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PROCEEDINGS

of the

WESTERN FARM ECONOMICS ASSOCIATION

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Palo Alto, California

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Few people who have raised corn in Southern Illinois or wheat in Western Kansas or cotton in Central Texas or lemons in the frostier portions of Southern California will question the desirability of an economical insurance policy which will pay indemnities if the crop fails. Despite the mitigating effects of crop diversification and the higher prices allegedly received for short crops, crop failure remains a disturbing hazard to farmer and community alike. The importance of the hazard is attested by the fact that approximately one-third of the federally insured wheat farmers become loss claimants each year, for an average of 175 bushels of wheat each.<sup>(2)</sup>

The federal government's experiment in insuring crop yields on wheat is now in the midst of its fourth crop year. The parallel experiment in cotton is beginning this year, on the 1942 crop. No other crops are now being insured, although preliminary studies are being made on citrus fruit, corn, tobacco, and rice, and possibly on certain other vital money crops.

The government's insurance carrier is the Federal Crop Insurance Corporation, a corporate agency within the Department of Agriculture; the policies are sold and losses are adjusted through the AAA's county Agricultural Conservation Committees. The insurance contract itself is a simple agreement under which the Crop Insurance Corporation undertakes to indemnify the insured producer (owner-operator, tenant, or crop-sharing landlord) for any shortage below 75 c/o of a normal yield on the acreage seeded. A cheaper policy assuring only 50 c/o of a normal yield is also offered. Only 6 c/o of the wheat insurance is on a 50 c/o basis, but California experience suggests that this limited cover may be more widely used by cotton growers. The insured yields and premium rates for each farm are based on the actual or estimated yield history of that farm. Both premium rates and possible indemnities are computed in terms of bushels of wheat or pounds of cotton; cash payments are made only for convenience' sake, in the exact value equivalent of the bushels or pounds due.<sup>(3)</sup>

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(1) Given at fifteenth annual meeting of the Western Farm Economics Assn., held at Stanford University, Calif., June 24-26, 1942.

Many of the facts cited in this analysis are presented more fully in the March 1942 number (Vol. XVIII, No. 6) of Wheat Studies of the Food Research Institute, entitled "Federal Crop Insurance in Operation," which was prepared by the same author.

- (2) Statistical data on insurance participation, loss claims, financial results, etc., will be found in the Annual Reports of the Manager of the Federal Crop Insurance Corporation for the fiscal years 1939, 1940 and 1941, and in the Branch Office Progress Reports and Indemnity Reports periodically compiled by the Corporation.
- (3) Background information on the plan will be found in Report and Recommendations of the President's Committee on Crop Insurance, 1937 (H.Doc. 150, 75th Cong., 1st Session) and in the FCIC's pamphlet Economic Justification for Certain Salient Provisions of the Regulations, Application, and Policy for Wheat Crop Insurance. Technical details applicable to 1942 operations will be found in Wheat Crop Insurance Regulations, 1942, and in County Yield and Rate Procedure, 1942 (also same for cotton).

The FCIC's plan of operations embraces five features which require special emphasis, before any attempt is made to evaluate the results:

- (1) Participation is voluntary. The insurance is actively urged upon eligible farmers, but no compulsion of any sort is exercised. No special allotments or gratuities are contingent upon purchase of crop insurance, nor do the land banks or other federal lending agencies bring pressure to bear, nor has the FCIC made any special effort to persuade lenders to demand crop insurance. There does, however, seem to be a growing tendency among commercial banks and production credit associations in the wheat areas to demand FCIC protection.
- (2) The premium rates allegedly undertaken to distribute the loss-costs according to the risks involved -- that is, each farm is supposed to receive a premium rate which would exactly cover its probable losses, over a period of years. The loss experience of the FCIC suggests that this ideal is not being attained, but the attempt is clearly necessary if the program is to avoid land-value distortion and the subsidization of uneconomical land use.
- (3) Crop insurance is written as yield insurance, not as price or profit assurance. Though the federal government has undertaken to assure minimum selling prices for farm products by other means, the crop insurance program has been confined strictly to the assurance that the farmer will have something to sell. This is a necessary limitation, since the assurance of yield is reasonably amenable to actuarial appraisal while the price hazard most definitely is not.
- (4) The yield assurance under the FCIC contract is limited to 75% of a normal or average crop, to make malingering unprofitable and to keep the insurance premiums down to reasonable levels. When an insurance premium of 2% to 35% is deducted from this 75% guaranty, the remainder is clearly not a profitable crop. In most instances, and at average market prices for the crop, the assured yield provides little if any more than a recovery of operating expenses, taxes, and depreciation. FCIC insurance is therefore to be regarded primarily as a disaster preventive, not as income assurance. It will not usually provide net income for the farm family.
- (5) Because there would be a very real social advantage in the farm stability which an efficient and widely used crop insurance system would provide, the government has seen fit to assume all of the operating expenses of the crop insurance venture, as well as the hazard of underwriting loss, during an experimental period. No plans for ultimately covering all or part of the expenses of crop underwriting by increasing the premiums, have yet been announced. Probably none exist.

In approaching our basic question "Is federal crop insurance worth its cost?" we are obviously impelled to consider the present experiment, and its record on wheat and cotton. In so doing, it seems pertinent to ask and answer four preliminary questions: First, how widely is federal crop insurance used or likely to be used? Second, how essential is it

to present users and prospective users? Third, how much does it cost in operating expenses to make crop insurance available to farmers? Fourth, are there acceptable alternative methods of insuring the crop-loss hazard?

With respect to the use of crop insurance by farmers, the wheat experiment furnishes the best guide. In its first year, 1939, about 9.4% of the seeded acreage was insured. For 1940 the percentage increased to 17.6, for 1941 it remained at about 17.5, and for 1942 it will be about 20.0. The percentage of producers covered will likewise approximate 20.0 in 1942, but the 1942 harvest will be about 22 1/2% insured because of the greater productivity of the insured acreage.<sup>(4)</sup>

The percentages of seedings insured vary greatly from state to state and from county to county. Nebraska in 1941 had 40% of her wheat acreage insured, whereas Montana had but 6%. In important wheat-producing counties the use of crop insurance varies from none at all to 75% of acreage seeded. The causes of this variation are many, and include the attitudes of the county committees, the popularity of the AAA, the presence or absence of recent loss experience, and the level of premium rates. This latter is vitally important. In a sample check on 1940 and 1941 participation in scattered important wheat-producing counties the average county paying 10% or less (of its normal yield) in premium rates insured 35% of its acreage; but the average county paying over 20% in premium rates insured only 10% of its acreage. Evidently wheat farmers will insure small risks when the insurance rates are low, but they hesitate to insure major risks because the rates are high.

The wheat experiment is not sufficiently seasoned to assure against changes in the trend of participation, but the figures to date and convictions gleaned from numerous interviews alike suggest that while persistent selling effort can greatly increase the use of crop insurance, it will continue to be vastly more difficult to sell in hazardous areas than in safe ones. The premium rates themselves explain this. The average premium rate for 75% insurance in the Ohio Valley is about 5%; in North Dakota 18.4%; in Western Kansas 25%; for the United States as a whole, about 10%. Assuming a continuation of the AAA wheat program in its present form, it seems reasonable to expect that in another five years about 30% of American seeded wheat acreage can be insured. However, this estimate contemplates that 40% of non-hazardous acreage but only 20% of risky acreage will be reached.

The demand for cotton crop insurance on the 1942 crop has been disappointingly small. The Corporation recently reported that 11.5% of cotton allotment units were protected, but since a "unit" is "protected" when either a landlord's or a tenant's share is covered, it seems doubtful if over 8% or 9% of the crop is really covered. This is a smaller beginning than that achieved with wheat in 1939.

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(4) Greater percentages of insurance coverage are shown by some calculations which regard an acreage as wholly insured if a landlord's interest in the crop is insured and the tenant's is not, or vice versa; our estimates tabulate the insurance of a 40% interest in 100 acres as 40 acres, etc.

Turning now to the question of the importance of crop insurance to the individual farmer, it becomes important to know who buys crop insurance -- large operator or small; rich or poor, diversified-crop producer or one-crop producer. In general, it may be said that wheat crop insurance is selling almost proportionally among all these groups. The smaller farms seem to be a little more likely to insure than the larger ones; insecurely financed farmers are a little more likely to insure than well-financed ones, although it seems clear that the very weakest farmers -- those likely to become charity cases in poor crop years -- do not insure; tenants are a little more likely to insure than are owner-operators or crop-share landlords; and diversified farms are a little more likely to insure than are one-crop farms. This latter fact is disappointing, since it is clearly more important to insure a sole source of income than one out of several. The difficulty seems to be the size of the premium; it is easier to get a 100-bushel premium to insure one-fourth of a farm, than to get a 400-bushel premium covering the whole farm.

The urgency of crop insurance to the individual is also affected by the frequency and severity of crop losses in his area, and by the likelihood of successive crop losses. Table I below indicates how often and how severely individuals in typical areas are affected by wheat crop loss. The data, which are adapted from the records of the Federal Crop Insurance Corporation, indicate the number of supernormal, normal, and subnormal yields resulting from 558 farm seedings in each of six representative counties. Nine annual seedings (1930-38 inclusive) on 62 representative farms are used in each county. Normal in each instance is defined as the average or typical yield per acre on the individual farm in question.

Table I  
Frequency of Good, Average, and Poor Wheat Yields in Sample Counties  
(62 farms for 9 years in each county)

Percentage of Illinois Average Yield (Randolph)	No. Dakota (Barnes)	Nebraska (Saunders)	Kansas (Clark)	Washington (Whitman)	California (San Luis Obispo)	
Above 200	3	29	1	84	0	18
187½ to 200	2	14	3	15	0	5
175 to 187½	2	16	1	8	0	13
162½ to 175	7	31	2	10	1	23
150 to 162½	18	33	17	10	4	23
137½ to 150	25	26	22	19	13	49
125 to 137½	41	46	57	27	37	38
112½ to 125	60	33	77	26	68	47
100 to 112½	99	35	114	17	148	56
87½ to 100	113	42	89	29	160	60
75 to 87½	93	45	51	39	83	52
62½ to 75	58	37	50	48	34	42
50 to 62½	24	36	32	35	9	32
37½ to 50	7	35	27	40	1	25
25 to 37½	2	54	10	44	0	38
12½ to 25	1	43	5	31	0	32
0 to 12½	3	3	0	76	0	5
Total Seedings	558	558	558	558	558	558

Table I indicates that a considerable percentage of the wheat seedings in each of these counties result in losses which would be compensable under 75% insurance contracts. However, it may be assumed that only yields below 62 $\frac{1}{2}$ % of normal result in any significant net compensation to the farmer, after allowance is made for premium costs. On that basis the numbers of significantly compensable losses in the Illinois and Washington counties, and possibly in the Nebraska county, appear relatively small; but the numerous low yields in the other three counties show the importance of insurance protection there.

Another important test of the significance of crop loss to individuals is found in the probability of successive years of crop loss. If it be assumed that any yield below 62 $\frac{1}{2}$ % of normal constitutes crop loss, the 648 losses experienced by the 372 farms (62 in each county) during the nine years of the previous table were grouped in sequences as follows:

Table II  
Number of Cases of Yields Below 62 $\frac{1}{2}$ % of Normal Successively for:

State	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years
Illinois	35	1					
North Dakota	48	20	18	7			
Nebraska	64	4					
Kansas	51	17	19	6	6	4	1
Washington	8	1					
California	64	27	3		1		
Total	270	70	40	13	7	4	1

Table II also suggests that the availability of crop insurance in the Illinois, Nebraska, and Washington counties is not vital, even though it is useful; the likelihood of successive losses is not great. But the North Dakota, Kansas, and California counties operate under conditions which urgently demand insurance protection.

No one seems to know how many farmers are heavily dependent on single crops, or to what extent diversification is effective financial protection against crop loss. However, a sample check on income sources in several important wheat-producing counties indicates very diverse conditions; in a Washington county 70% of the wheat producers reported receiving in excess of two-thirds of their farm incomes from wheat, while in an Illinois county 73% received less than one-third of their farm incomes from wheat. Data on the probability of coincidence of loss on major crops seemingly do not exist in tabulated form.

An inspection of corn and cotton yields indicates that, like wheat, they are consistent and reliable in some areas, and highly irregular in others. Tobacco, citrus, and rice yields are somewhat more reliable, though citrus production is subject to terrific variations in orchard-heating cost which really should be covered in an insurance contract of this sort. It therefore seems reasonable to conclude of almost any important money crop, that there are areas where widespread use of yield insurance is socially desirable, and other areas where it is not particularly needed.

With regard to the operating expenses necessarily encountered in a crop insurance project, it should be observed that these vary according to the method of operation. Such matters as rate-making, computation of insured yields, selling effort, and supervision of risks in force, can be done casually or intensively. The FCIC has chosen a middle ground. Rate and yield data on wheat are prepared annually for at least 1,000,000 farms and sent to at least 1,500,000 individuals, and result in 450,000 insurance covers. This is an enormous job. Economy is sought by using the AAA organization to gather data, sell policies, supervise risks, and settle losses. Yield and rate computations are simplified to the nth degree -- to such an extent that these figures are based only on the history of the farm, ignoring such factors as crop rotations, use of fertilizers, choice of fields on the farm, or even changes in tenancy and farming methods. Yet it can be said that crop insurance is administered honestly, carefully, and thoughtfully.

The present operating expenses on wheat are about \$4,500,000 per annum. This is equal to about 32 cents per bushel of premiums on the 1942 contracts, and to about three cents per bushel on the normal yield of the insured acres. If we could persuade 30% of the farmers to buy crop insurance this cost could be held to about 24 cents per bushel of premiums or 2.3 cents per bushel of protected crop. Larger sales of insurance would reduce these costs still further.

There is some variation in per unit operating expenses from state to state, because of the varying sizes of farms, distances to be traveled, and highway conditions; but the variation per bushel of protected crop is not extreme, and appears unrelated to farming hazards in the area. That is, the operating cost sustained by the government in insuring a 1000-bushel crop in Western Kansas is about the same as that sustained in insuring a 1000-bushel crop in the Ohio Valley, if the same percentage of farmers is insured in each area. When we consider that the hazard is five times as great in Western Kansas as in the Ohio Valley, it is not hard to determine which expenditure is most worthwhile.

But the wheat insurance venture is costing the government more than just the operating expenses. There are underwriting losses too. Each of the past three years has produced an above-average wheat yield, yet the crop insurance indemnity payments have been respectively 152%, 165%, and 142% of premium collections. The 1941 loss was especially disconcerting, because the wheat yield was 32% above the 1926-40 average. These underwriting losses to date have about equaled the year's operating expenses, each year.



The underwriting losses represent a very serious problem which the FCIC has not yet handled with any degree of success. Attempts are being made, however, and some improvement may soon develop; but it seems likely that underwriting losses can only be controlled after spending a little more expense money on the improvement of premium rates and insured yield computations. In either case the operating expenses plus underwriting losses incident to insuring a wheat field seem likely to be at least 3 or 4 cents per bushel of normal yield. Whether this is paid entirely by the government or jointly by government and farmer, it must be regarded as the minimum cost involved in making the present type of wheat crop protection available.

Lack of experience prevents any estimate of insurance costs on other crops.

In considering possible alternatives to the present crop insurance plan, two ideas come to the fore. First, is any important degree of compulsion desirable in the crop insurance program? and second, could the underwriting losses be reduced by mutualizing the local administrative organization and by this means providing greater accuracy in the estimating of insurable yields and premium rates?

We have already observed that the present federal crop insurance plan is voluntary, and that about 20% of the nation's wheat acreage is insured under it. We have further estimated that 30% of our wheat acreage may be insured in five years' time. However, it appears that the hazardous areas where insurance is most needed are least likely to buy it. This means that the areas most likely to demand federal assistance such as emergency loans, mortgage moratoria, relief donations, and the like, are least willing to reduce their own hazards by buying insurance.

If a crop insurance plan is to be operated, and if its rates and terms are even reasonably equitable, it seems that the debtors of the government under land bank, land bank commissioner, and production credit loans might well be required to provide crop insurance protection. This would be a mild form of coercion. Likewise, there is no better way to make parity and soil conservation payments, if these subsidies are to be continued, than in policies guaranteeing successful harvests. However, these suggestions must be premised on a finding that a crop insurance program is worth its cost to the nation, which is still the major issue before us.

No finding that crop insurance is or is not a worthy undertaking can be tenable without considering possible alternatives of both insurance coverage and administrative organization. After all, the entire program is experimental. In this connection we are overwhelmed with suggestions -- for example, limiting the insurance protection to losses from certain stated causes only, or increasing the guaranty from 75% to 90% or 100% of normal yield, or writing the coverage on a dollar basis instead of a bushel basis, etc. The FCIC has studied such suggestions, and has already made several modifications in its contract and underwriting practices in the interest of greater efficiency and equitableness.

However, there is one suggestion for a future possible change in the method of operation which should be considered in detail. It

contemplates a simultaneous attack on the problems of underwriting losses and high operating expenses, by turning over the crop insurance administration within each county to local associations operated by the farmers themselves. The proposed plan would operate in the following manner: a committee from the association would establish the insured yield and premium rates for each farm in the county on a basis similar to that now used by the FCIC, except that the committee would be free to modify its rates in each instance to give weight to the farmer's selection of fields, use of fertilizers, choice of farming methods, etc. for the particular year. After the local association had sold its policies within the county it could apply to the FCIC for a reinsurance policy insuring against catastrophic losses in its county, paying the FCIC a premium out of the local premium revenue. When the crop matured each local association would pay its loss claims out of its remaining premium revenues, unless county average yields were disastrously low, in which case the FCIC reinsurance contract would provide additional funds to meet the losses.

It will be remembered that the existing FCIC program has thus far paid loss indemnities at least 50% greater than they should have been. There have been several contributing causes, but the inflexibility of underwriting methods, leading to premium rates and insured yields inconsistent with the risks of particular cases, has been an important factor. The proposed local-association plan would leave the problem of adapting individual yields and premium rates entirely to the local farmers, who can handle it most competently. If such associations made mistakes and promised more indemnities than their available income would pay, they could either settle in full by prorating the available income, or carry the unpaid portion forward as a claim on a possible future surplus, as their rules might provide. The function of the FCIC would merely be to indemnify the county association if the county average yield fell to a low figure. It would be up to the association to distribute the loss indemnities equitably.

The operating expenses of a system such as this would probably be no greater than the present one, and it should do better work. It would not be inconsistent with sound policy to subsidize these associations to some extent and give them advisory guidance through the Department of Agriculture.

There is ample precedent for this local-association-plus nationwide-reinsurance idea, and some experience to cast light on its feasibility. The Japanese Government in 1938 instituted a compulsory crop insurance system outlined in a fashion similar to this. If it works out satisfactorily under the troubled conditions Japan is going to experience in the next few months, we can assuredly call the idea a success; little can be learned of its progress to date. Here in America we have gratifying experience with farmer-owned fire insurance mutuals, farm credit associations, cooperative marketing associations, and other similar devices. Surely a crop insurance association is equally possible.

The local-association idea appears especially sound when we consider the possibility of insuring crops other than wheat. Of all the important cash crops, wheat seems about the easiest to standardize as respects type,

quality, method of culture, and yield. In cotton insurance, it seems probable that standards of cultivation will afford difficulty; in corn the time of planting and purpose of planting will have to be considered; in tree fruits the age and condition of the trees and the quality of the fruit will make problems; on tobacco the determination of quality will be an unavoidable puzzle. On matters like these a local crop insurance association will do a better job than an AAA committeeman with a rule book from Washington.

Now we may return to the basic issue. Is federal crop insurance worth its cost?

The evidence indicates that yield shortages below 75% of a normal crop occur on almost one-third of our wheat farms each year. About one-third of these shortages are very small and fully 40% of them occur in isolated years, preceded and followed by satisfactory crops. However, the light losses and the tendency to isolation of losses both seem to concentrate in the less hazardous areas, while the hazardous areas get both severe and frequent sequences of bad years. Also, it appears that in wheat the hazardous areas also tend to be one-crop areas. An inspection of the statistics on mortgage defaults and emergency loan demands supports the obvious conclusion that there is justification for subsidized crop insurance -- subsidized to the extent of part or even all of its operating costs -- in about half of the wheat-producing counties of the United States, if the farmers will make use of it.

In the other half of our wheat-producing counties it isn't worth an overhead of four cents or three cents or even two cents per bushel of wheat produced, to provide the guaranty which crop insurance affords. The risks are not great enough.

It seems arbitrary to say that we should spend federal money to subsidize insurance where it's least wanted, and to deny it where it's most wanted; and there may be both constitutional and political reasons for avoiding so arbitrary a policy. However, it might be reasonable to allocate the expense-money subsidy by states or counties on a per-bushel-of-premiums-collected basis, which really means distributing it on the basis of severity of risks covered. This would no doubt compel the non-hazardous areas to pay a part of their operating costs if they chose to have the crop insurance cover.

As respects the insurance of crops other than wheat, such insurance if feasible is amply justified, if necessary to promote human economic security in an area whose average output is adequate to maintain cultivation. The nature of the coverage -- that is, whether price is covered, whether quality is covered, whether irregular costs such as orchard heating are covered -- might well vary from crop to crop and even from area to area, as needs require.

But it is undoubtedly quixotic to dream of insuring the yield of all cash crops. The expense cost would be terrific, and our observation that one-crop farms were less likely to insure wheat than were diversified farms probably indicates that the farmers wouldn't want to buy excessively complete protection. An offering of insurance on major cash crops in regions affording substantial hazards, should be the utmost in ultimate objective.

Finally, we must consider the matter of immediate policy for the Federal Crop Insurance Corporation. The Corporation is insuring wheat and cotton in practically every important producing county -- on an underwriting plan which seems sound in general outline but has thus far produced very heavy underwriting losses. Some attempts have been made to strengthen the underwriting results, and two important changes will be made in 1943, but as yet no assurance of real progress is at hand.

In view of the importance of the objective, there is justification for continuing the present program on an experimental basis for a very few more years. Those years would be more valuable if the FCIC would experiment regionally with some of the numerous ideas which its personnel and their friends have advanced. If in another three years there is not substantial evidence that the present centralized system can control underwriting losses, it will be time to give local associations a brief trial.

Meanwhile, it will be inexcusable to promote any expansion of coverage into other crops. Statistical studies to test the possibilities are not objectionable, but until the more basic problems of administrative organization, underwriting methods, and insurance selling are solved, the FCIC does not need new worlds to conquer.

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