

AGRICULTURAL INSURANCE

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Few economic groups have a greater need of insurance than do the farmers. This need embraces nearly all the forms of protection offered by fire, life, and casualty insurance companies.

Insurance against fire and lightning is quite as necessary to the farmer as to the city man, while such coverage against windstorm is even more generally needed in the country than in the city. Farm property is more exposed to wind, as well as to lightning, than is city property, and, in the case of severe storms, the farm building is more subject to destruction because of the relatively light frame work that characterizes the great majority of such buildings.

Insofar as life insurance is concerned, the farmer is essentially in the same position as the city man. For all classes the need for this form of protection may be said to vary directly with the number of those dependent on the individual and inversely with his accumulated wealth relative to the amount that constitutes economic independence under the standard of living to which the dependents have become accustomed. The need for accident insurance on the part of the farmer exceeds that of the average city dweller, though falling somewhat below that of the miner, the railroad employee, and a few other occupations. The employer of labor on the farm needs liability insurance, as well as coverage for accidents occurring to himself.

In addition to these relatively common forms of insurance which may be said to apply in greater or less degree to all industrial classes, the farmer needs live-stock and crop insurance. It would be futile to attempt to cover even in outline these various insurance needs and the facilities for supplying them, in a paper such as present circumstances warrant, and I infer

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from the letter of your President that you are particularly interested in discussing the problems of crop insurance. I shall therefore limit my further remarks entirely to this phase of the farmer's insurance needs.

CROP DAMAGE DISTINGUISHED FROM FINANCIAL LOSS

One of the striking peculiarities of crop insurance as contrasted with other forms of property insurance is to be found in the nature of the risk itself, using the word risk for the object insured, rather than for the hazard or contingency against which protection is provided. Most forms of property insurance are written on material things of value which are already in existence. Crop insurance, on the other hand, deals with prospects, rather than goods in existence. In fact, the latter form of insurance expires almost co-incidentally with the transformation of prospects of wealth into actual wealth, consisting of useful and marketable products. This peculiar nature of the risks insured promptly raises the question of what is meant by loss in the case of crop insurance. In order to clarify our thinking on this point, a simple illustration may be found useful.

Let it be assumed that farmers X, Y and Z are engaged during a given year in producing wheat in three distinct semi-arid regions of the West, and that the average yield of wheat in each of these regions for the last 20 years has been 8 bushels per acre. Let it be assumed, also, that this average yield has, at the price received, given returns covering all proper charges against the production of an acre of wheat under the methods of tillage followed by these men. On each of the farms in question 35-bushel yields have been harvested.

In the territory where X operated, average conditions prevail throughout the year in question. X grows and actually reaps an 8-bushel crop. In Y's territory the season proves extremely adverse, a late spring frost, followed drought causing his crop to be a total failure. Finally, in the territory where Z is farming, climatic and other conditions prove highly favorable during the greater part of the season. Until within two weeks of harvest time, Z figures that he has a 35-bushel crop in prospect. At that time, however, a hail storm passes over his farm and destroys 60% of his crop, resulting in an actual yield of 14 bushels per acre, instead of 35 bushels.

Let us now make a brief analysis of what has happened. Had it not been for drought, excessive heat, untimely frost, hail, or some other cause or combination of causes, X, Y and Z would each have reaped a 35-bushel yield. In a certain sense, therefore, all may claim to have suffered loss. Farmer Z who had in immediate prospect a 35-bushel yield when he suddenly suffered a 60% damage by hail is, perhaps, the most emphatic of all in claiming to have suffered a serious loss. He actually reaped a harvest of 14 bushels per acre, while his cost of production was only the equivalent of eight bushels. Nevertheless, if Z had carried hail insurance on his crop, he would have been entitled to indemnity under the prevailing plan of settlement, equivalent to 60% of his insurance. It must be conceded, therefore, that Z suffered a recognized form of loss even though the loss, related to wheat in prospect, rather than to wheat already in existence, and in spite of the fact that his hail-damaged crop yielded him a material profit over and above his cost of production. The fact that the loss or damage suffered by Z on his crop was sudden and spectacular does not, however, make it materially different from the losses or damages suffered by X and Y. In each case, it was wheat in prospect and not wheat in existence that was lost. At the time of planting, the prospects of a perfect yield may have been equally good for each of the three men. The prospects of X were early reduced by certain natural causes; those of Y were entirely eliminated, also in the early part of the season; while those of Z continued good until nearly harvest time when they were suddenly reduced.

From this illustration it becomes apparent that the word "loss" in connection with crops may have either of two different meanings. The kind of loss suffered by Z when his prospective 35-bushel crop, was reduced to a 14-bushel crop, as well as the less spectacular but more severe loss which caused the prospects of X to shrink from 35 to 8 bushels an acre, is perhaps best termed "crop damage" by way of distinguishing it from the kind of loss suffered by Y, which was not only crop damage or a diminution in prospective yield, but a "financial loss" on the season's operations.

Adhering to this terminology, it may be said that X and Z suffered crop damage on their wheat, which, however, was not sufficiently severe to prevent X from breaking even, or Z from

making a profit on the year's operations. Y, on the other hand, suffered crop damage which resulted in a financial loss equal to his entire expenditures in connection with the crop which failed to yield a harvest. It is against such experiences as that of Y that crop insurance is particularly needed.

Even after this attempt at clarification, one of the terms, "crop damage", retains a vagueness which it seems impossible entirely to remove. The concept of crop damage here arrived at implies the difference between the best crop yet reaped on the farm in question and the actual yield harvested. In criticism of this concept, it may, of course, be said that a no-damage crop may not as yet have occurred. Various other objections could be pointed out if time permitted. In view of those difficulties and in order to make possible the compilation of data on crop damage, the United States Department of Agriculture has arbitrarily assumed that a crop exceeding by 10% the normal yield is a perfect or no-damage crop for the territory in question. The normal yield may in turn be defined as the yield that the crop reporter has in mind as one which in good years actually occurs over extended areas. The raising of the normal yield by 10% in order to arrive at the no-damage yield is an attempt to make suitable allowance for the fact that the yield which the crop reporter has in mind as a normal yield for his locality is not strictly a perfect or no-damage yield. The difference between a perfect or no-damage yield and the actual yield is taken as a measure of crop damage.

Using the term "crop damage" as just defined, the Department about twelve years ago began to require of its thousands of crop reporters in all parts of the country, estimates of the percentage of damage caused to leading crops from specified causes. The crops covered are corn, wheat, oats, barley, flaxseed, rice, potatoes, tobacco, hay and cotton, while the specified hazards to which crop damage is attributed include deficient moisture, excessive moisture, floods, frost, hail, hot winds, storms, plant diseases, insect and animal pests.

Time does not permit any detailed discussion of the data obtained. Summaries of this data have been published in tabular form in the monthly Crop Reporter of the Department of Agriculture for August, 1920, and in the Department of Agriculture Bulletin 1043, which deals specifically with crop insurance.

Taking wheat as an example, it was found that on a percentage basis covering the United States as a whole, the average annual crop damage from the various causes during the decade 1909 to 1918, inclusive, was as follows: deficient moisture, 12.38%; excessive moisture, 2.03%; floods, .33%; frost, .7%; hail, 1.1%; hot winds, 2.02%; storms, .26%; other climatic, 4.13%; plant diseases, 2.65%; insect pests, 2.12%; animal pests, .19%; other and unknown, .86%; average annual crop damage from all causes, 28.77%.

For the other crops the percentage, representing average annual crop damage from all causes for the country as a whole are as follows: corn, 31.99%; oats, 24.52%; barley, 28.65%; flaxseed, 36.44%; rice, 19.04%; potatoes, 30.12%; tobacco, 20.50%; hay, 20.35%; cotton, 35.49%.

Translating the above percentages into quantity figures, it means that the average annual damage from all causes on the crops in question amounted to the following figures: corn, 1,345,600,000 bushels; wheat, 301,200,000 bushels; oats, 414,300,000 bushels; barley, 74,100,000 bushels; flaxseed, 10,200,000 bushels; rice, 7,400,000 bushels; potatoes, 164,800,000 bushels; tobacco, 296,300,000 pounds; hay, 20,414,000 tons; cotton, 3,731,000,000 pounds.

It has also been calculated that on the basis of prevailing prices during the different years the annual damage to these ten crops amounted to a total sum varying from a minimum of \$2,054,000,000 in 1912 to a maximum of nearly \$3,066,000,000 in 1918, the average annual crop damage during the eleven years, 1909 to 1919, being \$2,620,000,000.

As would doubtless occur to each of you without my calling attention to it, the value figures just quoted represent in part a theoretical loss only. While an increase of 10 or 20 per cent. in the crop yield of a given farm will increase the gross income of the farmer by the same percentage, this relationship between increase in yield and increase in gross income does not hold when all or even a large proportion of the entire farmer group is considered. In this case increase in yield will, of course, materially affect the total supply of the commodity in question, which naturally affects the price. No attempt has been made to allow for this fact in translating the quantitative crop damage into terms of dollars.

CROP INSURANCE FACILITIES

The only insurance hitherto generally available for the risks or hazards in crop production has been that of hail insurance. This form of insurance on growing crops has developed during the last decade into a business of considerable magnitude. The total premiums for 1919, which marks the highest point yet reached, exceeded \$30,000,000. More than half of these premiums were collected by joint-stock fire insurance companies, about 60 in number, which write hail insurance more or less as a side line. The remainder was divided almost equally between a group of 41 specialized hail insurance companies doing business on the mutual plan, and State hail insurance funds or departments, the latter being found in four States, namely, North Dakota, South Dakota, Montana and Nebraska. A certain amount of fire insurance has also been written on standing grain in some States of the West.

While much can be said in favor of hail insurance for sections where the hail hazard is severe, such insurance is very poorly adapted to the farmer's real need for crop insurance. From one point of view it requires the farmer to buy more protection than he really needs while from another point of view, the coverage falls far short of meeting the needs. A large part of the hail insurance indemnities are paid out to farmers who, like Y in the illustration just used, have suffered partial crop damage from hail, but who, even without any insurance indemnity would show a profit on the year's operations. On the other hand, many farmers buy hail insurance and then find that their crops are lost by reason of other hazards. Such farmers, are, of course, worse off for having insured their crops on this plan by the amount of premiums paid. Crop insurance like life insurance should cover all hazards the control of which is beyond the power of the insured.

In recent years attempts have been made to work out a more adequate form of insurance protection for farm crops. The first attempts of this kind were made in 1917, when three joint-stock fire insurance companies offered general crop insurance coverage in North Dakota, South Dakota and Montana.

The insurance covered all the hazards to which crops are subject, with the exception of fire, floods, winterkill, and failure on the part of the farmer properly to till and care for his crops.

The hail hazard was specifically included in the coverage offered by this form of policy. The amount of insurance in the case of at least two of the companies was fixed at the relatively low figure of \$7 per acre and the insurance applied to a specified field area, the crops on which might include any or all of the following grains—wheat, flax, rye, oats, barley, and spelt. In case of total failure of the crop on such area, the company agreed to pay the face value of the policy, or \$7 per acre. In the event of partial loss, the indemnity provided for was equal to the difference between the value of the crop harvested on the field area insured and the face of the policy, it being specifically stipulated that the entire area insured in a given policy should be considered a single risk. Furthermore, the partial crop was valued at prices stipulated in the policy, namely, wheat, \$1; flax, \$1.75; rye, 70 cents; and oats, barley, and spelt, 50 cents a bushel. The insured under this policy was almost completely protected against severe crop damage, but not against a possible drop in the prices of the crop produced. Adjustment of all partial losses was necessarily postponed until after the insured crops had been thrashed.

These first attempts at general crop insurance proved rather disastrous for the companies that undertook them, owing, in part, to the severe drought that occurred in large sections of the States mentioned and, in part, to inadequate safeguards by the companies against the assumption of risks after severe damage had already taken place. The losses incurred under these contracts were to a considerable extent repudiated by the companies. Inability to settle in full was pled. In some cases fraud on the part of the insured was alleged and many claims were tentatively settled by the return of the premium collected. The outcome of this first attempt to provide a general crop coverage is much to be regretted.

For two years following these experiments of 1917, no general crop insurance, so far as I am aware, was written in the United States. During the last two years, however, the plan of offering a general crop insurance contract has been revived, at least two of the larger fire insurance companies having written such contracts.

One form of policy which was written during 1920, in effect guaranteed the farmer a specified income from each acre insured

unless damage resulted from fire, hail, wind, tornado, failure of the seed to germinate, or failure on the part of the farmer properly to do his part in seeding, cultivating, or harvesting the crop. Loss or damage through the elements, including frost, winter-kill, flood, drought, and from insects or disease was specifically covered by the policy.

The amount of insurance per acre was based on the investment in the crop as determined by allowing a fixed amount for each process in preparing for, cultivating, and harvesting the crop in question, plus an allowance for seed and for rental value of the land. Unlike the contract already described, the policy did not place a fixed value on the grain harvested, but provided instead for valuation on the basis of market price at the time of adjustment. The company, therefore, in effect, gave protection against a drop in prices, as well as against crop damage. This feature of the policy caused the venture to prove a costly one to the company using it in 1920 because of the unexpectedly heavy drop in prices.

A crop policy even more recently devised involves a plan materially different from either of those already described. The coverage as to hazards insured against is, however, practically the same as in the contract just outlined. In neither of these policies is the hail hazard covered. Under the plan embodied in this policy, however, the amount of insurance to the acre that an applicant may receive is based on a certain percentage of his average yield during the past five years, such part of the average yield being translated into dollars by applying to it a value per bushel or other proper unit of measure based on the price prevailing during the period in question. Thus a farmer who on a given farm during the past five years has averaged 48 bushels of corn per acre may be offered insurance in an amount equal to the value of about 36 bushels at the average price for corn during the past five years. If such average price were found to be 50 cents a bushel the insurance might be placed at \$18 per acre.

One of the most important differences between this policy and either of those previously described is the plan provided for settlement of losses. In the case of total destruction of the insured crop the company agrees to pay 75 per cent. of the cost of the field operations actually performed, such indemnity not

to exceed 75 per cent. of the total insurance carried. Furthermore, it is provided that the indemnity shall in no case exceed the cost of replacing all or any part of the quantitative returns on which the insurance is based with products of like kind and sound quality. Finally, it is provided that indemnity shall in no case exceed the amount, if any, by which the amount insured exceeds the market value of the crop harvested. Under this provision a change in price in either direction may be taken advantage of by the company.

The determination of the amount of insurance per acre to be written is particularly important in the general coverage plan of insurance here considered. In the ordinary insurance contract the amount of insurance placed on the various risks determines the size of the indemnity in case of loss, but does not, barring a moral hazard, affect the number of losses. Under the plan involved in each of the crop insurance contracts hitherto written, however, the insurance per acre determines not only the size of the indemnities, but also the number of cases in which indemnity will be due. To insure the corn fields in a given State or locality at \$24 per acre, or the equivalent in a stipulated yield, on the plan of any of the three crop insurance contracts described, obviously involves not only twice, but many times, the risk involved in insuring the same fields at \$12 per acre. From the farmer's standpoint the chance of collecting all or part of the second \$12 per acre would be several times the probability of collecting any part of the first \$12. To a large extent, therefore, the company can give justice between good and poor land as well as between good and poor farmers in a particular locality, merely by an adjustment of the amount per acre written, and without making any change in the rate of premium. This plan is not uniformly applicable, however, for the reason that climatic conditions make wide variations from the average yield much more frequent in some localities than in others.

The first of these three methods of determining a proper amount of insurance per acre, namely, that of an arbitrarily fixed sum, has the advantage of extreme simplicity. Obviously, however, the unmodified plan could not be applied to a wide range of crops in different sections of the country without either greatly underinsuring some risks or overinsuring others. Also, it fails to allow for good and poor land and good and poor farming

in the same locality. For general application some method of adjusting the insurance per acre to the investment involved, or the probable crop value, is essential.

The question may then be raised: Is the investment in the crop as determined by the number and cost of the field operations performed plus seed and rental, or the average income over a period of former years as determined by yield and price, the better basis for arriving at a safe and proper amount of insurance to be written?

As between these two methods, the first may be said to be the easier to apply in so far as the agent writing the insurance is concerned. The field operations already performed or to be performed before the crop is ready for market are easily translated into terms of dollars by means of simple tables showing the cost of each operation; and the cost of seed and fertilizer, if any, as well as the commercial rental value, can no doubt be determined with a fair degree of accuracy. The plan does not readily lend itself, however, to a differentiation between good farming and poor farming except as these factors are evidenced by the number of field operations performed.

The other method, that of average yield and price, has the disadvantage of being somewhat cumbersome and difficult to apply. Not many farmers keep records of their yields from year to year, and without such records few will be able to give with any degree of accuracy the yield obtained for each of five years past. The plan has the merit, however, of measuring past results insofar as it is possible to secure the facts, and these results form the most reliable basis for estimating the future results which are the subject of the proposed contract.

The best method of determining the indemnity due in case of loss raises an equally difficult question and one quite as important as that of determining the amount of insurance that may be written. The first of the three forms of contract outlined provided that in case the yield per acre, valued at the price stipulated in the policy, does not equal the amount of insurance per acre, the company will indemnify the insured to the amount of such difference. Under this plan it is of no financial consequence to the company whether prices go up or down. The risk involved in price fluctuations, insofar as it affects income from yield obtained, rests entirely on the farmer. A simple illustration will make this point clear.

A farmer insures his wheat at \$7 per acre under this plan. The wheat is valued by agreement in the policy at \$1 a bushel. By reason of drought or other cause the yield is reduced to 5 bushels per acre. The indemnity due under these conditions is \$2 per acre, regardless of whether the local market price of wheat at harvest time is \$0.80 or \$1.50 a bushel. To the company it makes no direct difference, therefore, whether prices advance or fall except as the collection of premiums not fully paid in advance may be affected.

In the case of the second form of policy outlined, this situation becomes essentially reversed. Assume that a farmer insures his wheat at \$12 per acre under this plan, which, as against the hazards covered, guarantees him a yield that a market price will equal the amount of insurance. In case of total destruction of his crop he will be paid for such operations and such investment as have been already made in connection with the destroyed crop. Suppose, however, that by reason of one or more of the hazards insured against, the yield is reduced to 8 bushels. If the wheat at harvest time sells for \$1.50 or more, no indemnity will be due, since the amount harvested will bring a return equal to or greater than the sum stipulated in the contract. But suppose, on the other hand, that wheat falls to \$0.80. The 8 bushels harvested will then be worth only \$6.40 and the indemnity due will be \$5.60 per acre. On the basis of this price, even a 12-bushel yield will call for an indemnity, assuming that damage has occurred from hazards covered by the contract, equal to the difference between \$12 and \$9.60, or \$2.40 an acre. To the farmer suffering crop damage from causes covered by the contract in such degree that his actual yield at market price falls below the insurance per acre, it makes no difference under this plan whether the price is higher or lower. To the company, on the other hand, high prices mean few and small losses, while low prices mean numerous and relatively large losses.

Turning now to the third and last form of contract previously outlined, conditions based on fluctuations in price take on still another aspect. Under this plan the company in effect reserves to itself the right to make settlement in kind on the basis of the average yield used in determining the insurance per acre, and at the same time retains the option of settling the claim on a basis of dollars per acre with the crop value at market price.

Assume again that a farmer carries insurance of \$12 per acre on his wheat, such figure in this instance having been determined by taking three-fourths of a 16-bushel average yield and an average price of \$1 a bushel. Owing to one or more of the hazards insured against, the yield, as in the preceding illustration, is only 8 bushels per acre. Assume first that wheat following harvest is worth \$1.50 a bushel. The company, of course, invokes the clause in its contract providing that its liability shall in no case exceed the amount, if any, by which the market value of the crop harvested falls short of the insurance per acre. Since the value of the 8 bushels harvested is \$12, no indemnity is due. But suppose, on the other hand, that the price following harvest is only \$0.80 a bushel. The company then relies on the provision that in no event shall its liability under the contract exceed the cost at the time of harvest to replace all or any part of the estimated yield with products of like kind and sound quality. The company, therefore, tenders the insured the equivalent of 4 bushels at \$0.80, or \$3.20. This sum together with the 8 bushels harvested, also at \$0.80, makes the gross returns to the insured \$9.60 per acre.

Had wheat remained at \$1 a bushel the indemnity on an 8-bushel yield would, of course, have been \$4 per acre, but with a market price at harvest time standing at \$1.50 the company pays nothing, and with a market price of \$0.80 it pays only \$3.20. Such an arrangement can not be expected to be acceptable to the farmer.

Experience, on the part of the companies, with all these forms of crop insurance contract has as yet proven decidedly adverse, and the present attitude with reference to a general crop coverage seems to be one of caution. In spite of this fact it is probable that any new contracts offered will be built up largely by the selection of provisions from those here discussed.

AVAILABLE STATISTICAL DATA

The United States Department of Agriculture represents, without doubt, the most important single source of statistical data bearing on the hazards and losses in connection with farm crops. Among available information from this source may be mentioned:

1. Data on climatic conditions for all parts of the country covering rainfall, temperature, wind, date of last killing frost in the spring, first killing frost in the fall, etc.

2. Data on the amount of crop damage from the more important hazards in all parts of the country. These crop damage records now cover a period of more than ten years.

3. Records of crop yield for a long period of years for all parts of the country. These data are supplemented as well as checked up every ten years by the Census reports.

4. Actual soil surveys of about one-third of the counties in the United States.

5. The Department also has a large amount of data bearing on the localization and the spread of plant diseases and insect pests.

The agricultural colleges and State Departments of Agriculture also have a certain amount of additional data with reference to their respective states.

The most useful figures of all will probably be found, however, to be the records of actual crop yield, since these figures represent the composite net results after all factors have played their part. The greatest short-coming of the crop yield figures, as well as the other data above referred to, will, no doubt, be found in the fact that the records as preserved represent relatively wide averages which cause them to lose much of their applicability to a specific locality or a given farm. While such hazards as drought and frost usually affect relatively large areas and hence show up in the averages, the same is less true with reference to such hazards as hail and tornados, which cut narrow paths and may leave the crops on individual farms in total ruin without affecting the crops on adjoining farms or materially changing the average results for a county or some such area. Among the very useful sources of information should be found the records of Government experimental stations, since these records, in many instances, now cover a considerable period and apply to specified farms, hence making it possible to arrive at some conclusion, not only as to average yield, but the frequency of given variations from such average.

PROPOSALS FOR CROP INSURANCE BY THE FEDERAL GOVERNMENT

During the years of 1917 and 1918 several bills were introduced in Congress by Mr. King of Illinois providing for a Bureau of Farm Risk Insurance to be established by the Federal Government. A few months ago a similar bill was again introduced by Mr. King, known as H. R. 10294. There has also been introduced in Congress a resolution by Senator Sheppard of Texas, known as S. Res. 214 which directs the Committee on Agriculture and Forestry of the Senate "to investigate the practicability and desirability of a Bureau of Crop Insurance, to be operated by the United States Government or otherwise, as may be found desirable." Congressman Sinclair of North Dakota has introduced House Concurrent Resolution 54 providing for a joint commission of the two Houses in Congress to "investigate the subject of crop insurance with a view to determining the practicability and expediency of creating a Government crop insurance bureau or other agency." So far as I am aware, none of these measures has as yet made any progress in Congress.

The only one of these measures which proposes specific action, namely, the King bill, provides for an appropriation of \$10,000,000 as an indemnity fund for the proposed Bureau and further appropriates \$100,000 for defraying the expenses of the establishment and maintenance of such Bureau. None of the measures contains any definite plans as to method of operation.

CONCLUSION

In conclusion permit me to repeat that one of the great needs of agriculture is insurance against crop damage amounting to serious financial loss. In few, if any, other important industries is the individual called upon to carry, unprotected by insurance, such risks as are involved in crop production.

Such insurance should afford true protection and should therefore cover all unavoidable hazards. In order to get protection against serious financial loss the farmer should not in addition be compelled to buy and pay for indemnity against minor cases of crop damage which he himself can carry without undue inconvenience. The insurance, whether administered by private or

public agency, must be so handled that a minimum of loading for cost of operation becomes necessary.

To point out certain requirements is, however, a relatively easy task. The working out of a plan which meets such requirements presents the real difficulty. Anyone contributing toward a solution of this problem will have performed a service not only to agriculture, but to the nation as a whole.