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THE AGRICULTURAL CRISIS IN COLORADO: CAUSES, FUTURE PROSPECTS AND STATE-LEVEL RESPONSE OPTIONS

by

Kenneth C. Nobe (Team Leader)
Jerry E. Fruin, Thomas A. Miller,
Melvin D. Skold and Warren L. Trock*

ANRE Research Report AR:86-1
April 1986

Colorado State University
Department of Agricultural
and Natural Resource Economics

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*Other contributors include Norman L. Dalsted, Jerry B. Eckert, S. L. Gray, James H. Lewis, Donald L. Lybecker, R. K. Sampath, Danny Smith, and Richard G. Walsh.

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EXECUTIVE SUMMARY

Causative Factors

The circumstances behind the current financial stress in agriculture have their roots in political and economic events of the 1970s. Rapidly growing export demands for grain, accelerating inflation, and low real interest rates encouraged debt financed investments in farm land and equipment. Optimism prevailed in agriculture as equity increased from appreciating land values, which in turn provided additional collateral for loans.

Early in the 1980s, federal monetary and fiscal policies were significantly changed in order to dampen inflation rates. Consequences were increased real interest rates and changed currency exchange rates. A strengthening U.S. dollar severely reduced exports, a situation aggravated further by a worldwide recession. Production surpluses and grain stock buildups weakened commodity prices and ultimately reduced cash flows below the levels necessary to service the debts of highly leveraged farmers. Land values fell, and equity and credit worthiness vanished.

Nationally, it is estimated that up to 100 thousand farms are technically insolvent (debt exceeds assets) and a similar number are so highly levered (debt exceeds 70 percent of assets) that they probably cannot survive. Foreclosures and bank failures are increasing as the forced writeoff of such losses proceeds. Family farms of moderate size without off-farm income appear hardest hit. In Colorado, the proportion of farmers facing financial crisis appears at least as high as in the national trends, particularly in the High Plains counties.

Future Prospects

What do the next one or two decades hold for the circumstances affecting agriculture? In general, most scenarios for the world food balance in the future imply that U.S. farm exports will grow at less than half the growth rate of the 1970s. At the same time, the productive capacity of U.S. farmers will expand to keep up and possibly even move ahead of the growth in markets, creating a tendency to depress real farm prices. The financial industry will recover and eventually provide credit to farmers at terms that will compare with other business sectors, but with possibly higher interest rates to reflect the higher risk in agriculture. Instability in farm commodity prices and income and in the financial environment facing agriculture will likely dominate the scene, making boom/bust cycles more observable than the underlying trends. If realized, this future economic and financial environment will mold the farm sector into a somewhat different form than we see today. Successful farmers will be those who can improve their production efficiency enough to maintain acceptable net incomes in the face of a continued downward drift of the parity ratio. Only the best managers will be able to adjust

over time to maintain both income and favorable rates of returns to resources.

The structure of agriculture will continue to change, as adjustments are made to a rapidly changing technological and economic environment. The major trends are already well known and will likely continue. Production will become increasingly concentrated on fewer and larger commercial farms while small, part-time farms will continue to become more numerous in many regions. By 2000, the largest 1600 farms in Colorado will likely account for over 75 percent of all sales, up from 70 percent in 1982. While the sole proprietorship family farm will remain the dominant organizational form for some years to come, the future financial environment and capital requirements of farming will encourage a more "industrial" type of business organization and financial structure in the farm sector.

Increasing reliance on the export market is causing much greater price uncertainty and increased financial risk. For example, U.S. grain markets are now exposed to the vagaries of worldwide weather, economic conditions, and individual country political decisions. Future changes in this situation will likely be in the direction of even more instability and risk in U.S. agriculture. The farmers of the future must be able to cope with this unstable and uncertain economic climate. They will need sophisticated management skills to accumulate information, manage risk, and adapt to a changing economic and financial environment. Successful farm businesses of the future will be organized for resiliency, both from the standpoint of production and from the standpoint of the way ownership is organized, financed and managed.

The present stress in agriculture is brought about by the need for a permanent adjustment to a new and much different set of economic and financial circumstances--conditions that have prospects for enduring to the end of the century. Public policy and institutions should assist, rather than prevent, this adjustment; they should provide those farmers that remain with the means of operating successfully in their new economic environment, while assisting those leaving agriculture in gaining a livelihood in expanding non-farm sectors of the economy.

Selected State-Level Response Options

As the current agricultural crisis has continued to gain momentum in Colorado, there has been an increasing concern among interested public officials about an appropriate state-level response. Early in 1985, the Governor proposed use of a discretionary fund allocation to his office to support an expanded Agricultural Experiment Station and Extension effort at Colorado State University and an expanded marketing and information response in the Colorado Department of Agriculture. A budget request in excess of one million dollars was submitted to the Governor and a legislative committee for review and recommended action. The proposal was submitted late in the session (in mid-March) and no funding action was taken.

In January 1986, the Governor held a press conference to announce a new statewide program, Project ARC (Agricultural Resources in Colorado), that was intended to mobilize available agency resources throughout the state, with county Extension offices serving as focal points for information dissemination. No legislative funds were requested and only a modest operating budget was obtained through various agency contributions. The major resource inputs, however, come from existing agency personnel and programs. Also, during the 1986 session, the Colorado legislature has been conducting hearings and considering a number of financial and educational assistance options for farmers and ranchers. Some of these options were evaluated by ANRE personnel in response to a formal request from Dr. David Carlson, Program Coordinator for Project ARC.

Specific proposals to assist farmers and ranchers faced with high debt-to-asset ratios and who are facing difficulties with servicing interest payments on land, equipment and operating loans were considered. These included interest buy-down plans, state-linked deposit programs, state-guaranteed loans and interest reduction programs for beginning farmers. In addition, a proposal for establishing a limited partnership program, financed in part with state school funds, was considered. Finally, a proposal that was a spin-off from the 1985 governor's initiative, to expand agricultural economics research and Extension programs in farm financial and marketing management, was evaluated.

The interest subsidy programs as a group were viewed to be of limited value for dealing with the farm financial crisis in Colorado, primarily because in order to be effective such programs would be extremely expensive (in orders of magnitude of 100 million or more initially), would only reach a small percentage of the farmers in trouble and many who are not, and if the crisis continues for several years as many observers now believe, these large costs would have to continue for several years. Nonetheless, such programs could be of benefit if specifically targeted to that group of farmers whose loans can be restructured so that reduced annual interest payments can be serviced with existing farm operation cash flows. Targeting loan and interest subsidy funds to beginning farmers, particularly if limited to equipment and operating loans, would also merit consideration. All of these kinds of options appear best suited to short-term crisis situations, however, while the current agricultural situation in Colorado is viewed as the beginning of a long-term change in the structure of agriculture that will continue for at least a decade.

One form of a limited partnership to buy distressed agricultural land and lease it back to former owners and/or other tenants--the Colorado Agricultural Investor's (CAI) proposal--was found to be based on an extremely weak financial feasibility foundation. Utilizing a set of assumptions based on available research and projected scenarios of the future, an ANRE model was built to duplicate the analysis of the CAI proposal that had been conducted by Germaine Realty. On the basis of this model, the projected before-tax cash flow would be exhausted by the end of the fifth year and the loss of returns on this amount would then

severely decrease partnership returns. Land values were projected to increase about 1.16 percent annually, rising from a present value of $750/acre for pivot-sprinkler irrigated land under continuous corn to about $892/acre at the end of the 15-year period (in 1986 dollars). This projected value would give an internal rate of return of approximately 0.80 percent. But, negative internal rates of return would result for each of the first 12 years in the 15-year proposal. These results are consistent with the observation that current and projected near-term returns to Colorado agriculture are not sufficient to service debt loads for highly leveraged farmers, no matter who holds the debt.

One other option for state-level response is to expand research and Extension funding for financial and marketing management. This approach is not presently under consideration in Colorado but has been successfully implemented in a number of mid-west states, notably in Iowa, Minnesota and Nebraska. Such an approach, known as the CASH (Colorado Agriculture Self-Help) Proposal, would respond to the current situation by first helping individual operators assess their prospects for remaining in business and then providing follow-up assistance to those who have the potential for continuing in farming. The primary response focus would be through an expanded Extension function, reinforced through expanded research in enterprise budgeting, assessing Colorado agriculture's competitive position and developing related marketing strategies. Compared to the other state-level response options that were evaluated, the CASH proposal is extremely cost effective. And it is the only option that truly focuses on those present and future operators who will remain in agriculture to the turn of the century and beyond.

Implications for Policy and Public Institutions

The 1985 farm legislation included some limited but positive steps that should assist farmers in adjusting to the new, more risky economic environment for agriculture. But, farmers continue to face severe constraints in the macro-economy that were not addressed in the recent farm legislation.

Federal farm policy makers of the future will be increasingly more concerned with those areas that affect the general economy--monetary and fiscal policy, tax policy, trade policy, and institutions influencing financial markets, capital flows, and uses. Because of the significance of these forces, farm policy attention in the future will likely continue to shift away from temporary price and income enhancement programs to policies designed to provide a more stable and favorable economic and financial environment for agriculture over the longer term.

State government has only limited means to influence the future of farming. Colorado, along with a number of other states, has been considering options that would ease the financial burden of farmers with over-leveraged loans on a short-term basis. Such programs are generally not amenable to assisting agricultural producers in general to adjust to the longer term changes now underway. They will not even help in the short run unless specifically targeted to that group of farmers whose

loans can be restructured so that they can be serviced under existing cash-flow conditions. New legislation to provide emergency funds for such efforts in Colorado would be prohibitively expensive and would likely have to be continued for several years. Conversely, expanded funding for existing research, education and Extension efforts, marketing programs, new taxation and credit policies, and rural development assistance can all play important roles. Focusing some state programs on those farmers who will survive and on providing a viable rural infrastructure for the future is a recommended course of action.

The role of the land-grant university in serving the farm sector is to provide the necessary technology for the future, to assist farmers in maintaining technical efficiency, and to increase their management skills. Agricultural scientists will be expected to continually search for cost-reducing technological change. Technical and production skills alone, however, will not be sufficient; economic, financial, and risk management skills will be absolutely essential in order for farmers to survive in the high risk business environment of the future. Achieving an appropriate balance between technical production elements and financial and marketing management elements in their research and Extension programs will be the major challenge facing land-grant universities to the turn of the century.

THE AGRICULTURAL CRISIS IN COLORADO:

CAUSES, FUTURE PROSPECTS AND STATE-LEVEL OPTIONS

PREFACE

At a press conference on January 8, 1986, Colorado Governor Richard Lamm announced a new state initiative to expand efforts to assist farm and ranch families impacted by the current difficult economic situation in the state. This new program, known as Project ARC (Agricultural Resources in Colorado), has been termed a renewed commitment by state agencies and Colorado State University (CSU) to work towards a healthier, growing agricultural sector in Colorado. Faculty in the Department of Agricultural and Natural Resource Economics (ANRE) at CSU participated, in part, in the ARC Project by: 1) analyzing the causative factors of the current agricultural situation (Trock, et al., January 1986); 2) projecting future scenarios for agriculture to the turn of the century (Miller, et al., February 1986 and Miller, et al., March 1986); and 3) analyzing selected state-level legislative options for responding to this crisis situation (Skold, et al., March 1986; Fruin, et al., March 1986; and Nobe, et al., March 1986). These research efforts, reported initially in the above-listed working papers, are presented in this ANRE research report.

This report bears the authorship of only the senior authors and team leaders for the series of working papers on which this effort is based. The overall exercise, however, was truly a team effort in which 14 faculty were directly involved. Numerous other faculty, graduate students and administrators provided ideas, critical review and constructive suggestions. The faculty who participated directly in this effort are members of the ANRE Department, unless otherwise identified below; they are the following: Norman L. Dalsted, Jerry B. Eckert, Jerry E. Fruin (Associate Professor, Department of Agricultural and Applied Economics, University of Minnesota and ANRE Visiting Associate Professor), S. Lee Gray, James H. Lewis, Donald L. Lybecker, John McKean, Thomas A. Miller (Agricultural Economist, Economic Research Service, U. S. Department of Agriculture and ANRE faculty affiliate), Kenneth C. Nobe, R. K. Sampath, Danny Smith (Associate Professor, Department of Agronomy, CSU), Warren L. Trock and Richard G. Walsh. The contributions of all who assisted in this research effort, both named and unnamed, are hereby duly acknowledged. The professional views expressed are those of the identified authors, however, and do not necessarily reflect official positions of the ANRE Department, Colorado State University or participating state and federal agencies.

INTRODUCTION

The current farm financial crisis represents an economic paradox, a situation of depressed net farm incomes, bankruptcy, declining farm commodity prices, and high interest rates, all in the midst of a period of relative economic prosperity in most other economic sectors. The crisis in agriculture has developed rather quickly and much more dramatically than could have been foreseen. The problem has received widespread notice in Colorado only during the past two years.

The causes for the crisis are well-known and widely accepted. These include depressed farm prices, surplus supplies, declining land values, declines in export markets for farm commodities, and borrowing at high interest rates. Pressures on the agricultural producing sectors spill over into agribusiness enterprises which serve to supply the producers with factors of production, into rural communities facing loss of economic activity associated with declines in farm income, and into the farm credit system itself. There are both short and long-term dimensions to the current crisis. In the short run, many farmers are facing foreclosure before the end of this year and in 1987. In the longer run, major changes in the structure of agriculture and in the relationship between the agricultural sector and the Federal and state governments are now inevitable.

Several important events have led to the current farm situation (Trock, et al, 1986). Two recent events, in particular, changes in U.S. monetary policy and shifts in demands for food, are particularly important for explaining recent dramatic changes in the farm financial condition. During late 1979, the Federal Reserve began to manage the supply of money while allowing interest rates to seek their own market levels. Earlier, during the middle seventies, the content of per capita food consumption began to change. More vegetable and grain products and less livestock products are being consumed. More recently, grain exports have fallen. The ensuing high interest rates and reduced grain and livestock prices dictate a style of farm management that concentrates more on cash flow and less on collateral and equity building. Due to these powerful forces, highly leveraged capital as a financial tool can no longer be used in farming, nor for that matter in a number of other industries. Many aggressive farm managers of the last decade, who used leveraged capital extensively, are now financially stressed, and some face bankruptcy. Many of these are not bad managers but rather aggressive managers trapped by forces outside their control. As in any management decision, risk was taken and the cost, now, is a non-liquid position of the farm business, due in part to recent devaluation of land values. The breakdown of the farm economy is being passed forward to the rural towns and communities that sell to the farmer and process or service farm products.

Recent ANRE research reflects the view that the new economic forces are restructuring American agriculture into a stronger industry that will ultimately stymie the decline in farm numbers and farm population. Further, Colorado agriculture can improve it's competitive position, relative to the rest of the nation, by strengthening farm management abilities and improving Colorado commodity market development. Farm management can be improved through financial analysis, more comprehensive record keeping, and disciplined marketing management. Commodity market development can be improved by taking advantage of the local concentrated market of 2.3 million people in Colorado and available national and international markets. This advantage can be gained through further local commodity processing and production of established and new crops for local, national and international sales.

Future historians will probably mark the 1980s as the Decade of the Farm Crisis. Beginning in 1935, changes in real value per acre of farm real estate began to increase annually and peaked in 1980, followed by five years of rapid decline--so far. During the twenty-five year period from 1955 to 1980, declines in real value per acre, compared to the previous year, occurred only twice (during the min-recession years of 1970-71) and then declined only slightly. In contrast, the declines during the past five years have been much larger, with the decline in 1985 over 50 percent greater than in 1934, the previous largest yearly drop since 1915. The decline in farm land values since 1980 has been accompanied by an increasing number of foreclosures, bankruptcies, and low farm net returns. Increasing national and state-level attention is now being directed to this current adverse agricultural situation.

Many agricultural economists are predicting that the current declining land value trend has not yet bottomed out (Charlier, March, 1986). Prospects for a major improvement in agricultural conditions in Colorado are dim for the next five to ten years and beyond (Miller, et al., 1986). For the immediate future, agriculture will continue to be beset by rapid change, fueled by unstable international conditions, biotechnology breakthroughs, farm financial stress and a general over supply in agricultural output relative to worldwide purchasing power. It is within this context, along with the realization that current and immediate future agricultural problems are not amenable to quick-fix solutions, that proposed public assistance programs must be judged.

CAUSATIVE FACTORS OF CURRENT FINANCIAL STRESS IN AGRICULTURE

Perspectives on the severity of the problem include the individual farm perspective, the state or regional perspective, and the national perspective. The national perspective provides an overview of the problem but may hide some of the important regional variations in the magnitude of the problem. In this section of the report, we attempt to summarize the pertinent national situation and supplement this information with data on the crisis in Colorado farming. The format followed is (1) to review the historical events occurring in the 1970s, (2) to summarize the events of the early 1980s, and (3) to relate the historical situation and events of the first half of the 1980s to the present situation in farming.

Review of Factors Shaping the 1970s

Historically, several major factors have contributed to the current economic stress in agriculture. Some of these are directly related to, or are a part of, the industry. Others are outside the agricultural sector and are quite general in their impacts on economic activity. Awareness of these factors, however, can serve to increase understanding of adjustments now occurring in the farming sector.

U.S. agriculture has historically emphasized increasing physical production. Production increases have resulted from increased yields related to agricultural research, increased application of purchased inputs, and expansion of harvested cropland. During the 1970s, production increases were further stimulated by aggressive farmer response to expanding domestic and export markets, increasing inflation, dramatically increasing land values and low (or even negative) real interest rates. Expectations of continuation of these trends led to significant investment, financed by borrowing with land as collateral for loans. These expectations were valid, for the most part, during the decade of the 70s. At the national level, total farm debt rose from $54 billion in 1971 to $91 billion in 1976, to $220 billion currently. Net farm income reached record highs and per-capita farm income was on par with non-farm income (Obert and Galston, 1985). Farm export markets expanded at 8 percent per year during the decade and farm prices and land values continued to rise.

In the non-farm sectors of the economy, farm service and factor supply sectors also prospered as a result of increased farm production to meet expanding demands. Employment opportunities in rural communities increased and agribusiness firms involved in processing and marketing agricultural products realized significant increases in earnings.

Government involvement in farm programs was reduced and, as a result, so was the taxpayer's burden in support of the programs.

In Colorado, the situation in the 1970s paralleled that for the nation. Total debt on Colorado farms expanded from $1.3 billion in 1970 to $3.8 billion in 1980 . Emphasis during this period was on collateral and the generation of asset value, rather than on the protection of repayment capacity related to income and cash flow. The boom in farmland prices nationally, and in Colorado, created new wealth during the 70s, but economic conditions were not such that this new wealth could be sustained.

By 1979, inflation rates had become intolerable so the Federal Reserve Board adopted a tight money, anti-inflationary policy. One result of this action, in combination with rising national budget deficits, was an increase in interest rates which in turn severely impacted American agriculture. At the same time, a worldwide recession curtailed the demand for exported agricultural commodities from the U. S.

Exports of farm products produced in the U.S., which had grown at a rate of 8 percent per year during much of the 1970s, have declined since 1980, due to the strong dollar, lack of economic growth in much of the developing world, and increased production in other countries. As a result, U.S. farm prices have been depressed during the last few years. Incomes have been especially low for farmers producing crops for the export market--in Colorado, for wheat and corn producers particularly.

At the same time exports and farm incomes were falling, capital intensive specialization in production and leveraged investment in land and equipment magnified the effects of the new Federal monetary policy. Interest payments surged upward, increasing from an average of about 10 percent on farm loans in the late 1970s to an average of 18 percent in 1981. Despite recent reductions in the prime rate, farmers were still paying 15 percent during the summer of 1985 and are paying upwards of 12 percent on loans to finance operations during the spring of 1986. The interest burden has become unmanageable for increasing numbers of farmers. Interest cost on farm debt has climbed from 24 percent of net farm income in 1970 to 77 percent in 1980, to over 100 percent in 1983 and beyond.

In summary, the financial distress of many farmers is a consequence of decisions made during the seventies at a time when agriculture was a part of a growing economy characterized by favorable prices, expanding markets, and low interest rates. Inflation inspired investments, made with expectations of continuing economic prosperity, have been difficult, and in some cases, impossible to manage, given the adverse changes in the economic environment during the 1980s.

Critical Events of the Early 1980s

Early in the 1980s, each of the events or forces that had driven the economic expansion of the previous decade was reversed. Exports peaked in 1981 and have declined each year since. As a response to significant changes in monetary and fiscal policy, inflation was dampened but real interest rates increased to levels not experienced in recent times. Results have been greatly reduced export demand for the food and feed grains, oilseeds, rice and cotton; production surpluses and stocks buildup; weakened commodity prices; and ultimately, financial problems in the farm sector characterized by reduced cash flows and increasing debt/asset ratios.

Declining Exports

Reductions in exports of agricultural and other commodities, following the peak in 1981, were occasioned largely by a world wide recession, credit problems among developing countries, and changed monetary and fiscal policies in the U.S. that affected interest and exchange rates. The recession of the early 80s was experienced around the world. It was basically a reaction to the expansionary period of the 70s, which was accompanied by high rates of inflation and facilitated by large and rapid capital movements. But it was fueled by changed monetary policy among the developed nations which reduced the credit available to debtor nations and increased interest rates. Countries with declining rates of growth and heavy foreign debt found it necessary to reduce imports of agricultural and other products to meet increasing interest payments to creditors. In the aggregate, trade flows diminished; specifically, exports of U. S. agricultural products were significantly reduced.

Decelerating Inflation

Concerned about high and continuing inflation rates during the late 1970s, officials within the Federal Reserve System changed their policy from that of management of interest rates to tight control of the money supply. The result was a desired reduction in inflation rates but which was accompanied by rapid increases in interest rates. These increases were felt internationally, causing (1) the burden of debt to be more acutely felt by foreign debtors, domestic users of credit and notably farmer-borrowers, and (2) an increased flow of foreign capital into the United States, giving strength to the dollar and affecting currency exchange rates. The combination of increased costs of credit (i.e., higher interest rates, and declining values of local currencies within other nations), aggravated the already growing problems of declining economic growth and forced most nations to curtail expenditures on imports from the United States. Exporters in the U.S. realized not only losses of sales to other nations, but they lost shares of markets to competing exporting countries as well.

Increased Real Interest Rates and Falling Asset Values

Though changed monetary policy has had important negative effects on export demand for agricultural products, the effects of changed monetary and fiscal policy on interest rates are of a more direct concern, i.e., they have adversely affected farmers' costs and finally their financial positions.

It has been noted that farm expansions in the 1970's depended on large quantities of borrowed capital. Changes in monetary policy made that capital more costly by reducing the inflation rate and reducing the money supply, making available capital more scarce. Fiscal policy, characterized by huge deficits and great expansion of the national debt, caused available supplies of money to become even more scarce. The result was significant increases in the real (inflation adjusted) interest rate. The relationships of the nominal interest rate, inflation and real interest rates are graphically depicted in Figure 1.

Farm asset values were also adversely affected by reduced exports, decreased commodity prices, increased interest rates and falling farm incomes. United States farm land prices peaked in 1981 and have declined markedly since that time. In some corn belt states, for example, decreases in values of up to 30 percent were noted by 1984 (Figure 2). No such radical change had yet been noted for Colorado as a whole, but there were reductions; the Colorado Crop and Livestock Reporting Service noted decreases in values of Colorado farms and ranches of four percent from 1981-1985 and seven percent in 1984-85, the most recent year for which such data are available.[1] These events were critical for agriculture. Many farmers who experienced major reductions in values of land, buildings, and non-real estate assets who have limited abilities to restructure debt are now suffering from reduced equities (increasing debt/asset ratios), and have experienced interest cost repayment problems. The resulting financial difficulties compounded the problems of low produce prices and loss of export markets also being experienced by these farmers.

Changed Financial Markets

The 1980s marked a significant change in governmental policy with respect to the financial sector. Through most of our history, the management and use of money (deposits, cash, loans, etc.) by financial institutions has been strictly regulated. Functions of institutions have been controlled; movements and uses of money have been monitored and

---

[1]The significant influence of nonagricultural use of farm land in some areas may explain why average prices for all Colorado farm land have not declined further. Greater reductions have undoubtedly been realized in the eastern counties of Colorado, where prices are not greatly influenced by nonagricultural uses of rural lands. Recent information on spot sales in eastern Colorado during early 1986, however, fall in value reduction ranges recorded earlier in Kansas, Nebraska and other severely impacted states lying to the east.

Figure 1

Inflation, Nominal Interest Rates, and Real Interest Rates, 1970-1984

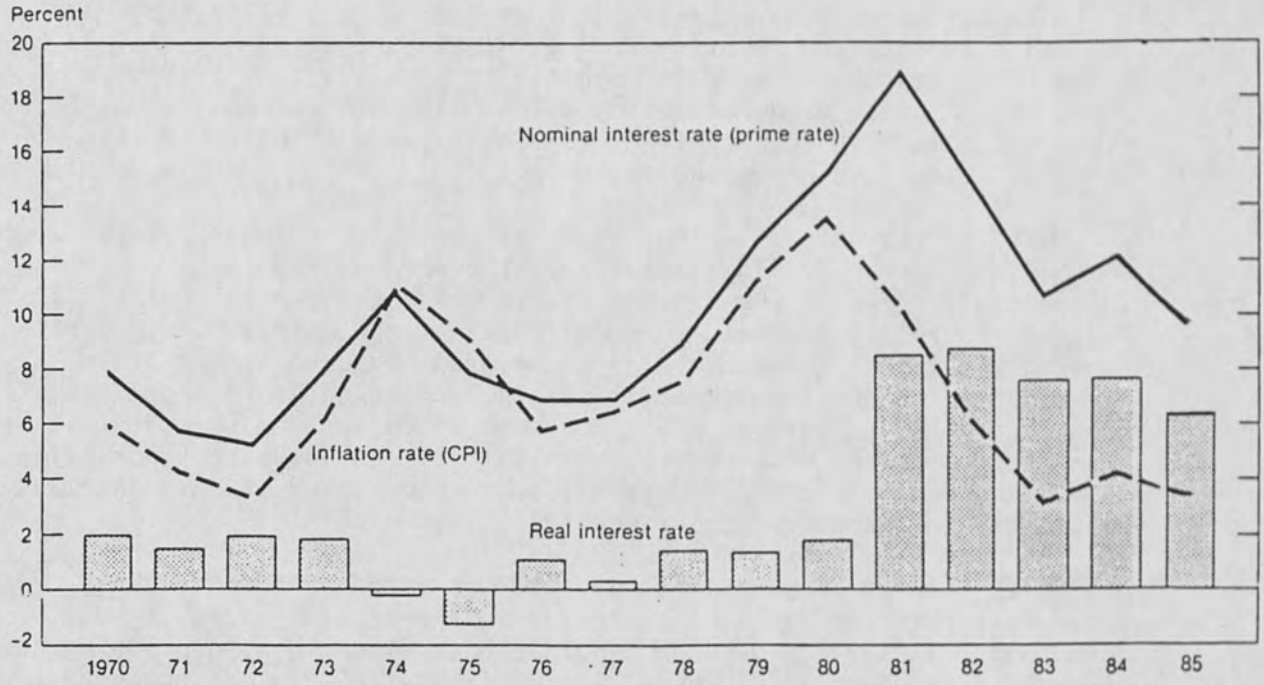
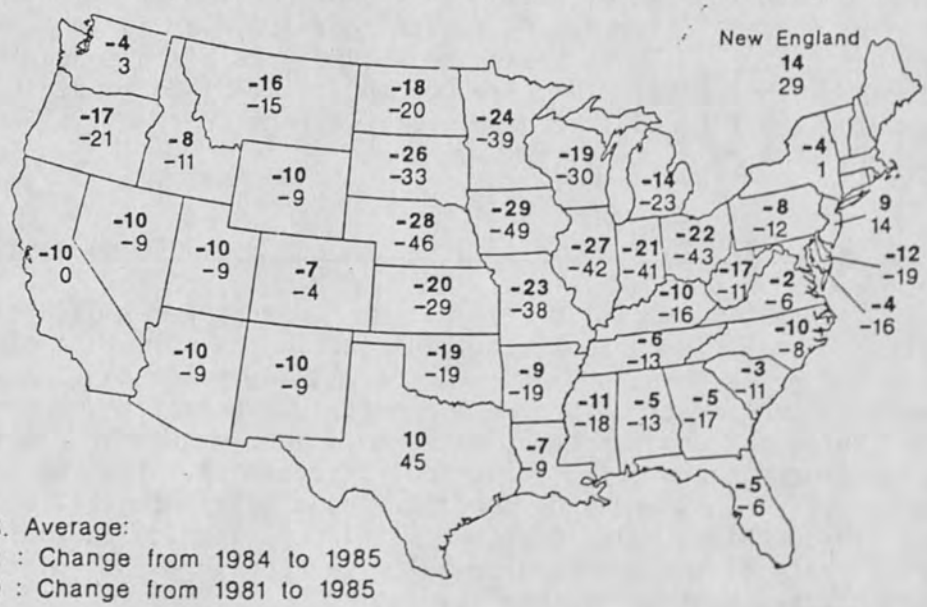


Figure 2

Change in Average Value of Farm Real Estate per Acre, 1984-85 and 1981-85



U.S. Average:
-12 : Change from 1984 to 1985
-19 : Change from 1981 to 1985

Based on index of average value per acre, 1977=100.

Source: 1985 Agricultural Chartbook, U.S. Department of Agriculture, December 1985.

interest rates have been regulated. A significant event during the first term of the Reagan administration was the deregulation of banks and financial markets. Especially important was the removal of limits on interest rates paid on savings. The effects have been far-reaching and important--especially to agriculture.

Capital markets have developed that are now global in their scope. Capital movements are relatively free, within and among nations, so that there is a greater tendency for capital to be attracted to high-value uses. One aspect of deregulation allows nations' currencies to "float", i.e., to seek their comparative levels or values in the international markets, which adds great uncertainty.

Within the United States, users of capital, including farmers, now compete openly for available capital. (Government also is a competitor in the capital market when it borrows to cover the Federal deficit.) The Federal Reserve System acts very deliberately to control money supplies. Huge institutional investors, large corporations, banks, and other financial interests impact heavily on the market and influence stocks and uses of capital. There is rapid movement of capital among users, as well as among countries. The result is volatility and increased instability within the capital market. Figure 1 shows the impact of this increasing volatility on interest rates since 1970.

With removal of the limits on interest rates paid on savings accounts, banks saw a marked increase in the cost of loanable funds. Unfortunately, savings have not increased to expand the supply of funds. Farmers, through their financial institutions, now pay market costs for capital. Even the Farm Credit System obtains its capital via sale of its own bonds in the open market. Thus, the cost of loanable funds is much greater now than it was prior to 1980. There is no favored treatment of farmers, except in special instances where, because of public policy, costs are reduced. Farmers buy capital and they pay for the risks of its use in agriculture. These risks are unlikely to diminish during the remainder of the 1980s. They are now an important and enduring factor influencing the financial structure of U.S. Agriculture (Miller, et al., Sept. 1985).

Resulting Changes in Agriculture and Rural Communities

The current financial crisis facing farmers is resulting in some important changes in agriculture. Changes in the structure of farming are not new -- farm numbers have been declining since the 1930s. However, in earlier times, farmers generally discontinued business as willing sellers. One important difference in the current situation is that some farmers are being forced out of business, often at considerable personal loss. They are experiencing financial difficulty, emotional stress, and strained relationships, within and outside their families. The visibility of the problem and political pressures associated with adjustment have reached extreme levels.

Changes in Financial Structure

Unlike low product prices which tend to affect all farmers, the financial crisis particularly affects those farms with high debt loads. Thus, the incidence of financial problems, while very severe, is still confined to a relatively small percentage of farms and ranches. Studies by personnel of the Economic Research Service, U. S. Department of Agriculture, show that nationally, in 1985, only 2.3 percent of all farms were technically insolvent and that 3.3 percent faced extreme financial problems (Table 1). If we assume that these percentages were also applicable to the 27,111 farms in Colorado, about 625 farms would have been technically insolvent and another 895 would have faced extreme financial problems during 1985. The farm crisis has continued into 1986, of course, and current farm financial problems in Colorado may now be increasing significantly.

Table 1: U. S. Farms in Financial Stress, January 1985.

Financial Stress Category	Debt/Asset Ratio	Farms	Percent of Debt
Technically insolvent farms	Over 100%	50,000 (2.3%)	13.1
Very highly leveraged farms	70-100%	71,800 (3.3%)	15.1
Highly leveraged farms	40-70%	194,000 (8.9%)	32.9
Low leveraged farms	Less than 40%	1,863,000 (85.5%)	38.2
Total		2,179,000	100.0

Source: Agricultural Information Bulletin 495, Economic Research Service, U. S. Department of Agriculture, 1985.

A more direct indication of financial distress among Colorado farmers was noted in the results of a recent statewide credit survey (Tinnermeier, Garland and Rubingh, 1985). More than 17 percent of respondents (468 usable questionnaires) reported debt/assets ratios above 70 percent. Nearly 37 percent of producers responding had debt/assets ratios above 40 percent. It is suggested by these data that a larger

percentage of Colorado farmers are technically insolvent and very highly leveraged than are farmers in the United States as a whole.[2]

The skewed size characteristic of the 1985 farm credit survey notwithstanding, some useful inferences about the financial structure of Colorado farming operations can be drawn from the data. Debt/asset ratios and gross sales are therefore given in Tables 2 and 3, respectively. Table 2 includes data showing the percentages of respondents by debt/asset ratio and size; in Table 3 the percentage distribution is shown in terms of total debt. It is evident that the farm debt and financial problems are not evenly distributed. Most financial analysts consider a debt/asset ratio above 40 percent as potentially dangerous. Using that figure as a cutoff point, the 36.5 percent of the respondents with debt/asset ratios greater than 40 percent (sum of three rows, last column, Table 2) accounted for 69 percent of the total debt (last column, Table 3). On the other hand, the remaining 63.5 percent of the respondents accounted for only 31.0 percent of the total debt.

If one compares numbers of farmers and debt load by gross sales and debt/asset ratio, the difference is even more striking. For example, 9.3 percent of the producers in the sales category of $200,000 or more, and with debt/assets greater than 40 percent, carry 43.3 percent of the total debt.

The areas of the rectangles within Tables 2 and 3 represent debt/asset ratios greater than 40 percent and gross sales of $100,000 or more per year. In this grouping, 15.7 percent of the respondents account for 53.4 percent of the debt. Thus, it is clear that the potential financial problems were primarily in those units with large gross sales. It should be noted again, however, that the respondents on this mail survey were mostly larger firms with higher debts. This fact is brought out by comparing the distribution of respondents with the distribution of all farms in the last two rows of Table 2. This lack of representativeness places some restrictions on the reliability of the inferences that can be drawn from these data.

Important also to a description and understanding of the present situation in agriculture are the needs for and availability of cash, as it is generated within farm businesses and is employed for operations, debt repayment and family living. All Colorado farms with debt/asset

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[2]Such a conclusion may not be warranted, however, since the Colorado survey respondents were mostly larger farmers with higher debts and did not therefore accurately represent the total population of Colorado farmers. A follow-up farm credit survey in Colorado was undertaken in February 1986, however, and an attempt is being made to obtain a more representative sample of respondents. Data from this survey are not yet available for analysis.

Table 2. Percent of Responding Colorado Farms and Ranches by Debt/Asset Ratios and Gross Sales, 1984

Debt/Asset Ratio Intervals (%)	Gross Sales ($000) Less than 10	10-39	40-99	100-149	150-199	200 or More	Dt/Asset Interval Totals	
	(Percentages)							
0 to 10	9.4	11.8	6.8	1.9	1.3	0.9	32.1	
11 to 40	4.3	10.4	6.8	2.6	1.3	6.0	31.4	
41 to 70	2.4	2.4	4.7	2.4	1.5	5.2	18.6	
71 to 100	0.4	2.1	4.3	1.1	0.6	3.2	15.7	11.7 36.5
101 +	0.4	1.7	2.4	0.4	0.4	0.9	6.2	
Total Respondents	16.9	28.4	25.0	8.4	5.1	16.2	100.0	
All Colorado farms 1/	44.3	23.5	15.8	6.4	2.6	7.0	100.0	

1/ Census of Agriculture, 1982.

Source: Tinnermeier, Garland, and Rubingh, 1985.

Table 3. Distribution of Debt as Percent of Total Farm Debt of All Respondents, 1984

Debt/Asset Ratio Intervals (%)	Gross Sales ($000) Less than 10	10-39	40-99	100-149	150-199	200 or More	Dt/Asset Interval Totals	
	(Percentages)							
0 to 10	0.1	0.3	0.4	0.1	0.2	0.3	1.5	
11 to 40	0.7	3.3	5.1	2.8	2.1	15.6	29.5	
41 to 70	1.0	1.3	5.1	3.4	3.8	28.7	43.4	
71 to 100	0.4	0.9	4.2	1.2	0.4	11.7	53.4	18.8 69.0
101 +	0.1	0.8	1.7	0.6	0.7	2.9	6.8	
Totals	2.3	6.6	16.5	8.1	7.2	59.2	100.0	

Source: Tinnermeier, Garland, and Rubingh, 1985.

ratios greater than 40 percent are under severe pressure to adjust, but we have no definitive statistical estimates of the exact nature of these aggregate adjustments at the state level. Cooperative Extension personnel in Colorado who are working with financially stressed farmers, however, have found a large variation in adjustments among different types of farms and ranches in different regions of the State. A rough estimate is that: (1) one third of the farms wherein insolvency is a threat are being maintained via restructuring of the financing or the ownership of the units; (2) one-third are eventually sold as whole farm units (which in some cases are leased back to the original owner), and (3) one-third are sold and combined with existing farms to form larger units. Thus, about two-thirds of the farms currently facing severe financial problems will likely continue to operate under new or reorganized ownership, while one-third will be combined with existing farms.

The burden of the financial crisis is most apparent in mid-size farms. Small part-time farms tend to be able to support high debt loads with off-farm income, while the largest farms can support high debt loads with higher sales and margins. Mid-size family farms without significant off-farm income and with high debt loads are particularly stressed.

While aggregate farm income in Colorado and in the U. S. may not have changed much in recent years, farm wealth has decreased substantially as a result of declining land values. This decline has been large enough in some areas to significantly affect the aggregate wealth of rural communities. The soundness of the Farm Credit System is now being threatened by this devaluation, as is the status of a number of commercial banks.

A number of small but significant changes are occurring in the financial structure of farms. These include: (1) less reliance on debt financing and leverage as a means of farm business expansion; (2) increases in leasing and renting; (3) increases in outside equity financing and off-farm income; and (4) increases in family farm corporations. The eventual adjustment of the farm sector to the new economic circumstances will very likely continue to be in these directions (Miller, Stucker, et al., 1985).

Changes in Farm Numbers

Some background information on structural change in Colorado agriculture helps put the present situation in perspective. First, the number of farms in Colorado steadily declined from over 60,000 in the 1930s to 25,500 in 1974. During this period, average farm size increased from 471 acres to 1,408 acres. Approximately two-thirds of the farms that went out of business during this period were purchased by continuing operators to enlarge their existing farms. Since 1974, however, a second trend has been superimposed on the first--many regions of Colorado have seen an increase in the number of small, part-time farms. Off-farm income is significant in maintaining these farms since volume of output is usually small and farm income is often negative.

The combination of these two trends since 1974 is leading to a bipolar farm size structure. First, there is an increasing number of part-time farms. They contribute only a small amount to total output and their owners rely primarily on off-farm income. Table 4 shows that Colorado farms of less than 180 acres

increased by 1.355, from 10,762 in 1978 to 12,117 in 1982. Second, the number of middle-size farms is decreasing. Farms between 180 and 499 acres decreased by 535 during this period and farms of 500 to 1,999 acres decreased by 457. Middle-size farms are disappearing at the rate of 1-3 percent per year in most regions of the state. Finally, there has been little change in the number of larger farms, which produce most of Colorado's agricultural output. although the data in Table 4 show a small decrease in the number of farms in the largest size group. This phenomenon reflects a breakup of some large units while there are also continuing combinations and enlargements of mid-size and some larger farms. Overall, total farm numbers were stable at about 27,000 for the period 1978 - 1982, but, as shown above, this figure is very misleading in regard to which farms are most important in terms of total output.

Historical changes in farm numbers appear to continue uninterrupted through good times and bad. In fact, evidence is not conclusive whether such trends are accelerated or retarded by aggregate changes in farmer well-being as measured by farm income, cost and price changes, or the parity ratio. Changes in farm size and numbers may be more related to income and inheritance tax laws, technological change and the efficiency of large farms, non-farm economic growth and increasing off-farm income, and changes in agricultural markets. Some studies at the national level have found that high commodity prices and Federal price support programs have even increased the rate at which larger farmers buy out mid-size farms. So it is evident that structural change has been occurring for several decades and has been induced by numerous factors, many of which have been regarded as otherwise positive in their effects on agriculture.

Little statistical evidence exists to document the relationship between these historical trends in farm numbers and the current farm financial crisis in Colorado. The rate of change in farm numbers has probably not been affected, although the causes of change may be different. Nor is the aggregate productivity of farming being adversely affected. Past structural change has generally improved productivity by transferring resources from less productive farmers to more productive farmers and this transfer trend is still occurring. Aggregate Colorado farm income estimates show substantial year-to-year variability, but no recent trends (Division of Business Research, 1984). There are few data available to support a hypothesis that the present financial crisis has unduly accelerated the decline in the numbers of mid-size farms. And, of course, it is misleading to conclude that all of the decrease in farm numbers is due to the present farm crisis.

Table 2. Changes in Colorado Farm Numbers, 1978-82.

	Planning and Management Districts[1]					Colorado Total
	1	5	6	10	Other	
1978						
Total Farms	4,667	2,131	2,823	1,975	15,311	26,907
0-179 Acres	1,055	322	820	1,138	7,427	10,762
180-499 Acres	1,038	294	546	383	3,170	5,431
500-1,999 Acres	1,820	815	805	284	2,984	6,708
Over 2,000 Acres	754	700	652	170	1,730	4,006
1982						
Total Farms	4,284	2,147	2,543	2,097	16,040	27,111
0-179 Acres	1,071	398	694	1,317	8,637	12,117
180-499 Acres	833	313	493	358	2,899	4,896
500-1,999 Acres	1,630	760	737	271	2,853	6,251
Over 2,0Q0 Acres	750	676	619	151	1,651	3,847
1978-1982 change						
All Farms	- 383	+ 16	- 280	+ 122	+ 729	+ 204
0-179 Acres	+ 16	+ 76	- 126	+ 179	+1,210	+1,355
180-499 Acres	- 205	+ 19	- 53	- 25	- 271	- 535
500-1,999 Acres	- 190	- 55	- 68	- 13	- 131	- 457
Over 2,000 Acres	- 4	- 24	- 33	- 19	- 79	- 159
Annual change						
All Farms	- 96	+ 4	- 70	+ 30	+ 182	+ 51
0-179 Acres	+ 4	+ 19	- 32	+ 45	+ 302	+ 339
180-499 Acres	- 51	+ 5	- 13	- 6	- 68	- 134
500-1,999 Acres	- 48	- 14	- 17	- 3	- 33	- 114
Over 2,000 Acres	- 1	- 6	- 8	- 5	- 20	- 40
Annual percent change						
All Farms	- 2.2	+ 0.2	- 2.8	+ 1.5	+ 1.1	+ 0.2
0-179 Acres	+ 0.4	+ 4.8	- 4.5	+ 3.4	+ 3.5	+ 2.8
180-499 Acres	- 6.1	+ 1.5	- 2.7	- 1.7	- 2.3	- 2.7
500-1,999 Acres	- 2.9	- 1.8	- 2.3	- 1.2	- 1.1	- 1.8
Over 2,000 Acres	- 0.1	- 0.9	- 1.3	- 3.1	- 1.2	- 1.0

[1]District 1 is 6 northeast counties, District 5 is 4 east central counties, District 6 is 6 southeast counties, and District 10 is 6 counties in the Montrose-Delta area.

Source: Division of Local Government, County Economic Series, Colorado Department of Local Affairs, Denver, CO. 1985.

Rural Community Impacts

Data have not yet been developed to describe the "spillover effects" of the current farmer financial problem. Within some rural communities, however, these effects are readily visible--as closures of agri-business firms, failures of banks, increases in unemployed persons, and generally reduced economic activity. But the available data on demographic changes, incomes and employment are not well related to changed numbers of farms and depressed farm incomes. Cause and effect relationships are difficult to describe with confidence. Nevertheless, available data provide a few clues to what is happening generally in rural Colorado and suggest some relationships that should be studied to facilitate public/private actions.[3]

Data on net migration for counties in the principal agricultural areas of Colorado (planning and management districts 1, 5, 6 and 10) reflect, in some cases, the changes in farm numbers within the last decade. (See Figure 3.) Summaries of net migration are given in Table 5. These data show that, where agriculture is relatively important to local economies (in regions 1, 5, 6 and 10), decreases in farm numbers have influenced net out-migration. The relationship is especially evident in district 6 and in such counties as Otero, Bent and Baca. In other counties, where there is greater diversity of economic activity (i.e., less dependence on agriculture), decreases in farm numbers have had little or no influence on net out-migration. Examples are Prowers, Elbert, and Delta counties. But in the most recent years for which data are available, 1983 and 1984, most counties in districts 1, 5 and 6 have experienced out-migration. These were years of increasing financial distress, when the impacts of changes in agriculture have been most keenly felt and, of course, the crisis has continued to the present.

Data on total personal incomes and farm incomes are also suggestive of rural community impacts (Division of Local Government, 1985). Summaries by planning and management districts are given in Table 6. Several relevant observations can be made via perusal of these data. For example, it is evident that farm income is significant to total personal income in each of the districts (as it is for most counties in the districts) but in only one year, 1975, were farm incomes as much as one quarter of total personal incomes in two districts -- one and five. Other sources of personal income were more important in other years in most counties.

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[3]A rural impact survey is currently underway by the Department of Sociology at CSU as part of the Project ARC effort but data from this study are not yet available.

Figure 3. COLORADO PLANNING AND MANAGEMENT REGIONS

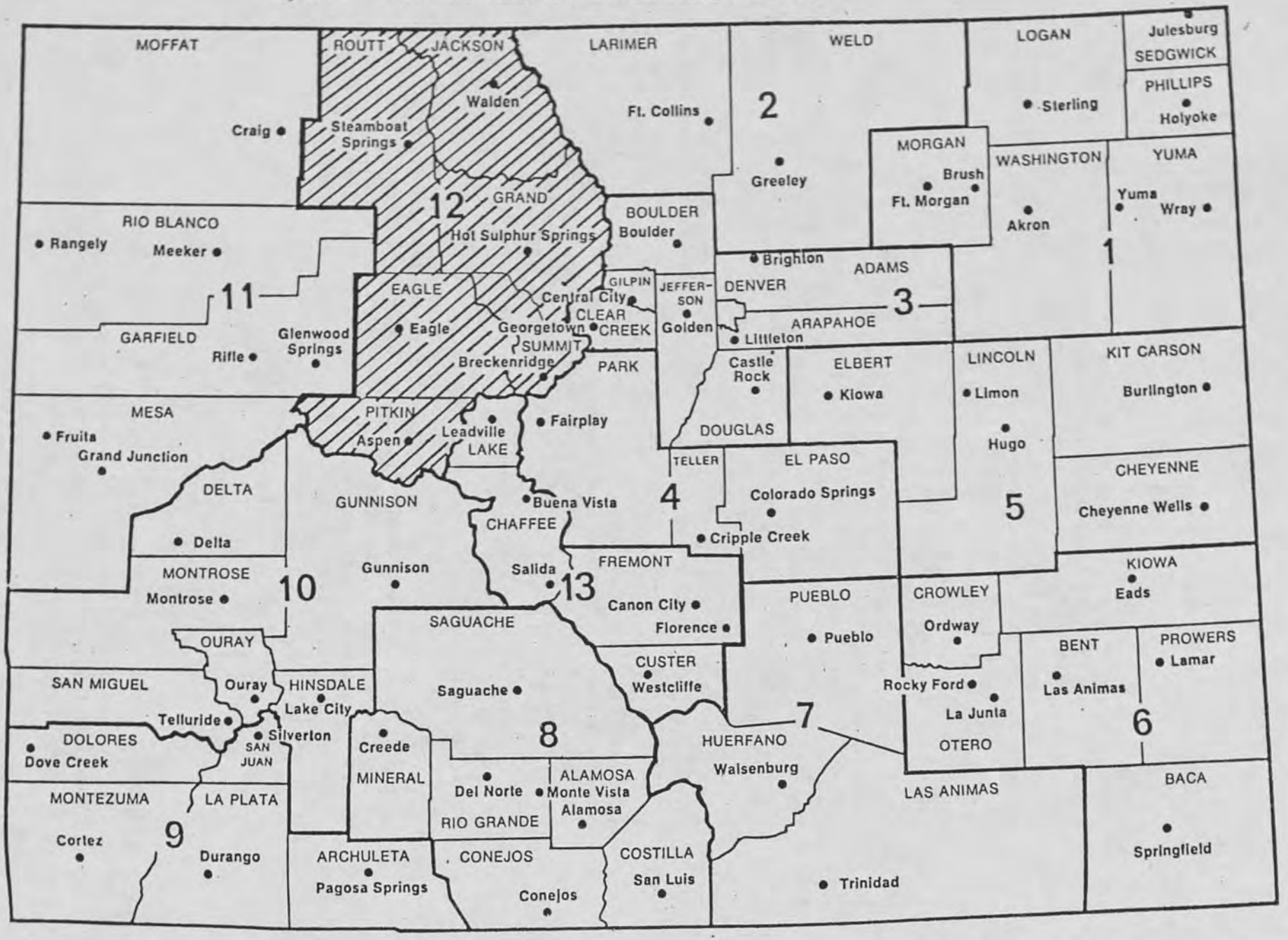


Table 5. Net Out-Migration for Planning and Management Districts 1, 5, 6 and 10, Colorado, 1975 - 1985[1]

Years	Planning & Management Districts 1	5	6	10	Other	Colorado
1975	58	195	91	1416	12766	14526
1976	- 112	-130	-1148	1102	26937	26649
1977	- 563	-350	-1603	1308	49912	48704
1978	- 209	250	- 998	1520	60751	61269
1979	1082	735	- 542	2126	36238	39639
1980	320	300	- 503	1932	33625	35674
1981	- 361	33	- 377	1122	50887	51304
1982	510	475	111	530	41147	42773
1983	- 439	311	- 372	18	32553	32071
1984	- 1545	81	-1182	43	930	-1673

[1]Net migration is computed by subtracting natural increase from the estimate of population change for each calendar year and shows people entering/leaving the district. Population change, December 31 each year, is an interpolation of the July 1 estimates of population which are made each year by the Demographic Section, Department of Local Affairs, Colorado. Natural increase is computed by subtracting deaths from births for each calendar year.

Source: Division of Local Government, County Economic Series, Colorado Department of Local Affairs, Denver, CO., 1985.

Farm income in a few specific counties has been more important. In the counties listed below farm income has usually been one quarter or more of total personal income in the nine year period shown in Table 6.

District 1	District 5
Sedgwick Washington Yuma	Cheyenne
District 6	**District 10**
Crowley Kiowa	None

Farm income within counties and these four districts has been highly variable through the nine years, 1975 - 83. Year-to-year variations are as much as 50 percent--in a few cases more. But total personal incomes have trended upward, with minor variations. These data suggest that tne quite variable farm incomes have only moderated the consistent growth in total personal incomes; they have not been that important as a source of income to all persons within these districts.

The relationship between farm and total personal incomes is important to the problem of financial distress in agricultural in at least two respects: (1) In those counties where farm incomes are an important part of total incomes (say, one-quarter), tne effects of financial distress will be more important than in those counties where farm incomes are less important to total personal incomes. Financial distress will cause both variability and reduced levels of farm incomes. But in counties and districts with economic diversity, i.e., several important sources of total personal incomes, variable and/or low farm incomes will not be as critical to the economic welfare of residents. (2) Those counties and districts with economic diversity will have much greater capacity to absorb persons displaced from agriculture--whether they be farm families or families of persons employed in agribusiness enterprises. As noted earlier, displaced farm families tend to stay in the communities where they have farmed. Employment opportunities will be greater when there are diverse economic enterprises in communities and counties. We should expect out-migration of displaced farm families to be less in those counties where diversity has been achieved and farm incomes are thus less important.

Important also to rural communities is the loss of wealth that has been a part of the farm financial crisis. For several decades, and especially since World War II, the values of farmers' assets appreciated markedly. Increased values of land were the most notable, but values of working assets, (i.e., machinery, buildings, breeding herds, etc.), appreciated too and contributed to farmers' increasing net worths or

Table 6. Total Personal Income and Farm Income, Planning and Management Districts 1, 5, 6 and 10, Colorado, 1975 - 1983.[1,2]

Years/ Income		1	5	6	10	Other	Colorado
				(thousands of dollars)			
1975							
	Tot. Per. Inc.	686,478	181,524	453,510	374,729	13,772,915	15,469,156
	Farm Inc.	226,411	51,440	96,899	29,785	156,031	560,566
1976							
	Tot. Per. Inc.	599,393	144,395	428,665	402,333	15,544,802	17,119,488
	Farm Inc.	99,895	6,122	57,342	27,375	164,708	355,442
1977							
	Tot. Per. Inc.	614,195	173,058	434,065	420,385	17,491,657	19,133,360
	Farm Inc.	100,592	26,849	54,813	13,712	120,241	316,207
1978							
	Tot. Per. Inc.	637,043	208,485	459,420	455,425	20,459,679	22,220,052
	Farm Inc.	92,462	37,280	69,826	22,078	200,079	421,725
1979							
	Tot. Per. Inc.	694,052	233,315	477,777	484,773	23,987,831	25,877,748
	Farm Inc.	131,256	47,972	79,108	22,213	244,439	524,988
1980							
	Tot. Per. Inc.	699,414	238,731	480,976	515,959	27,523,464	29,458,544
	Farm Inc.	92,859	42,239	71,766	17,663	260,238	484,765
1981							
	Tot. Per. Inc.	723,875	253,830	508,291	548,290	32,062,362	34,156,648
	Farm Inc.	138,521	44,228	82,495	14,059	285,474	564,777
1982							
	Tot. Per. Inc.	729,029	241,833	506,740	570,737	35,542,261	37,589,600
	Farm Inc.	61,686	20,036	64,913	12,940	288,863	448,438
1983							
	Tot. Per. Inc.	771,648	293,945	547,030	569,869	37,905,516	40,088,008
	Farm Inc.	96,346	65,056	90,615	11,955	287,534	551,506

[1]Total Personal Income of an area is defined as the income received by, or on behalf of, all the residents of that area. It consists of the income received by persons from all sources. Farm income is income to farm proprietors plus wages and salaries to farm employees.

[2]Income statistics were obtained from the Bureau of Economic Analysis, Department of Commerce, by the Division of Local Government, Department of Local Affairs, Colorado. Income data for 1984 are not yet available.

Source: Division of Local Government, Colorado Economic Series, Colorado Department of Local Affairs, Denver, CO., 1985.

wealth. Recent years of economic recession and especially hard financial times in agriculture, however, have taken their toll via wealth reductions in agriculture, i.e., declining net worths. Some farmers have seen their equities halved, quartered or completely lost by depreciation in the values of their assets. Unfortunately, we do not have an accurate measure of the impact of such changes. While a somewhat similar loss of wealth occurred in the 1930s, much different relationships existed between agriculture and the rural community during that time. But we can reasonably speculate about the impacts of wealth reductions and develop some appreciation of likely effects. In this regard, we note that:

(1) The loss of equity and collateral value reduces the ability of both national and local credit institutions to provide credit; therefore, they are restricting both consumer and business loans to farmers as well as to non-farmers.

(2) While wealth is not directly related to short run consumption expenditures, it does have an impact; families with declining equity spend less on consumption, even if their incomes remain unaffected.

(3) Farm equity often represents a farmer's retirement fund. The loss of equity, even for debt-free farmers, affects their propensity to consume out of current income, relative to the need to save for retirement.

Other linkages exist, but the above are sufficient to illustrate our suggestion that additional concern, focus, and research on these linkages is warranted. These wealth changes may well represent the key linkage between the present farm situation and rural communities in Colorado.

FUTURE PROSPECTS FOR AGRICULTURE IN COLORADO AND THE UNITED STATES

The economic circumstances which now prevail in the agricultural industry of Colorado and the United States are not overnight phenomena. They have been developing over the past decade and a half and have their roots in the unique political and economic events of the 1970s. In that decade there was (1) significant growth in foreign demand for certain commodities, (2) accelerating inflation within the general economy, and (3) low real interest rates. Farmers (and others) were motivated by these events to invest heavily in farm land and equipment, and to rapidly expand their production capability. A turnaround in each of these elements in the early 1980s led to reduced export demand for commodities, leaving farmers with excess capacity and large stocks of grains, plus slowed inflation rates and high real interest rates. The consequence has been financial distress within the farm sector, characterized by reduced cash flows, increasing debt/asset ratios and rapidly declining farm land prices. The purpose of this report is to place these events in a longer run, forward looking perspective--to the year 2000.

Factors Affecting the Longer Run Future of Farming

Long-term planning by public policy makers and private individuals alike involves expectations concerning the future environment of the agricultural industry. Most likely "scenarios" are often identified for planning purposes. Unfortunately, many of the major factors that will influence the future cannot be forecast with any degree of accuracy. Nonetheless, some information is available that provides clues as to what the future will hold for agriculture. A review of this information is helpful as we look ahead at agriculture to the end of the century.

At this point in time, there are few signs of immediate improvement in the economic circumstances facing agriculture. Year-end stocks of 1985 wheat and corn crops increased markedly, continuing downward pressure on prices. Projected wheat exports of 1.05 billion bushels for the 1985 crop year are down 26 percent from 1984 and the lowest level since 1976. The cattle market for the early part of 1986 looks a little brighter, but periods of price weakness are anticipated to continue for livestock producers. Looking ahead specifically to Colorado agriculture in 1986, analysts at the annual Colorado Business/Economic Outlook Forum recently noted that farmers continue to face difficult financial conditions, with sliding farmland prices and export markets still being hurt by the strong dollar. They concluded that: "Although net farm income is expected to increase somewhat in 1986, the overall farm economy in Colorado does not show any signs of an economic turnaround." (CBEOC, 1986, p. 8) Other forecasts we have seen agree with this basic conclusion.

The longer run situation is less clear. But, the major factors that will affect the environment of U.S. and Colorado agriculture to the year 2000 are known are are considered in the following section. Attention is focused on technology and productivity, export markets and prices, the likely future overall financial environment, and prospects for continued boom and bust cycles. The objective is to summarize the best information now available on the major factors that will mold the future; this information can provide the basic background for public and individual planners to use as they make their long-term forecasts and decisions concerning agriculture.

Technology and Productivity

Changing technology has long had a major impact on the structure and productivity of U.S. agriculture. Prior to 1940, production increases were largely attributable to the expanding land base. As a result, total productivity (ratio of output to total inputs on a value-weighted basis) growth was slow. Total productivity more than doubled in the post-war era because of the doubling of output, with relatively small increases in inputs. However, substantial changes in the mix of inputs and the partial productivities of the different input categories occurred. Labor inputs declined by 78 percent, while technology-based inputs--mechanization, chemicals, and improved crop varieties and animal breeds--rose dramatically.

Over the past 30 years, farm productivity has increased at an average rate of 1.9 percent per year. Annual increases in productivity peaked at a rate of 2.2 percent per year during the period of 1950 to 1965. Since then, the increase rate has declined to about 1.5 percent per year--closer to rates experienced during the 1925-50 period (USDA, ECIFS 3-5, p. 69). A commonly expressed concern is that the past sources of productivity growth have been exploited, which implies that future gains will require substantial effort to develop new sources of technology. Of additional concern are the declining real rates of public research funding in the face of this apparent critical need for newer technologies. This trend is continuing, in spite of the fact that several studies have shown that annual rates of return for publicly funded agricultural research are well above the rates required by the private sector for investment in high-risk R & D (Evenson et al., 1979).

A recent report by the Office of Technology Assessment (1985) identified several promising emerging agricultural technologies that will impact both animal and plant agriculture. Most of the technologies given within the category of animal agriculture involve the use of molecular genetics as the basis for manipulation and include the following subcategories:

1. Microbial mass production of biological agents such as feed supplements, growth hormones, and materials for the detection, prevention, and treatment of infectious and genetic disease--especially those associated with reproduction.

2. Insertion of desirable genes into developing embryos.

3. Embryo transfer.

4. Nutritional additives that promote fiber digestion or improve partitioning in ruminants.

The subcategories important for plant agriculture include:

1. Development of microbial inoculums to decrease fertilizer requirements, stimulate growth, and promote disease and insect resistance.

2. Plant propagation via cell and tissue culture.

3. Genetic modification using cell culture selection and gene transfer via genetic engineering.

The potential contributions to increases in agricultural productivity by these emerging technologies have been widely addressed. A more important question, however, is the time frame within which they can be adapted to applied production systems. The information-based technologies, those involving computer and communication management aids, are available now from both public and commercial sources (Bonnen, 1983). With regard to the biological technologies listed above, Bonnen projects that use of molecular biology techniques will have a noticeable impact in the animal sciences within a decade because most of these animal techniques involve manipulation at the microbial level rather than genetic modification of higher organisms. There is no reason to expect that the development of microbial inoculums to promote plant growth, disease, and insect resistance will occur at a slower pace than animal technologies involving microorganisms. Payoffs from the genetic engineering of higher organisms, however, are likely a longer-term venture because of the relative lack of understanding of their molecular and genetic behavior.

The 1985 OTA report projected the impacts of emerging technologies on production in the year 2000, assuming four different national research and development scenarios. Under the best and worst case scenarios, production or feed efficiency gains between now and 2000 were estimated as follows: wheat, 27.8 and 13.9 percent; soybeans, 23.3 and 16.7 percent; beef, 4.3 and -5.7 percent; and swine, 9.1 and 3.0 percent. Gains in reproductive efficiencies under best and worst case scenarios were 15.5 and 4.4 percent for beef cattle, and 23.6 and 2.8 percent for swine. For all of agriculture, productivity was estimated to increase at the rate of 2.2 percent per year under the most favorable research funding scenario, and only 1.1 percent per year under the worst case scenario of little research and no new technology.

OTA estimates that a 1.8 percent growth rate in productivity would be required to balance world supply and demand in 2000. This growth in productivity could be obtained if research and Extension expenditures are increased by 2 percent per year in real terms. This matching of future

productivity gains and expected growth in markets depends vitally on the rate of increase in research and extension funding. One should note, however, that projections of increased productivity rates based on presently unavailable technologies are highly subject to errors.

Bonnen (1983) has also addressed the issue of the impact of emerging technologies on existing institutional structures. He concludes that, contrary to some existing claims, the newer genetic technologies will augment rather than replace traditional agricultural research. In addition, the basic research associated with the newer technologies must be closely linked to existing subject-matter and problem-solving research efforts and technology transfer (Extension) mechanisms.

The implementation of emerging genetic technologies will also depend on the public's perception of their impact. Public interest groups have already made their presence known, and progress of several research groups involved in genetic engineering has been interrupted by legal means. In a similar context, even traditional methods of conducting animal and medical research are being subjected to greater scrutiny from outside groups than in the past. Johnson and Wittwer (1984) have noted the philosophical commitment to logical positivism inherent in the agricultural research establishment and other biological/physical science disciplines. As a result, these groups are poorly equipped to discuss concerns with their critics about social values, safety, and health. Agricultural scientists must become increasingly aware of the "value-related" issues relevant to their research so that future research can be designed to accommodate a broader set of concerns.

The competitive position of U. S. and Colorado agriculture will likely be impacted by emerging technologies. Considering the development potential of a significant part of the world's agriculture, there are no guarantees that the competitive position of the United States will be improved. One method of assessing the nature of the impact is to characterize these technologies as either "output increasing" or "factor saving". If production increases are the primary impact, the increases must also be accompanied by substantial gains in productivity to enhance our competitive position in export markets. Factor saving technologies would also enhance the U. S. position in these markets. The position of Colorado's agricultural industry relative to other states would likely depend on the timing of the availability of emerging technologies. For example, if dramatic increases in crop photosynthesis became available before improvements in water-stress resistance, Colorado could be placed at a greater disadvantage, relative to higher rainfall states.

As the above example illustrates, individual states should attempt to become aware of the impacts of specific emerging technologies on the competitive position of their dominant agricultural industries. This knowledge would allow each experiment station to emphasize research that would promote technological development in those subject-matter areas most likely to improve the competitive position of agriculture in that state.

An additional question concerns the beneficiaries of technology development. Sundquist (1985) notes that producer benefits depend on the nature of demand for their products, market structure, and the nature of the technology. If demand is highly inelastic (which is the case for domestic markets for most farm and food products) and the industry is reasonably competitive, "output increasing" technologies tend to strongly reduce prices and the benefits are passed from producers to consumers. An example would be plant biotechnology that substantially increases yields but also increases the need for chemical and energy inputs, thereby raising the cost of production. Such technology can depress market prices enough to reduce industry returns, thereby actually exasperating the farmer cost-price squeeze (Doyle, 1985, p. 116). After most farmers adopt a new technology, however, tendencies for the sector to overproduce and face decreased incomes are generally exacerbated.

Alternatively, biotechnology offers the possibility of improving the efficiency of production without increasing yield per se. For example, natural insect repellant traits could be much more cost effective than traditional chemical approaches to formulating, manufacturing, and applying biocides, even if yields are reduced slightly. Such factor saving technologies can provide more benefits to producers when they do not lead to dramatic increases in other factor inputs to produce a particular commodity. Nevertheless, within the agricultural sector, benefits of new technology tend to be distributed disproportionately to larger, earlier-adopting farms, which in turn are more likely to survive the current agricultural crisis.

The type of technology involved (output increasing or factor saving) should also be considered by public agencies in the allocation of research funds for technological development. Historically, private industry research has played a significant role in technological development. Conversely, private companies have typically emphasized technological advance comprised of purchased inputs. This relationship will likely continue with the emerging technologies. Therefore, public agencies should consider giving priority in funding to the development of factor-saving technologies, where fewer commercial incentives exist.

Product Prices and Income from Farming

Over the long run, the major question affecting farm product prices is whether markets, both domestic and export, will grow fast enough to absorb future increases in productivity. If markets grow at a rate that keeps up with or exceeds growth rates in productivity, farm prices would generally strengthen and farm income prospects would brighten. Alternatively, if the growth in demand for food is not enough to keep pace with expanding production capacity, chronic downward pressure in farm prices would exist, and the long term income situation for farmers would be less bright. In a large part, the eventual trends in farm prices are determined by a rather tenuous balance between the growth rate of productivity of U.S. agriculture and the growth in domestic and export food markets. These national level variables will have an important influence on the future economic prospects of Colorado farmers.

One of the most thorough studies of the balance between future markets and production was recently completed by the U.S. Department of Agriculture (Edwards, 1985). This study reviewed prospective trends in world food demand and supplies, U.S. exports, domestic U.S. food demand, and the capacity of U.S. agriculture to meet these demands to the turn of the century. While the balance between the growth in markets for U.S. farm products and the capacity of farmers to meet this growth is subject to a number of unknowns, some important conclusions were drawn by the USDA study that are pertinent to the future of farming.

The importance of future export markets in determining the environment for U.S. agriculture is paramount. By 1981 we were exporting the production from about 40 percent of all harvested acres in the United States, compared with 20 percent during the early seventies. Longrun trends suggest that the proportion may have to rise to 50 percent by the year 2000. Growth in the domestic U.S. market alone simply will not support a growing and economically healthy farm sector in the years ahead--rather the well-being of farmers will depend increasingly on the growth and reliability of export markets. The alternative is scaling back the U.S. farm sector to a <u>much smaller</u> size that will provide for mostly domestic markets. This situation is particularly important for Colorado agriculture, given its heavy dependence on what, corn and feed grain production.

The long-run world food situation appears to be improving. The USDA study finds that world agricultural productive capacity is growing faster than world markets. This fact in itself suggests a long run decline in real prices received by all farmers. For U.S. farmers, a second question is concerned with maintaining a competitive share of world food export markets. The study concludes that the current prospects are for U.S. crop exports to grow at slightly under 3 percent per year for at least the coming decade, though year to year variations are expected above and below that level (Edwards, 1985, p. 15). This projected level compares to an average annual growth rate in U.S. agricultural exports of about 8 percent in the seventies. Considering world wide trends toward increased production, the U.S. share of world production is likely to decrease, as is the U.S. share of world trade. Thus, while the United States will continue to be the major exporter of farm products during coming decades, the future prospects for exports are not nearly as bright as during the 1970s.

The domestic market for U.S. farmers is expanding, but much more slowly than export markets. The USDA study reviewed trends in population, per capita income, tastes, and relative prices and found that the domestic demand for food will rise by less than one-third during the next three decades, with most of the increase due to population growth. This growth of less than one percent per year implies that if U.S. consumers were to be the only market for U.S. farmers, U.S. agriculture would have much excess capacity, farm incomes would decline, and we would experience accelerated out migration of people and resources. In particular, wheat producers, who now export 60 percent of their crop, would have to severely restrict the size of their enterprises

to match domestic markets, and Colorado would bear a significant part of this adjustment.

The long term well-being of the U.S. farm sector will depend in a large part on how these growth rates in domestic and export demand are related to future increases in productive capacity. For example, if growth in productivity continues for the next 30 years at the 1.9 percent-per-year pace of the past 30, total farm output will increase by 70 percent above the present level. Such a growth rate would increase the production capacity of U.S. agriculture at a rate slightly faster than expected growth in both domestic and export markets. To the extent production out paces demand, it would create chronic surpluses of some commodities, downward pressure on prices received by farmers, and a need to move excess resources out of a depressed farm sector. Farmers who produce wheat, corn, soybeans, and cotton would have to make the greatest adjustment, since the greatest excess capacity would exist in these commodities.

While the projected balance is close, the USDA study concludes that the most likely possibility is that export markets in the future will not expand fast enough to keep pace with technological advance. As a result, the tendency toward excess capacity and depressed farm prices that we are now experiencing will likely persist in the longer run. "The likely prospect is for the gradual down trend in real prices received by farmers to continue during the coming decades, subject to periodic interruptions." (Edwards, 1985, p. 6). This trend has persisted for more than a century, and little evidence suggests that it will not continue. Prospects for U.S. agricultural capacity to grow faster than markets and for a decline in world food prices in real terms certainly support this conclusion.

Prices paid by farmers for production inputs are likely to continue increasing in the coming decades. Therefore a continued decrease in the parity ratio--the ratio of prices received to prices paid--is expected by the USDA analysts. Continued downward pressure on farm incomes will persist, if these conclusions are born out by future events.

The major uncertainty with these conclusions lies with the future for export markets. With export markets growing in long run importance to U.S. farmers, more and more of the fate of agriculture rests with these markets. Domestic markets can simply not support the agricultural plant we have today. While the 8 percent expansion pace for export markets that occurred in the 1970s will not continue, expected growth rates in the neighborhood of slightly less than 3 percent per year would at least come close to absorbing prospective increases in overall productivity. Colorado wheat producers, who have been moving as much as 3/4 of their crop into export markets, face a particularly uncertain future. Even relatively small deviations in growth rates of export markets from this 3 percent level could cause significant changes in the wheat subsector. The same is true to a lesser extent for Colorado corn and feed grain producers. But aside from such commodity variations and uncertainties, there is little in the USDA report that suggests a marked long-term improvement in the prices received by U.S. or Colorado farmers.

Financial Conditions

An additional set of factors will dictate the future investment picture in agriculture and how those investments are financed. These are the same factors that are causing much of the current financial stress in agriculture--interest rates, credit availability, inflation, the foreign exchange value of the dollar, and income tax laws concerning investments. These factors are exogenous to agriculture and, as discussed earlier, are greatly affected by macroeconomic policy--particularly the size of the Federal budget deficit and controls on the money supply. Beyond some generalizations about the farm credit industry, it is difficult to describe the future of these factors with much clarity. Forecasting future U.S. macroeconomic policy is certainly difficult.

The agricultural credit industry must work itself out of the current crisis before any degree of "normality" can be achieved in the financial environment of agriculture. The Farm Credit System, with 44 percent of the farm land debt and 19 percent of non-land debt ($74 billion total), now has $10-15 billion in bad or problem loans (Schnittker, 1985). Realized losses are already in the area of $1 billion, and could possibly reach 2/3 of the value of problem loans by 1988. While the size of these losses could wipe out the current capital reserves, it is not expected that the Farm Credit System will be allowed to fail. But until all of these losses are realized, the Farm Credit System will face some degree of difficulty in supplying credit to farmers under terms and in amounts that can be considered normal.

The same type of losses are being written off by the private sector agricultural banking industry. An increasing number of agricultural banks are seeing nonperforming loans exceed their primary capital (Melichar, 1985). The upward trend in the number of agricultural banks in this potentially vulnerable position suggests that failures of agricultural banks may continue at recent high levels for some time to come. Charge-offs of nonperforming loans are slow. Only about 20 percent of all agricultural banks charged off over 1 percent of their total loans during the first half of 1985. However, a substantial and rising minority experienced relatively large losses that will exert a significant negative impact on their 1986 earnings. Again, these adjustments and losses must run their course before the agricultural banking industry can again provide a more normal credit supply to farmers. This adjustment process could take a few more years at the present rates.

Another adjustment process affecting agricultural land must also be completed. Land that is taken over through foreclosures must eventually find its way back to individual ownership and the effect of this oversupply of land on the market will be reflected in depressed land prices. In some regions, this adjustment will continue to hold land values down for a number of years. Until this process is complete, farmers will continue to face a degree of non-price credit rationing by lenders (Obert and Galston, 1985, p. 20).

But difficult as they are, these adjustments will eventually be worked through, and the farm credit industry will again be able to operate in a more normal environment. A major force in the current evolution has been the deregulation of the banking industry. This deregulation started in 1980 and will play an important role in the future, with the increased cost of loanable funds making banking a big volume, narrow margin business (Kohl, 1985). Most agricultural banks will survive, although economic pressures will result in many small, mostly rural, banks being acquired by metropolitan banks and bank holding companies. The Farm Credit System will likely continue, with mergers of districts and associations, and the Farmers Home Administration will continue to play an important role in agricultural finance.

While the industry will be able to meet the future credit needs of agriculture, the terms of this credit may be different than in the past. There will be a substantial push to standardize the loan approval process, with agri-lenders emphasizing the income and cash flow potential of applicants rather than collateral growth. Differential interest rates based on loan size and risk will be the norm rather than the exception. Many farm borrowers will be forced to pay a significant risk premium if they wish to obtain money from lenders who have other options for placing their funds. This risk premium on agricultural loans may even become large, due to the increasing instability in agriculture and financial markets (described in the next section). At best, farmers will have to compete with the non-farm sector for credit; loans at preferential rates such as those of the Farm Credit System in the past will be replaced by rates at least as high as those charged by commercial banks (Freshwater and Leblanc, 1985).

Tax policy and macroeconomic policy of the future will continue to be the primary factors affecting the financial environment for farmers, just as they are currently. The major concern here is deficit spending by the Federal government and the ability of Congress to control it in the future. Tight money and huge deficits drive up real interest rates and the value of the dollar. In the long run, farmers would be major beneficiaries of significant reductions in the federal budget deficit (Obert and Galston, 1985, p. 22). Both the price situation, hurt by the strong dollar in export markets, and the financial situation, hurt by high interest rates, would be improved by reductions in the federal deficit.

At the present time, economists hold widely differing views of the future for macroeconomic and financial variables. Some believe the present situation will be sustained indefinitely. Others appear to be arguing that the present situation is so bad that it cannot be tolerated, and therefore must adjust back toward the situation that prevailed prior to 1981. A middle ground is represented by the belief that neither the large federal deficit nor the large balance of payments deficit can be sustained (Tweeten, 1985). Simply put, the United States is currently borrowing large sums of money from foreign countries to finance these deficits. The United States in the 1980s resembles Latin America of the 1970s--living beyond its means until its credit runs out. Interest

payments on the federal debt are now growing geometrically, and, if unchecked, will eventually exceed the ability of our country to pay. At some point, however, foreigners will refuse to lend money or make other investments in the United States, causing a decline in the strength of the dollar. A beginning of this trend is already evident.

Inflation will eventually increase with the declining strength of the dollar and real interest rates will decline. Exports will expand to help pay off the massive foreign debt liabilities that have been accumulated. The United States will be pushed toward recession in the process. Farmers will benefit in some ways from this adjustment, as cheap farmland appreciates from inflation, credit availability expands with collateral values, and as the cheaper dollar increases farm exports. Nominal interest rates, however, may be driven up in the process, increasing the expense of debt capital.

While the approach Congress will eventually take toward controlling federal deficits is impossible to foresee, two observations can be made here. First, even if agreement was reached today on an effective deficit control package, the benefits would come too late for many endangered farmers. Such agreement would improve the long run situation in agriculture, but not prevent the failure of many now facing an insolvency crisis. A second observation concerns the likelihood of controlling both inflation and real interest rates in the long run. Interest rates on 30-year fixed rate mortgages paid by home owners are currently between 9 and 11 percent. These rates suggest that the financial community does not anticipate that the sum of the inflation rate and the real interest rate to be much below this level in the next decade. When we add a premium to account for the differences in risk between agricultural loans and housing loans, (which could be 1 to 2 percent), the possibility for nominal interest rates on future farm loans to hold in the neighborhood of 12 to 13 percent becomes apparent.

This brief review of the financial environment facing agriculture provides little hope of a short term improvement. In the longer run, however, external credit restrictions may be alleviated as the farm credit industry works its way out from under the present burden of lost collateral and nonperforming loans. Farmers in the future will compete for funds with other industries, under terms that reflect the size of loans and relative risks. Macroeconomic policy cannot be anticipated with any accuracy but mortgage markets are now suggesting that long term nominal interest rates may not decline much from their current levels.

Increasing Instability in Prices and Interest Rates

These trends in farm prices and financial conditions represent an equilibrium state toward which the agricultural sector will adjust. There is also the likelihood of unpredictable shocks occurring that cause wide swings above and below these trends. As export markets have grown, the "internationalization" of U. S. agriculture has sharply increased variability in U. S. agriculture, as it moved onward from the relatively stable period of 1950s and 1960s. The opening of USSR to the world grain

market in 1972, expansion of world production on semi-arid lands, volatile conditions in international financial markets, and trade policies by both importing and exporting countries to insulate themselves from world market variabilities have been responsible for most of this growth in grain market instability (Miller, et al., Oct. 1985). Because the United States is the major world grain exporter and because its markets are open to world market influences, the United States is now the residual supplier and main "shock absorber" in world grain markets.

While a more favorable world food balance is expected in the future, oscillation between years of excess production and years of very tight supplies is anticipated, causing continued substantial year-to-year variability in world grain prices. There is strong evidence that foreign market prices could become even more volatile in the future than in the recent past. The primary reason for the present market instability faced by U.S. farmers is the increased use of domestic and trade policies by other countries to insulate and stabilize internal prices and force the adjustment burden on the residual world market. Because it appears that an increasing number of both exporting and importing countries in the future will further insulate their domestic markets from world prices, an increasing adjustment burden will have to be met by the residual world market and the domestic U.S. market. Therefore, the potential for world grain market instability in the next two decades appears even higher than it was in the seventies and early eighties (Miller, et al., September 1985).

Interest rates and financial markets in general have also become more volatile. The increasing integration of U.S. and world financial markets has increased the degree to which changing world financial and economic conditions and shifting international currency exchange rates are reflected in domestic U.S. credit markets. The deregulation of the banking industry has further destabilized the cost of borrowing. High and volatile interest rates and greater use of variable-rate loans have provided new sources of financial risk for farmers. Fluctuations in fund availability from lenders along with lenders' non-price responses to changes in financial markets has tended to further destabilize farmers' access to credit. Risks arising from unanticipated changes in the rate of inflation and the loss of collateral value via land depreciation have become very apparent to both farmers and lenders. Public responses to inflation and the later side effects of policy to control inflation have in turn created additional instability and financial risks. This increased financial market instability represents an important and enduring factor influencing the future financial environment of U.S. agriculture (Miller, et al., Sept. 1985).

As a result, agriculture in the future will continue to face instability and uncertainty in both commodity markets and financial markets. Changes are already in place in the structure of world markets and institutions that increase the likelihood of such instability in the future. This instability will be reflected in year to year variation in grain prices, interest rates, and inflation rates, and in unpredictable two-to-four-year cycles or oscillations about equilibrium trend lines discussed earlier. These oscillations will result in a series of booms

as well as busts for agriculture as we look ahead to year 2000. There are prospects for busts much like we are seeing at present, and at the same time, the continuing but less likely prospect of booms similar to the one that occurred in the early seventies.

Lenders and investors will carefully appraise this instability when they loan money or make long term financial commitments and respond by adding a risk premium to interest rates to cover the increased risk. This risk premium may be viewed as either an inducement for such people to make higher risk loans and investments or as an expected reimbursement for unpredictable losses that will occur from time to time. The extent that price and financial risk in agriculture has increased from the relatively stable 1950s and 1960s--and will persist or even increase further in the future--will exert a significant upward pressure on interest rates paid by farmers in the future.

Impact of These Factors on Agriculture

The possible future behavior of prices and financial variables was described in the previous section. Downward pressures on real farm prices are expected to continue, as are upward pressures on real interest rates. Instability in both farm commodity prices and the financial environment facing agriculture will likely increase. What will this environment mean for farmers in the future? What is the possible impact of these factors on U. S. and Colorado agriculture? How will incomes and resource returns in farming be affected? How will the ownership and financial structure change as the farm sector adapts to this dynamic environment? What type of management expertise will be needed--particularly in the area of risk management and financial management? There is at least a partial empirical basis for examining the most likely results of these forces.

Impact on Farm Income and Resource Returns

A continuing downtrend in real prices received by farmers, accompanied by increases in prices paid by farmers for inputs, will cause a continued decline in the parity ratio--the ratio of prices received to prices paid (Edwards, 1985, p. 16). However, this continued downward drifting of the parity ratio, which has been occurring most of the time since 1947, does not necessarily have longrun calamitous implications for efficient farmers. Adjustments farmers make to improve productivity and reduce costs through the more efficient use of improved inputs have in the past offset these unfavorable price trends and maintained net farm income at acceptable levels. There is no apparent reason to expect that the future downward pressure on the parity ratio will prevent efficient farmers from maintaining net farm income at acceptable levels. Less efficient farm managers, however, will be at a greater disadvantage than they were during the 1970s.

These price trends will force continued and even increasing emphasis on efficiency, with farmers focusing on cost control and efficient use of resources, rather than on increasing the volume of

production at any cost. For example, attention will shift to obtaining higher calving percentages and weaning weights rather than more cows; to obtaining yield levels with limited applications of fertilizer to maximize net returns rather than maximizing yields; and to producing crops with the most efficient machinery complement, rather than with the largest machinery available. Successful farm managers of the future will necessarily be highly skilled at obtaining both technical and economic efficiency--on the technical side squeezing the "last drop" of benefit out of each unit of input, and on the business side, maximizing net income (rather than gross sales) from each enterprise. Focus on technical efficiency alone will not get the job done for farmers who wish to remain in business.

Price and cost changes in a dynamic agricultural sector cause changes in output levels, changes in resource levels, and changes in the value of some resources, such as land. We anticipate no strong upward or downward trend in the rate of return to resources in farming. Adjustments of resource values to maintain favorable rates of return in the face of lower product prices appear to be well within the capabilities of efficient managers in the farming industry (Tweeten, 1985). Greater efficiency enables farmers to earn favorable rates of return on resources and cover all costs at even lower ratios of commodity prices received to prices paid for inputs. Given time, both demand and supply of farm output are responsive to price. Lower real prices increase the quantity demanded and reduce production and resource use to control excess capacity. Efficient farmers will be able to adjust over time to maintain both income and favorable rates of returns to resources.

Impact on the Structure of Agriculture

The structure of agriculture will continue to change, as adaptions are made to changing technological and economic environments. Agriculturalists are all familiar with the past trends: fewer and larger commercial farms with increasing concentration of production; an increasing number of small part-time farms in many areas; the growing importance of off-farm income; increased specialization; changes in the ownership and control of farm assets; increases in vertical integration and contracting in producing some commodities; a declining economic base in agriculturally dependent rural communities; and, in some sub-sectors, a pronounced shift toward a more "industrialized" structure. At the national level, much attention has been devoted to the causes and consequences of these changes (Harrington, et al.; Tweeten, 1984; USDA, 1981). Less information is available on the specific relationships in Colorado, but there is little evidence that the process differs significantly in this state.

The Census of Agriculture shows a slight increase in Colorado farm numbers between 1978 and 1982, but the increase is in the small farm category that accounts for a very small part of total production:

	1978	1982	Annual percent change
Total Farms	26,907	27,111	+ 0.2
0-179 Acres	10,762	12,117	+ 2.8
180-499 Acres	5,431	4,896	- 2.7
500-1,999 Acres	6,708	6,251	- 1.8
Over 2,000 Acres	4,006	3,847	- 1.0

Currently the increase in small farms in Colorado is offsetting the decrease in medium size units, which are disappearing at the rate of 1-3 percent per year in most areas of the state.

Data are not yet available for more recent years, but there are indications that these trends are continuing or even accelerating. Over the longer term, these changes in farm numbers appear to continue more or less uninterrupted through good times and bad. In fact, evidence is not conclusive whether such trends are accelerated or retarded by aggregate changes in farmers well-being as measured by farm income, cost and price changes, or the parity ratio. Changes in farm size and numbers may be more related to income and inheritance tax laws, technological change and the efficiency of large farms, non-farm economic growth and increasing off-farm income, and changes in agricultural markets. Structural change represents the longer term adjustment to a changing technological and economic environment.

Two available studies have provided detailed projections of the structure of farming to the year 2000 at the national level. The first and most comprehensive of these studies provides the following highlights (Lin, Coffman, and Penn, 1980):

* By 2000, the largest 1 percent of U.S. farms will account for about half of all production.

* Almost two-thirds of all U.S. production will likely come from the largest 50,000 farms.

* Capital requirements will rise to about $2 million per farm for farms with sales of more than $100,000--double the 1978 level.

* Continued growth in the number of small part-time farms and large commercial farms with total farms declining from 2.3 million in 1985 to 1.75 million in 2000.

The second, more recent study finds that there has been some recent leveling off in the trends in total farm numbers (Edwards, Smith and Peterson, 1985). It estimates the total number of farms in 2000 to be between 2.2 million and 1.9 million, and finds that the disappearance of middle-size farms may be slowing from the pace of the 1970s. Of course, neither study includes possible effects of the current and continuing farm crises.

Some speculative judgment is required to apply these findings to Colorado. The 1982 Census of Agriculture does provide an accurate

starting point. The 1982 data and our best judgments of future trends suggests:

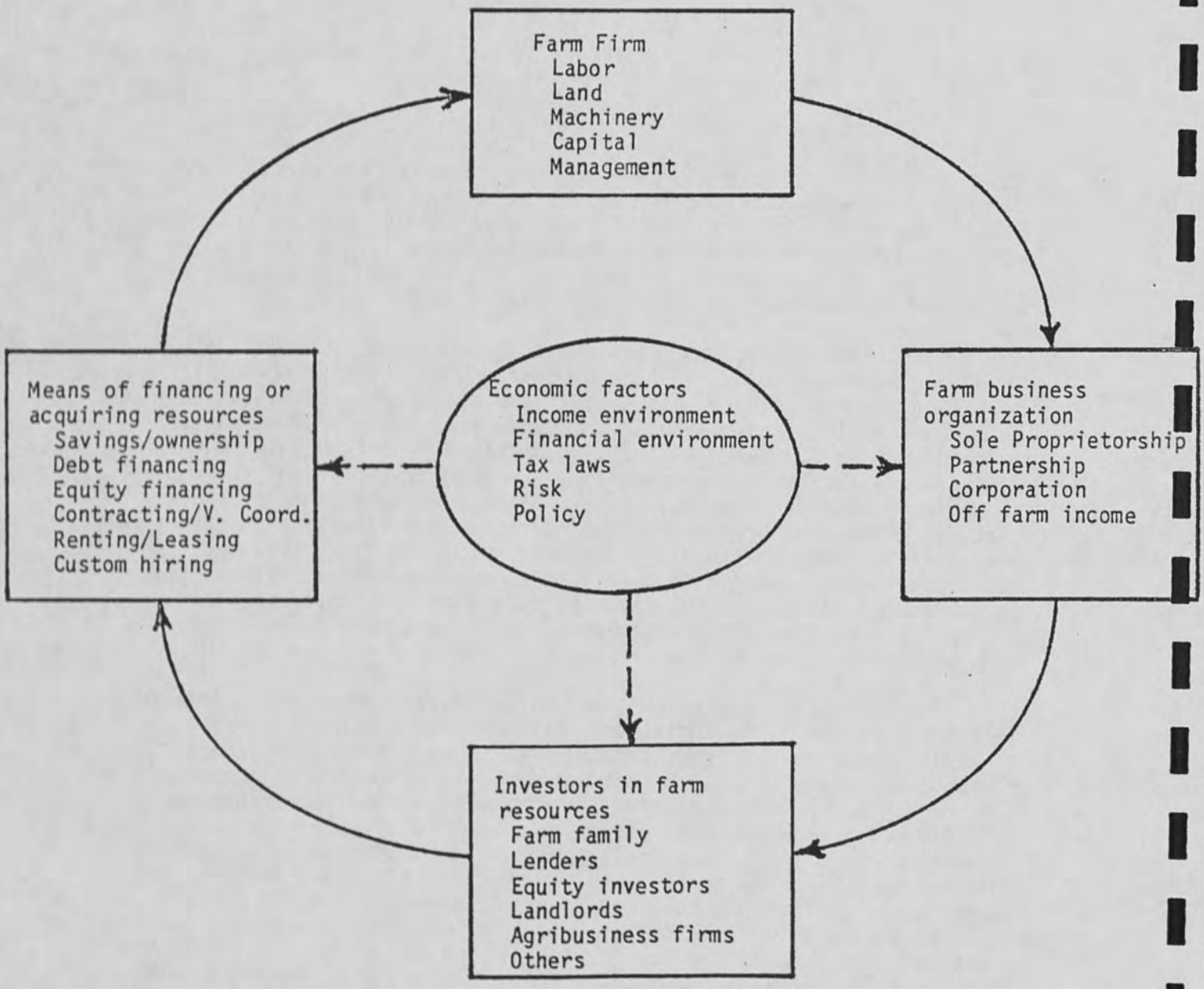
	1982	2000
Total farms in Colorado	27,111	26,000-28,000
Commercial farms (1982 Dollars)		
Over $ 40,000 sales	8,649	7,000-8,000
Over $100,000 sales	4,365	4,500-4,750
Sales accounted for by the largest 1,600 farms in state		
All sales	70%	75-80%
Grains	39%	48-60%
Cattle and Calves	82%	85-90%

Some sub-sectors in Colorado such as cattle feeding are already extremely concentrated, with possibly 99 percent already on the largest farms. Other sectors such as grain farms show less concentration of production, with more production remaining on mid-sized farms. In most sectors, small part-time farms will continue to grow in number but will likely become even less important in production.

Little statistical evidence exists to document the relationship between historical trends in farm numbers and the current economic conditions in agriculture. The latest figures show 2,284,630 U.S. farms as of June 1, 1985, down 43,000 from 1984; from 1981 to 1984, farm numbers declined an average of 35,000 each year (USDA, Nov. 1985). While farm numbers have declined steadily since the mid-1930s, the causes of the current change may be different. Also, available data do not show that aggregate productivity of farming is being adversely affected. Past structural change has generally improved productivity by transferring resources from less productive farmers to more productive farmers and this transfer is still occurring. We expect many of these physical changes in the structure of farming to continue in the future, much the same as they are presently occurring.

The current financial crisis facing farmers is resulting in some important changes in financial structure. A key question is: What financial and ownership structure will emerge to enable the farm sector to fit comfortably within the new economic and financial environment? We are now beginning to see a major transition in agriculture, away from debt financing to alternative means of financing or obtaining access to resources. Figure 4 schematically pictures this adjustment process (Miller, et al., Sept. 1985). Key economic and financial factors are shown at the center, and the farm firm is represented at the top. Three types of financial adjustments are occurring; (a) adjustments in the organizational form of the farm business, (b) changes in those making investments or providing capital to farming, and (c) adjustments in the means farmers are using to finance or otherwise acquire resources. These adjustments are interrelated in a complex but not well understood manner, as suggested by the circularity shown in Figure 4.

Figure 4--Circularity of Means of Acquiring Resources, Farm Business Organization and Investment in Agriculture



Source: Miller, Thomas, et al., The Changing Financial Structure of the U. S. Farm Sector, ANRE Working Paper WP:85-5, Colorado State University, September 1985.

Generally, the adjustment is away from the traditional sole proprietorship, savings-financed ownership structure that has long been traditional to U.S. family farming. There has been a decline in the sole proprietorship business form, particularly for commercial farms; these are being replaced by partnership arrangements and family-held corporations. There has also been a great increase in the diversification and liquidity provided by off-farm income.

Debt financing and leverage are sharply declining as the principal means to finance or otherwise acquire the resources necessary for the farm production process. Leasing and outside equity financing are growing in importance. This equity infusion may come from family members off the farm, current lenders under some sale-leaseback arrangement, non-family investors using a limited partnership arrangement, and possibly state or federally funded ventures to provide funds and share the private sector risk of equity investments in agriculture (Berry and Boehlje, 1985). This substitution of non-farm equity for debt results in some loss of control over assets by farmers, but improves the financial resiliency of the agricultural sector. While the sole proprietorship family farm will remain the dominant form for some time to come, these changes nonetheless appear to represent the slow but steady emergence of a more "industrial" type of business organization and financial structure in the U. S. farm sector.

Structural change in the farm sector has generally negative "spillover effects" in rural communities. Decreases in the number of farms, as well as in the economic well-being of farmers, adversely affects the incomes of agri-business firms, level of unemployment, and the general level of vitality and economic activity in many rural communities. However, cause and effect relationships are difficult to describe with confidence. In counties where agriculture is relatively important to local economies, adjustment problems may arise. In Colorado, the southeast counties, and Sedgwick, Washington, Yuma, Crowley, Kiowa, and Cheyenne are examples. These counties, unless they rapidly develop an economic diversity and become less dependent on agriculture, will likely have to continue adjustments to a declining population. Agribusiness firms in these counties may face lower incomes as fewer and large farmers buy more inputs at large regional trade centers and less in the local community. In other counties, where there is greater diversity of economic activity, structural change in agricultural will have less impact--examples are Prowers, Elbert, and Delta counties, and counties along the front range of Colorado. Here non-farm employment opportunities will be available so that such counties will have a much greater capacity to absorb persons displaced from agriculture.

The Need for Risk Management and Resiliency in Farming

On the basis of the best information available on future trends, agriculture faces a dynamic and uncertain environment. In relying more heavily on export markets, U.S. agriculture is facing considerable

greater price uncertainty, and increased financial risk. United States markets are now exposed to the vagaries of worldwide weather, economic conditions, and individual country political decisions. If this situation changes in the next decade, it will likely be in the direction of even more instability for U. S. and Colorado agriculture.

What will this price variability and market and financial uncertainty mean for the farmer of the future? Increasing price variability in world markets will increase the need for more reliable market information and forecasts (Miller, et al., Oct. 1985). While such information is provided by USDA situation, outlook and market news activities, and can be supplemented by private farm management consultant assistance, increasing price variability and uncertainty also increases the incentive for farm firms to acquire their own timely information for decision making. Furthermore, emerging technology in telecommunications and micro computer information management will enable farmers to have instant access to the best information available for production, marketing, and financial decision making. The ability to accumulate accurate and detailed information and to form reliable expectations from this information will become crucial to operating a farm business and to the survival of that business.

The successful future farmer will be a better manager than today's farmer--a production manager, a marketing manager, and a financial manager. The ever changing and uncertain business environment will require thorough understanding and use of accounting, financial statements and analyses, budgeting and planning, and sophisticated office management procedures. New production technologies and remote sensing capabilities in both crop and livestock will enable him/her to monitor and maintain the production process at peak efficiency. Farmers and ranchers will understand the risk of the economic and financial environment and utilize the best available marketing and financial management techniques to counter or control those risks. Financial and risk management skills will be as important as production skills.

Increased fluctuation in markets and financial conditions will present farmers with the opportunity for gains as well as losses. Successful farmers will be those who maintain the resiliency to survive during the busts so that they are in a position to expand production and take advantage of the booms. This resiliency will take several forms: the organization of the production and financial structure; the ability of the firm to survive the adverse effects of plans gone astray; the use of technologies that allow adjustments of production to meet changing markets; and generally, the resiliency of the farm firm to survive the "crises" to take advantage of the opportunities the "booms" present. Resilient firms will provide the agricultural industry of the future with the fundamental and essential ability to adjust to an unstable and changing environment.

On the technical or production side, successful farmers will consider the flexibility of new technologies, their inherent risks, and their effect on the farm's ability to adapt and adjust. Specialization that is accompanied by capital-intensive production results in higher

fixed costs, less flexibility, and increased risk. Where possible, successfully farmers will consider diversified production plans to maintain resiliency and reduce this risk.

Marketing alternatives to reduce the risk associated with increased product price variability will become more widely used. These include forward contracting, hedging, inventory management and spreading sales, and maintaining eligibility for government price support loans. Options trading for agricultural commodities also has the potential for being an effective means of reducing market risks. These alternatives will be combined with greater investments in market information to improve the quality of expectations on market conditions and allow advantageous timing of sales.

The successful farm business of the future will have a resilient financial structure. Resiliency in financial structure depends on the amount of debt capital used, the sources of equity capital, and the form of business organization. It can be best illustrated by comparing the financial structure of a typical non-farm corporate business with the financial structure of a traditional sole proprietor family farm (Miller, et al., Sept. 1985, p. 5). Non-farm corporate businesses avail themselves of many different sources of financing; debt capital (bonds); internal equity capital in the form of retained earnings or stocks provided by existing owners; external equity provided by new shareholders; and other sources, such as leases and warrants. The corporate organization provides both the firm and its investors with an effective means to spread and offset risk through diversification. Each financial category represents a different type and degree of risk. The investors minimize risks by owning diversified portfolios of investments in other firms to spread or balance offsetting risks of each investment. The different assets owned by the corporate firm also represent a diversified portfolio, each to some extent offsetting the risk of other assets owned by the corporation.

These different sources of financing and levels of diversification provide efficient risk bearing for both the firm and its investors. In a large portfolio, an asset's own risk (variation in returns) tends to be offset by other assets and the risk premium that must be provided by the return from each asset or investment is thereby reduced. In this way, corporate financing reduces the cost of risk bearing for both the firm and its investors (Berry and Baker, 1985, p. 192).

In smaller, less diversified portfolios, an asset's own risk has much greater importance. The traditional owner-operated sole proprietor family farm represents an extreme case, where the firm's major investment is typically in only one asset (land) and the firm's owner (the farm family) invests in only that firm. Returns to this investment must compensate both the firm and its owner for all of the cost of risk, since none is diversified away. In addition, reliance on debt capital for financing increases the risk of loss of the family's equity capital. This high cost of risk bearing will provide an incentive to farm families

of the future to change their asset and financial structure and adopt more complex business forms that provide some of the risk bearing efficiencies already in use in the nonfarm corporate world.

In addition to technical or physical resiliency, and a diverse financial structure with less use of debt capital, the successful farmer of the future will maintain larger financial reserves (both equity capital and credit reserves). Off farm income will continue to play an important role as it has in helping many farmers through the present period of adjustment.

Are Heroic Public Response Measures Warranted?

Clearly, many of the factors cited above have led to a situation of acute economic distress for specific farmers and the agricultural sector, distress which will undoubtedly lead to major adjustments at the farm and industry levels. It seems clear that supplemental employment or, in some cases, exit from the farming industry altogether may be necessary. What is not clear or generally agreed upon by interested parties is the extent to which public action is warranted as a means to resolve these current difficulties.

Whether "heroic measures" are to be taken or not is a matter of political value judgement--judgment which cannot, and should not, be made by any academic discipline. However, there are a number of innovations in financing which could be considered as a means of alleviating financial stress in agriculture. Boehlje, (1985) has suggested several options, including: (1) renegotiation of contracts with new terms such as delayed principal payment, rental equivalent payments in place of principal and interest; (2) innovation in lease arrangements such as flexible cash leases, barter payments and the like; and (3) collection of collateral in place of debt with lease back arrangements to the original owner. Purchase of land by non-farm operators with rental arrangements between new owners and past owners is a possibility for using the private sector to help alleviate debt and credit problems, particularly on a farm-to-farm basis. In some cases, state laws can facilitate the effectiveness of such options.

There are also institutions in place now which can be reorganized and/or coordinated to provide public assistance to economically stressed farmers. Whether the reorganization and coordination of institutional activity in this regard takes place is a matter of political policy, as evidenced by the emergence of Project ARC in Colorado.

The limited data available indicates that the preferences of displaced farmers are such as to warrant an examination of the available options in this regard. Such options may be preferable to reliance on automatic market adjustments in terms of minimizing community impacts of displacement and minimizing the individual costs of dislocation from

agriculture. The evidence suggests, for example, that individuals displaced from agriculture: (1) make substantial efforts to maintain some tie to farming or ranching, including greatly reduced home-farm operation or limited leased-farm operations utilizing family labor and salvageable equipment; (2) have a strong preference for staying in the community and maintaining residency on the "farm;" (3) engage in serious attempts to find off-farm employment in the home community or within reasonable commuting distance; (4) express a willingness to receive training and respond to educational opportunities for alternative employment; and (5) are reluctant to leave the community for the sake of financial survival (Trock, 1985).

To the extent that these reactions elicit favorable response from the political system, institutional aids in meeting the personal objectives could be found. Information on options for those wishing to maintain a limited, but active, involvement in farming, information on local community employment options, on the job training options, educational facilities, and the like could be made available with little change in local and state institutions. Many such services are already available; they could be redirected and coordinated in addressing the current agricultural crisis, as for example, through the ongoing ARC Program.

The foregoing analysis clearly supports the contention that the farmers of the future, both those who survive the current crisis and new entrants, will be those with financial and marketing management skills, in addition to production expertise. Such "new" skills do not develop overnight and there will remain a need to continually update and reinforce these management components. This reality in turn suggests that an expanded effort to provide Experiment Station-based research and Extension outreach that include these elements should now be given priority consideration at land-grant universities. The nuclei for such efforts already exist in university departments of agricultural economics. But the present crisis and the emerging more business-oriented agricultural sector will require an expanded effort by those faculty and Extension personnel skilled in farm financial and marketing management than has been the case in the past.

SOME PERSPECTIVES ON STATE-LEVEL FINANCIAL ASSISTANCE OPTIONS

The difficulties facing U. S. agriculture and the agricultural credit system--both public and private--are well documented elsewhere (Dillon and Raup, 1986; Miller, Trock and Smith, 1986). Corn Belt and Northern Great Plains states such as Illinois, Iowa, Minnesota and North Dakota have seen dramatic increases in farm foreclosures, farm bankruptcies and delinquent and non-performing agricultural loans in the 1980s. These adverse conditions are moving to the West and eastern Colorado is already being impacted about as badly as Nebraska, Iowa and Kansas.

Agricultural land prices in these states have fallen rapidly since 1981. For example, the average value of Minnesota farmland has decreased by 48 percent in the last five years from a high of $1,310 an acre in 1981 to $686 in 1985 (Dion and Raup, 1986) and similar declines are now being experienced in eastern Colorado (Skold, et al., 1986). This loss of collateral value has pushed increasing numbers of farmers into insolvency. In Minnesota, the number of Production Credit Association loans in bankruptcy or foreclosure increased from 55 in December of 1982 to 288 in September of 1985. The number of Federal Land Bank loans in foreclosure or bankruptcy increased from 100 in December of 1982 to 687 in September of 1985 (Minnesota, 1986).

Although agriculture in Colorado as a whole has not seen the dramatic declines in land values such as have occurred in the Midwest grain export-oriented states, it shares the problems of low commodity prices, high interest rates, and high input prices with the rest of U. S. agriculture. As the financial problems of the U. S. farm credit system continue to worsen, obtaining financing will likely become a major problem for many Colorado farmers, just as it has been for midwestern farmers during the past 24 months. According to unofficial estimates the foreclosure rate during 1985 was double that in 1984 and is still increasing in 1986. There is ample evidence that a large number of Colorado farmers are facing severe financial stress (Tinnermeier, Garland and Rubingh, 1985).

Is State Action Needed or Desirable?

The financial stress of many farmers today is not due to simple mismanagement. Many farmers are in trouble today because of actions taken in the 1970s. Many farmers made rational decisions to expand capacity in a period of high commodity prices, low interest rates and federal policy statements that encouraged increased agricultural production (Miller, Trock and Smith, 1986). The consequences of widespread farm failures during the 1980s will adversely impact many related areas of society, agri-related businesses, rural communities and including capital markets, tax revenues, and welfare payments. Therefore, it is in the interest of the state and general public to assist in the current restructuring of agriculture and to share in some

of the costs. A state's resources are limited, however, and its actions should be targeted to where it can make a cost-effective impact. In this regard, the Financial Stress in Agriculture Discussion Group in Minnesota (but with relevance to Colorado as well), recommended that:[1]

(1) State programs should focus on resolution of financial stress and adjustment problems, not on freezing the process or keeping farmers operating "just one more year." It makes little sense to rescue farmers from their plight this year, only to find that they have no long-run future in farming because of their continued precarious financial position.

(2) A fundamental problem for many farmers, and one that the state can assist in resolving, is that of debt load and debt servicing. The state can do little about farm prices, excess commodity supplies, or other production costs.

(3) A strategy of selective recycling of farmers and farm assets should be accepted as a legitimate alternative to that of assisting them in "holding on" until their equity is all gone.

(4) The adjustment costs needed to alleviate financial stress should not be borne only by farmers and farm lenders. Since developments external to the agricultural sector were partly responsible for financial stress, the public at large should share the burden of easing the necessary adjustments and bearing part of the costs.

(5) If the public does not bear part of the required adjustment costs now, other costs, in the form of higher interest rates, increased demands on social programs, etc., will be incurred in the future.

(6) State action cannot "save" all farmers as farmers but it can facilitate the adjustment process, and in this sense "save" farmers and their families.

For purposes of targeting state programs the farm population can be classified into three categories:

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[1] The following section is taken from "A Framework for a State Agricultural Adjustment Program" by the Financial Stress in Agriculture Discussion Group of the Department of Agricultural and Applied Economics of the University of Minnesota, February 1986.

Not restructurable

Farmers in this category are generally characterized by high debt/asset ratios (.70 or higher), low profitability, and associated high debt service costs. (However, some high debt farms are profitable.)

Alternatively, annual net worth declines of 20 percent or more are characteristic of farms which are not restructurable. Approximately 15 percent of all U. S. farm operators fall into this group.

Restructurable

Farmers in this category are more moderately leveraged with debt/asset ratios between .40 and .70.

An alternative indicator for this category of farmers is that the annual rate of change in net worth varies between a decline of 20 percent and an increase of 5 percent. Depending on the criteria, nationally up to 46 percent of all farm operations would be classified as restructurable.

Financially stable

Farmers who are financially stable have relatively low debt loads (debt/asset ratios of .40 or less).

As an alternative indicator, average net worth is estimated to increase annually by 5 percent or more. Approximately 39 percent of all farm operators in the U. S. are in this third category.

Farmers in the first category will likely need to exit or recycle. Their problem is clearly one of excessive debt that can not be serviced and must somehow be eliminated--partially or totally.

Debt can be eliminated in one of three ways; it can be paid off using earnings, it can be paid off using the proceeds of the sale of assets, or it can be written off (discharged) by the lender. Since earnings are inadequate to service the debt, it can be eliminated only through sale of assets or by being written off and absorbed by the lending community.

Either of these strategies transfers part of the cost of the financial stress problem to the remaining farmers. The sale of assets results in generally declining collateral values and credit worthiness of farm borrowers as a whole. Higher write-offs on the part of the lending community result in additional pressures for lenders to raise interest rates to offset those higher losses. The burden of paying these higher interest rates will primarily be borne by moderately leveraged farmers so that the cost of financial

stress will be diffused. The potential transfer of adjustment costs is an important consideration when designing public policies to alleviate the problem.

The second group of farmers includes those that may be in a financially vulnerable situation. Their cash flow is currently adequate, but could become insufficient if interest rates remain at their current levels or rise due to the pass through of loan losses. For this group of farmers, the policy focus should be more on interest costs and interest rates and less on total debt.

Farmers in the third group are generating modest levels of income, in large part because of low levels of debt. They should not receive assistance from public sector programs targeted towards those who are financially stressed.

Selected State Financial Assistance Options

Interest Rate Buy Down Programs[1]

Interest rate buy down programs are probably the most effective way to target aid to the middle group of farmers, those that are viable or potentially viable but have cash flow problems and/or difficulty in obtaining operating loans, even at relatively high interest rates. Interest rate buy downs or subsidies may serve a number of purposes. They lower the cash flow requirements to service debt. They may "buy time" for farmers by reducing the immediate cash flow requirements, allowing more orderly and longer term internal adjustments in debt and asset levels and to external economic conditions. They allow the lender to collect interest payments from troubled borrowers so that the cost of losses are not transferred to other borrowers in the form of higher interest rates. They reduce or minimize the necessity to liquidate farm assets to cover debt service and indirectly stabilize farm asset values. Finally, they keep funds flowing to financially stressed farmers who might otherwise not be able to get loans.

An example of a successful interest buy down program is the one included in the 1985 Minnesota Emergency Farm Operating Loan Act. The program included $25 million for interest rate buy downs in 1985. The initial results were disappointing to some of the political sponsors of the bill, however, because during 1985 only $2.8 million was expended for interest rate buy downs rather than the full $25 million. The late passage date (March 6, 1985), the unfamiliarity of lenders with the new program and competition from federal credit assistance programs limited

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[1] For a more detailed discussion of Interest Rate Buy Downs, see "Farm Interest Rate Buy Downs: Issues and Options" by the Financial Stress in Agriculture Discussion Group, Department of Agricultural and Applied Economics, University of Minnesota, February 1986.

the amount expended. The program had a substantial impact, however, and must be judged a success, for the reasons given below.

A total of 1,875 borrowers obtained 1985 operating loans at an average interest rate of 8.4 percent and 402 farmers were able to refinance existing loans under the program. Loans totaling 84 million dollars were directly subsidized under the program for the $2.8 million of state funds expended and some additional credit was provided to participants as a result of their improved financial projections. A total of 148 state banks, 54 national banks, 52 PCAs, one FLBA, and one savings and loan association participated in the program. The Minnesota Department of Commerce has estimated that over $120 million in private capital was made or remained available to farmer borrowers who were having difficulty obtaining or turning over loans, as a result of the 1985 interest buy down program (Minnesota, 1986).

Since a state's resources are limited, an interest buy down or similar subsidy program should:

1. Be targeted toward farmers in the middle group of farmers whose operations are truly restructurable. In those cases where operations cannot be restructured, the states limited funds should be devoted to other adjustment programs such as job training and relocation assistance.

2. Be clearly identified as a temporary program, but with the possibility of extension to a multi-year program if the farm crisis continues for some time.

3. Be structured so that the state program can be "piggybacked" on any Federal interest rate buy down programs for which the borrower is eligible.

4. Give operating and short-term loans priority over real estate and long-term loans.

5. Require the lender to assume part of the cost of the reduced interest and a major part (preferably all) of the risk of default.

6. Require the lender to assume some of the cost of the interest buy down and retain <u>all</u> of the risk of default on the principal on real estate loans. (If the lender does not retain the risk of default, the state would end up guaranteeing land values.)

The state's primary role should be that of oversight and approval. Existing lenders should be best able to determine which operators will be viable with assistance. Lenders should retain most of the risk of default so that they are not overly tempted to put operators in group 1 (not restructurable) into the program and thereby convert questionable loans into a state-guaranteed loan program. Lenders should also provide

a portion of the interest subsidy so that they are not tempted to put operators in group 3 (those who can pay market interest rates on their loans) into the program.

Interest rate subsidies should be temporary and limited to the period of time necessary for the required adjustments to be made. There should be no intention to make such programs permanent, although the severity of the current situation means that some operators may require subsidies for more than one year.

State-Linked Deposit Programs

In a linked deposit program, states use revenues from their investment portfolios or common cash funds to purchase low-yielding Certificates of Deposit (C.D.s) at participating financial institutions. These institutions agree to use these funds to make loans to farmers at below-market interest rates. At least six states have linked deposit programs, with Illinois having the largest ($176 million). These kind of programs were generally started or expanded in 1985. Interest rates on the C.D.s ranged from 3.5 to 7.88 percent while the interest rates paid by farmers ranged from 6.5 to 11 percent. Three states require the lender to loan to farmers at a rate no greater than the C.D. rate plus 2.5 percent. One state (Michigan) allows lender spreads of up to 5 percent. These programs can provide a very real benefit to farmers who receive the loans. The 1985 interest rates of 6.5 to 11 percent compared very favorably to rates commercial banks were charging last year. State-linked deposit programs have provided little incentive for the banks to make more marginal loans, however, since the lenders retain all risk of default (Popovich, 1986).

State-linked deposit programs can be an effective mechanism for subsidizing agricultural interest rates, similar to interest buy down programs. Most of the current state programs do not meet the objectives stated above, however, because they do not attempt to target group 2 (restructurable) farmers. That is, there are generally no debt-to-asset ratio or lender-of-last-resort restrictions. Consequently, it is very likely that many of the current linked deposit loans are going to group 3 farmers who could pay full market interest rates on their own. However, there is no reason why new (or existing) linked deposit programs could not be designed to specifically target aid to group 2 farmers. Giving preference to equipment and operating loans would also be a desirable action.

State-Guaranteed Loans

Loan guarantees are sometimes viewed as a "cheap" way for the state to aid agricultural (or other) industries. By guaranteeing the loan, the state assumes the "risk" premium portion of the interest rates so that the cost to the borrower is lower, as is the apparent return to the lender (if the loan would have been made at all). The state has no cash outlay at the time the guarantee is made. The effect of loan guarantees

will be to lower interest rates to the borrower and allow more funds to be loaned to operators in the agricultural sector.

Loan guarantees can also be used in conjunction with interest rate buy downs and state-linked deposit programs. Under this approach, however, the state assumes the risk of default of the loan and the eventual costs can be very substantial, depending on the type of guarantee and subsequent economic conditions and related events. In order to be a low cost program to the state, credit risk and collateral adequacy must be screened by the state far more closely than for a simple interest buy down program. The lender has less incentive to do this because the loan is "risk free." Specifically, if a loan guarantee program is instituted by the state, extreme care must be taken to avoid lenders rolling over non-performing and other troubled paper into the loan guarantee program. Lenders will try to do this by any number of ingenious means. Their behavior will be dictated by both business sense and a drive for survival.

The Minnesota Farm Security Program

The Minnesota Farm Security Program is an example of a loan guarantee program that was initially very low cost. It was established in 1977 to help beginning farmers who would not otherwise be able to get credit to purchase farm real estate. It guaranteed 90 percent of the loan and provided an interest adjustment of 4 percent on the outstanding principal. The guarantee was available on loans through any lender or on a contract for deed. Because of the guarantee of 90 percent of the loan principal, many lenders (such as retiring farmers), had no real incentive to critically analyze the borrowers cash flow and debt service requirement, which in turn led to a large number of poor risk investments.

Initially, because of the inflation in land prices and high commodity prices during the late seventies, the program was operating without major problems. The number of loan defaults has increased rapidly in the past two years, however, and most of the 400 recipients are now expected to default. Minnesota is expected to have to pay out up to $20 million in loan guarantees in the 1985-87 budget period. Another $40 million in guarantees may be needed in the next budgeting period. Because of these adverse developments, the program was suspended indefinitely on February 14, 1985.

The Illinois Guarantee Program

The Illinois loan guarantee program for restructuring agricultural debt is targeted at group 2 (restructurable) farmers. It is designed to consolidate and spread out a farmer's existing debt over a longer time period at a reduced interest rate. New operating loans or purchases are not covered. Applicants must have debt to asset ratios of not less than 40 percent and not greater than 65 percent. In return for the state guarantee of 85 percent of the principal, the lender agrees to lower the interest rate to 250 basis points over one year Treasury bill rates.

(The effective interest rate to the farmer on February 24, 1986 would have been just over 10 percent.) The interest rate will be adjusted yearly, based on the then current T-bill rate. Loans will be set up on a 30-year amortization schedule with a balloon payment in 10 years.

Participating farmers initially must have and then continue to maintain sufficient collateral to cover the 85 percent state guarantee at all times. It is permissable to have a guarantor co-sign the note and/or pledge additional collateral, however, if the applicant does not have enough collateral in his own right.

This program appears to be well designed to meet many of the objectives previously discussed. It should be effective in assisting farmers who have adequate assets but with cash flow problems for servicing their debts because of currently existing excessive short term debt or high interest rates, or both. It assists creditors in that a major lender can convert a problem account to one that is current, producing sufficient interest to cover the lender's cost of funds and expenses and have 85 percent of the principal guaranteed. (Note that this program is also is designed to consolidate loans so presumably a number of creditors will be paid up entirely.) The net impact of this program should be to increase credit to other farmers as well and at lower interest rates than if lenders had to take loan losses. The state appears to be reasonably protected in that its 85 percent guarantee is more than covered by sufficient collateral at all times.

From a practical standpoint, however, there are two potential problem areas to be aware of in this type of legislation. The first is the state's role in valuing the collateral. The second is the uncertainty of future interest rate levels available to farmers. These problems, of course, are not new or unique, but can greatly effect the success or failure of the program.

The key question is, what is the value of land and machinery at the time of the loan? It is to the advantage of both farmers and lenders to place a high value on a farmer's assets so that he is eligible for the loan guarantee program. This problem will remain critical until the general level of land and machinery prices stops declining and stabilize or start to increase. If commodity prices remain low and if it is necessary to call some of the loans, the collateral values may not be there and the state may have substantial losses. Further, the program as structured would put foreclosed assets on the market rapidly and potentially drive all farm asset price levels down further.

A participating farmer will have a term loan with a variable interest rate tied to short term instruments (one year T-bills). The farmer and not the lender bears the entire interest rate risk in this case. Although interest rates have been trending downward recently and normally short term rates are less than long term rates, this situation could reverse on short notice and thereby increase the farmers' debt service requirements dramatically.

These two considerations do not negate the value of such a program. These real world risks must be borne by someone but should be recognized when considering adoption of the program.

Programs to Aid Beginning Farmers

A state program to assist people start farming at this time may be desirable, for at least two reasons. First, it would help replenish the number of family farmers, replacing those who are retiring or leaving agriculture because of financial problems. Continued entry is needed to maintain a reasonably balanced age distribution of farmers and to maintain the number of family farms. If the supply of farm credit is restricted, however, credit to the unproven new entrants will be even more restricted or non-existent. The effect will be to keep potential family farmers out of agriculture. Second, such a program would assist in the recycling of farm assets and maintaining farm asset values, especially machinery.

Because of the inherent risk of farming and the large capital outlays required for land, a state credit program for beginning farmers should be targeted for operating and intermediate term loans for seed, feed, livestock, and machinery purchases. The program should encourage the beginning farmer to rent land, preferably on shares, to reduce cash flow requirements and minimize the leverage on the limited assets of the typical beginning farmer. The program should be risk-averse in that it maximizes the chances of long run survival, based on earnings from operations and should avoid speculating for capital gains.

The Minnesota Program

The major flaw of the now suspended Minnesota Farm Security Program (discussed previously in the guaranteed loan section) was that it encouraged the sale of entire operations, including land, to beginning farmers. The young farmers started out in a very highly leveraged situation that depended on high commodity price levels and monetary inflation to meet debt service requirements. Although high activity at the time of peak land prices clearly aggravated and hastened the problems of the Minnesota Farm Security Program, land debts caused many of the beginning farmers to be too highly leveraged, even for normal price levels. In this situation, land appreciation cannot be captured as cash flow on an annual basis but land depreciation decreases net worth immediately! On the other hand, a beginning farmer who borrows money for operating expenses, livestock and machinery and rents land on shares appears to have a reasonable chance of success, even at current price levels. State programs such as the one in Minnesota but limited to non-farm land loans to assist beginning farmers with debt financing for such costs appear to be viable.

The Idaho Family Farm Development Authority Proposal

This proposal is to set up an authority that can issue tax free revenue bonds and to use the proceeds to provide funds to lenders for loans to assist beginning farmers establish farming operations. Loans would be made at 2 to 3 percent below the market interest rate. (Note the similarities to linked deposit plans.) Eligible beginning farmers are required to have net worths of less than $100,000. Loans could be for up to $125,000 for depreciable agricultural property such as equipment and breeding stock or up to $500,000 for agricultural land and improvements. The program would not cover any operating loans. If the loan is for the acquisition of agricultural land, the beginning farmer has to have access to adequate working capital, farm equipment, machinery or livestock. If the loan is for the acquisition of depreciable agricultural property, the beginning farmer has to have access to adequate working capital and land.

Risks (and costs) to the state appear minimal in the Idaho proposal in that the loans are not guaranteed and the bonds are pure revenue bonds that are not obligations of the state or its political subdivisions. Since in reality these bonds will be backed only by loans and loan revenues from agricultural land and equipment, however, they may not be widely accepted by sophisticated private investors. The bonds would be legal investments for other state agencies with investment funds, however, so it is quite possible that other public agencies as bond holders would assume part of the interest rate subsidy cost and the risks of default.

Although definitely targeted toward beginning family farmers, the program is oriented to land purchases and does not allow operating loans. Therefore, it runs the risk of over leveraging beginning farmers, as in the Minnesota case, especially if land prices continue to decline. We would recommend that if such a program was instituted in Colorado, it be oriented toward operating and machinery loans and away from real estate loans.

Public or Private Land Purchase Plans

A number of proposals have been made for investors and/or public agencies to buy agricultural land and/or entire farming operations as a means of assisting financially strapped farmers. Many of these proposals include provisions for the current farmer land owner to continue to farm as a tenant and to repurchase the farm at some time in the future. The stated advantages of this approach are that private and/or public capital can assist farmers to stay on their farms and that by purchasing land and providing capital , somehow stop the decline in land and machinery values. It is expected that private investors would be willing to commit capital in anticipation of a market rate of return on their investments. In some cases, however, a public agency or a non-profit foundation could also subsidize the project by covering part of the capital risk or taking a below market rate of return in order to enhance the return to the private investors.

However well meaning these proposals are, most of their advocates are uniformly naive in that they do not understand and take into account the magnitude of the restructuring presently needed in agriculture and the probable long term nature of agriculture's problems. Most of the proposals assume that land prices have bottomed out or will do so in the next few months. There is no evidence that this has or will occur, even considering last year's precipitous decline in most areas. Low world commodity prices and federal budgetary pressures will continue to hold down farm income and the returns from agricultural land, at least in the near future. There is generally a lack of outside speculative interests, (and indeed speculative disinterest in agricultural land), at present because of the recent decline in land values, low cash returns and the low level of inflation in the economy.

Our perspective is that downward pressure on land prices will continue while land prices decline through "normal" levels--i.e., a capitalized value based on cash return plus inflation--to land price levels where land will "almost" cash flow. For example, based on present farm prices and expenses, this could mean a further drop of 20 to 50 percent from 1985 land prices in southwest Minnesota where land prices have already dropped 50 percent from their 1981 levels. Significant declines could occur also in Colorado, especially for dry land wheat areas where the declines until recently have been relatively small. This may well be a temporary phenomenon but the psychological euphoria on the upside has a counterpart in a psychological depression on the down side. Land prices should eventually recover to their "equilibrium" level, however, where the value of land is equal to a capitalized value based on expected cash returns, plus inflation. In our view, this process will take longer than has been assumed by most real estate brokers and other interested parties.

Farm land prices in the United States peaked in 1922-23 and 1981-82, covering a period of 60 years. The previous bottom of this cycle did not occur until the mid to late 1930s. Although there are many differences in the economic situation today compared to in the earlier period, this phenomenon nonetheless illustrates the potential long term period of land price cycles in the United States. We do not see any evidence that land price cycles in Colorado will not continue in line with national cycles in the current situation.

Even if the conventional wisdom assumption that land prices have or will bottom out soon turns out to be correct, corresponding projections of future land price increases are still probably too optimistic, considering the world supply and demand outlook for agricultural commodities for the next decade. Therefore, the only way to achieve annual normal (6 to 8 percent) increases in land prices would be through monetary inflation. Yet, current federal policy is designed to limit inflation and it has been extremely successful.

The sponsors of public/private land purchase programs generally over estimate the impact of investing, say, $50, $100, or $200 million in

land and asset values. Considering the total number of farms under stress, such investments would only have a minor impact on the overall problem. For example, one hundred million dollars will buy at most a few hundred commercial farms and less than 100 farms in some areas of higher valued lands.

The issue of "poor" farmers in terms of production and/or management skills is generally not raised when these kinds of programs are considered. An indiscriminate commitment to attempt to keep all the existing farmers on the land, however, will lower the potential returns to investors. Some farmers who lack the necessary managerial skills should leave agriculture--at least as farm operators. Some existing farm units should be restructured because they are the wrong size.

Finally, many of the cash flow projections for these programs are relatively too optimistic. If the farmer can earn enough to live on and save enough to buy back the farm at the inflated prices necessary for the investors to get a market return, he/she should be able to restructure his/her debts with existing lenders. If this is not the case and the land is sold to limited partnership ventures, then private investors would likely be faced with the prospect of earning less than a market rate of return for a decade or more.

A proposal to form a limited partnership to invest in distressed Colorado farm land, including an investment of state funds, is evaluated in the following section of this report.

The Colorado Agricultural Investors Proposal

The Colorado Agricultural Investors (CAI) proposal is a plan to help alleviate some of the asset financing problems faced by the weak agricultural economy of the state. It proposes formation of a Real Estate Limited Partnership to invest in distressed agricultural farmlands, using both private and institutional funds. Farmlands so acquired would be leased back to farmers (often the current operator) under an arrangement whereby the farmer could re-purchase the farm from the partnership at the end of a 15-year period (Germane Realty Corporation, 1986).

Forming real estate limited partnerships is an idea proposed by State Treasurer Roy Romer (1985). The partnership would invest in Colorado farmlands to acquire, operate and eventually dispose of it at a profit obtained from positive cash flows and appreciation in land values.

At the end of the third year, and continuing until the partnership is dissolved, 5 percent of the partnership's gross farm income would be applied as an unallocated reserve towards down payment for purchase of the land by the original tenant (original owner). When the farm is repurchased by the "tenant," the partnership would increase the cash reserve by 8 percent annually for the remaining period of the agreement. The original tenant would be expected to match the amount of reserve created by the partnership.

The CAI proposal calls for utilizing private investment capital (40 percent), the State of Colorado Public School Fund (10 percent) and borrowed money (50 percent), resulting in a 50 percent leverage of the original investment funds. The state investment contribution would be limited to $10 million.

The analysis follows of a possible a limited-partnership operation. Because assumptions determine the results, we have attempted to make each assumption explicit and offer a basis for the assumption.

Assumptions

1. Land area. We have assumed a gross land area of 117,200 acres. All of the cultivated land is considered to be irrigated by center pivot sprinkler irrigation systems. Because the typical center pivot system irrigates 130 acres, the 732.5 quarter-sections (160 acre each) involved will have (130/160 =) 81.25 percent of the land irrigated. That is, 95,225 acres of the 117,200 acres will be irrigated. We have assumed no returns from the unirrigated corners or from the acres diverted under government programs because their inclusion would have only negligible impact on the results but would unnecessarily complicate the analysis.

2. Land purchase price. Land can be purchased at $750.00 per acre, based on current offerings for such land in northeast Colorado. The initial purchase price of $87.9 million is applied. As with the Germane proposal, a $2.5 million reserve is assumed.

3. Costs and returns, base year. All of the irrigated acres are assumed to be used to produce corn for grain. The 1986 cost and return estimates for an acre of center pivot irrigated corn are based on information collected from irrigated farmers in 1984 (Dept. of ANRE, 1986). These 1984 cost and return estimates have been revised to reflect 1986 conditions of prices and quantities and to reflect the conditions assumed for this analysis. The 1986 estimate of costs and returns for an acre of center pivot irrigated corn, as developed by the CSU Cooperative Extension Service, are given in Appendix 1. The per acre costs and returns project an annual return of $2,826 per center pivot system if the farmer does not participate in the government program. An annual return of $13,962 is possible, however, by complying with the federal

program and receiving the income from government payments. Thus, we have assumed that all of the 117,200 acres in the CAI proposal will be in compliance with the government program.

4. Lease arrangement. Because of the potential large number of irrigation pumps located in areas served by different electricity supplying cooperatives, fertilizer dealers, etc., we have assumed a variation on a cash lease, rather than a crop and cost share lease. Landlord cost sharing of inputs, as typical with crop-share leases, would be administratively difficult, given the potentially large numbers of input suppliers requiring timely payments for input deliveries. It is recognized that a lease which divides costs in different proportions than returns is not desirable. The lease arrangement chosen was used because of its operational feasibility. Under this lease, the partnership or "landlord" would receive 25 percent of the gross value of the income from the land. ASCS rules require splitting the government payment in proportion to the crop share. In contrast to a cash lease, under which landlords receive a fixed amount per acre, this lease causes the landlord to share in both price and yield risk. As with the cash lease, the tenant would receive 75 percent of the value of production, plus 75 percent of the benefits from participating in government programs.

5. Yields. There has been a notable increasing trend in yield per acre on Colorado's irrigated corn acreage. Two recently completed studies assumed a yield increase of one percent per year (Hanway, et al., 1980; Young, et al., 1982). Starting with an average yield of 140 bushels per acre, we assume that yields will increase by one percent each year for the 15-year projection. These increases are assumed to be the result of increased fertilizer use; all fertilizer costs are assumed to be borne by the tenant.

6. Prices. Price projections are based on the provisions of the Food Security Act of 1985 (Stucker and Collins, 1986), the most recent piece of agricultural policy legislation enacted by the U. S. Congress. The price projections used are taken from a recently released study conducted by the Food and Agricultural Policy Research Institute at Iowa State University (ISU/FAPRI) (Womak, et al., 1986). A recently completed analysis by the ANRE Department relates the present and projected conditions of the national agricultural economy to Colorado (Miller, Trock and Smith, 1986). These analyses of the future for the agricultural

economy are consistent with those of other forecasters (Daft, 1986). The 1985 Act runs for five years, through the 1990 crop year. Beyond 1990, we have assumed that the long-term trend of allowing agricultural prices be determined by the market will continue, rather than being supported at levels considerably above market prices. Thus, prices projected for 1990 are expected to continue, adjusted for inflation, until the year 2000. The projected prices used for this analysis are shown in Appendix 2.

7. Inflation. All costs and prices are expressed in 1986 dollars. The ISU/FAPRI study assumes an annual inflation rate of 5.1 percent. Prices are expressed in real 1986 dollars (Appendix 2). The present value of the future stream of income is discounted at a rate of (8.0-5.1=) 2.9 percent.

8. Acreage Reduction Payment. It is assumed that the $0.73/bushel Acreage Reduction PIK Payment will continue throughout the 15-year projection. It is not clear from the 1985 Act, however, if this payment applies to 1986 only or if it will continue throughout the term of the 1985 Act. The ISU/FAPRI projection assumes it will continue; our assumption follows the assumption made in that study.

9. Down payment Contribution. A down payment contribution of 10 percent of the expected selling price of the land will be provided by the landlord at the end of the 15 years. This approximates the down payment contribution assumed in the Germane Proposal when the expected selling price of the land is $1800 per acre.

10. Tax Advantages. Tax advantages, due to rapid depreciation and/or losses, available to private investors are not considered in the analysis. Such incentives may be substantial under current federal tax law but this is one provision all current tax law restructuring proposals are attempting to eliminate or severely curtail.

Analysis

Considering the above listed premises and assumptions, the following computer-generated tables include analysis and the results of an ANRE model of the Colorado Agricultural Investors plan. The first page of the tables summarizes the input data to the ANRE model. The gross acreage and operating conditions remain basically the same as with the Germane Realty Corporation analysis. Per acre expenses to be paid by the landlord are shown at the top of the second page.

Two loans are required. The first for $43.95 million is for the 50 percent loan against the value of the initial investment. It is amortized over 30 years with a balloon payment after 15 years. The second loan of $10.0 million from state funds requires an interest payment only; the principal will be repaid from the land sale proceeds at the completion of the 15-year project life.

The remaining pages of the computer-generated tables show the annual income and expense for the farm land and the proportion of that income and expense which is due to the landlord (Columns 1-11). Columns 12 through 32 distribute the loan and farm operating expenses against the landlord income. Column 33 calculates the internal rate of return and column 34 presents the net present value of future incomes.

ANRE ANALYSIS--COLORADO AGRICULTURAL INVESTORS PROPOSAL
(Based on Germane Reality Computer Model Output)

INPUT DATA

140	Bushels per Acre Initial Corn Yield (1985)
$10.00	Value of Corn Stalks per Acre ($/Ac)
117200	Total Acres
95225	Irrigated Acres (130/160 of a quarter section)
81.25%	Irrigated Acres
21975	Non Irrigated Acres (30/160 of a quarter section)
18.75%	Non Irrigated Acres
25%	Landlord Share of Total Gross Revenue
$750	Expected Land Purchase Price ($/Ac)
$90,400,000	Total dollars to be invested
$87,900,000	Total Value of land (irrigated plus non irrigated)
$2,500,000	Total Value of Non Invested Reserves
$1,800	Expected Land Selling Price ($/Ac)
15	Years until land sold
8	Compounding rate for accumulation of downpayment

DOWNPAYMENT COMPUTATIONS

$61.42	Average Landlord gross income per total acre (Average per total acre of Column 6--ANRE ANALYSIS, Page 4)
10.79%	Percent of landlords gross income per total acre needed to generate ten percent of the expected selling price
$6.63	Dollars of Landlord's annual gross income per total acre needed to finance downpayment of 10% of expected selling price
$180.00	Future value of annual downpayment stream for both landlord and orginal tenant
50%	Leverage--Amount of Purchased Price
1.00%	Percent of orginal assets managed as annual management fee (Input as a decimal, ie 1% is .01)
3.00%	Percent of total gross farm income as annual management fee (Input as a decimal, ie 1% is .01)
$879,000	Annual management fee from farms managed
$25,000	Annual management fee from reserves managed
$863,741	Annual management fee from gross farm income
$1,767,741	Total annual management fee

$7.00	Real Estate Taxes ($/Total Ac)
$7.00	LL Irrigation Repair Costs ($/Irrigated Ac)
$0.90	Property Upkeep ($/Total Ac)
$0.54	Property Insurance ($/Total Ac)
$30,000	Irrigation System Investment Excluding Well per Quarter Section
$3,000	Salvage Value of Irrigation System
12	Life of Irrigation System (Years)
160	Total Acres per Quarter Section
$14.06	Irrigation System Depreciation ($/Total Ac/Yr)

$43,950,000	Beginning Balance Loan 1
30	Life of Loan (Years)
1	Number of Payments per Year
10.00%	Annual Interest Rate
$4,662,183	Annual Interest and Principal Payment
	Note: Balloon Payment after 15 Years

$10,000,000	Beginning Balance Loan 2
15	Life of Loan (Years)
1	Number of Payments per Year
10.00%	Annual Interest Rate
$1,000,000	Annual Interest Payment
	Note: Balloon Payment after 15 Years
	Only pay interest on this loan

$37,500,000	Initial Investment Amount
$2,500,000	Investment Reserves
$40,000,000	Total Initial Investment

$250,000	Organization and offering expenses
5	Years to amortize over
$50,000	Annual amount

$2,500,000	Acquisition Fee
5	Years to amortize over
$500,000	Annual amount

3.00%	Sale Cost Fee (decimal)
$189,864,000	Total Sale Price
$5,695,920	Cost of Land Sale

10.00%	Interest Rate for Investment Reserves (decimal)
2.90%	Discount Rate for Net Present Value of Income Stream
	(8.0% minus 5.1% inflation rate)

SALES PROCEEDS

$189,864,000	Total Sales Price
($5,695,920)	Less Cost of Sale
($35,460,934)	Less Principal Loan 1
($10,000,000)	Less Principal Loan 2
$2,500,000	Plus Undistributed Reserves
$141,207,146	Sale Proceeds

2.5% Acreage Reduction Payment Percentage of corn yield
Used when computing payment for diverted acres

80.0% of Irrigated Acres in corn if participate in farm program.

Annual Input Data (Miller)

Year	Target Price ($/Bu)	Farm Price ($/Bu)	Yield (Bu/Ac)	Acreage Reduction Payment ($/Bu)
1	$3.03	$1.99	140.00	$0.73
2	$2.91	$1.86	141.40	$0.73
3	$2.74	$1.81	142.81	$0.73
4	$2.53	$1.79	144.24	$0.73
5	$2.30	$1.79	145.68	$0.73
6	$2.30	$1.79	147.14	$0.73
7	$2.30	$1.79	148.61	$0.73
8	$2.30	$1.79	150.10	$0.73
9	$2.30	$1.79	151.60	$0.73
10	$2.30	$1.79	153.12	$0.73
11	$2.30	$1.79	154.65	$0.73
12	$2.30	$1.79	156.19	$0.73
13	$2.30	$1.79	157.76	$0.73
14	$2.30	$1.79	159.33	$0.73
15	$2.30	$1.79	160.93	$0.73

Income Calculations

Col	Computation
(1)	Irr Ac * .8 * Farm Price * Annual Yield
(2)	(Target Price-Farm Price)*(.8*Irr Ac*yield/ac)
(3)	Acreage Reduction Yield % * ARY Payment($/Bu) * Bu/Ac * Irr Acres
(4)	Irr Ac * .8 * Stalk Price

27-Feb-86 Last Updated
Income and Expense Table by Year

Year	(1) Total Gross Corn Grain Income	(2) Total Deficiency Payment Income	(3) Acreage Reduction Payment	(4) Income From Stalk Grazing	(5) Total Gross Income	(6) Landlord Gross Income	(7) Landlord Real Estate Taxes	(8) Landlord Irrigation Repair Costs	(9) Property Upkeep, Insurance & Depreciation Expenses
0									
1	$21,223,748	$11,091,808	$243,300	$761,800	$33,320,656	$8,330,164	$666,575	$666,575	$1,816,893
2	$20,035,645	$11,310,445	$245,733	$761,800	$32,353,622	$8,088,406	$666,575	$666,575	$1,816,893
3	$19,692,023	$10,118,001	$248,190	$761,800	$30,820,013	$7,705,003	$666,575	$666,575	$1,816,893
4	$19,669,176	$8,131,391	$250,672	$761,800	$28,813,039	$7,203,260	$666,575	$666,575	$1,816,893
5	$19,865,867	$5,660,107	$253,179	$761,800	$26,540,954	$6,635,238	$666,575	$666,575	$1,816,893
6	$20,064,526	$5,716,709	$255,711	$761,800	$26,798,745	$6,699,686	$666,575	$666,575	$1,816,893
7	$20,265,171	$5,773,876	$258,268	$761,800	$27,059,115	$6,764,779	$666,575	$666,575	$1,816,893
8	$20,467,823	$5,831,614	$260,850	$761,800	$27,322,088	$6,830,522	$666,575	$666,575	$1,816,893
9	$20,672,501	$5,889,931	$263,459	$761,800	$27,587,691	$6,896,923	$666,575	$666,575	$1,816,893
10	$20,879,226	$5,948,830	$266,093	$761,800	$27,855,949	$6,963,987	$666,575	$666,575	$1,816,893
11	$21,088,018	$6,008,318	$268,754	$761,800	$28,126,891	$7,031,723	$666,575	$666,575	$1,816,893
12	$21,298,899	$6,068,401	$271,442	$761,800	$28,400,542	$7,100,135	$666,575	$666,575	$1,816,893
13	$21,511,888	$6,129,085	$274,156	$761,800	$28,676,929	$7,169,232	$666,575	$666,575	$1,816,893
14	$21,727,006	$6,190,376	$276,898	$761,800	$28,956,081	$7,239,020	$666,575	$666,575	$1,816,893
15	$21,944,277	$6,252,280	$279,667	$761,800	$29,238,023	$7,309,506	$666,575	$666,575	$1,816,893
Total	$310,405,793	$106,121,171	$3,916,373	$11,427,000	$431,870,337	$107,967,584	$9,998,625	$9,998,625	$27,253,395
AVG/Yr	$20,693,720	$7,074,745	$261,092	$761,800	$28,791,356	$7,197,839	$666,575	$666,575	$1,816,893

Income and Expense Table by Year (Continued)

Year	(10) Total Landlord Expenses	(11) Landlord Net Operating Incomes
0		
1	$3,150,043	$5,180,121
2	$3,150,043	$4,938,363
3	$3,150,043	$4,554,960
4	$3,150,043	$4,053,217
5	$3,150,043	$3,485,195
6	$3,150,043	$3,549,643
7	$3,150,043	$3,614,736
8	$3,150,043	$3,680,479
9	$3,150,043	$3,746,880
10	$3,150,043	$3,813,944
11	$3,150,043	$3,881,680
12	$3,150,043	$3,950,092
13	$3,150,043	$4,019,189
14	$3,150,043	$4,088,977
15	$3,150,043	$4,159,463
Total	$47,250,645	$60,716,939

AVG/Yr $3,150,043 $4,047,796

LOAN DATA

Year	(12) Initial Investment	(13) Loan 1 Annual Payment	(14) Loan 1 Principal Paid	(15) Loan 1 Remaining Principal	(16) Loan 1 Interest Paid	(17) Loan 2 Annual Payment	(18) Loan 2 Principal Paid	(19) Loan 2 Remaining Principal	(20) Loan 2 Interest Paid
0	$40,000,000								
1		$4,662,183	$267,183	$43,682,817	$4,395,000	$1,000,000	$0	$10,000,000	$1,000,000
2		$4,662,183	$293,901	$43,388,916	$4,368,282	$1,000,000	$0	$10,000,000	$1,000,000
3		$4,662,183	$323,291	$43,065,624	$4,338,892	$1,000,000	$0	$10,000,000	$1,000,000
4		$4,662,183	$355,621	$42,710,004	$4,306,562	$1,000,000	$0	$10,000,000	$1,000,000
5		$4,662,183	$391,183	$42,318,821	$4,271,000	$1,000,000	$0	$10,000,000	$1,000,000
6		$4,662,183	$430,301	$41,888,520	$4,231,882	$1,000,000	$0	$10,000,000	$1,000,000
7		$4,662,183	$473,331	$41,415,190	$4,188,852	$1,000,000	$0	$10,000,000	$1,000,000
8		$4,662,183	$520,664	$40,894,526	$4,141,519	$1,000,000	$0	$10,000,000	$1,000,000
9		$4,662,183	$572,730	$40,321,795	$4,089,453	$1,000,000	$0	$10,000,000	$1,000,000
10		$4,662,183	$630,003	$39,691,792	$4,032,180	$1,000,000	$0	$10,000,000	$1,000,000
11		$4,662,183	$693,004	$38,998,788	$3,969,179	$1,000,000	$0	$10,000,000	$1,000,000
12		$4,662,183	$762,304	$38,236,484	$3,899,879	$1,000,000	$0	$10,000,000	$1,000,000
13		$4,662,183	$838,535	$37,397,949	$3,823,648	$1,000,000	$0	$10,000,000	$1,000,000
14		$4,662,183	$922,388	$36,475,561	$3,739,795	$1,000,000	$0	$10,000,000	$1,000,000
15		$4,662,183	$1,014,627	$35,460,934	$3,647,556	$1,000,000	$0	$10,000,000	$1,000,000
Total	$40,000,000	$69,932,744	$8,489,066		$61,443,679	$15,000,000	$0		$15,000,000

TAXABLE INCOME IN YEAR ZERO DOLLARS

Year	(21) Non-operating Income	(22) Landlord Income (11+21)	(23) Interest (16+20)	(24) Amortized Cost of Organization Setup	(25) Amortized Cost of Acquisition Fees	(26) Total Amortized Costs (24+25)	(27) Taxable Income (22-23-26)
0							
1	$250,000	$5,430,121	$5,242,954	$50,000	$500,000	$550,000	($362,833)
2	$250,000	$5,188,363	$5,069,960	$50,000	$500,000	$550,000	($431,598)
3	$250,000	$4,804,960	$4,900,100	$50,000	$500,000	$550,000	($645,140)
4	$250,000	$4,303,217	$4,733,166	$50,000	$500,000	$550,000	($979,950)
5	$250,000	$3,735,195	$4,568,948	$50,000	$500,000	$550,000	($1,383,752)
6	$250,000	$3,799,643	$4,407,230	$0	$0	$0	($607,587)
7	$250,000	$3,864,736	$4,247,796	$0	$0	$0	($383,060)
8	$250,000	$3,930,479	$4,090,425	$0	$0	$0	($159,946)
9	$250,000	$3,996,880	$3,934,891	$0	$0	$0	$61,989
10	$250,000	$4,063,944	$3,780,963	$0	$0	$0	$282,982
11	$250,000	$4,131,680	$3,628,403	$0	$0	$0	$503,277
12	$250,000	$4,200,092	$3,476,969	$0	$0	$0	$723,123
13	$250,000	$4,269,189	$3,326,410	$0	$0	$0	$942,779
14	$250,000	$4,338,977	$3,176,467	$0	$0	$0	$1,162,510
15	$250,000	$4,409,463	$3,026,872	$0	$0	$0	$1,382,591
Total	$3,750,000	$64,466,939	$61,611,554	$250,000	$2,500,000	$2,750,000	$105,385

CASH FLOWS

Year	(28) Landlord Income (22)	(29) Debt Service (13+17)	(30) Before Tax (28-29)	(31) Sales Proceeds	(32) Cash Flow Before Tax Plus Sales Proceeds
0					
1	$5,430,121	$5,502,607	($72,486)	$0	($72,486)
2	$5,188,363	$5,347,529	($159,166)	$0	($159,166)
3	$4,804,960	$5,196,821	($391,861)	$0	($391,861)
4	$4,303,217	$5,050,361	($747,144)	$0	($747,144)
5	$3,735,195	$4,908,028	($1,172,833)	$0	($1,172,833)
6	$3,799,643	$4,769,706	($970,063)	$0	($970,063)
7	$3,864,736	$4,635,283	($770,548)	$0	($770,548)
8	$3,930,479	$4,504,648	($574,169)	$0	($574,169)
9	$3,996,880	$4,377,695	($380,816)	$0	($380,816)
10	$4,063,944	$4,254,320	($190,376)	$0	($190,376)
11	$4,131,680	$4,134,422	($2,742)	$0	($2,742)
12	$4,200,092	$4,017,903	$182,190	$0	$182,190
13	$4,269,189	$3,904,667	$364,522	$0	$364,522
14	$4,338,977	$3,794,623	$544,354	$0	$544,354
15	$4,409,463	$3,687,680	$721,782	$141,207,146	$141,928,928
16					
Total	$64,466,939	$68,086,295	($3,619,355)	$141,207,146	$137,587,790

INTERNAL RATE OF RETURN AND NET PRESENT VALUE

Year	Internal Rate of Return (33)		Net Present Value (34)
0	($40,000,000)		($40,000,000)
1	($72,486)		($70,444)
2	($159,166)		($150,321)
3	($391,861)		($359,655)
4	($747,144)		($666,412)
5	($1,172,833)		($1,016,621)
6	($970,063)		($817,161)
7	($770,548)		($630,800)
8	($574,169)		($456,791)
9	($380,816)		($294,426)
10	($190,376)		($143,040)
11	($2,742)		($2,002)
12	$182,190		$129,283
13	$364,522		$251,376
14	$544,354		$364,810
15	$141,928,928		$92,435,821
IRR	0.08272	Total	$48,573,616

Summary of Results with Alterantive Assumptions for the ANRE Model

Land Selling Price	Internal Rate of Return	Net Present Value
1800	8.27%	$48,573,616
1500	6.49%	$28,582,709
1200	4.17%	$8,591,803
900	0.80%	($11,399,104)
750	-1.70%	($21,394,557)
700	-2.78%	($24,726,375)

Results

The projected cash flow before tax, plus sales proceeds (Column 32), in the ANRE model, is negative until year 12. Assuming the increasing yield trends and the corn price projections are correct (along with our other assumptions), the partnership would have difficulty sustaining itself. The $2.5 million surplus would be exhausted by the end of year five. Loss of returns on the $2.5 million reserves would decrease partnership returns even more than reflected in the projections.

Internal rates of return to the partnership are very dependent on assumed real increases in land values. The sensitivity of the internal rate of return to alternative end-of-period land values is shown in the final preceding table. Appendix 3 is a figure depicting long-term trends in U. S. agricultural land values (U. S. Department of Agriculture, 1985). Notice that rapidly increasing land values were associated with periods of relatively prosperous agricultural economic conditions, and that increasing and decreasing land values trends have been long-term phenomenon since 1915. We have no reason to believe that future conditions will differ significantly.

Our assumptions reflect a decline in commodity prices from where they are today; however, this decline is assumed to gradually level off. Income potentials from such prices are not likely to stimulate large increases in land values. Taking the post-World War II trend in land values, (starting from 1945) it would project to a real land value increase of about 1.16 percent annually. With this trend, land values in 15 years would increase from the present value of $750 to about $892 per acre (in 1986 dollars). This value is very close to the $900 per acre land value which would result in an internal rate of return of 0.80 percent.

The results of the ANRE Analysis reveal that the current and prospective returns in agriculture are not sufficient to service debt loads, no matter who holds the debt. Because the returns above cash costs are so small, margins are not sufficient to repay principal and interest on borrowed capital. This result is not surprising. Current operators without heavy indebtedness are surviving; those with significant amounts of debt are experiencing financial difficulty and failure.

These analyses were conducted from the landlords' (partnerships') point of view. Equally important, however, would be how such projections appear for the tenant. The tenants' 75 percent share of gross income from the corn crop must pay for all purchased input costs (seed, fertilizers, chemicals, electricity for pumping water, hired labor, etc.) plus provide and operate the machinery and equipment necessary for productive farming. Cursory analysis reveals that these projected trends in prices, yields and costs result in financially infeasible conditions

for tenants, particularly in later years, due to increasing irrigation energy and fertilizer costs.

There are several major uncertainties which could alter the course of this projection. Among these are:

a. The long term efforts by Federal policy makers to reduce the intervention of the government in price policy may change. Specifically, direct (deficiency) payments (Column 2) may be reduced in moves to balance the federal budget.

b. If the currently projected trends in agricultural commodity prices continue, farmers may adopt less input intensive practices and per acre yield reductions will result.

c. A major change in international supply/demand balance could spur exports and result in a temporary improvement in price and income conditions.

d. As loan rates and target prices decrease relative to market prices, the benefits to farmers from participation in government programs will decrease, resulting in lower participation rates. Supplies will increase and prices decrease.

e. This analysis is in constant dollars; the effects of inflation have not been considered. In the past, high rates of inflation have been reflected in farm costs, but to a lesser extent in grain prices. However, high inflation, if it materializes,could justify the 50 percent leverage assumed in the CAI proposal.

It must be recognized that a proposed limited partnership to buy distressed farm land such as CAI would not be limited to pivot-sprinkler irrigated land devoted to corn production. Other land use systems, i.e., dry land cash cropping, cow-calf beef operations, etc., could also be analyzed, using the ANRE model, and different results would be projected. Further, quite different and possibly more favorable results could flow from an approach in which the 50 percent leveraged capital assumption were eliminated.

Finally, although the ANRE analysis of a relatively large-scale limited-partnership venture resulted in projected internal rate-of-return stream that may not be competitive with alternative investment options available to private investors, that is not to say that a limited partnership would not be viable on a farm-to-farm basis. Individual operators currently faced with debt load servicing problems could evaluate such an option which, if found to be viable, could be carried out by incorporating the farm business and selling shares to potential investors outside of the immediate farm family (Barry and Beohlje, 1985).

Such an approach would not work for all farmers under financial stress; the uniqueness of each individual case would have to be carefully evaluated.

Appendix 1

Irrigated Continuous Corn, Non Compliance, Northeast Colorado, 1986

Gross Receipts/Owner Operator:		
Acres of crop	130	ac.
Yield per acre	140	bu.
Total yield	18,200	bu.
Market price	$1.99	bu.
Grazing-stalks ($10/Ac.)	$1,300	
Gross Receipts	$37,518	
Direct Costs, 130 Acres:		
Operating--preharvest		
Nitrogen ($.32/bu.)	$ 5,824	
Other fertilizer ($.14/bu.)	2,548	
Herbicide & insecticide ($.16/bu.)	2,912	
Seed ($.16/bu.)	2,912	
Irrigation energy ($.40/bu.)	7,280	
Irrigation labor ($.04/bu.)	728	
Fuel & oil ($.04/bu.)	728	
Machine repairs ($.02/bu.)	364	
Interest on operating capital ($.13/bu.)	2,366	
Total:	$23,296	
Operating--harvest		
Hired labor ($.02/bu.)	$ 364	
Fuel & oil ($.05/bu.)	910	
Machine repairs ($.04/bu.)	728	
Interest on operating capital ($.00/bu.)	-	
Total:	$ 2,002	
Total Direct Costs:	$25,298	
Property and Ownership Costs:		
Machinery replacement ($.21/bu.)	$ 3,822	
Machinery taxes & insurance ($.03/bu.)	546	
General farm overhead ($.09/bu.)	1,638	
Real estate taxes ($.05/bu.)	910	
Sprinkler depreciation and upkeep	2,480	
Total Ownership Costs:	$ 9,394	
Total Direct & Ownership Costs:	$34,692	
Net Receipts, 130 Acres:	$ 2,826	

Irrigated Continuous Corn, Compliance, Northeast Colorado, 1986

Gross Receipts/Owner Operator:		
Acres of crop	104	Ac.
Yield per acre	140	bu.
Total yield	14,560	bu.
Market price	$1.99	bu.
Grazing-stalks ($10/Ac.)	$1,040	
Gross Receipts	$30,014	
Direct Costs, 104 Acres:		
Operating--preharvest		
Nitrogen ($.32/bu.)	$ 4,659	
Other fertilizer ($.14/bu.)	2,038	
Herbicide & insecticide ($.16/bu.)	2,330	
Seed ($.16/bu.)	2,330	
Irrigation energy ($.40/bu.)	5,824	
Irrigation labor ($.04/bu.)	582	
Fuel & Oil ($.04/bu.)	582	
Machine repairs ($.02/bu.)	291	
Interest on operating capital ($.13/bu.)	1,893	
Total:	$20,529	
Operating--harvest		
Hired labor ($.02/bu.)	$ 291	
Fuel & oil ($.05/bu.)	728	
Machine repairs ($.04/bu.)	582	
Interest on operating capital ($.00/bu.)	-	
Total:	$ 1,601	
Total Direct Costs:	$22,130	
Property and Ownership Costs:		
Machinery replacement ($.21/bu.)	$ 3,822	
Machinery taxes & insurance ($.03/bu.)	546	
General farm overhead ($.09/bu.)	1,638	
Real estate taxes ($.05/bu.)	910	
Sprinkler depreciation and upkeep	2,480	
Total Ownership Costs:	$ 9,396	
Total Direct & Ownership Costs:	$31,526	
Net Receipts, 104 Acres:	($ 1,512)	
Deficiency payment, 14,560 bushels @ $1.04/bu.	$15,142	
Acreage reduction payment, 455 bushels @ $.73/bu.	332	
Total Net Receipts and Payments:	$13,962	

Irrigated Continuous Corn, Compliance, Northeast Colorado, 1986 (continued)

Gross Receipts, Landlord:		
Acres of crop	104	Ac.
Yield per acre	140	bu.
Total yield	14,560	bu.
Landlord's share (25%)	3,640	bu.
Market price	$1.99	bu.
Grazing-stalks	$260	
Gross Receipts	$7,504	
Direct Costs, 104 Acres:		
Irrigation repairs	910	
Property and Ownership Costs:		
Real estate taxes	$ 910	
Sprinkler lease and upkeep	2,480	
Total Direct & Ownership Costs:	$ 4,300	
Net Receipts, 104 Acres:	$ 3,204	
Deficiency payment, 3,640 bu. @ $1.04/bu.	$ 3,786	
Acreage reduction payment, 114 bushels @ $.73/bu.	83	
Total Net Receipts and Payments:	$ 7,073	

Irrigated Continuous Corn, Compliance, Northeast Colorado, 1986 (continued)

Gross Receipts, Tenant:	
Acres of crop	104 Ac.
Yield per acre	140 bu.
Total yield	14,560 bu.
Tenant's share (75%)	10,920 bu.
Market price	$1.99 bu.
Grazing-stalks ($10/Ac.)	$780
Gross Receipts	$22,511
Direct Costs, 104 Acres:	
Operating--preharvest	
Nitrogen ($.32/bu.)	$ 4,659
Other fertilizer ($.14/bu.)	2,038
Herbicide & insecticide ($.16/bu.)	2,330
Seed ($.16/bu.)	2,330
Irrigation energy ($.40/bu.)	5,824
Irrigation labor ($.04/bu.)	582
Fuel & Oil ($.04/bu.)	582
Machine repairs ($.02/bu.)	291
Interest on operating capital ($.13/bu.)	1,438
Total:	$20,074
Operating--harvest	
Hired labor ($.02/bu.)	$ 291
Fuel & oil ($.03/bu.)	728
Machine repairs ($.04/bu.)	582
Total:	$ 1,601
Total Direct Costs:	$21,675
Property and Ownership Costs:	
Machinery replacement ($.21/bu.)	$ 3,822
Machinery taxes & insurance ($.03/bu.)	546
General farm overhead ($.09/bu.)	1,638
Total Ownership Costs:	$ 6,006
Total Direct & Ownership Costs:	$27,681
Net Receipts, 104 Acres:	($ 5,170)
Deficiency payment, 10,920 bushels @ $1.04/bu.	$11,357
Acreage reduction payment, 341 bushels @ $.73/bu.	249
Total Net Receipts and Payments:	$ 6,436

Appendix 2

Background Assumptions and Data for Analysis of A Limited Partnership Proposal

National Level Corn Program Data

Year	Investment Year	% Change GNP Deflator	Target Price	Loan Rate	Price Received
1984			$3.03	$2.55	$2.65
1985			$3.03	$2.55	$2.47
1986	1	3.30%	$3.03	$1.92	$1.99
1987	2	4.10%	$3.03	$1.82	$1.94
1988	3	4.20%	$2.97	$1.73	$1.96
1989	4	5.10%	$2.88	$1.82	$2.04
1990	5	5.10%	$2.75	$1.90	$2.15
1991	6	5.10%	$2.89	$2.00	$2.26
1992	7	5.10%	$3.04	$2.10	$2.37
1993	8	5.10%	$3.19	$2.21	$2.49
1994	9	5.10%	$3.36	$2.32	$2.62
1995	10	5.10%	$3.53	$2.44	$2.75
1996	11	5.10%	$3.71	$2.56	$2.89
1997	12	5.10%	$3.90	$2.69	$3.04
1998	13	5.10%	$4.09	$2.83	$3.20
1999	14	5.10%	$4.30	$2.97	$3.36
2000	15	5.10%	$4.52	$3.12	$3.53

1986-89 inflation projections from Iowa State FAPRI Staff Report (#1-86) Abner W. Womak, R. E. Young II, W. E. Meyers, and S. R. Johnson, An Analysis of the Food Security Act of 1985. FAPRI Staff Report #1-86, Food and Agricultural Policy Research Institute, Iowa State University, Feb. 1986. (Inflation and general economic forecasts from Wharton Economic Forecasting Associates.)

1990-2000 inflation assumed at 1989 level.

1986-90 target prices set by 1985 Farm Bill.

1991-2000 target prices constant in real terms at 1990 level.

1986 loan rate announced by Secretary of Agriculture.

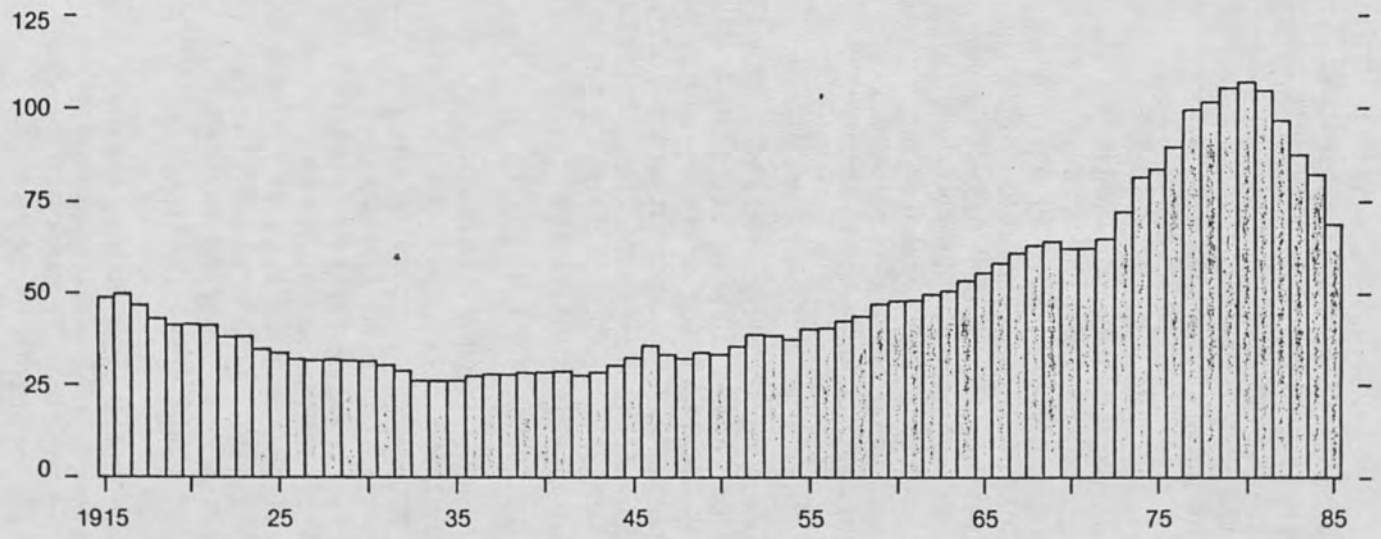
1987-89 loan rates and 1986-89 prices received projections from Iowa State FAPRI Staff Report (#1-86).

1990-2000 loan rates and prices constant at real terms at 1989 level.

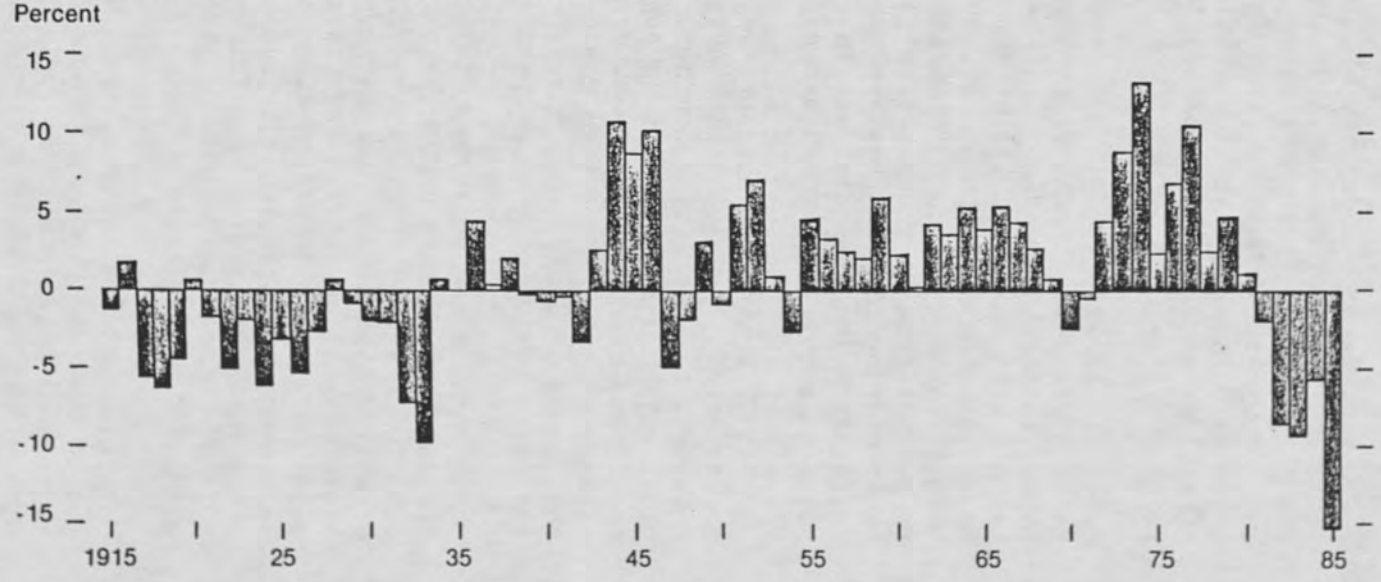
Background Assumptions and Data for Analysis of A Limited Partnership Proposal
(continued)

Year	Investment Year	National Level Data In 1986 Dollars: Target Price	Loan Rate	Price Received
1984				
1985				
1986	1	$3.03	$1.92	$1.99
1987	2	$2.91	$1.75	$1.86
1988	3	$2.74	$1.59	$1.81
1989	4	$2.53	$1.59	$1.79
1990	5	$2.30	$1.59	$1.79
1991	6	$2.30	$1.59	$1.79
1992	7	$2.30	$1.59	$1.79
1993	8	$2.30	$1.59	$1.79
1994	9	$2.30	$1.59	$1.79
1995	10	$2.30	$1.59	$1.79
1996	11	$2.30	$1.59	$1.79
1997	12	$2.30	$1.59	$1.79
1998	13	$2.30	$1.59	$1.79
1999	14	$2.30	$1.59	$1.79
2000	15	$2.30	$1.59	$1.79

Index of Real Value per Acre of U.S. Farmland



Change in Real Value per Acre from Previous Year



Excludes Alaska and Hawaii. The indices of real farmland value computed by dividing the nominal land value indices by the Consumer Price Index.

Source: 1985 Agricultural Chartbook, Agricultural Handbook No. 652, U. S. Department of Agriculture, December 1985.

Conclusions

Many farmers today are highly leveraged and/or have a debt structure that causes cash flow problems with current commodity prices. The current cash flow problems of these farmers will not be alleviated in one crop year, perhaps not even in several years. Asset values, especially land, are still declining and the world supply/demand situation for U. S. farm commodities is not promising for the next few years.

Highly leveraged farmers have only three options: (a) leave farming and seek other employment, (b) recycle through sale of assets to reduce their debt load, or (c) have part of their debt written off. If lenders have to absorb all of the losses and costs of resolution of financial stress of the highly leveraged farmers, they will have to pass most of these costs on to moderately leveraged farmers. However, it is in the interest of the public at large to share in the burden of restructuring some of the farm debt. The alternative will be increasing social and financial distress in rural communities and higher interest rates to surviving farmers and rural businesses.

All farmers can not survive the current agricultural crisis. Some are so highly leveraged that their operations are not restructurable and they will have to leave farming. Career counseling, job training and other adjustment assistance is appropriate for this group. Others have debt loads that can be managed or restructured via programs like interest rate subsidies or long term refinancing. A third group of farmers has low levels of debt; these operators should be able to meet their financing needs from the private sector.

Because the state has limited resources, a state's financial aid programs for farmers should be targeted to the middle group--those whose debt loads are restructurable. Interest rate buy downs can be an effective type of state-level program for this group of farmers, especially if private lenders participate in the subsidy and retain a substantial portion of the risk of default. If the operator has sufficient collateral but problems of servicing debt because of too much short term debt and/or high interest rates, state programs such as the Illinois Guarantee Program or state-linked deposit programs may be effective and relatively cost effective for state investment.

Some states have enacted (Minnesota) or are considering (Idaho) guaranteed loan programs for beginning farmers. Such programs would help to replenish the number of family operators as older farmers are leaving agriculture in increasing numbers. Such an effort in Minnesota (the Minnesota Farm Security Program) was started at the wrong time in the farm land price cycle and when prices declined in the early 1980s, many of the participating farmers were over leveraged. The proposed program in Idaho, however, appears to be more timely. If such a program were instituted in Colorado, it would be preferable to focus it primarily on

operating and equipment purchase loans, rather than for loans to purchase farm land.

Limited partnership programs to buy distressed farmland will have little impact, given the magnitude of the restructuring problem facing agriculture at this time. Even more important, however, is that the investors are doomed to earn less than a market rate of return for the next several years. The reason many farmers are in financial trouble today is that farm assets are overvalued, given current market conditions. A below market rate of return can therefore be expected until U. S. agriculture has completed the required adjustments in productive capacity. This is a fact of life for farmers operating on their own or under any of the state-level assistance programs now under consideration in Colorado.

TARGETING FUNDS FOR AGRICULTURAL ECONOMICS RESEARCH AND EXTENSION

A proposal to target funds for an expanded agricultural economics research and Extension program should be considered as a continuous effort to improve the state's competitive position by providing direct management decision making assistance and information to agricultural producers and agribusiness support firms. Such a program can facilitate adjustments required in restructuring agriculture and it can take advantage of these circumstances to further Colorado's competitive position. It cannot, however, forestall the adjustments of farm and agribusiness failures already locked in by adverse external economic forces. But, it can facilitate Colorado joining other states in influencing policy affecting agriculture. Finally, the program would focus directly on farmers who have a potential for surviving the current agricultural crisis by sharpening their management decisions and their marketing strategies. Unlike most other proposed state-assisted programs, it is designed to help farmers, agribusiness firms, and related agricultural dependent rural infra-structure units to help themselves, rather than relying solely on financial and price subsidies which are paid for indirectly by the general population in any case. This endeavor, referred to herein as the CASH (Colorado Agricultural Self-Help) proposal, and the importance of the agricultural sector in Colorado, should be explained clearly to the public policy decision makers to elicit their support.

Background on Previous Efforts

Actions Taken in Other States

The agricultural crisis first became evident in the major grain producing states in the Midwest. More recently, the problem has spread to the High Plains states. The wave of adversely impacted agricultural producers appears to be continually moving west, although the deep south and eastern states have their share of farm problems as well. State assistance programs that have received the most publicity focused on various forms of financial relief to farmers overburdened with high interest loans for purchase of real estate and machinery and for annual input purchase loans. (Popovich, 1986; Brake, Boehlje and Lee, 1985)

Less publicized, but more widespread in terms of the number of farm and ranch operators reached at lower per capita cost, has been a series of special program efforts in agricultural economics research and Extension. Since their initiation in the early 1980s, major programs of this type have been undertaken in many of the Midwest and High Plains states, most notably in Minnesota, Illinois, Iowa, Missouri, Nebraska and Kansas. In a typical situation, a major task force effort was designed to provide financial analysis assistance to farmers through the Extension component of the land-grant universities in these states, and supported by research in agricultural economics that focused on current problems and policy analysis. In some states, in Iowa for example, agricultural

economists from the land-grant university are now available to work on a one-to-one basis with all farmers who request assistance (Dept. of Economics, 1985). Such efforts have not yet been fully mobilized in the states to the west, although some special legislative funding requests to support agricultural economics research and Extension are presently under consideration in Wyoming and perhaps elsewhere as well.

The major research and extension responses evident in many of the Midwest and High Plains states were made possible by three interrelated factors: 1) most of these states already had large agricultural economics departments and Extension Economist staffs which allowed for priority shifts of personnel to the agricultural crisis, 2) internal reallocations of some experiment station and Extension funds were made and for special grants were obtained to support research and Extension faculty in these departments, and 3) in several states, special targeted legislative funding initiatives were passed that directed additional funds to these efforts. It is perhaps no coincidence that in those states where the major efforts are underway, notably in Minnesota, Iowa and Nebraska, such special legislative funding support was provided. This situation should come as no surprise. The extremely tight budget constraints that many land-grant universities have been operating under for over a decade and the constraints imposed by faculty tenure and prior commitments to other lines of agricultural research and Extension have made it virtually impossible to make large internal funding reallocations in the short run. Without special targeted funds, therefore, the response capability for farm financial and marketing management programs cannot fully develop.

Agricultural Economics Research and Extension in Colorado

Faculty in the Department of Agricultural and Natural Resource Economics (ANRE) at Colorado State University have also attempted to mount a major effort to assist farmers and ranchers to adjust to the current agricultural crisis. A series of farm financial and stress management workshops have been underway for two years and are scheduled to continue, along with follow-up contacts with those persons who have been attending the workshops. This effort received a major boost this past year when two regional Extension agricultural economist positions were funded and a vacant Extension position in the ANRE Department on campus was filled and converted from a nine-month to a twelve-month appointment. Research is underway in crop and livestock enterprise budgeting, marketing strategies and the competitive position of Colorado agriculture. Such research results are being published and disseminated with increasing frequency. A major expansion has also occurred in rapid turnaround analysis of policy issues and legislative options for responding to the agricultural crises; these results have recently been published in a series of working papers (Miller, et al., 1986; Skold, et al., 1986; and Fruin, et al., 1986 and Nobe, et al., 1986).

These ANRE department efforts, nonetheless, are severely constrained by budget limitations. In spite of these constraints, however, there is

a sufficient, but unfunded faculty reserve potential to respond quickly to an expanded program effort as envisioned in the CASH proposal.

Colorado Agriculture Development and Crisis Response (CADCR) Proposal

Early in 1985, the Governor of Colorado became concerned with the rapidly deteriorating situation in Colorado agriculture. In discussions with his staff and agency heads, a plan emerged to request legislative approval to use discretionary funds to support a major research and educational program directed primarily to farmers operating under serious financial and emotional stress. Responsibility for developing the CADCR Proposal was given to the Commissioner of Agriculture and his staff. Assistance was also provided by administrators and faculty at Colorado State University. By mid-March, 1985, the proposal for a state response to the agricultural crisis had been completed and was submitted to the Governor and a legislative committee for review and analysis. The proposal focused on three strategies: (A) to expand agricultural development and marketing efforts, (B) to improve farm financial management, and (C) to provide timely information and analysis. In order to initiate this program immediately, a supplemental appropriation in the amount of $153,000 was requested for the remainder of FY 1985. An additional special appropriation in the amount of $921,000 was requested for FY 1986. The details of the proposed program response and related budget issues are summarized below (Carlson, March, 1985).

Summary of Proposed Actions

STRATEGY A: EXPAND AGRICULTURAL DEVELOPMENT AND MARKETING

1. Expand Specialty and Alternate Crop Research and Market Development. This project would expand our knowledge of alternate and specialty crops with significant economic potential for Colorado agriculture. Requested funds of $410,000 would be used by the Colorado State University (CSU) Experiment Station to investigate the agricultural production, processing, and market potential of such crops. These funds would also be used to study ways in which Colorado agricultural producers may benefit from biotechnological research being conducted at CSU and other state universities.

2. Create 1 and Reallocate 1 Agricultural Marketing Position. These specialists in the Colorado Department of Agriculture (CDA) would help producers establish direct markets with consumers, work with commodity groups to develop new regional markets, and assist more producers to get started in the export market. They would also assist potential developers of new agricultural processing facilities within the state. One position is being created now through internal reallocation. The other position is included in the Department's FY 1986 budget request of $75,000.

3. Conduct State-level Analysis to Determine Competitive Position of Colorado Agricultural Products. This analysis will show where Colorado agriculture can compete successfully in world markets and where greater investments must be made to improve our position. This analysis will be closely tied to loan and target prices in the 1985 farm bill. First phase results will be available on key Colorado export crops one year after the study begins and will be widely distributed to producers and marketing firms. No work is currently underway in this area; $87,500 is requested to carry out this analysis by CSU.

4. Analyze Regional Agricultural Development and Marketing Opportunities and Provide Start-up Funds for Implementation. This project would provide up to $30,000 to each of four regions of the state to identify and analyze ways to strengthen marketing opportunities for agricultural commodities or processed goods produced in the region. An additional $50,000 would be provided to each region toward implementation. Other potential rural economic development projects that would benefit agriculture significantly could also be investigated using these funds. Existing energy impact funds, administered by the Department of Local Affairs, would be used. No new funds are requested.

STRATEGY B: IMPROVE FARM FINANCIAL MANAGEMENT

1. Expand Extension Financial and Stress Management Workshops. More than 500 farmers and ranchers have attended eight 4-session financial workshops in the past two months. These seminars were co-sponsored by bankers' associations and state and federal agencies. Seminars cover financial statements, cash flow analysis, and financing alternatives. Workshops are largely self-supporting from fees charged. Requested funds would cover the cost of conducting another 8 to 12 workshops, including the addition of a stress management component and the preparation of additional educational materials.

2. Create 1 and reallocate 1 CSU farm management specialist positions. The delivery of financial management and farm-level marketing information and research to producers is an important component of the Extension system. These specialists would help to develop financial management and marketing workshops, work with county and regional Extension personnel and farm groups, and serve as a conduit for information from CSU and other sources. One of these positions is being funded by reallocation of funds. The $50,000 is requested to support the other position. During the current crisis situation, this information is vital for farmers and ranchers. One specialist would be responsible for the Western Slope and the other for the Front Range.

3. Create 2 and reallocate 1 regional farm management specialist positions and hire 1 CSU Extension economist. Each of the four Extension regions needs a regional specialist trained in farm financial management and marketing. These agents would work with individual farmers, small groups, voc-ed teachers and help organize additional farm management associations. Of the three regional specialists to be added, one would be stationed on the Western Slope, one in the San Luis Valley-southwest region, and one in southeast Colorado. The additional Extension economist would be stationed at CSU and directly service northeastern Colorado. One of the positions will be funded with reallocated funds, but $165,700 is requested to fund the other three positions.

STRATEGY C: PROVIDE TIMELY INFORMATION AND ANALYSIS

1. Establish statewide telephone hotline. Nine states have established telephone "hotlines" to provide information on financial and stress management, federal and state farm finance programs, and related topics. Requested funds would be used to man a telephone line in the Colorado Department of Agriculture from 8 to 5 daily for 12 months. CSU would handle referrals from the Colorado Department of Agriculture for technical information on agricultural finance and marketing and special requests for printed information. $48,000 is requested.

2. Monitor and analyze credit information. An agricultural credit survey was carried out by CSU and CDA in the fall of 1984 to determine the severity of agricultural finance problems in Colorado. A report was issued in February of 1985. In follow-up efforts, information on the lending experiences of agricultural banks and agencies will also be included. The surveys and analysis will be conducted by CSU researchers in cooperation with CDA, federal, state, and private banking institutions and agencies. Personnel to do the work are available, but an additional $52,000 is requested to expand the survey and analysis and to disseminate the reports in a timely manner.

3. Develop and disseminate information on the connection between agriculture and the state's economy. To determine how changes in Colorado's agricultural production, processing, and marketing are affecting state and local economies, complex models showing the linkages among all sectors of the economy are necessary. The most current model of Colorado's economy was constructed in 1975, using information from 1970-73. An updated model is needed to document the extent to which our state and selected regions depend upon agricultural activity. Changes in farm ownership and cash flows due to the current farm crisis have made the 1975 state economic model totally obsolete. The updated model will be important in developing and refining state and regional marketing strategies.

Researchers at CSU developed the 1975 model and are best equipped to update this information. $150,000 is requested because extensive field surveys must be conducted. Preliminary results would be available within one year and information would be widely disseminated.

The budget implications of the CADCR Proposal are summarized in Table 7.

The Governor's initiative for dealing with Colorado agricultural problems failed to gain legislative approval in the 1985 session and has not been resubmitted. During the 1986 session, however, several alternative financial assistance proposals have been under discussion, along with related homestead and moratorium proposals, some of which were analyzed and reported on in ANRE working papers. In the year that has passed, farm land values continued to decline, more farmers are leaving agriculture, (both voluntarily and involuntarily), and more and more public officials are now conceding that the current crisis may be longer-term indeed. And, there is a growing frustration among concerned parties about the lack of action on state-level assistance proposals. The one exception is the Governor's 1986 initiative now under implementation which is outlined below.

Project ARC (Agricultural Resources in Colorado)

Having failed to obtain legislative funding support for his 1985 initiative, the Governor early in 1986 formally proposed Project ARC--Agricultural Resources in Colorado. No special funding from the legislature was requested for this program. It relies instead on efforts to mobilize available agency staff and budget resources throughout Colorado, with the Extension Service's county offices identified as the primary focal points.

The ARC project has moved into a high gear effort, utilizing an intensive public relations campaign to bring it to the attention of all agricultural producers in Colorado. The mechanics of the program were presented as the lead article in the first issue of a special newspaper tabloid (Carlson, Project ARC, Winter 1986). Since this article succinctly summarizes the mechanics of and aspirations for the program, it is reproduced below in its entirety.

PROJECT ARC--WORKING FOR YOU

Project ARC--Agricultural Resources in Colorado--represents a renewed commitment by state agencies and Colorado State University to work towards a healthier, growing agriculture in Colorado. In introducing the project in early January, Gov. Richard Lamm and Commissioner of Agriculture Tim Schultz called the project an essential step toward meeting the needs of farmers and ranchers who are an

Table 7. Colorado Agricultural Development and Crisis Response Program: Budget Request Detail

	FY 85 Add'l $ Requested	FY 86 Add'l $ Requested	FY 86 Add'l FTE Requested	Requesting Agency
A. Expand Agricultural Development and Marketing				
1. Expand specialty & alternate crop research & market development	60,000	350,000	3 FTE	CSU Exp Station
2. Hire 1 and reallocate 1 agricultural marketing specialists to improve our capability to market Colorado products	7,500	75,000	1 FTE	Agriculture
3. Conduct state-level analysis and disseminate information on the competitive position of Colorado agriculture products	12,500	75,000	0 FTE	CSU Exp Station
4. Analyze ag development & marketing opportunities for 4 regions and provide startup funds for each region toward implementation	-0-	-0-	0 FTE	
SUBTOTALS	$80,000	$500,000	4 FTE	
B. Improve Farm Financial Management				
1. Conduct initial & followup marketing, financial & stress management workshops in cooperation with Colorado agricultural lenders	10,000	10,000	0 FTE	CSU Extension
2. Hire 1 and reallocate 1 CSU farm management specialists to work with regional management agents on educational programs	8,300	50,000	1 FTE	CSU Extension
3. Hire 2 and reallocate 1 regional farm management specialists and 1 CSU economist	23,700	142,000	3 FTE	CSU Extension
SUBTOTALS	$42,000	$202,000	4 FTE	
C. Provide Timely Information and Analysis				
1a. Establish statewide telephone hotline (12 months)	6,000	30,000	0 FTE	Agriculture
1b. Establish statewide telephone hotline (12 months)	3,000	9,000	0 FTE	CSU Extension
2 Monitor & analyze farm credit situation; report information quarterly	12,000	40,000	0 FTE	CSU Exp Station
3. Develop and disseminate updated information on the connection between agriculture and the state's economy and employment	10,000	140,000	1 FTE	
SUBTOTALS	$31,000	$219,000	1 FTE	
GRAND TOTALS	$153,000	$921,000	9 FTE	

important part of Colorado's economic and cultural base.

"Project ARC is not a magic wand to wave over agriculture and make all of its problems disappear," Schultz said. "It will not keep all the farmers in the state on their farms. What the program will do is bring together existing resources and create some new resources to help the agricultural situation."

Under the Governor's sponsorship, several state agencies have responded to the problems in the farming industry by committing funds and labor to Project ARC. The project addresses the economic and social needs of the state's agricultural community, and helps to identify long-term needs in the industry. Colorado State University and the network of Cooperative Extension offices across the state have key roles to play.

Kenneth R. Bolen, new Director of Colorado Cooperative Extension, reports that "CSU is responding to the difficult situation in agriculture by expanding educational efforts in farm financial management and farm stress training. With the Agricultural Resources in Colorado Project, local Extension offices will serve as one-step referral centers to assist farm and ranch families in seeking assistance."

The first objective of the project is to make public resources easily available to farmers and ranchers through one-stop information centers in every CSU Cooperative Extension office statewide. Services and resources include:

1. one-to-one financial analysis, and farm financial education programs,
2. agriculture marketing programs,
3. stress management,
4. job training and placement,
5. human services, such as counseling and food and energy assistance, and,
6. community development assistance.

"The program will bring all these services into focus for Colorado's farm and ranch residents who may never have needed them before and may be unaware that the services exist," Gov. Lamm said.

Don Moschetti of Center, Colorado, Chairman of the Overview Committee, says the program creates a resource base that can help farmers who will remain on the land as well as those who may have to leave the farm. "ARC is a program to put all of the state's resources within reach of our producers in Colorado," he said.

With extensive assistance from CSU, Project ARC will also document within 60 days the extent and severity of financial conditions in Colorado agriculture, and their spillover effects in rural communities.

This documentation will include a survey of producers to determine their financial condition; a review of the conditions in the agricultural credit system; and documentation of the effects of the farm crisis on rural communities: tax base, schools and hospitals, employment, and social impacts. A preliminary report will be available in March..

According to Project Coordinator David Carlson; "Innovative Approaches" will take the forefront in Project ARC in turning producers' eyes to the future. The project will identify and publish a list of innovative ideas and approaches being used by producers in the state to make their farms and ranches more financially sound. "Ideas like manufacturing straw logs, marketing stone-ground wheat flour, and taking hunters as ranch guests are being done right now by Colorado farmers and ranchers. Although these ideas won't work for every producer, they are examples of farmers who are finding a niche in innovative agriculture that is allowing them more years on the land," Carlson said. A June conference is scheduled to provide a forum for interchange of ideas, he said. Project ARC will also analyze additional state initiatives that could strengthen agriculture's condition in Colorado.

"Project ARC cannot solve all the problems in agriculture today, but it is a step in the right direction," Schultz said. "By its very makeup, it represents a commitment by state government to work for agriculture and to build a stronger base for the industry in future years. It is not the entire answer, but it represents the chance and challenge to continue developing one."

Project ARC is still too new to allow a full analysis of its success rate at this time. As Commissioner Schultz has noted, however, "Project ARC cannot solve all the problems in agriculture today, but it is a step in the right direction". By giving publicity to the problem and marshalling all available agency resources, some progress toward solution should emerge. But, there is also the danger of creating an overexpectation within the agricultural community. The fact remains that a large proportion of the technical assistance needed to deal with the agricultural crisis at the farm and ranch level falls within the realm of financial management expertise and marketing strategies--the discipline domains of agricultural economists. In contrast, the vast majority of the staff resources that Extension, the Experiment Station, and the Colorado Department of Agriculture have available are not trained in these areas of expertise.

A related danger is that as the problems in agriculture continue over the longer term, the initial enthusiasm generated by farmers and agency support personnel alike will begin to evaporate as they see too little of substance offered to help them solve farm problems. If that occurs, then it would likely follow that a period of depression could set in during which farmer participants in particular, and the public in general, would begin to feel that there are no solutions to the farm problem. Such is definitely not the case even if there are no quick fix answers. The crisis will simply take longer than many expected to work through the system. Some farmers who would prefer to remain on the land will be forced off. Remaining farmers will necessarily have to develop financial management and marketing expertise, over and above their physical production skills. And, they will have need for, and will likely demand, continued agricultural economics research results and related Extension inputs over the longer term.

The CASH (Colorado Agriculture Self-Help) Proposal

During the past two years, we have seen two major efforts in Colorado designed to reach most farmers under financial and emotional stress. Both emanated from the Executive Branch instead of from the Legislative Branch. The 1985 Governor's initiative can be faulted for having been too ambitious, too broad based, and too expensive; in any case it failed to gain legislative support. The 1986 ARC initiative attempts to accomplish many of the same things as the 1985 proposal aspired to but expects to do so without any additional budget and only limited agricultural economics staff support; it too will likely fail to fully achieve its objectives, because of these constraints. There is a middle ground, however, referred to as the CASH proposal. It would require some fund increases in order to provide assistance to farmers through agricultural economics research and Extension support over the longer term.

The CASH project is designed as a long-term effort that would continue beyond the current crisis and provide a continuous flow of research and education to the farmers that will remain in business. It will require some additional money--a modest expansion effort would cost

approximately $500,000. These costs, expanded by inflation, would continue year after year. The fact remains, however, that agriculture is currently faced with serious financial management and marketing problems that will likely continue into the foreseeable future.

The CASH proposal is designed to: 1) provide a comprehensive Extension program in financial and marketing management that would eventually expand to provide assistance to all farmers on a one-to-one basis; 2) develop a vigorous response capacity for agricultural policy and current issues analysis on a continuous basis; and 3) move forward rapidly on support research in enterprise feasibility budgets, marketing strategies and the competitive position of Colorado agricultural products in national and international markets. The focus would be on efforts to help farmers and ranchers individually adjust to the present crisis and to the forthcoming adverse agricultural situation that is likely to continue for a decade or more.

Within this framework, the most crucial operating decisions at the farm or ranch level will continue to be: 1) operating efficiency; 2) debt management; 3) risk management; 4) marketing; and 5) participation in federal commodity and conservation subsidy programs. For the immediate future, the prime objective of farm and ranch operators will be survival; how successful they are will depend largely on how they carry out these five major kinds of operating decisions. The CASH proposal is designed to provide both a research and Extension response. These will be discussed below in reverse order because in this instance the need for research flows best from the bottom up, rather than the conventional means of doing "useful" research and then depending upon Extension to deliver the results, whether operators have a high priority need for it or not at that time.

Proposed Extension Service Response

It is possible in this instance to adopt a response model developed at the University of Nebraska for the National Extension Committee on Organization and Policy (Bolen and Lucas, 1984). This proposed model, which could be implemented in Colorado through the CASH program, is described in that report as follows:

> The Cooperative Extension System will develop a total production systems approach to improve the profitability of agriculture by striving for maximum economic returns, not maximum output. Better integration of production, financial and marketing strategies will be achieved by using the resources of a team of Extension specialists and agents.
>
> -Interdisciplinary Systems Approach
>
> To regain profitability, farmers and ranchers need help in developing the most appropriate production system for their individual farms and ranches achieving optimum economic

efficiency. The critical role for Extension and research is to provide data bases and to assist in developing agricultural production systems that are viable, realistic and economically feasible.

The Cooperative Extension System must use a multi-disciplinary approach on a commodity and farm basis to analyze the problems and help determine the most economic and viable production systems. In many situations, this will require computer models to help the producers integrate information and determine the critical management decision points resulting in optimum economic return. In addition, it will require more field demonstrations and adaptive research to appropriately fine tune technology for adoption.

Agricultural practices will be analyzed and evaluated within the framework of production systems. Properly combining the expertise of appropriate subject matter specialists to identify the inter-relationships and results of various decisions could make the difference between profit and loss with an enterprise.

-Increase Economic Efficiency Educational Programs

Management is one of the most important factors in production efficiency. Some farm and ranch operators will be more efficient with some enterprises than others. Educational programs and analysis of farm records will help producers identify profitable and unprofitable enterprises.

The understanding of production economic principles is essential to achieve economic efficiency. The Cooperative Extension System will help clarify the relationship between production decisions, financial management, risk management, and marketing alternatives and their impact on farm profitability. The focus of educational programs will be on the economic return for the farmer and rancher.

Farm records and their proper use are critical to profitability. Many farmers and ranchers currently do not have adequate records for economic analysis. The Cooperative Extension System will encourage and support the need for farm records for enterprise and farm analysis.

-Increase Emphasis in Farm (Family) Financial Management

Given the impact of interest rates and capital charges to the farm business, debt management needs constant review. Understanding the importance of interest expense in the cost structure in agriculture and properly managing that expense will be critical to future farm and ranch profitability. The financial impact of production and marketing alternatives needs

to be analyzed with careful attention to debt repayment schedules.

Personal, family, and business goals may not be compatible. Cooperative Extension programs will help farmers and ranchers identify personal, family, and business goals and understand the financial impact of these decisions.

-Increase Understanding of Risk Management Alternatives

Farm operators need to analyze their personal approach to risk and understand the capability of their businesses to handle uncertainty. Personal characteristics and financial status affect a producer's approach to risk. Educational programs will help farmers and ranchers understand their risk preferences. Extension programs will help producers review alternatives to reduce risk in the farm business including enterprise diversification, government farm programs, and crop insurance.

Farmers should recognize that profit, in the purest sense, is a return to risk. Programs are being developed to help farmers evaluate the risks, as well as potential profitability of alternative decisions. Through such programs, farmers can integrate production risks, market risks and financial risks in making decisions which give them the greatest probability of achieving reasonable management objectives with acceptable risks.

-Increase Understanding of Farm, Family and Personal Stress Associated With Financial Stress

Cooperative Extension programs will help farmers and ranchers identify the stressors affecting them; how these stressors contribute to dysfunctional behavior exhibited by individuals and families; and strategies for effectively managing stress and reducing stressors and/or the impact of stress.

-Program Determination and Reallocation

Agribusiness and industry will be encouraged to participate in determining Extension program priorities. The Cooperative Extension System will redirect programs and reallocate resources to help farmers and ranchers improve production systems skills and decision making. Modern communications technology will be used to reach more people and to encourage adoption of new research discoveries and improved production techniques.

-Longer Term Needs of Farmers and Ranchers

The Cooperative Extension System through farm policy educational programs, will continue to help farmers and ranchers identify policy alternatives and consequences to help improve farm profitability. Additional emphasis will be placed on increasing the understanding of the international economic situation and the impact of trade policies on the farm business. More emphasis on improving marketing skills will be included in educational programs to help improve farm profitability.

-Evaluation

Increased effort will be devoted to program evaluation. The Cooperative Extension System is committed to do an effective and careful evaluation of the impact of programs directed to improving the profitability of agriculture.

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There are many macro-economic and policy factors beyond the control of individual farmers and ranchers. However, they need to understand the new and changing economic environment and know how to cope with these conditions. Through commodity groups and farm organizations, farmers can help shape policies that will affect them in the future. The Extension Committee on Organization and Policy does not suggest that an educational program is the only answer to the current challenges in agriculture. However, these economic factors stress the importance of encouraging efficiency and integrated approaches as a means of coping with the new environment.

Proposed Research Response

The only mechanism presently available for making an expanded research response to the continuing adverse agricultural situation in Colorado is through the Experiment Station because there are no federal or private contract and grants support funds available to Colorado State University for this effort. There is a federal point of departure, however. The Joint Council on Food and Agricultural Sciences has a congressionally mandated role to develop plans for the future. The rationale for the proposed Experiment Station based research response for the CASH proposal is the Council's list of recommended priorities for FY 1987 (JCFAS, 1985). Of the five priorities listed, the first order ranking is: "Increase Agricultural Productivity Through Management". In defense of this priority, the Council stated in part:

"Profitability has always been an important component of U. S. agricultural and forestry enterprises. To help the producers of food and fiber cope with the current difficult economic climate, the science and education system needs to develop multidisciplinary research and education programs focused on increasing farm and forest profitability. Attention should be

directed to optimizing profits through better integration of production management, and marketing strategies, including new uses for farm products, and to developing realistic family and business goals. Agricultural producers who face critical operating decisions need help in evaluating available alternatives.....

To this we would add, public policy makers and administrators also need help in evaluating alternatives; hence, one major research component in the CASH proposal is developing an adequate policy and current issues analysis capability. We also concur in the need for multidisciplinary inputs into the research component. But the key difference from the past is that economics is now a central focus of the research envisioned, rather than providing the "window dressing" after key technical research decisions have been made.

The Director of the Colorado Agricultural Experiment Station has identified priority research needs in his 1986 budget request that fit nicely with the expanded agricultural economics research envisioned under the CASH proposal. As set forth in a recent report, Colorado Agricultural Experiment Station: An Overview of Goals, Priorities and Needs, 1986, (CAES, 1986), these priorities are:

"Priority Budget Needs for 1986-87: Critical needs are for personnel, operating and equipment support to maintain and strengthen research programs in agricultural marketing, finance, credit and policy; production and marketing of new and alternative crops; integrated reproduction management; integrated pest management; integrated soil and crop production and marketing systems; and socioeconomic factors influencing individuals, families, communities and overall consumer needs.

This is an extremely long shopping list, albiet all these elements have direct relevance to the current agricultural situation. If sufficient funds are forthcoming to carry out this research priority package, agricultural economists should necessarily be involved in each of the proposed interdisciplinary efforts. In addition, however, there remains a need for some discipline oriented agricultural economics research as well. This includes the need to develop and annually update crop and livestock enterprise budgets, to assess the competitive position of Colorado agricultural products and to develop marketing strategies for them. Finally, as noted above, there is a need to expand the agricultural and natural resource policy analysis response capability. It is these areas of research that would receive the most direct attention under the CASH proposal.

Budget and Manpower Implications

The major budget components of the CASH proposal are summarized in Table 8. Comparing it with the budget summary for the 1985 Governor's initiative (Table 7) will reveal that all of these items were included in the former proposal. The major difference is that items judged less

critical to deal with the current agricultural crisis were stripped away so that the CASH budget is less than half of the budget for the original 1985 proposal.

Faculty manpower requirements are also somewhat less. Some part-time technical assistance would also be needed at the field-level in one-to-one financial counseling efforts. Taking our cue from very successful similar programs at Iowa State University, and the University of Nebraska, we would propose to recruit farmers (both those still in the business and others who may recently have been forced out). For example, the program at Iowa State, known as Farm Aid, involves some state and area farm management specialists who are university faculty. "In addition, 25 part-time Extension Associates were hired to help provide financial planning assistance. Almost three-fourths of the associates were active farmers, all of whom had college degrees in ag-business"--the Iowa State University term for an agricultural economics degree (Economics Newsletter, 1985). Given the number of such CSU graduates who have been farming in Colorado, it is highly likely that enough of them could be recruited to staff the part-time Extension field component of the CASH program.

Table 8. The CASH Proposal-Budget Overview

Program Components	FTE's	Costs
Extension		
Regional Farm Mgt. Agents	2	$100,000
On Campus Farm Mgt./Marketing Specialist	1	50,000
Part-time Farm Mgt. Counselors		150,000
Sub-totals	(3)	(300,000)
Experiment Station Research		
Competitive Position of Colo. Agri.	1	50,000
Marketing Strategies and Int'l Trade	1	50,000
Analysis of Policy and Current Issues	2	100,000
Sub-totals	(4)	200,000
TOTALS	7	500,000

On campus at CSU, there is presently sufficient unfunded excess staff capacity in the ANRE Department to implement the proposed Extension and research components without hiring additional faculty. This is the case because of the current nine-month appointment status of ANRE faculty; for the coming academic year, for example, excess capacity in the form of unfunded summer session employment for these faculty equates to a budget figure for salaries and fringe benefits of approximately $225,000. Where ever there is a good match between the on-campus

Extension and research requirements and available under-funded faculty, it would be desirable to use these faculty instead of hiring additional new faculty.

Conclusions

Farmers, ranchers, and agri-business managers in Colorado, along with their counterparts throughout the U. S., face severe financial difficulties at the present time. This is the situation, not because of any lack of production capability, but rather due to a lack of financial management expertise in the face of adverse economic conditions largely beyond their control. The CASH proposal would respond to this situation by first helping individual operators assess their prospects for remaining in business. Then, follow-up assistance would be offered to those who have the potential for continuing in farming.

The primary response focus of the CASH proposal would be through the Extension function. It would also be strongly reinforced through expanded research capability, however, in enterprise budgeting, continual assessment of Colorado agriculture's competitive advantage and development of related marketing strategies, and analysis of policy and current issues for producers, managers, and public decision makers. This is a program with a long-term focus that seeks as its primary audience all operators who will remain in business. Compared to other public assistance programs that seek to target a select few operators currently in most financial jeopardy (and which could be adequately funded only for the short term), the CASH proposal appears to be extremely cost effective. It deserves serious consideration as a state-funded response effort to the agricultural crisis in Colorado.

IMPLICATIONS FOR POLICY AND PUBLIC INSTITUTIONS

The major factors likely to affect the future environment of U.S. and Colorado agriculture have been identified and we have provided insight on the possible effect of these on the farm sector. We now consider the question of what implications these prospects have for the management of public institutions serving agriculture and for policy formulation and implementation at the federal and state levels.

At this point, it is helpful to address an important question about how the current crisis facing farmers and ranchers fits into the chronology of past and prospective future events. Two views are possible: (a) The present emergency situation is a temporary and transitory phenomena that will be replaced in the not too distant future with conditions more like the 1970s, or (b) the present crisis situation is brought about by the need to adjust from the conditions of the 1970s to a much different economic and financial environment that has prospects of enduring to the end of the century. While these views are polar opposites, each with some truth, the evidence reviewed in this report clearly supports the second--the present crisis is a painful part of a permanent adjustment to a new baseline environment for agriculture.

Viewed in this manner, the policy implications of the present situation become clearer. Temporary and "heroic" public actions to bridge the current "depression" are based on false hopes and only forestall the eventual adjustment. Farmers currently facing insolvency will not likely be saved by "heroic measures", and adjustments necessary for others to survive could be put off until it is too late. What appears more prudent are public actions to assist in the adjustment and to provide farmers that can survive with the means of operating in the new environment; those who must leave agriculture should be assisted into expanding non-farm sectors of the economy.

It should be stressed that the future suggested by the second view above will be challenging but not necessarily bleak. Agriculture has successfully adjusted to major changes of this magnitude in the past. Once the current bad debt is off the books and land values stabilize, agriculture will emerge a stronger industry in better shape to address the challenge of the future. Many farmers and ranchers, actually a majority, have already made the adjustments and are moving into position to take advantage of the new business environment. It is also encouraging to note that for the first time in over a generation, it is possible for a young producer with reasonable equity capital to begin farming with interest rates, land prices, purchase inputs, machinery and other expenses that cash flow out of product sales (Price, 1986). Policy and public institutions have an obligation to serve these clients, as well as those who must leave the industry.

Implications for Federal Policy

Most of the recent national agricultural policy debate has focused on the 1985 Farm Bill. In a longer run context, some positive steps were taken in the final bill signed into law. First, shifting to market oriented price support loans should allow U. S. farmers to compete more effectively in world markets. Artificially high price supports have in the past been interacting with the strong dollar to further limit export sales of grains. Lower price supports should begin to remove this obstacle while still providing the safety net needed by farmers in a boom and bust future. Secondly, the bill provides for continuing income supports at present levels for two years, followed by possible small reductions. This income support should provide help for farmers during the period of greatest adjustment. Other features of the legislation, from trade incentives and the extension of PL-480 programs to a conservation reserve program to reduce the cropland base, are also consistent with the future economic environment anticipated in this report.

The price and income supports of the farm bill do not directly address the credit and financial crises presently facing farmers. Only a small amount of these payments--a conservative estimate is 11 percent--go to farmers who are facing serious financial difficulty, and even in these cases, the support is usually too small in relationship to the interest costs on debts to make much difference. New titles of the bill deal with FmHA funding and procedures, in some cases increasing the flexibility of the agency to deal with credit problems and allowing FmHA to hold foreclosed farmland off the market when selling it would further depress prices. While the 1985 Farm Bill does not deal with the question of maintaining reserves of the Farm Credit System, separate farm credit legislation was passed which may provide some stability to the system in the future.

Farm policy in the future will necessarily be more concerned with those areas that affect the general economy--monetary and fiscal policy, tax policy, international financial markets, and developments in trade flows. As a capital intensive industry depending substantially on export markets, agriculture has as great a stake in macroeconomic policy as any industry in the United States. In order to keep the agricultural economy healthy, interest rates must be kept down and the dollar must not be over-valued. Farm policy efforts must recognize this need. Attention in the future may shift away from temporary price and income enhancement policies and toward policies to create a more stable and favorable economic and financial environment for agriculture over the longer term. Agricultural policies of the future need to be flexible enough to deal with problems as they arise, share the increasing risk of farming, and at the same time maintain agriculture's flexibility and resilience in adjusting to change.

Implications for State Government and Policy

The political and economic events leading to the present crisis in U. S. agriculture were reviewed earlier. State government was not involved in or responsible for the turn of events that led to the current situation in agriculture, and has only limited means to influence the outcome. State government activities in the agricultural sector (especially in Colorado) primarily focus on the regulation of product quality, markets, and banking. While some options are available in this arena to ease and/or facilitate the burden of adjustment, there are limits on what can be accomplished. A positive example is the proposed change in Colorado banking charters that would allow state banks more time to writeoff acquired real estate assets--a measure that would add stability to land markets.

In a recent report, a Governor's Commission in Wisconsin has taken a thorough look at the options available to state governments to deal with the current problem in agriculture (State of Wisconsin, 1985). It looked at state options concerning credit policies, research and education, marketing, taxation, and rural development assistance. While many of the possibilities considered may not be politically feasible in Colorado, the Commission does offer some important suggestions, and concludes that "The most effective state action to improve the profitability of Wisconsin agriculture is to reduce the property tax" (p. 1). It specifically proposes expanding a program to target property tax relief to farmers with lower income levels. It also recommends continued assistance in the marketing of farm products, and for research and Extension actions aimed at increasing farm profitability and developing new products and markets. In addition, it recommends that attention be given to assisting farm families who are forced out of agriculture by implementing a set of programs including education, training assistance, and transition loans. Finally, it recommends adoption of a cohesive rural development strategy and increased local economic development assistance. Interested parties are urged to study the report.

In discussions with Dr. David Carlson, Director of the ARC Project, it was agreed that four broad legislative options in Colorado would be analyzed. These were: (1) a limited public/private partnership for buying agricultural land; (2) interest buy-down programs for producer loans on agricultural land; (3) state-linked deposit programs, primarily for reducing interest payments on annual operating loans and equipment loans; and (4) targeting funds for agricultural economics research and Extension that would focus on financial and marketing management needs of agricultural producers. Based on our analysis of these options, and taking into account our conclusion that the agricultural sector in the U. S. and Colorado is a long-term adjustment trend that may continue for another decade or two, we concluded that state-level assistance programs to buy down interest rates or guarantee loans would have little positive impact. Most of these programs, along with a limited partnership approach to buy distressed farm land, would not be cost effective and would impact on only a small proportion of the farmers who currently face severe debt servicing loads. By targeting interest rate buy down, state-

linked deposit and loan guarantee program more specifically to farmers whose loans are restructurable, and therefore capable of surviving, cost effectiveness and level of positive impact could be improved significantly. Targeting funds for non-land purchase costs of beginning farmers would also be cost effective and with adequate funding would be capable of impacting on most potential operators in this group.

Implications for Land Grant Universities

Farmers with adequate technology, equity and management skills will survive the current agricultural crisis and even prosper. These farmers and new entrants with the necessary skills and financial means represent the future clients of agricultural programs at Land Grant Universities. The university will play a primary service role in providing the necessary technology for the future, in assisting farmers in maintaining technical efficiency, and in increasing management skills.

In the physical and biological sciences, research and education remain high priorities. Biotechnology should be applied in ways that reduce chemical dependency, increase production efficiency, broaden genetic diversity, and enhance biological and economic stability in agriculture here and abroad. Emerging technologies require skilled farmers to manage the production process, and universities must continue to educate both existing and prospective agriculturalists in the skills necessary to work in a complex technical environment. While some physical research may not primarily benefit farmers in the short run, because of the price depressing effects of increased production, this fact should not be viewed as cause to discontinue public support for such research. To the contrary, the long lead times required to make potential biotechnology advances into realities, when viewed in the context of the long run uncertainty about the world's population growth and food supply, strongly support the need for such research. Given the uncertainty, the prudent action for the university research community is to search tirelessly for cost-reducing technological change in agriculture. Failure to do so runs the risk of unacceptable shortages and high food costs if we fail to accurately foresee long-run world food needs.

Cooperative Extension will need to continue to help farmers and ranchers adapt and utilize research discoveries to increase the economic efficiency of agricultural production. A recent publication prepared for the Extension Committee on Organization and Policy outlines an appropriate Extension system response (Bolen and Lucus, 1984). As the above statements imply, the traditional missions of the land-grant university--research, teaching, and extension--can, if appropriately focused, continue to effectively serve the present and future needs of agriculture.

It is noted in this report, however, that technical and production management skills alone will not be sufficient for a farmer to survive in the future; economic, financial, and risk management skills will also be absolutely essential for survival. Farming is inherently becoming more

risky, and capital requirements per worker remain higher than in any other industry. Business expertise in general, and particularly financial and marketing management skills to operate in a high risk environment, are essential to survival. University research, education, and Extension administrators must recognize this new reality in agriculture and begin to respond to these new high priority needs of the farmers and ranchers of the future. Achieving an appropriate balance between technical production elements and financial and marketing management elements in their research and Extension programs will be a major challenge facing land-grant universities to the turn of the century.

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