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Proceedings of
Regional Research Committee NC-161

FINANCING AGRICULTURE IN A CHANGING ENVIRONMENT: MACRO, MARKET, POLICY AND MANAGEMENT ISSUES

St. Louis, Missouri
October 2-3
1989

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College Station, Texas 77843-2124
May 1990

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During 1988, the U.S. Congress established a 25 member Federal Crop Insurance Commission. The purpose of the Commission is to recommend changes necessary to improve the Federal Crop Insurance (FCI) program. The Commission was instructed to give particular attention to: 1) reasons for low participation rates, 2) adequacy of insurance coverage provided by FCI, 3) identification of states and commodities which exhibit the most serious problem of lack of participation, and 4) how FCI can be modified in order to eliminate the need for costly disaster payment programs, like the 1988 Disaster Assistance Act. Despite the activities of the Commission, dissatisfaction with FCI persists.

"Crop Insurance Falls Short of Expectations." This title introduces an article in the September 1989 Agricultural Outlook published by the ERS-USDA. A follow-up article in the October issue identifies possible options for change, but the authors conclude that none of the options are preferable to all concerned.

The purpose of this paper is to review past literature on alternative public policies for providing protection from farm income variability due to adverse weather conditions. Gaps in this research will be identified and explored. A second purpose of the paper is to provide results of a simulation study that help identify interactions among various forms of federal programs.

Programs to Limit the Financial Effects of Adverse Weather

Farmers in the United States have access to three different forms of Federal assistance to counter the potential financial problems created by adverse weather. These three forms of federal assistance include:

(1) Federal Crop Insurance (FCI)
(2) Disaster payments
(3) Farmers Home Administration Emergency Disaster Loans

Each program varies with regard to the frequency with which the program is offered, the degree of subsidy involved, and the types of farmers or farm commodities eligible under the programs. A review of each program follows.

Crop Insurance

The 1980 Federal Crop Insurance Act expanded the availability of crop insurance into virtually all crops and geographic areas. The program is available each year to all producers. A stated objective of FCI is to replace low yield disaster assistance programs. Despite the Federal Crop Insurance Act of 1980, crop insurance has been plagued with lower than anticipated participation; around 14% of eligible acres annually. According to James Deal, former director of FCI, 68% of all eligible acres are needed to make the program cost effective. In order to entice producers to participate in crop insurance, premiums paid are subsidized for insurance coverage up to 65% of guaranteed yield. To date no changes or modifications have resulted in participation rates near the 68% of farmers needed to make FCI cost effective.

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A 1983 nationwide survey (Patrick, et al. 1985) showed that all-risk crop insurance ranked as the least important of financial alternatives in response to risk by Illinois and Indiana corn, soybean, and hog farmers. All-risk crop insurance was used by less than 6 percent of the farmers surveyed. Furthermore, all-risk crop insurance ranked below government emergency credit in level of importance of financial responses. These findings indicate the lack of interest by farmers in Federal Crop Insurance (FCI) and may also indicate the possible substitutability between FCI and government emergency loans, such as FmHA disaster loans. This substitution could be one reason for the perennial low participation in FCI.

A study by Skees and Nutt focused attention on insurance premiums and farm-level loss ratios (loss ratios on an ex post basis are calculated by dividing indemnities received by premiums paid). They concluded that although FCI has made significant changes to provide coverage based on individual expected yields, crop insurance indemnity rates are not derived from estimates of individual farm's risk. Thus some farms have an expected loss ratio below one, i.e. a negative expected value associated with the purchase of crop insurance.

A study by Patrick and Rao showed that all-risk crop insurance reduced the probability of survivability for all farms with initial debt-to-asset (D/A) ratios of .7 from .34 to .3. But for farms with high yield variability and the same initial debt-to-asset ratio, the probability of survivability increased from .26 to .32; however, the expected value of crop insurance for these farms was below zero. And although the farms with a .4 and .2 debt-to-asset ratio all survived, crop insurance increased the probability of net worth gain in both D/A ratios.

Many studies indicate that the extent to which crop insurance is a cost effective tool in risk management depends on the location of farm operation, yield variability, crops grown, and diversity of farm enterprises. But most studies tend to indicate that crop insurance is under utilized. This may be because in each of the studies there is no accounting for government emergency loans. As the survey by Patrick suggests, farmers may be relying on FmHA disaster loans during periods of poor yields instead of purchasing crop insurance. If farmers view FmHA disaster loans as performing the same function as crop insurance, but at essentially no cost, why should crop insurance be purchased? Furthermore, crop insurance indemnity payments may eliminate farmers from eligibility of FmHA disaster loans.

Government Emergency Disaster Loans

FmHA emergency disaster loans are designed to provide a "safety net" from the effects of natural disasters. These loans help farmers recover from actual production and physical losses inflicted by drought, floods, hailstorms, etc. Loans under this program vary in size and duration depending on type and severity of disaster, but all carry a subsidized rate of interest.

The emergency disaster loan program grew dramatically between 1976 and 1981 as a result of widespread natural disasters in 1978 and 1980. The FmHA loan portfolio for emergency disaster loans rose from $900 million in 1976 to $10.8 billion in 1982. This increase in 6 years marks the largest growth of all FmHA loan programs. After the peak in 1982, the emergency disaster loan level began a gradual decline to a level of $8.8 billion in 1987, yet as of June 30, 1987, the emergency disaster loan program was the largest FmHA loan program in dollar terms and numbers of loans outstanding.

Delinquencies of FmHA emergency disaster loans have, as with all FmHA loan programs, been an ongoing problem. As of December 31, 1987, delinquencies of emergency disaster loans amounted to $5.3 billion or over 59 percent of all outstanding emergency disaster loans; this $5.3 billion accounts for 78.7 percent of all outstanding principal loans under this program. This is by far the largest dollar amount of delinquencies of any FmHA loan program. Furthermore, over 89 percent of these delinquent loans have been delinquent over 3 years. Many of the emergency loan delinquencies are not collectable, and consequently will be reflected in future loan write-offs by the agency.

These escalating loan delinquencies have resulted in increasing loan losses for the emergency disaster loan program. In 1976 total loan losses from emergency disaster loans were $4.9 million. In 1987 total loan losses from the same program were $485 million, a 100 fold increase in loan losses in only 11 years. These losses account for 43 percent of all FmHA loan losses.

To combat increasing loan losses associated with this program, the FmHA has recently tightened eligibility requirements for emergency disaster loans. This action, coupled with generally favorable growing conditions in 1987, account for the sharp decline in loans under the program. As recently as 1981 $5.1 billion of loans were issued under the program; in 1988 only $30 million were loaned, the least since the 1950s.

Under present provisions a farmer becomes eligible for an emergency loan if revenues have been reduced by more than 30 percent of normal revenues as a result of natural weather conditions (for the purpose of this program revenues include marketing receipts, crop insurance, and disaster assistance if any). If a farmer can prove that revenues have been reduced below the threshold, a loan up to 80 percent of losses or $500,000 whichever is less may be obtained. The interest rates on these loans are now at 4.5 percent, substantially below the market rate of interest. Repayment terms for emergency loans vary according to the type of loss, use of funds, available collateral, and the borrower's repayment ability, but the average repayment period is seven years.

In addition to these provisions, the 1985 Food Security Act set forth some further eligibility requirements. Beginning in 1987, no emergency loans were to be made for production losses that could have been covered by FCI. However, producers that are prevented from planting due to farm natural disasters would be covered regardless of FCI participation. Furthermore, no longer are emergency loans available to farmers who can get credit elsewhere (Glaser, 1986). Both of these stipulations were waived in the Disaster Assistance Act of 1988, but remain in effect for all years after 1988 (100th Congress, 1988).

Disaster Assistance

Prior to 1980 and the expansion of FCI, the majority of financial risk was alleviated by a disaster assistance program administered by the Agricultural Stabilization and Conservation Service (ASCS) of the USDA. The program provided direct payments to farmers during periods of low yields due to poor growing conditions. The program differed from FCI in that farmers did not incur sign up or coverage costs; farmers only need to apply for payments after losses were suffered (Miller and Trock, 1979). To qualify for direct payments under the ASCS Disaster Payment Program, losses had to be below a given threshold--this varied from year to year but remained between 60 to 75 percent of normal yields.

Although studies showed that many producers were better off with ASCS Disaster Payment Program than expanded Federal Crop Insurance (King and Oakmek, 1983), the expensive nature of direct disaster payments led to the shift toward crop insurance. During the period 1974 to 1977, producers received approximately $450 million per year in compensation for losses. This $450 million is considerably less than the estimated cost of crop insurance given expected participation rates.

Since the expansion of Federal Crop Insurance in 1980 there has been no continuously available disaster payment program. However, the ASCS is given the power to make adjustments in regular commodity programs to compensate producers for extraordinary losses (USDA, 1984). The nature of these adjustments vary greatly depending on growing conditions, area, and commodity, but from time to time payments may be available to producers when planting is prevented or yields are abnormally low due to natural conditions.

Furthermore, indirect disaster assistance is available to farmers that participate in the diversion program and have livestock. The Secretary of Agriculture is given the latitude to provide non-cash assistance to farmers in areas that are experiencing poor growing conditions. These non-cash benefits come in the form of granting a variance for farmers to bale or graze government set-aside acres. During

years of persistent drought or other unusual weather conditions the Secretary of Agriculture can grant farmers in individual counties the ability to use set-aside acres to feed to livestock either by grazing or by baling and feeding. It is then up to the ASCS in each county to determine the impact that releasing set-aside acres will have on local hay and forage markets and decide accordingly whether or not to open these acres. Under this policy response no actual payments are made, but the farmer with livestock can experience substantial feed savings which in effect can lead to substantial income increases from what would exist in the absence of this program allowance. Furthermore, under this program provision farmers can receive benefits even if the disaster is localized, since diversion acres can be released on an individual county basis.

In 1988, due to the widespread severity of the drought an emergency disaster assistance bill was passed. The 1988 Disaster Relief Act was designed to ensure that farmers received a certain level of gross income in spite of the adverse growing conditions. Although many argue that programs like these undermine the drive for participation in crop insurance, policymakers felt compelled to give additional income relief from the effects of the drought.

In addition to this comprehensive disaster assistance program many counties throughout the cornbelt allowed farmers that participated in the set-aside program and fed livestock to bale and graze set-aside acres. Although the program did not go so far as to allow farmers to sell their forage, they were allowed to feed it to their own livestock, hence reducing the amount of forage they would have to purchase on local markets.

This disaster assistance act was formulated due to extreme circumstances. The cost of this program, estimated at $4 billion (Sands, 1988), prevents this from being an ordinary means of dealing with risk from growing conditions, but a precedence has been set in providing temporary disaster relief when catastrophic growing conditions dictate. For example, growing conditions in 1989 have triggered another disaster assistance program for producers adversely affected by weather conditions.

Simulation Results

To test for possible interactions among various forms of federal programs, a case farm was selected to reflect a typical grain operation in Livingston County, Illinois. The farm consisted of 600 acres of tillable ground, 50 percent planted to corn or placed in the government set-aside program and 50 percent in soybeans. It was assumed that the farm operator owned 200 acres and share rented the other 400 acres on a 50-50 share basis. The farm was simulated over the period 1979 through 1988 using three different debt-to-asset ratios: 20 percent, 50 percent, and 70 percent respectively. Farms with an initial D/A ratio of 20 percent were assumed to be ineligible for FmHA disaster loans due to lender of last resort criteria.

Price and yield levels, and their variances, were obtained from a sample of 30 farms in Livingston County and the immediate surrounding area. Variances of yields and prices were computed on an individual-by-individual farm basis and then averaged to avoid reductions in variance from averaging high yields or prices on one farm with low yields or prices on another farm. Corn yields and prices were examined for correlation, but a very low correlation was observed. A similar pattern was found between soybean yields and soybean prices. Consequently, the simulation model was run under the assumption of no correlation on an individual farm between yields and prices. A comparison of corn and soybean yields did indicate a positive correlation of .198 between these yields. To account for this correlation, the simulation model was run by randomly selecting corn yields based upon the observed variance of corn yields. Soybean yields were picked pseudo-randomly. That is, soybean yields were allowed to vary according to the observed variance of yield, but with the condition that those yields correlate with corn yields at a level equal to that observed in the historical data.

The model was run for the 10 year period of 1979 through 1988 using different scenarios to reflect availability or nonavailability of various forms of government programs. One hundred replications were computed for each scenario. The outcomes of the various scenarios were then evaluated by examining the

mean level of income and net worth as well as the standard deviation of these measures. In addition, the number of replications in which the net worth of the farm was increased and the number of replications in which the farm was forced to liquidate were determined.

Table 1 shows the results of the simulations assuming only crop insurance is available for the farm. Regardless of the initial D/A ratio, mean net income and the standard deviation of net income are higher if the farm does not purchase crop insurance. Participation thus lowers both income and risk as expected. However, the farm with an initial D/A ratio of 50 percent increased net worth in 17 replications without crop insurance, and only 12 times with crop insurance. And, at this D/A ratio, liquidation occurred in only one replication with or without crop insurance.

For a farm with an initial D/A ratio of 70 percent, liquidation occurred in 82 replications with crop insurance, but in only 80 replications without crop insurance. Results of these simulations confirm what several other authors have found -- participation in crop insurance is not very attractive to the farms with an adverse financial position.

Tests were conducted to determine if there were significant differences in mean net income and mean ending net worth between the with and without crop insurance scenarios. No significant differences were observed.

Table 1 is based on the assumption that both FmHA disaster loans and federal disaster payments are not available. Table 2 provides the simulation results under the assumption that disaster payments are available. The availability of disaster payments is determined by the following probability schedule. If yields fall below 65 percent of normal but above 40 percent of normal a .4 likelihood was assigned to the availability of disaster payments. If yields in a given year fall at or below 40 percent of normal but above 20 percent of normal then a .6 probability is assigned to the availability of disaster payments. And if yields fall at or below 20 percent of normal, a .8 probability is assigned to the availability of disaster payments.

A comparison of results in Tables 1 and 2 reveals that the existence of disaster payment programs increases average income and net worth by rather modest amounts. In addition, the standard deviations of net income and net worth are equal to or lower than without the program. A test of means between the runs reported in Tables 1 and 2 were conducted. No significant differences were obtained.

Table 3 provides simulation results under the assumption that both disaster loans and disaster payments are available. Results differ little from those reported in Table 2. No significant differences in mean net incomes for comparable farms were observed among Tables 1, 2, and 3. Table 4 shows results under the assumption that the farms participate in the set aside program and that both disaster loans and disaster assistance programs are available. A comparison of Tables 3 and 4 reveal some interesting shifts in results as a result of set aside programs.

For farms with an initial D/A ratio of 20 percent, mean net incomes and mean net worths increased as a result of participation in set-aside programs. The standard deviations of these measures also dropped. However, the risk-return tradeoff still exists with respect to the purchase of crop insurance.

For farms with a D/A ratio of 50 percent, mean net income and mean net worth increase as a result of participation in set-aside programs. Interestingly, the percentage of farms that increased net worth with crop insurance was higher than when the set-aside program was not used. For the scenario without crop insurance, participation in set-aside programs actually decreased the percentage of farms that increased net worth.

For farms at an initial D/A ratio of 70 percent, the most noticeable difference between Tables 3 and 4 is in the percentage of farms liquidated. With no set-aside participation, farms in this category had a 2 percent difference in failure rate with versus without crop insurance. But when the farm participates in the set-aside

program, failure rates are 6 percentage points lower without crop insurance! However, a test of means reveals no significant difference between results in Tables 3 and 4.

By comparing mean net income and standard deviation reductions, we can determine the relative cost of risk reduction. Table 5 shows the ratio of reductions in income to reductions in standard deviation as a result of purchasing crop insurance.

For a scenario with no ASCS set-aside participation, no disaster loans, and no disaster payments, the relative cost of reducing risk through crop insurance increases as the D/A ratio increases. When disaster payments are made available, the cost of risk reduction increases for the farms with an initial D/A ratio of 20 or 50 percent, but decreases for the farm with a 70 percent D/A ratio. When disaster loans and disaster payments are both available, the cost of reducing risk through crop insurance does not change for the farm with a D/A ratio of 20 percent, but rises for the farms with a D/A ratio of 50 or 70 percent.

A rather surprising result is that when the farm participates in the set-aside program, the cost of reducing risk through crop insurance increases for the farm with a D/A ratio of 20 percent, falls modestly for the farm with a D/A ratio of 50 percent, and falls sharply for the farm with a D/A ratio of 70 percent. Also notice that with all three programs in place, the relative cost of risk reduction varies little across farms with different D/A ratios.

Conclusions

The federal government offers a variety of programs to farmers which can be used to offset risks associated with adverse weather. Results of simulations for a typical grain farm in Illinois suggest several important conclusions. First, there is a relatively small difference in mean net income and net worth, and their standard deviations, when comparing farms with or without crop insurance. However, crop insurance does lower both expected income and net worth and their associated standard deviations. Low participation rates by Illinois farmers in FCI suggest that most farms do not believe the reduction in risk resulting from crop insurance is worth the reduction in income.

Second, it is commonly accepted that the existence of disaster loans, and particularly disaster assistance payments, are a strong deterrent to participation in FCI. Results of the simulation model do suggest that the existence of these programs is likely to lower the incentives for participation in crop insurance. However, the net effect of these programs on the desirability of FCI appears to be very limited, and would likely offer only a minor inducement to change the decision about purchase versus nonpurchase of crop insurance.

Finally, participation by farmers in ASCS set-aside programs does appear to alter incentives for participation in crop insurance. For farms with a low D/A ratio, the effect is to make risk reduction through crop insurance more costly. For farmers with a higher D/A ratio, participation in ASCS set-aside programs lowers the relative cost of risk reduction through purchase of crop insurance.

Table 1. Simulation results for 100 replications of a Livingston County grain farm: No participation in ASCS set-aside programs, no disaster payments or FmHA disaster loans available.

	Beginning Debt-to-Asset Ratios		
With Crop Insurance	.2	.5	.7
Average Mean Net Income	$ 32,313.56	$ 16,315.58	$ 1,335.91
(Average Standard Deviation)	(12,406.45)	(15,588.91)	(18,388.11)
Mean Ending Net Worth	611,341.02	253,384.81	103,234.10
(Standard Deviation)	(48,198.55)	(76,606.92)	(39,356.82)
Percentage of Farms that Increased Net Worth	93%	12%	0%
Percent of Farms Liquidated	0%	1%	82%
Without Crop Insurance	.2	.5	.7
Average Mean Net Income	$ 32,630.96	$ 16,770.03	$ 1,920.86
(Average Standard Deviation)	(13,233.77)	(16,463.74)	(18,806.63)
Mean Ending Net Worth	613,202.56	257,929.30	111,556.308
(Standard Deviation)	(50,394.14)	(80,364.23)	(29,982.38)
Percentage of Farms that Increased Net Worth	93%	17%	0%
Percentage of Farms Liquidated	0%	1%	80%

Table 2. Simulation results for 100 replications of a Livingston County grain farm: No participation in ASCS set-aside programs, no FmHA disaster loans, disaster payments are available.

	Beginning Debt-to-Asset Ratios		
With Crop Insurance	.2	.5	.7
Average Mean Net Income	$ 32,375.79	$ 16,427.06	$ 1,430.13
(Average Standard Deviation)	(12,356.58)	(15,488.37)	(18,272.17)
Mean Ending Net Worth	611,963.26	254,499.65	103,234.10
(Standard Deviation)	(47,941.35)	(76,028.45)	(39,356.82)
Percentage of Farms that Increased Net Worth	93%	12%	0%
Percentage of Farms Liquidated	0%	1%	82%
Without Crop Insurance	.2	.5	.7
Average Mean Net Income	$ 32,726.37	$ 16,885.82	$ 1,962.46
(Average Standard Deviation)	(13,095.51)	(16,296.30)	(18,757.44)
Mean Ending Net Worth	614,156.58	259,087.23	111,556.30
(Standard Deviation)	(49,673.35)	(79,474.35)	(29,982.38)
Percentage of Farms that Increased Net Worth	93%	17%	0%
Percentage of Farms Liquidated	0%	1%	80%

Table 3. Simulation results for 100 replications of a Livingston County grain farm: No participation in ASCS set-aside programs, disaster payments and FmHA disaster loans available.

	Beginning Debt-to-Asset Ratios		
With Crop Insurance	.2	.5	.7
Average Mean Net Income	$ 32,375.79	$ 16,480.00	$ 1,426.27
(Average Standard Deviation)	(12,356.58)	(15,476.53)	(18,253.69)
Mean Ending Net Worth	611,963.26	255,028.99	103,234.18
(Standard Deviation)	(47,941.35)	(75,734.15)	(39,356.82)
Percentage of Farms that Increased Net Worth	93%	13%	0%
Percentage of Farms Liquidated	0%	1%	82%
Without Crop Insurance	.2	.5	.7
Average Mean Net Income	$ 32,726.37	$ 17,118.49	$ 2,128.67
(Average Standard Deviation)	(13,095.51)	(16,272.12)	(18,711.95)
Mean Ending Net Worth	614,156.58	261,413.88	112,473.80
(Standard Deviation)	(49,673.35)	(77,954.64)	(29,860.46)
Percentage of Farms that Increased Net Worth	93%	18%	0%
Percentage of Farms Liquidated	0%	1%	80%

Table 4. Simulation results for 100 replications of a Livingston County grain farm: Participation in ASCS set-aside programs, disaster payments and FmHA disaster loans available.

	Beginning Debt-to-Asset Ratios		
With Crop Insurance	.2	.5	.7
Average Mean Net Income	$ 32,815.04	$ 17,699.26	$ 2,388.26
(Average Standard Deviation)	(10,933.11)	(13,209.79)	(15,479.58)
Mean Ending Net Worth	617,482.01	267,221.60	95,183.58
(Standard Deviation)	(42,022.90)	(65,207.03)	(43,340.31)
Percentage of Farms that Increased Net Worth	96%	15%	0%
Percentage of Farms Liquidated	0%	1%	83%
Without Crop Insurance	.2	.5	.7
Average Mean Net Income	$ 33,190.00	$ 18,250.37	$ 3,024.87
(Average Standard Deviation)	(11,574.32)	(14,036.14)	(16,706.17)
Mean Ending Net Worth	619,983.67	272,732.71	103,758.10
(Standard Deviation)	(43,439.20)	(67,681.87)	(26,628.96)
Percentage of Farms that Increased Net Worth	95%	17%	0%
Percentage of Farms Liquidated	0%	1%	77%

Table 5. Ratio of reduced income to reduced standard deviation of income as a result of purchasing insurance.

D/A Ratio	No ASCS No Dis. Loans No Dis. Pmts.	No ASCS No Dis. Loan Dis. Pmts.	No ASCS Dis. Loan Dis. Pmts.	ASCS Dis. Loan Dis. Pmts.
20%	.38	.47	.47	.58
50%	.52	.57	.81	.67
70%	1.39	1.10	1.53	.52

References

Deal, James S. "Hearings before the Subcommittee on Agricultural Production, Marketing and Stabilization of Prices of the Committee on Agriculture, Nutrition and Forestry." U.S. Senate 95th Congress, second session, 8/15-17/78, U.S. Government Printing Office. Washington, D.C. 1979.

Glaser, Lawrence K. Provisions of the Food Security Act of 1985. USDA/ERS, Washington, D.C., April 1986.

King, Robert P. and George E. Oamek. "Risk Management by Dryland Wheat Farmers and Elimination of the Disaster Assistance Program." American Journal of Agricultural Economics 65(1983):247-55.

Miller, T. A. and W. L. Trock. Disaster Assistance to Farmers-Needs, Issues, and Programs. Montana State Cooperative Extension, 88 (Feb. 1979).

Patrick, G. F., P. N. Wilson, P. J. Barry, W. Boggess and D. L. Young. "Risk Perceptions and Management Responses: Producer-Generated Hypotheses for Modeling." Southern Journal of Agricultural Economics 17(1985):231-38.

Patrick, G. F. and Annath S. Rao. "Crop Insurance's Role in Risk Management on Hog-Crop Farms." Unpublished manuscript under review.

Sands, Laura. "Drought Aid Comes Home." Farm Journal. September, 1988.

Skees, Jerry R. and Perry J. Nutt. "The Cost of Purchasing Crop Insurance: Examining the Sensitivity of Farm Financial Risk." Agricultural Finance Review 48(1988):37-48.

United States Congress. Federal Crop Insurance Commission Act of 1988. Public Law 100-546, 100th Congress, Oct. 1988.

U.S. Department of Agriculture, Economic Research Service, Agricultural Outlook, September, 1989.

_____. Natural Disaster Assistance Available from the U.S. Department of Agriculture. USDA, Washington D.C., 1328(Aug. 1984).