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Assessing the Effects of the 1988 Drought in North Dakota

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The year 1988 was a uniquely challenging one for North Dakota's farm and ranch operators. Following on the heels of a series of years during which low commodity prices, high interest rates, and falling land values had placed severe economic pressure on many operators, 1988 was characterized by the most severe drought conditions that the state had faced since the 1930s. In the wake of the drought, many policymakers are interested in the extent to which producers were aided by the various forms of drought assistance. Further, there is widespread interest regarding the overall effects of the unusual conditions of 1988 on the financial status of farmers and ranchers. Crop and pasture losses are known to have varied substantially across the state, and the extent of drought aid received also was quite variable. In addition, producers who had substantial amounts of stored grain could have benefited from drought-induced price increases. Thus, some producers suffered severe financial setbacks, while others benefited financially from the drought conditions.

Study Procedures

Information to address these and related issues was drawn from the 1989 update of the North Dakota longitudinal farm panel study. This study began in 1985 when 933 farm and ranch operators were contacted by telephone regarding their 1984 financial situation and socioeconomic characteristics. Initial screening questions were incorporated into the 1985 survey to ensure that all respondents were less than 65 years old, were operating a farm, considered farming to be their primary occupation, and sold at least $2,500 of farm products in 1984 (Leholm et al. 1985). These producers were subsequently contacted in 1986, 1988, and 1989 and asked to provide financial information for the previous year. This paper is based on data from 466 producers who provided information in each of the four surveys. Comparison of selected characteristics of survey participants to data from the 1982 Census of Agriculture reveals that participants are representative of the state as a whole on the basis of age, farm size, and distribution of farms throughout the eight state planning regions.

The remainder of this paper is organized into two parts. First, effects of the drought and drought assistance programs are examined, then the financial situation of farm and ranch operators is assessed by examining their income for 1988 and their balance sheet data as of December 31, 1988. Results are compared with those of the 1988 and 1986 surveys.

Effects of 1988 Drought

Survey respondents reported drought losses that averaged 71 percent for small grains, 59 percent for row crops, 68 percent for hayland, and 60 percent for pasture (Table 1). About 45 percent of the producers with livestock reported reducing their herd as a result of the drought. The average reduction was about 28 percent. Over half (53 percent) of these producers would like to rebuild their herds in 1989 if conditions are favorable.

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Table 1. Drought losses experienced in 1988

Item	Value	Item	Value
	(percent)		*(percent)*
Percent loss for small grain:		Percent loss for hayland:	
Mean	71.1	Mean	68.1
Median	75.0	Median	75.0
Distribution:		Distribution:	
Zero to 25	4.7	Zero to 25	8.0
26 to 50	22.8	26 to 50	21.2
51 to 75	29.8	51 to 75	29.9
76 to 90	16.7	76 to 90	23.0
91 to 100	26.0	91 to 100	17.9
Percent loss for row crops:		Percent loss for pasture:	
Mean	58.5	Mean	59.6
Median	60.0	Median	60.0
Distribution:		Distribution:	
Zero to 25	20.1	Zero to 25	10.8
26 to 50	26.5	26 to 50	37.7
51 to 75	20.9	51 to 75	24.5
76 to 90	9.2	76 to 90	9.2
91 to 100	23.3	91 to 100	17.8
Did respondent have to reduce livestock herd size as a result of drought?		Does respondent intend to rebuild in 1989 if conditions are favorable?	
Yes	45.2	Yes	53.4
By what percentage was herd reduced?		Did respondent cut hay on CRP acres in 1988?	
Mean	28.4	Yes	13.9
Median	22.0		
Distribution:			
0.01 to 10	18.0		
10.01 to 25.00	49.2		
25.01 to 50.00	26.2		
50.01 to 100	6.6		

One step taken by the USDA to assist drought-stricken producers was to allow producers to cut hay from CRP acres. About 14 percent of the respondents reported that they had cut hay on CRP land in 1988.

A number of other forms of drought assistance were also extended to producers. These included some that were authorized under earlier legislation and others that were incorporated in the Disaster Assistance Act of 1988. Major forms of drought assistance that were available to producers included crop disaster payments, the emergency feed program, and the emergency feed assistance program.

Drought assistance was received by more than 91 percent of survey respondents (Table 2). Of those receiving drought aid, 98 percent received crop disaster payments, and these payments averaged $14,918 per producer. About 14 percent of these producers also received Emergency Feed Program aid, and about 6 percent obtained help from the Emergency Feed Assistance Program.

Table 2. Receipt of drought assistance by respondents

Item	Value	Item	Value
Did respondent receive drought assistance?		Amount received from emergency feed program:	
Yes	91.5%	Mean	$827
		Median	$0
Amount received for crop disaster payments:		Distribution:	
Mean	$14,918	Zero	85.8%
Median	$11,000	$1 to $5,000	8.1%
Distribution:		$5,001 to $10,000	4.5%
Zero	2.0%	$10,001 or more	1.6%
$1 to $1,000	4.1%		
$1,001 to $5,000	20.7%	Amount received from emergency feed assistance program:	
$5,001 to $10,000	22.7%	Mean	$211
$10,001 to $20,000	27.8%	Median	$0
$20,001 to $30,000	12.2%	Distribution:	
$30,001 to $50,000	8.5%	Zero	94.5%
$50,001 or more	2.0%	$1 to $5,000	4.2%
		$5,001 to $10,000	1.3%
		$10,001 or more	0.0%

Disaster payments proved to be the key to survival for many operators. The average total disaster payment (including crop disaster payments, Emergency Feed Program aid, and Emergency Feed Assistance Program aid) was $15,234 (Table 3); the median amount was $11,000. If producers had not received any aid, the average net cash farm income would have been only $6,266, and nearly 40 percent of the producers would have had a negative net cash farm income.

Table 3. Effect of disaster payments on net cash farm income

Item	Value	Item	Value
Total disaster payments:		Net cash farm income minus total disaster payments:	
Mean	$15,234	Mean	$6,266
Median	$11,000	Median	$4,000
Distribution:		Distribution:	
$0 - $4,999	23.7%	Less than -$10,000	19.6%
$5,000 - $9,999	21.7%	-$10,000 to -$1	20.3%
$10,000 - $19,999	26.5%	$0 - $4,999	13.0%
$20,000 - $39,999	20.9%	$5,000 - $9,999	14.3%
More than $39,999	7.2%	$10,000 - $19,999	14.3%
		More than $19,999	18.5%

All-risk crop insurance also helped compensate for the drought losses of some producers. About 61 percent of the respondents had been covered by all-risk crop insurance in 1988 (Table 4). These producers received an average of $12,332 in loss payments. About 89 percent of the respondents planned to buy all-risk crop insurance in 1989. Purchasing all-risk crop insurance in 1989 was a requirement in order to receive crop disaster payments for the 1988 crop. About 20 percent said their lender required them to buy crop or hail insurance.

Producers generally believed that crop insurance and drought assistance payments combined covered about half of their losses, but responses ranged widely. Most producers felt their farming operation would survive--only 2.4 percent planned to quit farming because of the drought.

Table 4. Respondents' participation in all-risk crop insurance

Item	Value	Item	Value
Did respondent have all-risk crop insurance in 1988?		Does lender require all-risk crop insurance or hail insurance?	
Yes	61.4%	Yes	19.8%
Amount received for loss payments:		What percentage of losses were compensated by crop insurance and drought assistance payments?	
Mean	$12,332		
Median	$7,500	Mean	47.4%
Distribution:		Median	50.0%
Zero	3.0%	Distribution:	
$1 to $1,000	6.1%	0% - 10%	13.9%
$1,001 to $5,000	27.0%	11% - 25%	16.8%
$5,001 to $10,000	25.9%	26% - 50%	29.6%
$10,001 to $25,000	27.7%	51% - 75%	22.7%
$25,001 or more	10.3%	76% - 100%	17.0%
Does respondent plan to buy all-risk crop insurance this year?		Does respondent plan to quit farming as a result of drought?	
Yes	88.8%	Yes	2.4%

Farm Financial Situation

About 49 percent of survey respondents felt their net cash farm income in 1988 was less than for a typical year, 38 percent believed it was about the same, and 13 percent thought 1988 income was more than normal (Table 5). For those who felt their income was greater than normal, the average improvement was 22 percent. Those who felt their income was less reported a decrease of 33 percent.

Table 5. Comparison of 1988 net farm income to a typical year

Question	Value
How did 1988 net cash farm income compare to a typical year?	
More	12.9%
Less	49.3%
About the same	37.8%
How much more?	
Mean	21.8%
Median	20.0%
How much less?	
Mean	-32.5%
Median	-25.0%

Producers responding to the 1989 survey reported gross farm income levels for 1988 that were slightly less than those for 1987 (Table 6). Depreciation and interest expenses were slightly lower in 1988 than in 1987, and government farm program payments (not including drought aid payments) fell about 23 percent from their 1987 level. The decline in government program payments was largely because of drought-induced increases in commodity prices, which in turn led to reductions in deficiency payments.

Table 6 . Selected income and expense items for North Dakota farm and ranch operators

Item	1985	1987	1988
Gross farm income:			
Mean	$113,188	$117,354	$115,559
Median	$80,000	$80,321	$80,958
Distribution:			
Less than $40,000	19.6%	17.6%	18.5%
$40,000 - $99,999	41.1%	43.0%	40.3%
$100,000 - $249,999	32.1%	29.1%	32.1%
$250,000 - $499,999	5.0%	7.9%	7.1%
$500,000 or more	2.3%	2.5%	2.1%
Depreciation expense:			
Mean	$15,902	$18,529	$16,660
Median	$11,884	$12,000	$10,135
Interest expense:			
Mean	$14,941	$12,523	$11,676
Median	$10,000	$7,000	$7,700
Government farm program payments:			
Mean	NA	$22,799	$17,568
Median	NA	$16,000	$12,000
Net cash farm income:			
Mean	$18,012	$21,328	$21,305
Median	$10,000	$15,000	$15,000
Distribution:			
Zero or negative	24.8%	10.6%	11.2%
$1 to $4,999	11.1%	10.6%	11.2%
$5,000 to $9,999	14.9%	15.5%	15.4%
$10,000 to $24,999	28.3%	36.2%	33.6%
$25,000 or more	21.0%	27.2%	30.5%

Net cash farm income was almost the same in 1988 as in 1987 (about $21,300), although there were some regional differences (Figure 1). Initially, this data might appear to conflict with the findings (reported earlier) that disaster payments and crop insurance made up for only about half of drought losses and that 49 percent of producers felt their income was less than in a typical year whereas only 13 percent felt it was greater (Table 5). However, further reflection suggests several factors that could have supported net cash farm income in 1988. Most of these factors relate to the fact that net cash farm income does not necessarily reveal inventory changes because losses could be offset by gains. Thus, reductions in grain or feed inventories or livestock herds as a result of direct or indirect effects ofthe drought would not necessarily be reflected in the computation of net cash farm income for 1988. Another factor could be the difference of perception versus reality; because 1988 was a year of severe crop losses, farmers could have perceived their net cash farm income would be less than it actually was.

The level and composition of total family income for the respondents changed only slightly from 1987 to 1988 (Table 8). Earnings from off-farm employment and other off-farm income (e.g., from investments) were up slightly, while farm income and revenues from mineral leases showed slight decreases.

Table 8. Composition of farm family income, North Dakota, 1984, 1985, 1987, and 1988

Item	1984	1985	1987	1988
	percent of total			
Net cash farm income	60.8	64.8	71.1	70.3
Earnings from off-farm employment	18.9	20.5	20.0	20.0
Mineral lease income	9.7	3.5	1.4	1.2
Other off-farm income	10.6	11.2	7.5	8.5
Total farm family income	$24,489	$26,545	$28,833	$29,024

Asset values in 1988 were up slightly (about 1 percent) from their 1987 level, the first increase in asset value since the panel study began (Table 9). The increase results in large measure from the slight increase in land values that occurred in 1988 (Johnson 1989).

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Producers also succeeded in reducing their outstanding debt by about 3.8 percent in 1988, the second straight year that substantial reductions had been achieved. With asset values growing and debt decreasing, the average net worth of producers increased for the first time since the early 1980s.

The debt-to-asset ratio has often been used as a key indicator of financial health. The average debt-to-asset ratio continued to rise in 1988 although the median value fell slightly (Table 9). It appears, however, that a few producers with very high debt levels, including some who are insolvent, may influence the mean value substantially. The debt-to-asset level varied widely by region from a low of 32.2 in the northeast to a high of 74.1 in north central

Table 9. Total assets, debt, net worth, and debt-to-asset ratio of North Dakota farmers, December 31, 1984, 1985, 1987, and 1988

Item	Average	Median	Item	Average	Median
	dollars			*dollars*	
Total assets:			**Net worth:**		
1984	419,677	300,000	1984	279,562	200,000
1985	396,233	280,000	1985	252,593	160,000
1987	387,377	257,000	1987	252,509	160,000
1988	391,025	283,000	1988	263,182	177,000
Total debt:			**Debt-to-asset ratio:**		
				number	
1984	141,830	82,000	1984	.36	.30
1985	140,484	89,000	1985	.41	.30
1987	132,281	80,000	1987	.45	.32
1988	127,284	80,000	1988	.49	.31

The Disaster Assistance Act of 1988 was pivotal in enabling many North Dakota producers to avoid severe financial losses. More than 91 percent of all respondents received drought aid, with total payments averaging more than $15,000. Crop disaster payments were the major form of aid received, but many livestock producers also received help through the Emergency Feed programs. Crop insurance also was important to many farmers. About 61 percent of the survey participants had been covered by all-risk crop insurance, and they received loss payments averaging more than $12,000.

Although average gross farm income and net cash farm income for 1988 remained near their 1987 levels, the drought will have long-term implications for many producers. Drought conditions led many producers to reduce their livestock herds and feed inventories, while others sold stored grain in response to rising prices. Estimating the magnitude of these inventory changes was beyond the scope of this study, but their effects will be felt in 1989 and perhaps beyond. Favorable weather and crop conditions will be needed to ensure further recovery of North Dakota agriculture.

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