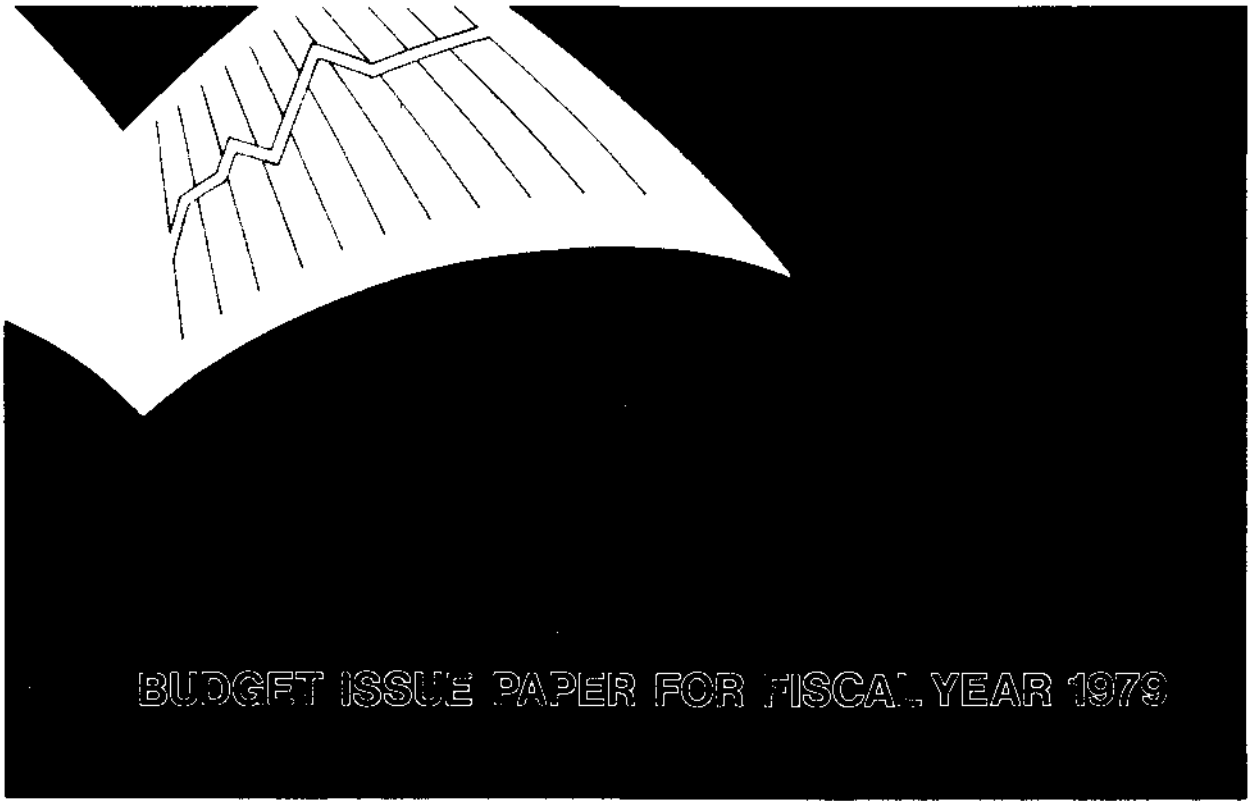
# Protecting the Farmer Against Natural Hazards: Issues and Options

March 1978




CONGRESSIONAL BUDGET OFFICE
CONGRESS OF THE UNITED STATES

# PROTECTING THE FARMER AGAINST NATURAL HAZARDS: ISSUES AND OPTIONS

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## PREFACE

During the second session of the 95th Congress, legislation will be considered to extend, modify, or change substantially the federal role in providing protection for farmers against agricultural disasters. This study, undertaken at the request of the Senate Budget Committee, provides an analysis of the issues and options related to this subject. In keeping with the Congressional Budget Office's mandate to provide nonpartisan and objective analysis, this paper makes no recommendations.

The study was prepared by James Vertrees under the direction of Raymond Scheppach, Assistant Director of CBO's Natural Resources and Commerce Division. Marilyn Moore of CBO's Budget Analysis Division provided useful information on current federal programs. The report was edited by Robert L. Faherty, and it was prepared for production by Angela Evans. The author wishes to acknowledge the helpful comments of Damian Kulash, Peter Emerson, Dan Twomey, John Giles, Don Campbell, Barry Carr, Alan Walter, and John Subat.

Alice M. Rivlin
Director

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## SUMMARY

Farmers are constantly susceptible to the vagaries of nature. Natural hazards such as drought, excess moisture, hail, insects, and disease can seriously damage or completely destroy crops and livestock. The economic consequences of the risk and uncertainty of these natural disasters vary widely among agricultural producers, and they are affected by factors such as location, type and size of enterprise, degree of specialization, financial position, and alternative income sources for the producer. Because of these varying circumstances, producers do not all seek the same level of economic protection.

Risk assumption is a common strategy of producers for dealing with these risks. Many producers assume risks by relying on their capital reserves and nonfarm income. Other producers transfer risks to a second party through natural hazard insurance and loans. The federal government provides three types of programs--federal crop insurance, disaster payments, and emergency loans--that increase the number of alternative strategies for individual producers.

The current federal role in reducing uncertainty and income instability caused by natural hazards is based on two key assumptions: First, the economic risks of loss are too great for individual producers to bear alone; and second, a failure on the part of the federal government to assume some portion of these risks would contribute to disinvestment, declining farm production, and higher consumer prices.

During its second session, the 95th Congress will consider legislation to extend, modify, or change radically the present federal role. The Congress will attempt to create a balance among several federal objectives:

- Assisting producers to adjust to uncertainty and income instability;
- Maintaining the production capacity of the agricultural sector;
- Treating all producers equitably;



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- o Making federal policy compatible with the private insurance sector; and

- o Establishing federal budget effectiveness.

In shaping the federal role, the Congress will focus on considerations such as type of program, coverage, level of protection, and the sharing of costs between the federal government and the producers.

## CURRENT POLICY

At present, the federal government's three basic programs to protect farmers against economic losses from natural hazards are:

- o Disaster payments, which are authorized for producers of wheat, corn, grain sorghum, barley, cotton, and rice through crop year 1979 by the Food and Agriculture Act of 1977;

- o Federal crop insurance; and

- o Emergency loans from the Farmers' Home Administration (FmHA) and the Small Business Administration (SBA).

Summary Table 1 presents the general parameters of these programs.

Under current policy many producers may be eligible for all programs. Though evidence is limited, it is likely that some producers have participated concurrently in two of the three key programs. On the other hand, some producers may be ineligible for any federal program. Soybean producers, for example, are not covered by disaster payments, and they may be located in areas where crop insurance is not available. For producers in these circumstances, emergency loans would be the only possible federal program.

The distribution of benefits among individual farmers is not certain. The level of disaster payments is directly related to the amount of production losses, which is determined by the size of the farm and the severity of the natural hazard. Most FmHA borrowers are thought to be small to average in size, whereas SBA ostensibly makes loans to all producers. Producers of all sizes, in terms of acreage of the insured crop, buy crop insurance. It appears, however, that proportionately fewer small producers buy insurance than do larger

ones, though this varies depending upon the crop and the location. Evidence suggests that the size of the producer is only one of the factors that affect participation in federal crop insurance.

The impact of the current federal programs on overall agricultural production is thought to be minor because the liability covered by the programs is relatively small. Consequently, the effect of current policy on farm and food prices and on the overall domestic economy is negligible. The most certain impact of current programs is a reduction in income instability for individual producers. Existing federal programs contribute in varying degrees to the economic viability of individual producers. By reducing income instability for producers, federal programs can help local communities that are dependent on agriculture.

The estimated annual average federal cost of continuing current policy is about $650 million (through 1980). The budget impact in terms of average outlays, however, is about $1,150 million because of the outlay effect of emergency loans.

## ALTERNATIVES TO CURRENT POLICY

Four possible alternatives to current policy are:

- Elimination of disaster payments;
- Expansion of the federal crop insurance program;
- Expansion of the private insurance sector; and
- Expansion of the emergency loan program.

Eliminating disaster payments would sharply diminish the federal role in reducing income instability for individual producers, but it would have little impact on overall production. The federal liability would be reduced by $7 billion, and an annual average cost savings and reduction in outlays of $500 million through fiscal year 1980 would be realized. The inequity of "free insurance"--which is what disaster payments provide to eligible producers--would be removed; but many of these producers--those located in high-risk areas--would be ineligible for federal crop insurance and perhaps for emergency loans.

SUMMARY TABLE 1. GENERAL PARAMETERS OF FEDERAL PROGRAMS TO PROTECT AGRICULTURAL PRODUCERS AGAINST LOSSES FROM NATURAL HAZARDS a/

| Program | Eligibility | Coverage |
|---|---|---|
| Federal Crop Insurance | Participating producers with qualifying losses. Losses must be greater than 25 percent of normal. | Not available on all crops in all areas. Unavailable on about 25 percent of the acreage of major crops. Where available, only about 13 percent of eligible acreage of major crops is insured--about 8 percent of total national acreage. |
| Disaster | Producers of wheat, corn, grain sorghum, barley, rice, and cotton complying with these program provisions. Losses must be greater than 25 percent of normal production for cotton and rice and 40 percent for other crops. | Limited to specific crops, but available where any of those crops are grown. |
| Emergency Loans | | |
| FmHA | Producers unable to get credit elsewhere. Losses must exceed 20 percent of normal for a major enterprise. | Not limited to specific crops. Requires designation (or authorization) of counties as emergency loan areas. |
| SBA | Producers with verifiable losses. | Not limited to specific crops. Requires similar designation as FmHA |

a/ See Chapter III for detail.

b/ For producers with complete losses of specific crops. Production costs based on 1977 national averages.

c/ Producer losses covered are: for crop insurance, indemnities; for disaster payments, payments made; and for loans, loans made.

SUMMARY TABLE 1. (Continued)

| Level of Protection | Annual Cost to Producers | 1975-1977 Averages (Millions of Dollars) | |
|---|---|---|---|
| | | Producer losses c/ covered | Annual federal cost |
| 50 to 60 percent of total production costs, including land, for producers of major crops with maximum coverage. b/ | Average cost for all producers of $4.56 for $100 of insurance. | 90 | 46 |
| 30 percent of total production costs. b/ | Free | 436 | 436 |
| Up to 100 percent of production losses valued at market prices. | 3 and 5 percent interest rates. Average 7-year repayment period. | 797 | 52 (230) d/ |
| Up to 100 percent of production losses valued at market prices. | 3 and 6.625 percent interest rates. Average 11-year repayment period. | 1,600 e/ | 81 e/ (1,600) d/ |

d/ Outlays. For SBA disaster loans it is assumed that loan repayments to the disaster loan fund are for other than agricultural loans in previous years. Thus, loans made and outlays for agricultural loans are the same.

e/ Fiscal year 1978 only.

For an expanded federal crop insurance program to be an acceptable alternative to current policy, the level of participation would have to be increased. In order to increase participation, premium subsidies would be needed. It is estimated that a 50 percent premium subsidy would be needed to achieve participation of 60 percent of the total acreage for most crops. The annual average federal costs and outlays of an expanded nationwide federal crop insurance program with a 50 percent premium subsidy (and with administrative and operating expenses paid by the federal government) would both be nearly $800 million, with possible costs in unusual years of $1.4 billion or more. Overall, this would mean a much higher level of federal risk assumption than under current policy.

The private insurance sector has little incentive to expand into multiple-peril or all-risk crop insurance because the potential losses are large, and because the premiums would have to be at least 50 percent higher than those for federal crop insurance to cover expenses such as premium and income taxes and capital costs. For the private insurance sector to write all-risk insurance on any significant scale, federal reinsurance and perhaps subsidies would be needed. A greater reliance on private insurance companies to broaden crop insurance coverage would be consistent with the objective of making federal policy more compatible with the private sector; to what extent other federal objectives would be served, however, is uncertain.

An expanded emergency loan program that replaced current programs could provide farmers a means to reduce the income instability caused by natural hazards. A loan is a means for a producer to adjust, after losses occur, by incurring future loan repayment obligations. Depending on interest rates and repayment terms, this burden may preclude producers with low equity and those with severe losses from participating. For many producers, however, loans are preferable to insurance because of the uncertainty of adverse economic consequences and the availability of emergency loans compared with the certainty of insurance premiums. The costs of an expanded emergency loan program would be relatively low compared with current programs. For example, annual net costs of a $2 billion loan program with $1.6 billion in outlays (assuming a 3 percent interest rate) would be $125 million.

Compared with continuation of current policy, elimination of disaster payments would mean annual average federal cost savings (and reduced outlays) of $500 million through 1980; an expanded

federal crop insurance program (replacing current programs) with subsidized premiums could mean additional average costs of nearly $150 million. This cost differential of $150 million, however, is reflected in the budget as a decrease in outlays of $350 million dollars relative to current policy. This results from the elimination of emergency loans and their associated outlays. In contrast, an expanded emergency loan program would cost about $500 million less than current policy and about $700 million less than an expanded crop insurance program. Average outlays would be nearly $400 million more than current policy.

Both an expanded federal crop insurance program and an expanded emergency loan program would improve upon current policy in assisting individual producers adjust to uncertainty and income instability. Although both options would have a more positive effect on producers' willingness to maintain or expand production capacity, whether either option is required to maintain current production capacity is unclear. Under either option, however, there would be less than full voluntary participation for many reasons. The likelihood of uncovered producers suggests that other kinds of federal assistance would be demanded. This means that it will be difficult and perhaps costly for the Congress to authorize a single disaster assistance program to achieve all the federal objectives.

## CHAPTER I. INTRODUCTION

Farmers have great risk of economic losses from a host of natural hazards such as drought, excess moisture, extreme temperatures, hail, wind, floods, insects, and disease, which can seriously damage or totally destroy crops and livestock. Farmers, or agricultural producers, must thus seek appropriate strategies to minimize economic losses.

The federal government has historically played a role both in helping producers deal with potential economic losses through crop insurance and in providing emergency loans and direct payments to farmers to offset actual economic losses caused by natural hazards. Nevertheless, the current federal programs are generally thought, on the one hand, to provide ineffective coverage and protection and, on the other hand, to be costly to the taxpayer.

During its second session, the 95th Congress will consider new legislation to extend, modify, or change radically the federal role in protecting farmers against agricultural disasters. The legislation that emerges will have to balance a number of federal objectives and program considerations. The major federal objectives include reducing uncertainty and income instability for individual producers, maintaining the production capacity of the agricultural sector, treating all producers equitably, and achieving the specific objectives at minimal cost to the federal government. The Congress will shape the federal role through specific decisions on eligible commodities and areas, type of program coverage, level of protection, and distribution of costs to the producer and to the federal government.

This paper discusses these various issues in order to provide background information for the debate on agricultural disaster legislation. Specifically, Chapters II and III present an overview of natural hazards and current federal programs. Chapter IV discusses federal objectives and program issues. Finally, Chapter V lists a number of options and evaluates each in terms of the federal objectives and program considerations described in Chapter IV.



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## CHAPTER II. THE RISK ASSOCIATED WITH NATURAL HAZARDS

Agricultural enterprises are constantly susceptible to the uncertainties of nature. The risk of economic losses because of natural hazards is added to the uncertainties associated with changing consumer tastes, market access, quality of management, and other causes. The purpose of this chapter is twofold: to examine producer risks associated with various types of natural hazards, and to identify how producers generally respond to these risks.

### NATURAL HAZARDS

Natural hazards are occurrences such as drought, flood, hail, frost, wind, excessive moisture, flood, insect infestation, plant diseases, and similar events that are unavoidable and beyond the control of a single individual. Depending on their severity, these hazards can cause partial or total economic losses of crops.

Natural hazards can have a direct impact on crops in terms of economic losses. For instance, drought can reduce yields or cause total crop failures. Natural hazards can also have indirect impacts such as prevention or delay of planting and harvesting. Prevented planting can cause total loss of production, while delayed planting can reduce yields. Similarly, prevented harvesting can cause total loss, while delayed harvesting can reduce production and crop quality.

The severity of economic losses is directly related to the timing of natural hazards. A frost after soybean harvest begins, for example, has little if any impact on yields, whereas such a frost at an earlier stage could drastically reduce yields. Dry conditions can have varying effects on corn yields depending on the stage of growth. A producer who has applied fertilizer, pesticides, and other production inputs and loses his crop near harvest time suffers greater economic losses than one whose loss occurs early in the growing season or before planting.

Accurate estimates of aggregate economic losses from natural hazards are not available. Not only is it a problem to determine what constitutes a loss, but also it is difficult to identify losses

attributable strictly to natural hazards. Nevertheless, information is available that identifies the relative importance of natural hazards in terms of crop losses. The following observations on Federal Crop Insurance Corporation (FCIC) indemnity payments for 1939-1975 provide some perspective on the severity of various hazards:

- For all crops, drought is the single largest cause of crop losses, accounting for about one-third of all FCIC payments from 1939 to 1975. 1/ Variations in precipitation (drought and excess moisture) account for more than half of total losses.

- Frost (including freeze, cold, and winterkill) and hail account for about 30 percent of crop losses.

- Among crops there are substantial differences in the relative importance of natural hazards and crop losses. For example, drought accounts for 40 to 50 percent of losses for wheat and feed grains, whereas it causes minor, if any, losses for crops such as citrus, apples, grapes, peaches, potatoes, and rice (an irrigated crop). On the other hand, frost, freeze, cold, and winterkill are the primary causes of losses to this latter group of crops but are of far less importance to some other crops.

- For individual crops, losses vary from one geographic area to another, reflecting, among other things, differences in the incidence of specific natural hazards. For example, in Nebraska 90 percent of corn indemnities were for drought losses, while in Indiana the corresponding figure was only 46 percent.

## FACTORS AFFECTING PRODUCER RISKS

The economic consequences of the risk and uncertainty of natural hazards vary widely among producers and are affected by several factors. These factors affect producer choices of strategies for dealing with these risks.

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1/ FCIC statistics probably understate the relative importance of crop losses attributable to drought because insurance is not offered in areas where the chances of drought are high.

## Location

The incidence of natural hazards is not uniform over all areas. For a specific type of natural hazard--for example, variable precipitation--the range of probability of occurrence is quite broad.

## Enterprise Specialization

In general, the greater the degree to which the enterprise is specialized, the more significant is the potential economic impact from losses because of natural hazards. For example, a farmer whose only income-producing crop is wheat stands to suffer more of an economic loss from a specific natural hazard than one who also produces other crops or livestock. In most cases, diversification of the enterprise reduces the potential economic loss because of natural hazards.

## Type of Enterprise

Within a given area, certain types of farm enterprises are more susceptible to damage from natural hazards than are other enterprises. For example, tree crops are more likely to be damaged by frost than are grain crops; cotton and soybeans are more prone to damage by excess moisture than is wheat.

## Size of Enterprise

Large farms have a much higher ratio of production expenses to net income, which emphasizes the importance of purchased production inputs, including labor. 2/ In contrast, for smaller farms purchased

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2/ In 1976 farms in the $100,000-and-over sales class--which is the largest class--had an average production expense of $5.74 for each $1.00 of net farm income. Farms in the $10,000-to-$19,999 sales class had an average expense of $2.46 for each $1.00 of net farm income, and farms with sales of less than $10,000 had expenses of $2.00 for each $1.00 of net farm income. Farm income and production expense data in this section and the next one are from U.S. Department of Agriculture, Economic Research Service, Farm Income Statistics, Statistical Bulletin 576 (July 1977).

inputs are less important relative to net income; for these farms, operator (and family) labor are a significant input. Thus, larger enterprises face greater absolute potential losses, primarily in terms of expenditures for purchased inputs. But for smaller enterprises, potential losses can mean a substantial reduction in returns to operator labor. The relative importance of potential losses among producers of different size is determined by such factors as the levels of indebtedness, capital reserves, and alternative income sources.

## Financial Position

A farmer's ability to withstand risk is influenced by his levels of indebtedness and capital reserves. In the agricultural sector, a substantial portion of operating expenses are financed with short-term borrowing; in addition, purchases of real estate and other capital items are financed with long-term loans. For individual producers, therefore, the level of indebtedness is a critical factor affecting the risk of economic losses; liquidity problems can quickly occur when there are production losses because loan obligations have to be accommodated. These problems tend to become more severe as the size of the enterprise and the level of indebtedness increase.

## Alternative Income Sources

Generally, larger producers are highly dependent on farming as their source of total income, whereas smaller producers are more reliant on off-farm earned income. For example, in 1976, for producers with farms that had gross sales over $100,000, net income from farming averaged 81 percent of total income. For producers with farms in the $10,000-to-$19,999 sales class, farm income represented an average of 42 percent of total income, and for those with farms in the less-than-$10,000 sales class, farm income accounted for 15 percent of total income. Producers who are dependent on the farm enterprise face a greater economic burden from production losses than those who rely heavily on off-farm earned income.

## Summary

In summary, farms in certain geographic regions face a greater risk of production loss because of natural hazards than do farms in other regions. Further, within a region, certain types of farm

enterprises are more likely than others to suffer losses from natural hazards. Specialized producers generally are subject to greater economic impacts from production losses resulting from natural hazards than producers who are more diversified. Larger producers have greater potential economic losses, and those producers who are highly dependent on the farming enterprise for income are susceptible to a greater economic burden from natural hazards than those for whom off-farm earned income is the major income source. Finally, producers who borrow substantial capital are more prone to serious liquidity problems because of losses from natural hazards.

All this suggests that producers' perceptions of risk and potential economic losses are diverse and conditioned by several factors. This means that all producers do not seek the same level of economic protection against losses from natural hazards.

## PRODUCER RESPONSE TO RISK

Natural hazards clearly create additional uncertainty for producers. In general, a producer has two broad options to deal with this uncertainty: either he can ignore the uncertainty, or he can adopt one or more strategies to reduce the adverse economic consequences of the uncertainty. The option selected will depend on the producer's aversion to risk.

If the producer elects to reduce the adverse economic consequences of uncertainty, several strategies are possible. For example, a producer can try to avoid risks by eliminating high-risk (and often high-value) enterprises, by diversifying to reduce variability of farm income, by reducing the total amount of investment in farming in order to lower the chance of financial disaster, or by using smaller amounts of borrowed capital. A producer can also try to prevent adverse economic consequences from natural hazards through improved facilities, techniques, and organization; for example, irrigation, drainage, and storage can reduce risks of variable precipitation.

Perhaps more important than either avoidance or prevention, a producer can assume risks through self-insurance by relying on capital reserves and off-farm income or through the transfer of risks to a second party. Risks can generally be transferred to a second party through insurance or loans. Federal crop insurance, disaster

payments, and emergency loans increase the number of alternative strategies available for individual producers. The next chapter presents an overview of these key federal programs.

## CHAPTER III. FEDERAL PROGRAMS

The federal government currently has three basic programs that deal with the problem of natural hazards: direct disaster payments, crop insurance indemnities, and emergency loans.

### DISASTER PAYMENTS

Disaster payments are direct cash payments to eligible producers of specific crops. Disaster payments were initiated by the Agriculture and Consumer Protection Act of 1973. Under this act, producers with allotments of wheat, feed grain, and cotton were eligible for payments for prevented plantings and low yields resulting from natural causes. (Allotments were the government-determined acreage that an individual farmer could have in an individual crop.) Disaster payments for rice were authorized by the Rice Production Act of 1975. Under these acts, disaster payments were calculated on the basis of three factors: established (or normal) farm yields, disaster yields (two-thirds of the established yield), and target prices. If a producer's actual yield was less than the disaster yield, he received a payment on the difference between the established yield and the actual yield on allotted acres. A producer with an actual yield identical to the disaster yield received no payment; if the producer's actual yield was one bushel less than the disaster yield, however, he would receive a substantial payment. This irregularity, known as the "snap back" provision, was a major fault of disaster payments.

In addition, only producers with allotments were eligible for disaster payments. In determining whether a producer with an allotment was eligible, total farm production, not just production on allotted acres, was used. If total farm production exceeded two-thirds of normal production on allotted acres, a producer was ineligible. In essence, disaster payments provided free insurance to eligible producers under the 1973 act.

The Food and Agriculture Act of 1977 modified the disaster payments provisions of the 1973 act and extended them only through the 1979 crop year because the Congress expected to pass new legislation with alternative mechanisms. The act made four key changes in the disaster payment provisions:

- It eliminated the "snap back" provision. Low-yield payments will be made on loss of production below 60 percent of normal for wheat and feed grain producers, below 75 percent of normal for cotton and rice producers.

- It changed payments so that they will be made on the basis of planted acres (except for rice) rather than on the basis of allotments. Consequently, any producer of wheat, feed grains, or cotton who complies with the required conditions will be eligible for disaster payments.

- It increased low-yield payments to 50 percent of the target price for wheat and feed grain producers.

- It maintained payments for prevented plantings, with some modification. This provision, which allows managerial judgment to affect losses, is subject to abuse and is difficult to control administratively.

Under the 1973 act, disaster payments averaged $436 million annually over fiscal years 1975-1977. The new provisions will increase coverage because they make payments on the basis of planted acres (except for rice), and they will increase payments for wheat and feed grains because they will be calculated on a larger proportion of the target price. These two changes will likely offset the cost savings from elimination of the "snap back" provision. Disaster payments under the 1977 act are expected to average $500 million through fiscal year 1980, the last year the payments are authorized.

## FEDERAL CROP INSURANCE

Federal crop insurance (FCI) is offered by the Federal Crop Insurance Corporation (FCIC), an agency of the U.S. Department of Agriculture. Most FCIC insurance is "all-risk" crop insurance; such insurance covers unavoidable losses resulting from any adverse weather condition, losses resulting from insect infestation and plant disease, and other causes outside the control of individual producers.

FCI is voluntary and producers pay a premium for protection. By law, premiums must be set at a level believed adequate both to cover claims for losses and to provide a reserve against unforeseen losses. FCIC has pursued a 0.9 loss ratio (ratio of indemnities to premiums) target; this means that over the long run 10 percent of premiums



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would go into a reserve. In fiscal years 1948-1976, for all crops, the loss ratio was 0.97. In some years indemnities exceeded premiums; in crop year 1976 the loss ratio was 1.57. The loss ratio for 1977 is estimated to be 1.65 because of drought losses. Among crops there are substantial variations in the ratio for a given year or a longer period.

The original law (the Federal Crop Insurance Act, Title V of the Agricultural Adjustment Act of 1938) authorized the appropriation of funds for a capital stock of $100 million; in early 1977 the capital stock was increased by the Congress to $150 million. As of October 1, 1977, all of the capital stock had been issued to meet heavy crop losses resulting primarily from drought in 1976, and there was a capital surplus of $63 million. Currently, legislation has been proposed to provide for an additional $50 million in capital stock. An annual appropriation of $12 million has been authorized for administrative and operating expenses. FCIC, with Congressional approval, however, has followed a policy of using premium income in addition to the appropriation to meet these expenses. Over time this has contributed to depleted reserves and the decline of capital stock.

FCI is not available in all counties nor on all crops in any county. In 1975, FCI was available in 1,467 counties, or about 50 percent of all counties in the United States. 1/ FCI, however, is not offered on about 25 percent of the acreage of major crops in areas where the risks of crop failure are high. Restricted availability reflects in part the statutory requirement that the FCI be run on an actuarial basis; FCIC can refuse to sell insurance in an area and it can terminate insurance where it is available. Furthermore, there are limits on the number of new counties that can be brought into the program each year.

The basic principle of FCI all-risk insurance is to guarantee a producer an amount of production in a commodity unit such as bushels. When a producer harvests less production than the guaranteed amount because of insurable causes, he is paid for the shortage at the price

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1/ Crop production is concentrated in a relatively small number of counties. About 30 percent of all counties produce 75 percent of U.S. wheat; about 20 percent of all counties produce 75 percent of U.S. corn; and 8 percent of all counties produce 75 percent of U.S. cotton.

per commodity unit that he has selected before the growing season. The amount of guarantee may not exceed the usual production cost per acre for the crop and the area. FCIC does not guarantee full production, but only some part of the average over a representative period of years--never more than 75 percent and usually less. Therefore, a producer bears the losses until they are 25 percent or more below usual production.

Even where FCI is available, the level of participation is low. Only about 13 percent of the eligible wheat, corn, barley, grain sorghum, soybean, and cotton acreage was insured in 1976; this was about 8 percent of total planted acres of these crops. The low participation can be attributed to several reasons. There is evidence that producers feel the level of protection is too low. Undoubtedly, competition from other federal programs is a factor. As is the case with other forms of insurance, little crop insurance is sold because of producers coming into FCIC offices (or contacting commission agents); most crop insurance is sold by sales agents in direct contact with producers. The limitation on appropriations for administrative and operating expenses may restrict sales efforts and limit participation. Another reason for low participation is that premium costs, even though relatively low compared with production costs, compete with other uses for producers' capital. Finally, unless some situation such as drought arises that intensifies interest in insurance, many producers opt for other strategies such as self-insurance.

## EMERGENCY LOANS

Several types of emergency loans may be available to producers. Emergency loans are administered through the Farmers Home Administration (FmHA) in the U.S. Department of Agriculture and the Small Business Administration (SBA). While the FmHA has been making emergency loans since 1949, SBA only began making these loans to farmers in mid-1977. The similarity of loan services available from the two agencies has prompted confusion and duplication of effort.

### Emergency Loans through FmHA

The emergency loan program was authorized by the Consolidated Farm and Rural Development Act of 1961. Emergency loans are made available in designated counties where property damage and/or severe production losses have occurred as a direct result of a natural

disaster. 2/ Emergency loans may be made by banks or other organized lenders and then guaranteed by FmHA, or they may be made directly by FmHA and then sold to the Federal Financing Bank (FFB). Most are direct loans and the FmHA insures the FFB against any loss.

Producers must meet several criteria to obtain a loan. Above all, the producer must be unable to obtain credit elsewhere. To be eligible a producer must also experience a loss greater than 20 percent of normal on an enterprise that accounts for at least 25 percent of farm income. Once a producer is eligible for one enterprise, he is also eligible for loans on other enterprise losses. Loans for actual losses (as verified by the producer) are made at 3 percent rate of interest up to $250,000, and at a 5 percent rate thereafter. The loan period can vary according to the purpose of the loan, but many loans are made for seven years.

During the years 1970-1976, 5,808 counties were designated as emergency loan areas. This included 4 counties designated in all seven years, 15 counties designated in six out of seven years, 83 counties designated in five out of seven years, and 239 counties designated in four out of seven years. The average county is designated in approximately one year out of four. Counties are most often designated for emergency loans in response to drought conditions; of the nearly 2,400 counties designated for emergency loans in 1977, approximately 2,200 were because of drought. On the basis of recent experience, there appears to be a contradiction between the number and frequency of county designations and the overall production conditions. A large number of county designations is not necessarily indicative of a substantial decline in agricultural output; it is more a measure of localized and temporary conditions that may improve during the year.

## Emergency Loans through SBA

Disaster loans are authorized by the Small Business Act of 1958 as amended, and recent amendments have made loans available to

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2/ To be designated, counties must be: (1) named by the Federal Disaster Assistance Administration as eligible for federal assistance under a Presidential declaration of a major disaster or an emergency, (2) designated by the Secretary of Agriculture, or (3) authorized by the State FmHA Director.

agricultural producers. These direct, guaranteed, or insured loans are made to restore the victims of disasters as nearly as possible to predisaster conditions. Areas must be designated by the President, the Small Business Administration, or the Department of Agriculture. Unlike FmHA emergency loans, borrowers do not have to meet the test of being unable to obtain credit elsewhere, nor do they have to suffer any specific losses to be eligible. Consequently, SBA is a more readily available source of funds.

Loans on actual losses are made at a 3 percent rate of interest up to $250,000, and at a 6.625 percent rate thereafter. Repayment can be up to 30 years, but the average period for nonagricultural loans has been 10 to 12 years. In fiscal year 1977 an estimated $41 million went to agricultural producers. For fiscal year 1978, $1.6 billion may go to producers.

## ASSESSMENT OF FEDERAL INVOLVEMENT

The federal government provides assistance--in the form of payments, loans, and insurance indemnities--to producers who have losses from natural hazards. There is substantial diversity among programs in terms of coverage, level of economic protection, producer costs, and federal costs.

### Coverage

The coverage of federal programs is such that many producers may be eligible to participate in all programs. There are, however, some administrative constraints; for example, the amount of emergency loans a producer can qualify for can be reduced by any FCI indemnities and disaster payments he receives. Though evidence is limited, it is very likely that some producers have participated concurrently in two of the three key programs. On the other hand, some producers may be ineligible for any federal program. Soybean producers, for example, are not covered by disaster payments, and they may be located in a high-risk area where FCI is not available. Emergency loans are an alternative for these producers only if their county is appropriately designated. Though it does not appear difficult for a county to be designated an emergency loan area or to have loans authorized by state directors of FmHA, individual producers may not have access to emergency loans.

## Level of Economic Protection

Cotton, corn, and wheat producers with total losses would receive disaster payments of about 30 percent of total production costs (based on 1977 prices, average production costs, and 1978 target prices). For producers with actual yields slightly below disaster yields, the combination of disaster payments and crop receipts would, on average, cover 40 to 50 percent of total costs. In contrast, based on 1976 average FCI prices per unit of loss, insured producers (that is, those who have the maximum production guarantee) with complete crop losses would receive indemnities equal to 50 to 60 percent of total production costs. If losses were slightly below the production guarantee, the combined indemnities and receipts would equal about the same 50 to 60 percent of total production costs. FmHA and SBA loans are made to cover actual losses based on expected normal production and recent market prices. In the case of FmHA loans, however, producers with losses less than 20 percent of normal must absorb those losses.

## Producer Costs

Producers who are eligible for disaster payments pay nothing for the protection provided, except for any costs of complying with provisions of the program. Disaster payments are, in a sense, "free insurance." FCI premium rates vary widely, depending upon the area, the crop, the insured level of production, and the price per unit of loss guarantee. Premium rates are subsidized because a part of administrative expenses are funded by appropriations, and because the FCIC, unlike private insurance companies, does not have to cover expenses such as premium and income taxes and capital costs. Based on 1977 average total production costs, FCI premiums can average 2 to 5 percent of per acre costs for grains, soybeans, and cotton.

Currently, borrowers pay 3 percent on the first $250,000 of emergency loans for actual losses; beyond this level FmHA charges 5 percent and SBA a maximum of 6.625 percent. Because of these low interest rates, for a seven-year loan with a 10 percent discount rate, the present value of loan repayments and interest for an FmHA borrower is 78 cents for each dollar borrowed. 3/ In contrast, if

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3/ Present value is a measure of what some future payments are worth at the present time. The discount rate is the interest rate used to calculate the present value. The higher the discount rate, the smaller will be the present value.

the interest rate were 8 percent (near FmHA's cost of borrowing), the same borrower would pay, at present value, 94 cents for each dollar borrowed; even at this rate a borrower would pay less than the cost of borrowing from most conventional sources. The current run on SBA loans suggests that low interest rates may be an incentive for some producers to borrow more than is necessary to adjust to production losses.

## Federal Costs

The annual federal costs of these programs are shown in Table 1. Disaster payments (excluding administrative costs) averaged $436 million annually over fiscal years 1975-1977. The average cost of FCI over the period--$46 million--is influenced by large losses in crop year 1976 (fiscal year 1977). The costs of FmHA and SBA loans are primarily the difference between interest rates paid by borrowers and the higher rates that FmHA pays purchasers of securities or that SBA pays the U.S. Treasury.

TABLE 1. ANNUAL FEDERAL COSTS OF DISASTER PAYMENTS, FEDERAL CROP INSURANCE, AND EMERGENCY LOANS, FISCAL YEARS 1975-1978: IN MILLIONS OF DOLLARS a/

| Program | 1975 | 1976 | 1977 b/ | Average 1975-1977 | 1978 b/ |
|---|---|---|---|---|---|
| Disaster Payments | 557 | 287 | 465 | 436 | 522 |
| Federal Crop Insurance | 32 | 15 | 91 | 46 | 99 |
| Emergency Loans (FmHA) | 77 | 34 | 66 | 52 | 68 |
| Emergency Loans (SBA) c/ | N/A | N/A | unavail-able | N/A | 81 |
| Total | 666 | 336 | 622 | 534 | 696 |

N/A = Not applicable.

a/ Federal cost for disaster payments is payments made; administrative expenses are not estimated. For Federal Crop Insurance, cost is the annual appropriation for administrative and operating expenses and change in working capital. Cost of emergency loans is the difference between interest income and interest expense, write-offs, and administrative expenses.

b/ Estimates based on the President's 1979 Budget.

c/ To agricultural producers only. Fiscal year 1978 estimate based on net expenses for the disaster loan fund.

While these estimated loan costs are the annual net expenses associated with FmHA and SBA loans, they do not necessarily reflect the budget impact in terms of outlays (or budget authority). For example, an increase in emergency loans made by FmHA will normally not be fully reflected in outlays since FmHA can sell securities through the Federal Financing Bank, which provides some offset to increased loan outlays. In contrast, SBA requires direct appropriations to finance loans; thus, any unexpected increase in loans is more fully reflected in outlays. This difference is demonstrated in fiscal year 1978 estimates where the sharp increase in SBA loans substantially increases outlays, while for FmHA emergency loans about the same loan level indicates a large decline in outlays (see Table 2).

Program costs can also be compared in terms of the producer losses covered through payments, insurance indemnities, and loans. This is done by estimating the federal cost per $100 of producer losses covered, which demonstrates how federal costs decline as

TABLE 2. OUTLAYS FOR FmHA AND SBA EMERGENCY LOANS, FISCAL YEARS 1976-1978: IN MILLIONS OF DOLLARS

| Program | 1976 | 1977 | 1978 |
|---|---|---|---|
| SBA Emergency Loans a/ | | | |
| Loans made | 177 | 357 | 1,760 |
| Outlays | 129 | 184 | 1,515 |
| FmHA Emergency Loans | | | |
| Loans made | 473 | 1,071 | 1,140 |
| Outlays | 94 | 415 | -33 b/ |

a/ These are totals for the disaster loan fund and not just for agricultural loans. In 1977, about $41 million was loaned to producers. In 1978, $1.6 billion is projected to be loaned to producers.

b/ Indicates a receipt.

producers assume a greater share of the risks of economic loss (see Table 3). Disaster payments, which are grants, are most costly. The average FCI cost of $51 per $100 of losses for fiscal years 1975-1977 is biased upward by fiscal year 1977; in fiscal year 1976 the cost was about $30 per $100 of losses covered. When FmHA or SBA makes a low-interest loan, future costs are associated with that loan until it is repaid. The estimate of $10 per $100 of producer losses in Table 3 is the total cost (in present value terms, using a 10 percent discount rate) to FmHA of lending $100 at 5 percent interest for seven years; specifically, it is the difference between repayments of the producer to FmHA on a seven-year loan at 5 percent and repayments of FmHA on its borrowing at 8 percent to finance the loan, plus administrative costs. At a 3 percent interest rate as now authorized, the cost would be $16 per $100 of producer losses.

TABLE 3. FEDERAL COSTS OF PROGRAMS IN RELATION TO PRODUCER LOSSES COVERED, AVERAGE FOR FISCAL YEARS 1975-1977

| Program | Losses Covered a/ (Millions of Dollars) | Federal Cost per $100 of Losses Covered (Dollars) |
|---|---|---|
| Disaster Payments | 436 | 100 b/ |
| Federal Crop Insurance | 90 | 51 b/ |
| Emergency Loans (FmHA) | 797 | 10 c/ |
| Emergency Loans (SBA) | 1,600 d/ | 20 d/ |

a/ Payments, insurance indemnities, and loans made.

b/ Average cost from Table 1 divided by losses covered.

c/ This is the present value (10 percent discount) of the difference between repayments of the producer to FmHA on a seven-year loan at a 5 percent borrower rate and repayments of FmHA on borrowing at 8 percent to finance the loan. In other words, this is the total cost (in present value terms) to FmHA of lending $100 at 5 percent interest for seven years. Administrative costs are also included.

d/ Fiscal year 1978 only. Present value calculated as for FmHA emergency loans except the loan period is 12 years.

## Distribution Of Program Benefits

Under the Agriculture and Consumer Protection Act of 1973, which contained authorizations for fiscal years 1975-1978, disaster payments were only made to producers with acreage allotments. This meant that only producers with a production history were eligible. Even though a high percentage of producers of wheat, cotton, corn, barley, and grain sorghum had allotments, the individual allotments were determined (with some adjustments) by the amount of acreage planted in a past period. The distribution of disaster payments over fiscal years 1975-1978 under the 1973 act is uncertain. Some effort was made to allocate allotments in favor of smaller producers; nevertheless, since federal program benefits were determined by the volume of production, benefits were probably concentrated among large farms.

The Food and Agriculture Act of 1977 made disaster payments (only through 1979 crops) available to any producer of wheat, feed grain, or cotton. While this increases coverage of disaster payments, it does not alter the expected distribution of payments toward larger producers.

Most producers in an area where crop insurance is available can purchase insurance. The distribution of indemnities is determined by the incidence of losses and the number and size of participating producers. It is evident from FCIC program data that producers of all sizes (in terms of acreage of the insured crop) buy crop insurance. For major crops in all areas, however, proportionately fewer small producers buy insurance than do larger producers.

The size of participating producers appears to vary considerably depending upon the crop and the area. From a national standpoint, however, the average FCIC endorsement (in terms of acreage) for wheat and corn is similar to the U.S. average acreage harvested for these crops; the average endorsement for cotton is larger than the U.S. average acreage harvested. This implies that proportionately more large cotton producers participate than do large wheat and grain producers. In sum, available data suggest that producer size is only one factor affecting participation in crop insurance.

It is thought that most FmHA borrowers are small to average in size. Though the "credit elsewhere test" tends to exclude large producers, a farmer who has leverage can become eligible if lenders determine that production losses have seriously eroded the

borrower's financial position. For the most part, however, FmHA emergency loans are made to producers of smaller size who are, at least temporarily, considered questionable credit risks by other lenders. But among these, FmHA tends to loan to those with equity and a record of efficiency. Ostensibly, SBA borrowers are of all sizes and income classes.

## Production and Domestic Economy

Current federal programs are thought to have only a minor impact on overall production. The major reason for this is the relatively small liability covered by federal programs. In recent years, federal programs have covered a liability equivalent to about 15 percent of the total value of crop production. Much of the coverage has been concentrated among disaster payment crops--wheat, corn, grain sorghum, barley, cotton, and rice.

Undoubtedly, some producers who otherwise would have been forced out of business because of losses from natural hazards have been able to continue because of federal programs. In these cases federal payments, indemnities, or loans were the difference between the forced sale of assets (or foreclosure) and the ability to meet current loan obligations and to finance the following year's operation. The size of this group relative to the total number of beneficiaries of the programs is thought to be small. But even if a number of producers were forced out in the absence of federal programs, their assets would be acquired by remaining producers and total production would not be affected.

Since federal programs have a minor impact on total agricultural output, their effect on farm and food prices is negligible. Even though federal programs can affect local economies by helping to stabilize the income of individual farmers the impact on the overall economy is normally very small. The primary reason for this is that total payments, insurance indemnities, and loans are small relative to farm income; in recent years they have been less than 2 percent of gross farm income.

## CHAPTER IV. FEDERAL OBJECTIVES AND PROGRAM ISSUES

A primary objective of the federal government with respect to the agricultural sector is the maintenance of a viable farming industry with full production, adequate farm income, and stable prices. The federal government attempts to achieve these goals, on the one hand, by commodity programs that reduce the price and income instability caused by market condition and, on the other hand, by programs that reduce the uncertainty caused by natural hazards. The current federal role with respect to natural hazards is based on two key assumptions: (1) the risks of economic loss are too great for individual producers to bear alone; and (2) a failure on the part of the federal government to assume some portion of these risks would contribute to disinvestment, declining production, and higher consumer prices.

It is generally agreed that the federal government should continue to help individual producers deal with uncertainty caused by natural hazards. The exact nature of the federal assistance, however, is a matter of considerable debate. In determining the dimensions of the federal role, the Congress will have to make implicit trade-offs among several federal objectives. This chapter discusses these federal objectives and the various program considerations.

### FEDERAL OBJECTIVES

All public policy issues have multiple federal objectives, and agriculture disaster protection is no exception. The two major objectives of this protection are:

- To help individual producers adjust to the uncertainty and income instability caused by natural hazards;
- To maintain the production capacity of the agricultural sector.

Additional objectives are to establish programs that treat all producers equitably, that do not eliminate initiatives by insurance companies in the private sector, and that are cost effective.

Federal programs have probably meant the difference between continued operation and forced exit from farming for a relatively small number of producers. Rather than preventing business failures, federal programs have more likely acted to stabilize the incomes of the producers. For individual producers, these benefits contribute in varying degrees to economic viability. In areas with widespread production losses where agriculture is the dominant source of economic activity, federal programs can bolster the local economy. The extent to which income is stabilized is determined by the type of programs, coverage, and level of economic protection.

The maintenance of overall agricultural production capacity is a primary federal objective. As a practical matter, however, it is unlikely that federal disaster assistance programs have had any perceptible impact on aggregate output. This is because the risks covered by the federal government in terms of liability and benefits (insurance indemnities, payments, and loans) have been small in relation to the total agricultural sector. Thus, federal programs have, in aggregate, only marginally reduced the risks of economic loss. Even though a number of producers might have been forced out in the absence of government programs, their assets, for the most part, would have been acquired by remaining producers.

Agricultural production capacity has expanded substantially in the past three decades, even with the limited federal role in helping producers adjust to the uncertainty caused by natural hazards. This expansion has been facilitated in an important way by federal price and income support programs. A major result of the expansion has been a marked increase in farm size and capital requirements. A basic question is whether overall production capacity would be jeopardized without a greater level of risk assumption by the federal government. If enough producers were adversely affected by natural hazards to cause a decline in investment in agriculture, this could lead to a lower level of output and higher consumer prices. Whether this would in fact occur is not known but a necessary condition for it to occur would be a period of prolonged and widespread economic losses caused by natural hazards. What this means is that there is no clear indication of the level of federal risk assumption, if any, that is needed to maintain current production capacity. Moreover, a significant federal assumption of risks of economic loss could increase output by drawing marginal land into production. Additional output could depress prices and further escalate federal costs of price and income support programs.

Producers differ according to location, type of enterprise, financial condition, and size; therefore, equity is a difficult objective to define and achieve. Nevertheless, equity is important because differential treatment of producers in coverage, level of economic protection, and producer costs affects the distribution of benefits and, consequently, agricultural output and farm structure. For example, concentration of coverage on selected commodities can alter production patterns away from other commodities. Further, subsidized coverage of producers in high-risk areas at the expense of other producers would encourage production on more marginal land. This would increase costs of protection for producers in low-risk areas, and it might also adversely affect them by increasing total production and lowering prices. Structuring programs so they are more advantageous for large producers could further concentrate production and income toward large producers. Conversely, preferential treatment of smaller producers, who account for a minor share of agricultural output, would do little to enhance overall production.

The private sector writes many kinds of insurance for agriculture. For production losses from natural hazards, however, private sector coverage is primarily limited to hail. Efforts to expand coverage to multiple-peril insurance have proven costly and unworkable because of an inadequate mechanism to cover large potential losses. Federal policy can erode the competitive position of the private sector in selling hail insurance and, additionally, can make the writing of all-risk insurance even more impractical. On the other hand, federal policy can provide incentives to the private sector to broaden coverage.

A program is effective with respect to the federal budget if the program's specific objectives are achieved at minimum federal cost. Measures of budget effectiveness include the level of federal costs, liability and losses covered (payments, insurance indemnities, and loans), predictability and controllability of costs, and the degree of program overlap. Federal costs for farm disaster programs are highly correlated to the number of hazards and producers covered, the level of economic protection, and the share of costs borne by producers. Federal costs are greater for direct payments than for insurance, and insurance is more costly than loans. Total liability and losses covered are determined largely by participation rates, and participation is affected by the individual producer's perception of the economic consequences. Also, the producers' preferences for alternative programs vary widely. Federal costs of insurance are more predictable and controllable than the costs of direct payments or loans, because actuarial concepts underpin

insurance and program overlap can increase federal costs and distort federal objectives.

## PROGRAM CONSIDERATIONS

Final legislative decisions on the federal role in disaster protection will involve a number of trade-offs among federal objectives. These trade-offs will be reflected in Congressional action with respect to key program considerations, such as: (1) type of program, (2) coverage, (3) level of economic protection, (4) producer costs, and (5) federal costs. Program types are the various policy instruments, such as direct payments, government insurance, federal reinsurance of the private insurance sector, and emergency loans. Coverage refers to the types of hazards, commodities, regions, and producers included in federal programs.

Federal costs are particularly sensitive to the level of economic protection and to the share of costs paid by producers. The level of economic protection is determined by: (1) the percent of production losses covered; and (2) the method of valuing production losses. With regard to the level of production losses, deviations in crop yields about the average are expected. For example, based on historical data regarding county yields, two-thirds of the total U.S. wheat acreage (in a given year) would be expected to have yields between 80 and 120 percent of average. Of the total acreage, about 16 percent would be expected to have yields below 80 percent of average; 31 percent of acreage would have yields below 95 percent of average. The implication is that federal costs increase as the level of protection is raised because: (1) producers eligible at the lower protection level receive benefits on additional losses; and (2) more producers are eligible at the higher level.

In sum, these program considerations are the means by which the Congress may shape the federal role in reducing producer income instability caused by natural hazards. In some instances, there are clear indications of how specific program considerations relate to federal objectives; in others, the relationship is clouded. In the next chapter, a number of options are evaluated in terms of these objectives and program considerations.

## CHAPTER V. FEDERAL OPTIONS

In this chapter several options to present policy are examined. These options reflect the general directions that public policy could take. Federal costs are extremely sensitive to weather and program provisions, and therefore the cost estimates should be viewed with caution. The options discussed are: (1) continuation of current policy, (2) elimination of disaster payments, (3) expansion of federal crop insurance, (4) involvement of the private insurance sector, and (5) emergency loans.

### CONTINUATION OF CURRENT POLICY

Continuation of current policy is defined as: (1) the disaster payment provisions of the 1977 Food and Agriculture Act; (2) Federal Crop Insurance; and (3) FmHA and SBA emergency disaster loans. Under a continuation of current policy, federal assistance would be a combination of insurance and loans. Most of the risks of economic loss assumed by the federal government would be for wheat, feed grain, cotton, and rice producers in the form of disaster payments. The coverage of FCI would continue to be limited by the costs associated with expanding insurance into high-risk areas. Participation in FCI would increase moderately if the current cost-price squeeze continues and if producers--either on their own or at the insistence of lenders--act to protect against losses. Losses covered by emergency loans would be determined by: (1) eligibility criteria such as credit tests and definitions of qualifying losses; (2) preference of producers for loans rather than insurance; and (3) loan terms, that is, interest rates and repayment periods.

The heavy proportion of federal benefits would be distributed to producers of wheat, feed grain, cotton, and rice, and a much lesser proportion would go to producers of other commodities who decide to participate in FCI and loan programs. Least favorably affected by federal programs would be producers of crops not eligible for disaster payments who are located in high-risk areas where FCI is unavailable. Among these producers, those who prefer insurance would find emergency loans an inferior alternative.

Average annual federal costs would be about $650 million under continuation of current policy. Federal costs of disaster payments

would average $500 million annually with probable upper limits of $800-$900 million. Costs of FCI would be a minimum of $12 million annually and, based on recent experience with large losses and the use of capital stock to cover indemnities in excess of premiums and reserves, average federal costs could be $50 million. Emergency loans are difficult to project; based on an average loan obligation of $1.5 billion at 3 percent interest, however, annual interest subsidy and administrative costs would average $90 million.

With respect to federal objectives, five implications of continuing current policy can be cited:

- Income instability would be reduced for selected producers in varying degrees because of differences among programs in coverage, and in level of economic protection and also because of program overlap.

- Agricultural production capacity would not be significantly affected by federal risk assumption because of the relatively low liability covered by the federal government.

- Federal programs would be highly inequitable with respect to the treatment of individual producers in terms of coverage, level of economic protection, and producer costs.

- Federal programs would not be particularly incompatible with the private insurance sector, although it is unlikely that the private sector would make any inroad in writing all-risk insurance.

- Federal costs (and producer benefits) would be concentrated among specific producers, and federal costs in terms of liability covered would be high. Program overlap would distort overall federal objectives. A major portion of federal costs would be unpredictable and relatively uncontrollable.

## ELIMINATION OF DISASTER PAYMENTS

Under the 1977 Food and Agriculture Act, disaster payments expire at the end of the 1979 crop year with final outlays in fiscal year 1980. The impact of this will be determined by what actions the Congress takes in 1978. Elimination of disaster payments with no offsetting changes would substantially reduce the federal role in

assuming a portion of economic risks of loss from natural hazards. Wheat, feed grain, cotton, and rice producers, who would no longer be covered by disaster payments, would have to reconsider alternatives. For those in areas where FCI is available, crop insurance would be one alternative. But it is unlikely that participation in FCI would increase significantly. For these producers, emergency loans could be another alternative. For producers of these crops in high-risk areas where FCI is not available, however, the only alternative would be emergency loans; they would be in the same situation as producers of crops that are not eligible for disaster payments now are.

With respect to federal objectives, elimination of disaster payments has several implications:

- The federal role in reducing the income instability of individual producers would be sharply diminished. The federal liability would be reduced by $7 billion.

- Any minor effect that current policy has on overall production capacity would become even more miniscule.

- The inequity of "free insurance" to selected producers would be eliminated. But producers in high-risk areas previously covered by disaster payments would still be ineligible for FCI.

- The private insurance sector would expand coverage modestly.

- On average, federal costs would be reduced by $500 million annually. Program overlap would be substantially reduced, and federal costs would be more predictable and controllable. Though these are important elements of budget effectiveness, the remaining programs--FCI and emergency loans--would have definite limitations.

## CROP INSURANCE

In considering options to the current FCI program, the roles of both the federal government and private insurance companies can be examined.

## Expansion of Federal Crop Insurance

For the federal government to increase substantially its assistance in helping producers to adjust to the uncertainty from natural hazards, participation in crop insurance is critical. One alternative could be to make crop insurance available to all producers at premium rates that reflect insurance risks and costs. Purchase decisions would be solely up to individuals. Based on current low participation rates, this alternative would do little to increase participation. Another alternative for expanding coverage is to make insurance more attractive. Two methods of increasing participation are increased sales activity and a premium subsidy.

Crop insurance is sold mostly as a result of FCIC sales employees (full-time or part-time) or commission agents contacting producers, and marketing constitutes nearly half of FCIC's operating and administrative expenses. As participation expands, increased costs are required per dollar of premium to attract new buyers. Thus, attempting to get increased participation solely through an expanded sales effort becomes at some point costly and ineffective.

A premium subsidy lowers the price producers pay for insurance. Although premium subsidies could increase participation, they are not authorized by law. 1/

Increased sales activity and premium subsidies could increase participation, but what participation the various combinations would produce is very uncertain. Unless an insurance program is fully subsidized, it is unrealistic to expect full participation because producers' perceptions of risks of economic loss are conditioned by many factors. Even for a free program that requires producers to sign up in advance of the growing season, full participation would be unlikely. Participation rates used in the following analysis are based on discussions with analysts and program personnel. There are a number of options for expanding FCI, all of which assume the elimination of disaster payments.

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1/ FCI premium rates are required by law to be sufficient to cover claims for losses and to establish a reserve.

Expand Current Program. The current FCI program with premium rates based on a 0.9 loss ratio could be expanded to cover the acreage where it is not now available. Since risks are greater in these areas, premium rates would have to be substantially higher than in present FCI areas. It is uncertain what participation rates in the new areas would be. Depending on the level of sales activity associated with expansion of the program, overall participation in terms of acreage would probably not increase much. Expansion of the current program only for disaster payment crops might increase participation nationwide for these crops to 10 percent of acreage. Additional federal costs would be around $4 million (see Table 4).

Premium Subsidies. Premium subsidies could increase participation. For disaster payment crops, a 50 percent premium subsidy could increase participation to 60 percent of the total acreage of those crops. This assumes: that the expanded program operates on a 0.9 loss ratio with premium rates set to reflect actuarial risks so that over time 10 percent of premiums go into reserves; that producers in all areas pay premiums equal to half of the premium rate implied by actuarial risks; and also that the federal government assumes all operating and administrative expenses. The federal cost, on average, would be $400 million annually. In years of unusual losses, indemnities could exceed premiums by at least $300 million; depending on the level of reserves, this could be an additional federal cost. A 25 percent premium subsidy would increase participation to perhaps 40 percent, and would cost, on average, about $200 million annually (see Table 4).

Expansion of FCI to cover all crops with a 50 percent premium subsidy could result in 60 percent participation. The annual average costs of this option would be near $800 million, with costs of up to $1.4 billion possible (see Table 3).

An expanded FCI program with or without premium subsidies would make insurance available to most producers (as long as they were located in an area where there were sufficient acreage and actuarial data to establish a program). With premium subsidies, participation would be greater, as would federal costs.

Federal crop insurance could be expanded in other ways, too. For example, the level of economic protection provided by FCI could be increased by raising both the production guarantee and the price per unit of liability. In addition, higher premium subsidies could

TABLE 4 ESTIMATED COSTS OF EXPANDED FEDERAL CROP INSURANCE: IN MILLIONS OF DOLLARS

| Option | Liability | Participation a/ (percent) | Premiums | Indemnities | Federal Cost | | |
|---|---|---|---|---|---|---|---|
| | | | | | Premium subsidy | Operating and administrative | Total |
| Current Program b/ | 2,100 | 8 | 105 | 95 | -- | 28 c/ | 28 |
| Expansion of Current Program for Disaster Payment Crops | | | | | | | |
| No premium subsidy | 2,300 | 10 d/ | 120 | 110 | -- | 32 | 32 |
| 25% premium subsidy | 5,400 | 40 d/ | 450 | 405 | 110 | 70 | 180 |
| 50% premium subsidy | 7,600 | 60 d/ | 630 | 570 | 320 | 80 | 400 |
| Expansion of Current Program for All Crops | | | | | | | |
| 50% premium subsidy | 16,000 | 60 | 1,328 | 1,200 | 665 | 120 | 785 |

a/ Percent of total crop acreage.

b/ These figures are based on program parameters that are representative of normal crop loss conditions.

c/ Under the current program, operating and administrative expenses in excess of $12 million are paid from premium income.

d/ Percent of total acreage of disaster payment crops.

be used. All of these options would increase federal costs. On the other hand, insurance could be structured so that only catastrophic losses--those below, say, 50 percent of normal--are protected. Depending on the structure of premium rates, this option could be less costly than expansion of the current program with premium subsidies. Insurance could be offered at different levels of loss protection at variable premium rates. In this case, premium rates per unit of liability would increase with the level of loss protection. Finally, insurance could be priced on the basis of the size and income of individual producers, if that type of differential treatment was thought appropriate.

Implications. An expanded federal crop insurance program (and elimination of disaster payments and emergency loans) with highly subsidized premiums (and all operating and administrative expenses assumed by the federal government) has a number of implications with respect to objectives.

- Because of increased participation and expanded coverage, the federal role in reducing income instability for individual producers would be broadened relative to current policy.

- The increased federal risk assumption would act as an incentive for producers to maintain and expand production capacity.

- Most producers would have the opportunity to purchase insurance at actuarially determined premium rates subsidized by the federal government, but perhaps as much as 40 percent of crop acreage would not be covered.

- The private insurance sector would experience increased competition from the FCIC in the sale of single-peril insurance such as crop-hail insurance.

- Federal costs would exceed those of current policy by at least $150 million. With elimination of disaster payments and emergency loans, program overlap would be reduced considerably. Additionally, the predictability and controllability of federal costs would improve. Because of a relatively large uncovered acreage, however, there would be a potential demand for other forms of federal assistance.

## Private Insurance Sector

Private insurance companies limit coverage primarily to hail because it is a risk they can accommodate with limited reserves. In 1976 about 200 companies were writing crop-hail insurance with a total liability of $9 billion. In that year premiums were $324 million, losses were $185 million, and the loss ratio was 0.57. 2/ Limited industry experience with multiple-peril crop insurance on an experimental basis has been unfavorable. For example, in 1976 companies had a loss ratio of 1.57 (indemnities exceeded premiums by 157 percent) on about $5 million of multiple-peril insurance. Insurance companies writing crop-hail insurance normally require a loss ratio of 0.6 or less to remain viable. This means that expenses including administrative costs, premium and income taxes, and costs of capital average about 40 percent of premiums, or about 67 percent of indemnities. Consequently, the high loss ratios experienced in writing multiple-peril insurance and observed in FCIC operating results are a constraint on the expansion of private insurers into multiple-peril or all-risk insurance.

A critical characteristic of insurance is that it distributes the burden of loss over areas and time through the accumulation of reserves. Ideally, a reserve is large enough over the long run to meet losses in excess of those expected. Private insurance companies, however, have been unable to find a suitable means to spread over time the risks associated with multiple-peril insurance.

Competition from FCI--and from emergency loans and perhaps from disaster payments--has probably restricted private insurance companies in offering multiple-peril insurance. Unlike private insurance companies, FCIC can operate on a much higher loss ratio. This means that insurance companies with a 0.6 loss ratio requirement would have to charge premium rates as much as 50 percent higher than FCIC to provide the same kind of all-risk insurance.

For private insurance companies to write all-risk insurance in agriculture on any significant scale would require some type of federal action. Reinsurance and federal subsidies are two possible types of action.

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2/ Data in this section come in part from Crop-Hail Insurance Association, 1976 Statistics, Crop-Hail Insurance, Multiple-Peril Crop Insurance, and Rain Insurance, (1977).

Reinsurance. Reinsurance is a means by which an insuring agency shares the risks assumed by it with one or more similar agencies, or with agencies that specialize in reinsurance. Usually, a contract defines the circumstances under which reinsurance is to apply, the respective shares or obligation in case of losses and indemnities to be paid, and the allocation of premiums. The FCI authorizing legislation permits FCIC to reinsure private insurers, but such reinsurance is limited to no more than 20 counties. The provision has never been implemented.

Thus, FCIC (or some other federal agency) might reinsure private insurance companies (or a group of companies) that write multiple-peril or all-risk insurance at premium rates that reflect their actuarial risks and costs. Such reinsurance could be provided at a reasonable premium to the companies. Insurance offered by private companies would not be attractive in areas where lower-cost FCI is available because, at a minimum, the premium costs of private insurance would be 50 percent higher. There would be little reason for companies to write insurance in high-risk areas. Therefore, this type of reinsurance plan, in which FCIC is a competitor with lower-cost insurance, makes little sense in terms of expanding the coverage of crop insurance. Another option is a reinsurance plan combined with federal subsidies.

Subsidies. Federal subsidies to producers who elect to purchase insurance from private companies could assure that no producer would have to pay more than FCI rates. In combination with a reinsurance plan this might make private insurance companies more competitive. Alternatively, insurance companies could charge FCIC rates and receive a subsidy on the difference between those rates and the rates that they would have to charge to cover their risks and costs.

Implications. Private insurance companies have little incentive to expand their coverage into multiple-peril or all-risk insurance under current federal policy.

The large number of insurance companies and independent agents that sell other types of insurance to agricultural producers gives the private sector access to more potential buyers than FCIC. On the other hand, FCIC has far more experience in program development, underwriting, and actuarial activities associated with all-risk insurance. In terms of the total cost of writing insurance, FCIC generally has slightly lower unit costs than insurance companies. It appears that there are economies of size in the insurance enterprise.

FCIC will likely remain in operation, perhaps with some modifications. Thus, federal policy will not result in a primary system of private insurance companies writing all-risk insurance with reinsurance by the federal government. But insurance companies and independent agents can be more involved than they are now. One option would be for FCIC to negotiate with the private sector to sell FCI on a commission basis. This might increase participation, and the federal obligation to the private sector would be limited to commissions.

Another option would be a reinsurance plan in which FCIC (or some other federal body) would reinsure individual companies or groups or pools of companies. These institutions would write insurance and be assured that losses would not exceed a specified portion of premium income. Provisions could offset the premium rate advantage of FCIC by adjusting the loss ratio threshold at which the federal government assumes losses. The key determinant of federal costs would be the level of reinsurance. The effect of this option on overall participation is unclear. Companies would most likely concentrate on low-risk areas where FCIC is also most active.

Federal assistance to the private insurance sector would serve to reduce any current or potential adverse competitive effects that federal risk assumption may have on that sector. There are, however, real uncertainties about what the consequences would be in terms of producer participation, coverage, and federal costs.

## EMERGENCY LOANS

Emergency loans differ substantially from insurance because the producer takes on future loan obligations after the loss occurs. In terms of reducing the income instability of producers, loans are different from insurance in that loans add to future claims on income. This burden depends on the terms of the loan--interest rates and repayment period. For a given level of liability, producers assume a greater share of economic losses through loans than through insurance.

A producer's preference between loans and insurance is affected by several factors. A producer with low equity and income would be hard-pressed to incur additional loan obligations (to help adjust to losses) and, in fact, might not be eligible for loans. Even for producers in relatively sound financial condition, a severe production loss or losses in consecutive years could make emergency loans

an inadequate alternative. Perhaps the most important factor influencing producers to prefer loans is the uncertainty of adverse economic consequences and the availability of emergency loans, compared with the certainty of annual insurance premium costs. In essence, some producers are willing to gamble that losses will be infrequent and small enough that loans will provide adequate protection.

Current FmHA and SBA emergency loan programs have limitations that prevent them from being effective options for achieving the federal objectives. The primary limitations are: program duplication and overlap, definition of qualifying losses, procedures for designating eligible areas, borrower eligibility, and loan terms. If emergency loans are to become an effective option for achieving federal objectives, several changes are necessary. The problem of program duplication could be alleviated if the administration of emergency loans was concentrated in one agency. An even more critical change would be to make loans available on the basis of losses to individual producers, independent of production losses elsewhere. This would eliminate the current designation procedures.

A key consideration in an emergency loan program is the loan terms. From the producer's standpoint, these terms are important because they determine the ultimate cost of using loans as the means of adjusting to production losses. From the government's standpoint, loan terms have a significant impact on the volume of loans (producer losses covered) and on budget outlays and costs.

Among any group of producers with qualifying production losses, the need for financial assistance would vary substantially. Some could adjust to production losses through insurance or capital reserves. Others would be accommodated by private lenders. Still others would have no recourse but emergency loans. For the first and second groups, the interest rate on emergency loans could be an incentive to borrow funds that are not necessary to adjust to losses. This would be the case particularly if the interest rate is substantially below the rates of private lenders or the rates of return on money in alternative uses such as savings or the purchase of farm real estate. For the group with no other alternative but emergency loans, the interest rate would be less a factor in affecting loan demand; but even these producers would not be insensitive to the interest rate.

All this suggests that for a specific volume of qualifying losses, the loan demand will increase as the interest rate declines.

Little is known about the specific relationship between emergency loan demand and interest rates. Total loan demand, however, is apparently more sensitive to interest rates of 3 to 5 percent than to rates that are closer to the market rate.

In the context of an expanded modified emergency loan program, loan terms would be an important policy lever for determining the extent to which federal loans help producers adjust to production losses. Additionally, by adjusting other basic provisions of the program, several options could be developed to target emergency loans to meet the financial needs resulting directly from production losses.

The net federal costs of emergency loans (see Chapter III) are administrative costs, defaults, and interest subsidies, with the subsidies being the primary cost component. For example, on an average loan balance of $2 billion, the difference in interest subsidies between 3 percent interest rates and 5 percent rates is $40 million; between 3 percent rates and 8 percent rates, the difference is $100 million. Though the net cost of loans is generally lower than other types of assistance, their impact on the budget (in terms of outlays) can be larger if emergency loans are increased within a fiscal year. This is particularly the case if loans are financed through direct appropriations rather than by the sale of securities.

Expanding the emergency loan program to replace current programs has several implications.

- Coverage and participation would be greater with an expanded loan program than with current policy. For producers of disaster payment crops and for those participating in FCI, however, individual risk assumption would increase.

- An expanded loan program would be more equitable than current policy in terms of availability of assistance. Most would have access to emergency loans if qualifying losses occurred. Participation would not be universal, however, for a number of reasons, particularly because some producers would be unable to carry additional debt.

- The private insurance sector would likely experience an increased demand for insurance if an expanded loan program replaced current policy because some producers prefer insurance to loans.

- Federal costs could be reduced sharply under an expanded loan program compared with current policy, and program overlap could be eliminated. But federal costs would be somewhat unpredictable and uncontrollable because of the uncertainty of loan demand.

## IMPLICATIONS

In Table 5 average annual (for future years) federal costs are given for the continuation of current policy and for three optional agricultural disaster programs. For loan programs, outlays are a better measure of budget impact in a given year than are federal costs. The outlay estimates for emergency loans under continuation of current policy reflect the assumption that both SBA and FmHA make loans. In the case of expanded emergency loans and expanded crop insurance, it is assumed that they are the major thrust of federal involvement. The estimates for expanded emergency loans reflect the possible effect of interest rates on loan demand; essentially, with other things constant, loan demand is substantially greater at interest rates 3 to 5 percent below market rates. The outlay estimates for expanded emergency loans assume that loans are financed through direct appropriations (as is the case with SBA disaster loans) rather than by the sale of securities (as is the case with FmHA emergency loans). Consequently, estimated outlays are a substantially greater proportion of loans than if the sale of securities provided off-setting receipts.

Eliminating disaster payments (with no other changes) would reduce average annual costs by $500 million. An expanded FCI program with a 50 percent premium subsidy would cost nearly $150 million more than continuation of current policy, with possible differences of $700 to $800 million more. An expanded emergency loan program with 3 percent loans would cost about $500 million less than current policy and about $700 million less than expanded crop insurance.

This assessment of general options does not lead to obvious conclusions about how major federal objectives can best be achieved. From the standpoint of maintaining overall production capacity of the agricultural sector, an expanded crop insurance program or emergency loan program would provide greater incentives for producers to maintain or expand production than would continuation of current policy. Whether either of these options is needed to maintain current production capacity is uncertain, but they would both substantially improve on current programs in assisting

TABLE 5 AVERAGE ANNUAL FEDERAL COSTS OF OPTIONAL AGRICULTURAL DISASTER PROGRAMS: IN MILLIONS OF DOLLARS

| Option | Program Level a/ | Outlays | Federal Cost |
|---|---|---|---|
| Continuation of Current Policy | | | |
| Disaster payments (through fiscal year 1980) | 500 | b/ | 500 |
| Federal Crop Insurance | 95 | b/ | 50 |
| Emergency loans c/ | 1,500 | 600 d/ | 90 |
| TOTAL | 2,095 | 1,150 | 640 |
| Elimination of Disaster Payments | 0 | 0 | 0 |
| Expanded Emergency Loans | | | |
| 3 percent interest rate | 2,000 | 1,600 e/ | 125 |
| 5 percent interest rate | 1,800 | 1,400 e/ | 76 |
| 8 percent interest rate | 1,300 | 1,000 e/ | 16 |
| Expanded Federal Crop Insurance | | | |
| Disaster payment crops | | | |
| 25 percent premium subsidy | 405 | b/ | 180 |
| 50 percent premium subsidy | 570 | b/ | 400 |
| All crops | | | |
| 50 percent premium subsidy | 1,200 | b/ | 785 |

a/ Includes payments, insurance indemnities, and loans made.

b/ Same as federal cost.

c/ Based on an average interest subsidy of 5 percent.

d/ Based on the average relationship between fiscal year 1976 and fiscal year 1978 of emergency loans (FmHA and SBA) and outlays.

e/ Based on the average relationship between fiscal year 1976 and fiscal year 1978 of SBA disaster loans and outlays.

individual producers to adjust to uncertainty and income instability.

One important consideration does emerge from this analysis. On the one hand, federal costs could increase substantially under a subsidized crop insurance program such as evaluated here. On the other hand, an expanded emergency loan program would be far less costly. Under either option, however, there would most likely be less than full voluntary participation for many reasons. The likelihood of uncovered producers suggests that other types of federal assistance would be demanded. This means that it will be difficult and perhaps costly for the Congress to authorize a single program designed to achieve major federal objectives.