insurance if protection is to be on truly favorable terms."

Some Difficulties of Crop Insurance

Moral Hazard

Crop insurance, a plan to lessen the individual risk of the farmer due to uncontrollable hazards, has its own hazards also, which must be eliminated or effectively guarded against before it can become successful. The moral hazard is a factor to contend with in practically all lines of insurance. One of the first requirements of an ideal insurance risk is that it cannot be brought about by human action. Hail insurance is among the few forms of insurance that benefit because of this attribute.

In fire insurance, buildings may be set on fire; in marine insurance, ships may be scuttled; or in theft insurance, goods may be removed by the owner. In these and other lines of insurance, the moral hazard has not been eliminated but has been effectively guarded against by keeping the amount of insurance materially below a conservative estimate of the value of the insured risk. In crop insurance, it still remains to be seen if the same means can be used to overcome this difficulty.

In all of the experience with crop insurance thus far the moral hazard has proven an important factor in the losses and in the failure of the attempt. It appeared first in the selection of risks. The greatest demand apparently coming from the unfavorable districts and from the careless and indifferent farmers in the better districts. It appeared later in the adjustment of losses due to important hazards such as drought, excess moisture, insects and disease, that cannot be accurately measured or separated from losses caused by neglect on the part of the farmer.

Unfortunately in these earlier attempts, no effective means were found to guard against adverse selection of risks. In a communication from an agent who wrote insurance for the company making the 1920 attempt, the following statement was made: "The farmer with the poor land, and the farmer who would say, 'Well I don't give a _____ whether I plow corn or not, I am sure of either corn or money', are the fellows who would want this insurance. It was difficult to interest the better farmers. Consequently, the moral hazard was great." No inspection of risks was provided fire agents and banks being allowed to write applications indiscriminately either for the purpose of getting the commission or insuring credit already extended to the applicant.

There is of course, danger in carrying the selection of risks too far. A proper balance should be maintained between the selection of risks and the necessity of securing a broad average that can only be obtained through a large number of risks. After the best selection possible in keeping with this principle is made, many opportunities for dishonesty and unfairness on the part of the insured are possible. As is the case with hail insurance, there is the possibility of claiming damage from hazards not covered in the policy. This would make it seem advisable, in view of a more favorable acceptance by the farmer, to cover all uncontrollable hazards to which the crop is subject to damage. The difficulty the company would encounter in determining the actual amount of crop harvested and marketed are also possibilities for fraud.

Company and Methods Used

In so far as it is possible, avoidance of poor risks lies partly in the insurance plan and partly in the company and methods used in carrying out the plan. In this respect mutual companies have a distinct advantage in that the insured as a group are the company and would have a mutual interest in guarding against negligence and fraud on the part of any individual within the group. The disadvantage of

this type of company would be the narrow spread of risks unless a number of the mutuals would combine into one large company providing reinsurance facilities which permit a company to limit its loss in any one disaster to amounts in keeping with their carrying capacities.

The forms of moral hazard are so numerous and varied that it seems impossible to guard against them without the cooperation of the community. Under whatever type of company used, a plan of local control within a community or county, of securing applications and adjusting losses might prove of real value. For example, a committee or board in each community, responsible to the company for adjusting losses and keeping records of actual experience would make possible the adjustment of rates on an experience basis and might lead to a community of interest that would help in guarding against the moral hazard.

Another method, that handles this problem of closer supervision by the company, has been used by a company in writing crop insurance on special crops such as sugar cane, vegetables, fruits, etc. The company dealt directly with cooperative associations or large commission consignment firms or selling agencies that handled the crops of a great many individual farmers. A master policy was issued to the association insuring a per cent of total normal production

of the association. Then the farmer secured his insurance from the secretary of the association, which he in turn used as security for credit with the association. The co-operative association secured the funds for loaning to the farmers by using the insurance policy for security with the Federal Intermediate Credit bank. This plan might be applied to the major field crops if the farmers could be bound closely together by a cooperative marketing association.

The proper time during the production period of the crop to sell crop insurance is another thing which complicates the problem. In past experience it was the intention not to insure the crop until it was above ground and in a healthy condition. Many farmers by that time did not want to insure and consequently narrowed the risk, both as to number and quality. The farmer with a good looking crop did not want insurance and the farmer with a poor looking crop could not get it. A solution to this problem would be to sell the insurance before the crop is planted or at a time when neither the farmer nor the company know what the weather conditions will be. But this would increase the risk to the extent that it would be highly impracticable for a company to offer crop insurance on such terms that the insured could afford to use it. However, there is no justifi-

cation for taking the entire responsibility away from the farmer. It should be his responsibility that the seed will germinate, and that soil and moisture conditions are such that a healthy state of growth will be reached.

The Attitude Toward Insurance

Granting a condition of ample reserves, competent management, and avoidance of poor risks, there is still an important difficulty to be overcome. It is generally believed, and also borne out by a limited amount of experience that no plan of crop insurance, no matter how efficiently planned or managed, can be successful without the favorable attitude of the farmer such as is now enjoyed by life, fire, and other permanently established lines of insurance. It is generally conceded that the farmer's attitude is not favorable to crop insurance. The reason for this is found in his experience with hail insurance. The opportunity to gamble in hail insurance, the opportunity for some dishonesty and fraud in claiming damage, and the sometimes questionable policy in adjusting losses has built up a feeling of distrust that will carry over into other lines and make the establishment of crop insurance more difficult.

Because of the unfavorable experience of past attempts, a company entering this field of insurance will in all

probability have a policy plan loaded with restrictions whose main object is to safeguard the company from heavy losses that will endanger its limited reserve. The Kansas company now ready to write crop insurance on winter wheat is typical of this rather terse description. Its rigid inspection of risks, its limiting of acreage to 20 per cent of each township, its high rates and relatively low amount of insurance per acre and its restrictions in the adjustment of losses all tend to build upon this unfavorable attitude. To balance this, the service rendered will have to be great.

It will be recalled that no company writing crop insurance has used the same plan more than one year and that every attempt resulted in heavy losses or complete failure. It will be very difficult for a company entering this field of insurance to overcome the many handicaps to its success. If a company could secure a sufficiently wide spread of risks and do a volume of business that would pay operating expenses and maintain a reserve for at least five years, it could then adjust its plan to an experience basis and have fair assurance of the ultimate success of establishing crop insurance.

Summarizing the major difficulties we have:

1. The personal factor, both from the moral standpoint and the standpoint of ability;
2. The demand for crop insurance comes from the unfavorable areas;
3. Crop averages do not show the wide fluctuations that make up the average;
4. A practical method of removing crop insurance from the individual basis;
5. The separation and measurement of specific crop hazards;
6. The building of a favorable attitude toward crop insurance.

Some Benefits of Crop Insurance

In the eleventh edition of the Encyclopedia Britannica in the article upon "Insurance" written by Charlton Thomas Lewis, Ph.D., an authority upon the subject are found these words: "The value of insurance as an institution cannot be measured by figures. No direct balance sheet of profit and loss can exhibit its utility. The insurance contract produces no wealth. It represents only expenditure. If a thousand men insure themselves against any contingency, then, whether or not the dreaded event occurs to any, they will in the aggregate be poorer, as the direct result, by

the exact cost of the machinery for effecting it. The distribution of property is changed, its sum is not increased. But the results in the social economy, the substitution of reasonable foresight and confidence for apprehension and the sense of hazard, the large elimination of chance from business and conduct have a supreme value. The direct contribution of insurance to civilization is made not in visible wealth but in the intangible and immeasurable forces of character on which civilization itself is founded."

Some very definite benefits may be gained by the permanent establishment of a successful crop insurance plan. What the farmer needs is stability of income. It would be better from an individual as well as a social point of view for the farmer's income to be \$2000 each year than to have a year of \$4000 followed by a deficit. The first condition encourages careful planning while the second encourages speculation, which if followed by a reaction generates a feeling of unrest.

It has been shown that instability of farm income for the individual farmer results to a large degree from three major factors: Weather, insects, plant and animal diseases, and price. So far, the ideal solution of control or elimination, through adaptation, control methods and forecasting has met with only partial success. The assumption and

distribution of risk by means of insurance offers a method for leveling off or preventing the violent fluctuations of the farmer's income. A successful plan of crop insurance, if properly presented, should be a distinct aid in getting farming down to a long time, conservative program, thereby proving to the insured that dependable income with a measure of safety is better in the long run, than a large income for some years with a deficit for others.

Very often the need of capital is felt before the crop is harvested or marketed. An insurance policy as ready collateral could be made use of to raise funds to finish the production process or to pay cash for necessary purchases. If credit can be obtained from the merchant, the price is necessarily high to at least partially cover the risk assumed. It is estimated that in some sections, particularly in the South, paying cash secured through the insurance used as credit, instead of the time price enables a saving sufficient to pay the insurance premium.

SUMMARY

Hail insurance through its long term of use has become firmly established, and, so far as its value extends if properly administered, fulfils a real need. Hail insurance has not progressed, in the way of improvements and adjust-

ments, with changing conditions. Possibly due to the increased severity of the hazard since 1924, the attention of the companies has been directed to means of lessening the losses instead of improving their policy plan and methods of administration. A number of companies have withdrawn from the field.

Other hazards perhaps not so severe in damaging the crop, though probably more often affecting it are equally worthy of attention for insurance coverage as is hail. The elimination of chance cannot be effected without taking all uncontrollable hazards into consideration in an insurance plan.

What the farmer needs is a steady income from year to year. Six successive years with an income each year of \$2000 would be more satisfactory from both the individual and the social viewpoint than three years of \$5000 each followed by three years of losses of \$1000 each year. One allows for constructive planning while the other fosters speculation followed by depression and unrest.

A continued effort towards a solution of this problem is indicated by the several attempts that have been made to insure crops, investigations and research conducted, and publications issued on the subject.

All attempts in the field of crop insurance thus far

have failed. The reasons for failure have been largely due to a lack of knowledge and experience to draw from and to unforeseen contingences that have arisen, particularly in the case of the two major attempts of 1917 and 1920.

Problems encountered:

1. A logical basis for determining the amount of insurance.
2. A safe amount of insurance and the rate necessary to cover losses.
3. Hazards to be included and those to be excluded from the policy contract.
4. An accurate method, and data necessary for measuring the hazards covered.
5. Should the company agree to pay for all loss below a fixed limit or should it agree to meet any loss the insured may have in such proportion of the amount of insurance as the damage bears to the undamaged crop.

The principal difficulties of crop insurance center around the personal factor. Few provisions for guarding against the moral hazard were included in the contract for little was known of the many versions in which this form of hazard could appear. The type of company writing this form of insurance and the plan of administration used was such

that close supervision of the risks was impossible allowing the moral hazard to have its full effect.

The insurance attitude which may be described by the expression, "Beat it or get beat", was due in part at least to dissatisfactions resulting out of hail insurance adjustments and made failure almost a certainty before the trial was under way.

CONCLUSION

While the experience up to the present time has been unfavorable for the insurer, it has not been valueless, for it at least suggests features and methods which should not be used in a crop insurance plan.

The company offering this type of insurance should be one of unusual financial strength. Profits may appear good for a time, only to be swept away by one or two years of failures.

A wide spread of risks covering at least two or three states and insuring more than one crop would be advisable.

The amount of insurance should be kept at a low figure for safety to the company and to avoid the moral hazard. It should be a definite amount and a very conservative one, limiting the company's liability to damage resulting in serious financial loss to the insured.

The closest personal inspection and supervision of risks is essential. Administration through fire agents or other representatives not directly responsible to the company or not having a practical knowledge of local agriculture will have little chance of success.

The cost of insurance, or the premium, must bear a reasonable relationship to its value to the insured. This is possible only if the physical hazards are accurately measured and the moral hazard reduced to a minimum.

Crop insurance has never been given the real trial that it deserves. At least five years would be necessary to determine its value. It should serve in the regions, and for those crops in which the need is greatest due to wide fluctuations in yields.

Crop insurance will in all probability be sold on a credit basis; the motive, to obtain credit or to secure loans previously obtained.

The ultimate success of crop insurance will depend on the greatest possible elimination of the moral hazard and the building of a favorable attitude by establishing confidence in its value. The success of insurance rests, more than any other economic institution, on the confidence of the people. Only where insurance undertakings enjoy this confidence can they become widespread and bring about their beneficent results.

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