Economics Statistics Cooperatives

Program Results and Plans

December 1978

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Economics, Statistics,
and Cooperatives Service
ESCS—42

ECONOMICS, STATISTICS, COOPERATIVES: PROGRAM RESULTS AND PLANS. Economics, Statistics, and Cooperatives Service, U.S. Department of Agriculture. ESCS-42.

Preface

The Economics, Statistics, and Cooperatives Service (ESCS) has three major missions within the U.S. Department of Agriculture: develop economic and statistical research, analysis, and information related to national and international food and agriculture, natural resources, and rural communities; collect and publish statistics related to agriculture, natural resources, and rural communities; and formulate research and technical assistance on financial, organizational, management, legal, social, and economic aspects of cooperatives. This report focuses on accomplishments in the fiscal year 1978 program, priority areas for fiscal year 1979, and research needs for the early 1980's.

Editor's Note

Most of the charts appearing in this report are samples from the 1978 Handbook of Agricultural Charts (Agriculture Handbook 551) published by ESCS. For a single free copy, write or phone ESCS Publications, Room 0054-S, U.S. Department of Agriculture, Washington, D.C. 20250. (202) 447-7255

Washington, D.C. 20250 December 1978

U.S. DEPARTMENT OF AGRICULTURE
ECONOMICS, STATISTICS, and COOPERATIVES SERVICE
WASHINGTON, D.C. 20250

Errata to "Program Results and Plans" (ESCS-42)

There is an error on page 5 of this report. The sixth line of the item entitled, Demand and supply of U.S. vegetable oil products, should read:

... 1973 embargo decreased prices by only 0.2 cent; ...

The reader should also note that the results are based on the average market response for the period 1965 to 1976 and that the effect on any single year could be significantly different.

Foreword

I am pleased to present this review of program results and future plans of the Economics, Statistics, and Cooperatives Service. This agency was created January 1, 1978, by consolidation of the Economic Research Service, the Statistical Reporting Service, the Farmer Cooperative Service, and the Economic Management Support Center. I refer you to the end of this report for an introduction to ESCS officials.

Reasonable food prices, adequate food supplies, clean environment, controlled inflation, profitable world trade, healthy and vital rural communities--these are among the highest ranking goals of most Americans. Agriculture and rural development are vital elements in society-wide public decisions about the issues surrounding these goals. The ESCS program is being shaped to focus more sharply on such issues and to provide more, and more timely, information of higher quality to support the public policy decisionmaking process.

This review includes a number of high-priority areas that will need attention in the early 1980's. Prominent in this list are questions relating to water supplies, small farms, environmental protection and enhancement, nutrition and food safety, rural transportation problems, farmer cooperatives, the organization and control of U.S. agriculture, foreign trade competition, resource planning, and rural economic growth.

We have developed our priorities after advice and counsel from many in and beyond the Department. We have met with leaders of the economics profession, statistics users, consumer and client groups, farm organization leaders, and Congressional staffs. We also met with the Department's assistant secretaries and most agency heads. In addition, we have benefited from our participation in the Joint Council, the National Association of State Universities and Land Grant Colleges, the Federal Economic Statistics Coordinating Committee, and others.

We greatly appreciate the counsel of these individuals and groups, and we invite their continued cooperation as we develop our programs to the needs of agriculture, rural communities, and consumers.

KENNETH R. FARRELL
Administrator

Contents

Economics, Statistics, Cooperatives: Program Results and Plans

Introduction

The Economics, Statistics, and Cooperatives Service (ESCS) was established by consolidation of the Economic Research Service, the Statistical Reporting Service, the Farmer Cooperative Service, and the Economic Management Support Center pursuant to Secretary's Memorandum No. 1927 dated October 5, 1977. The Secretary has assigned to the Service: (1) functions under the Cooperative Marketing Act of 1926 (7 U.S.C. 451-457), and (2) functions that relate to the collection and dissemination of crop and livestock statistics and the conduct of economic research in agricultural production, marketing, and distribution under the Agricultural Marketing Act of 1946 (7 U.S.C. 1621-1627).

The three major missions of ESCS focus on:

1. Economic analysis and research. This activity includes monitoring economic activities in agriculture and rural communities and developing outlook, short-term forecasts, and long range projections of resource needs, production, and distribution of food and fiber. It also investigates the performance of the food and fiber sector in meeting the needs of domestic and foreign consumers and in meeting other national goals concerning such matters as resource ownership and use, income and its distribution, and the structure and organization of agriculture and the food system. Current information is also developed on the principal social and economic factors affecting the quality of life in farm and rural areas and the impact of alternative public and private actions on them.

2. Crop and livestock estimates. This activity includes estimates of production, supply, price, and other aspects of the agricultural economy; conduct of enumerative and objective measurement surveys; and preparation and issuance of the official national and State estimates and reports of the Department relating to acreages, types and production of farm crops, number of livestock on farms, livestock products, stocks of agricultural commodities, value and utilization of farm products, and prices received and paid by farmers. It also includes review, clearance, coordination, and improvement of statistics in the Department, and research and development of statistical techniques to improve the efficiency of gathering, evaluating, and processing statistical data.

3. Research and technical assistance for agricultural cooperatives. ESCS conducts studies to support cooperatives that market farm products, purchase production supplies, and perform related business services. These concentrate on financial, organizational, legal, social, and economic aspects of cooperative activity in U.S. agriculture. Technical assistance supported by these studies is given on organizing new cooperatives, improving cooperative performance, changing business structure, and developing strategies for growth.

More than three-fourths of ESCS' activities are related to providing information on farms, such as input, production, and marketing. Much of this activity deals with collecting crops and livestock statistics that are basic to research and analysis of the agricultural situation and outlook. The remaining one-fourth is divided among rural development, foreign trade, natural resources, cooperatives, and food and nutrition, with most of the activity for research and analysis.

Information and data developed by ESCS on food, agriculture, natural resources, and rural development are made widely available. They are used by farmers, processors, handlers, consumers, and others to make production, marketing, and purchasing decisions and by legislators and other public officials to develop and administer agricultural, consumer, and rural programs.

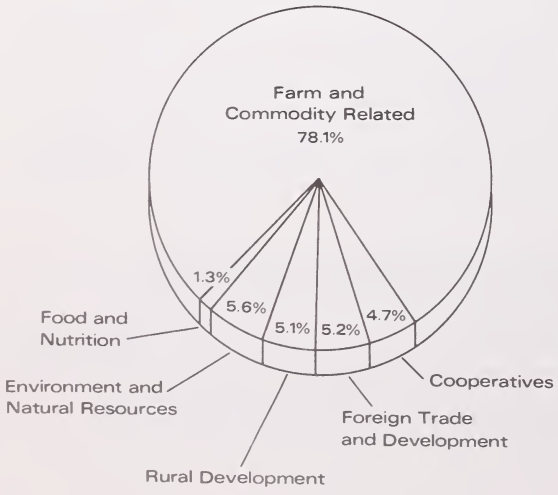
A large part of the ESCS crop and livestock estimates program is carried out through the 44 State statistical offices serving the 50 States. Most of these offices are operated as joint State and Federal services through cooperative arrangements with various State agencies. Economic analysis and research projects are conducted both in Washington, D.C. and with a small staff in each of 35 States, principally at the land grant colleges and universities.

ESCS serves as the focal point of national activity involving farmer cooperatives. Farm families use the cooperative form of business as extensions of their farm enterprises to purchase their production supplies, to process and market their products, and to obtain related services. By doing this, farmers are often able to reduce costs and obtain greater returns in the market place.

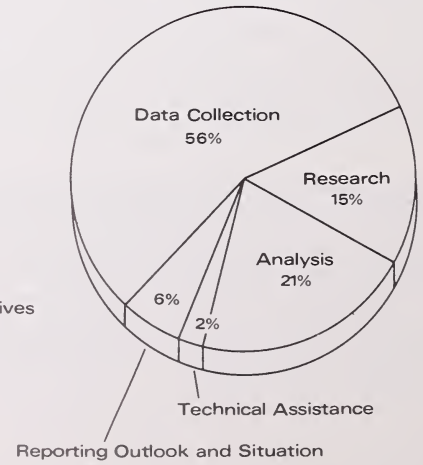
As of September 30, 1978, the Service had 2,173 full-time and 722 part-time employees; of these, 931 full-time and 572 part-time employees were in 92 locations outside of the Washington, D.C. headquarters.

This report, explaining the ESCS program, is organized by three major sections: (1) examples of accomplishments during fiscal year 1978, (2) new programs for fiscal year 1979, and (3) high-priority programs for the early 1980's that ESCS managers believe need to be accomplished.

AREAS OF EMPHASIS



MAJOR ACTIVITIES



Program Results for 1978

This section focuses on the objectives and examples of accomplishments for the 1978 ESCS programs.

Supply, Demand, and Price Analysis and Forecasting

Economic research and analysis are conducted to provide reliable estimates and forecasts of supply, demand, and price for major farm commodities and of production costs. National forecasts and analyses are provided for production, consumption, demand, costs, and prices for food grains, feeds, fibers, oils, fruits, vegetables, sweeteners, tobacco, meat animals, dairy products, and poultry. Problems and issues concerning farm credit, finance, fertilizers, pesticides, transportation services, and energy also are studied.

Summary of Accomplishments

Information has been provided to public and private agricultural leaders on patterns of wheat yields during 1921-75, wheat acreage response to risk, cost-benefit estimates of the brucellosis control program options, the economic impact of rail branch line availability, energy needs of the food-processing industry, and prospects for the U.S. wool and cotton industry.

Examples of Specific Accomplishments

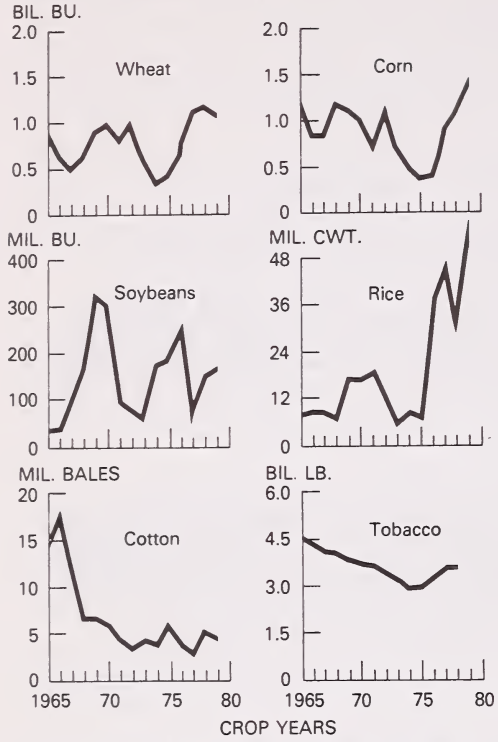
The National Food Review.--A new consumer publication provides analyses of the food supply, price, and consumption situation and outlook. It also reports on developments in marketing, consumer research and legislation, and USDA actions of interest to those concerned with consumer problems.

Farmers' newsletters.--Six separate titles were developed in the Farmers' Newsletter series designed to aid farmers in making their production and marketing plans. The newsletters were distributed to more than 100,000 farmers throughout the Nation by the end of the fiscal year, with some farmers receiving more than one title in the series. The titles and their distribution are: oilseeds, 43,000; livestock, 88,000; feed, 71,000; wheat, 58,000; cotton, 39,000; and general, 44,000. Initial surveys and evaluations found positive reactions from farmers, professional analysts, and communicators.

Outlook and situation.--Outlook and situation analyses are provided to the public via the monthly Agricultural Outlook publication. This comprehensive publication provides projections for the coming year on commodities and foreign trade and production, and gives general economic information. A 5-year forecast was established to provide a benchmark from which impacts of policy changes will be measured.

The 1978 outlook for the U.S. economy and prospects for U.S. agriculture and its relationship with world agriculture were topics featured at USDA's food and agricultural outlook conference held in Washington, D.C. in November 1977. Over 1,000 people attended, representing a broad cross section of public and private groups interested in or involved with the U.S. food and fiber sector.

STOCKS OF MAJOR FARM COMMODITIES



Crop years beginning: Wheat July 1, 1960-64, June 1, 1965 to date; cotton and rice, August 1; soybeans, September 1; corn and other tobacco, October 1, 1979 forecast.

Stocks of Major Farm Commodities[1]

	1976	1977	1978[2]	1979[2]
Wheat (bil. bu.)	.67	1.11	1.17	1.13
Rice (mil. cwt.)	36.9	40.5	27.5	47.6
Cotton (mil. bales)	3.7	2.9	5.1	5.4
Corn (bil. bu.)	.40	.88	1.11	1.07
Soybeans (mil. lbs.)	245	103	125	145
Tobacco (bil. lbs.)	3.3	3.5	3.5	3.5

[1] Crop years beginning: Wheat, June 1; flue-cured tobacco, July 1; cotton and rice, August 1; soybeans, September 1; corn and other tobacco, October 1. [2] Forecast.

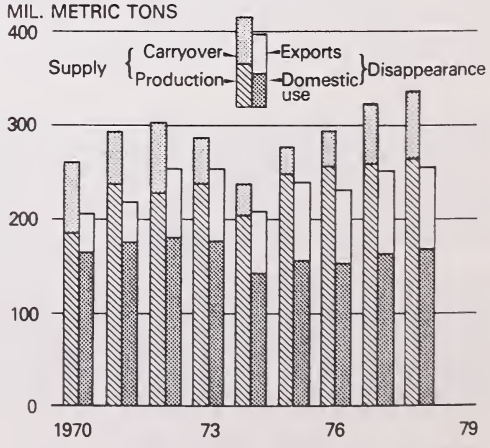
Total Grain Supply and Disappearance[1]

	1975	1976	1977	1978[2]
	Million metric tons			
Supply	276.8	294.9	324.4	338.3
Carryover	27.6	37.1	62.1	73.7
Production	248.6	257.3	261.8	264.3
Imports	.5	.6	.4	.4
Disappearance	239.6	232.6	250.6	254.6
Domestic use	155.1	153.2	161.5	168.5
Exports	84.5	79.4	89.1	86.6

[1] Year beginning October 1 for corn and sorghum; June 1 for oats, barley, wheat, and rye; and August 1 for rice. [2] Projected.

Totals may not add due to independent rounding.

TOTAL GRAIN SUPPLY AND DISAPPEARANCE



Year beginning October 1 for corn and sorghum: June 1 for oats, barley, wheat, and rye; and August 1 for rice. Supply includes imports. 1977 estimated. 1978 projected.

As market conditions can be very volatile, farmers, marketers, policymakers, and consumers need to know what to expect in the coming months. Separate outlook and situation reports are published regularly and cover eight commodity groups, major agricultural inputs, and the national and international food situation. These reports assess the current situation as well as the short-term prospects for demand, supply, and prices.

Quarterly broiler price prediction.--Several sets of quarterly equations for estimating the deflated wholesale price of broilers were developed and tested. The equations with the best predictive capability indicate per capita consumption of young chickens and per capita disposable income have the greatest overall impact on broiler prices. Per capita consumption of beef, veal, pork, and turkey have lesser effects on broiler prices. The equations developed are especially useful to poultry producers and processors and to consumers interested in the industry.

Cross-commodity supply and demand model.--Individual commodity models for feed grains, soybeans, wheat, and livestock have been linked into a simultaneous cross-commodity system to strengthen forecasting and analysis capabilities. Linking these models into a single interactive system will enable them to show, for example, what impacts a change in corn acreage or yield would have on the production and prices of competing grains and soybeans, and on livestock supply, demand, and prices.

Demand and supply of U.S. vegetable oil products.--Using a newly developed econometric model of the U.S. vegetable oil industry, economists evaluated effects of the price-support program for soybeans, the 1973 embargo, and Government donations under P.L. 480. The results show that: the current price-support program added 3.3 cents per bushel to the mean price of soybeans over the period January 1965 to April 1976; the 1973 embargo increased prices by only 0.2 cent; and Government donations of vegetable oil under P.L. 480 had no significant effect.

Demand and supply for peanuts.--Without the peanut price support and acreage allotment program, free-market gross farm income would have been $5.46 billion greater and peanut products would have cost consumers $2.83 billion less over the period 1972-76. Under a free market, however, net farm income would have been $1.38 billion less.

World cotton production and use.--After years of steady growth in world cotton production and use, the world cotton economy has experienced a slowdown in the 1970's. A special analysis concludes that the United States will continue to have the potential to produce and export cotton at levels experienced over the past few years. Cotton exports, averaging well over $1 billion annually, have made a large contribution to the U.S. balance of payments.

Retail meat prices.--A special report shows that consumers have demonstrated such a strong preference for beef that any reduction in supplies will exert a strong upward pressure on beef prices.

Behavior of wheat yields.--An analysis of wheat yields from 1921 to 1975 indicates that at the State and national level, randomness in wheat yields prevails and there is no demonstrable tendency for good years to follow good years or bad years to follow bad. The analysis also rebuts assertions made by some researchers (mainly climatologists) that the weather of the previous two decades has been unusually favorable for cereal yields; the last 20 years have been about average in terms of the weather's effects on yields.

Projected demand for grazing roughages.--Projections indicate that total demand for grazing roughages will increase from 78 to 197 percent by the year 2030 over the 1973-75 annual average level of 321 million tons.

Brucellosis control program alternatives.--An analysis of the brucellosis control program indicates that programs to control the disease result in greater beef and dairy production and lower farm prices. Increasingly lower costs to consumers more than offset the decreased producer prices and the program costs.

Supply of and demand for pesticides.--Pesticides represent a small share of farmers' production expenditures. Without them, however, farmers could lose one-third of their crop production to pests. Since 1974, when acute pesticide shortages demonstrated the need for reliable situation and outlook information, updated reports have been published on pesticide supplies and demand. In 1978, this report was expanded to include an analysis of the impact of policy actions on pesticide availability and pest control. The report provides the only comprehensive evaluation of pesticide production, capacity inventories, distribution problems, demand, and regulation. The report shows that adequate supplies of pesticides and a fairly stable demand are likely to result in prices to farmers close to those for last year. In general, suppliers have reduced beginning inventories, putting them in a better position to move available supplies without resorting to price reductions.

Energy in the food-processing industry.--A reference document has been developed which provides information on fuel use in food processing. Data are provided by 4-digit SIC industry classifications and by fuel type for the various food processing industries for 1975. The information is useful in determining the energy needs of the processing sector and evaluating impacts of changes in fuel prices and fuel availability on the food system.

Food and Fiber Industry Structure and Performance

Work in this area seeks to help public and private officials make more informed decisions through improved information on farm programs, regulations, and policies directed at improving the economic performance of the food and fiber system. Also, analyses measure the economic position of farmers, the efficiency and adequacy of the distribution system, and the impacts of the various factors that cause changes in production and marketing.

Summary of Accomplishments

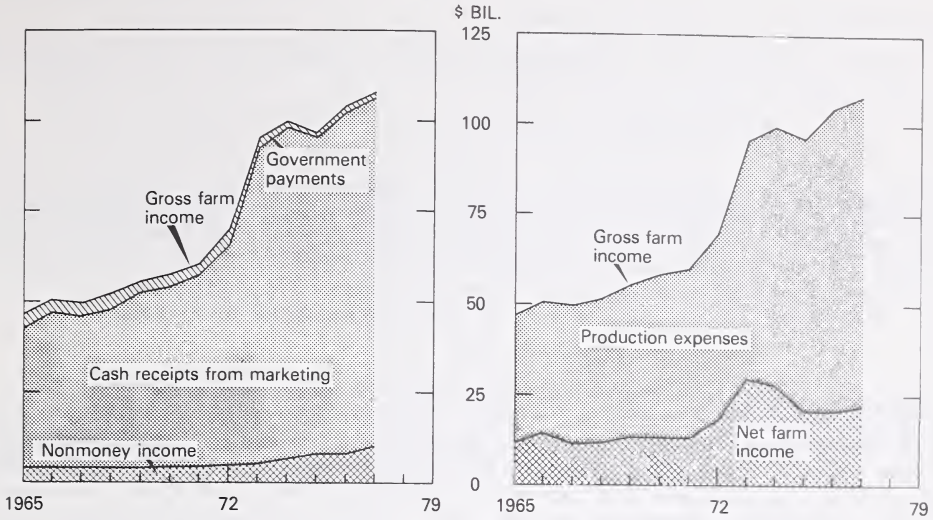
Analyses provided information on national farm income and financial accounts, the impacts of price stabilization and income policy on farm structure, the enforcement of the Reclamation Act of 1902, price spreads and marketing costs, agricultural costs of production, energy, farmer-to-consumer direct marketing, the structure and performance of the food wholesaling industry, small farms and farm strikes, and the structure of farm input industries.

Examples of Specific Accomplishments

Balance sheets of farm assets and liabilities.--Balance sheets were completed for the farming sector. These assemble into one financial statement major farm assets, inventory, and liability accounts, and provide an important measure of the financial health of the farm sector. Farm operator and landlord holdings and debts are listed separately and updated each year. For the first time, separate balance sheets were developed for each State.

Impacts of price stabilization and income policy on farm structure.--The short-term impacts of 100 percent of parity farm prices on total farm numbers would be minor. However, price stabilization programs tend to increase total farm numbers, shift farms

INCOME FROM FARMING

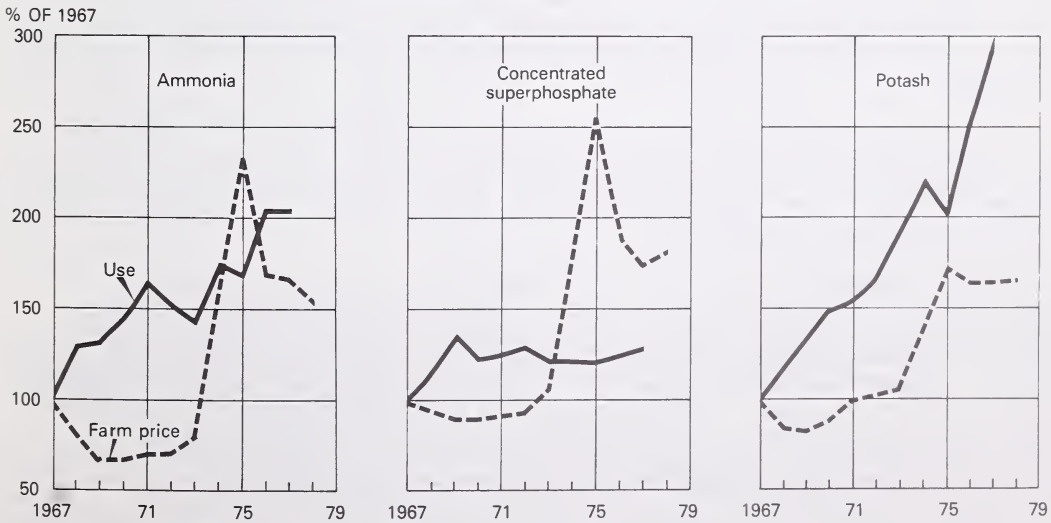


Income From Farming[1]

	1970	1971	1972	1973	1974	1975	1976	1977
				Billion dollars				
Gross income	58.6	60.6	70.1	95.5	99.9	96.9	104.1	108.1
Marketing receipts	50.5	52.9	61.2	87.1	92.4	88.2	94.5	96.1
Government payments	3.7	3.1	4.0	2.6	.5	.8	.7	1.8
Nonmoney and other income	4.3	4.6	5.0	5.8	7.0	7.9	8.9	10.2
Production expenses	44.4	47.4	52.3	65.6	72.2	75.9	81.0	88.0
Net farm income before inventory adjustment	14.1	13.2	17.8	29.9	27.7	21.1	21.1	20.1

[1] This net farm income series does not take into account changes in producer-owned crop and livestock inventories.

FERTILIZER USE AND PRICES



Use: fiscal year ended June 30. Retail price: April 15 through 1976; average of March and May 15, 1977 and 1978.

from higher to lower sales classes, increase real cash receipts per farm, and lessen the market concentration in the farm sector.

Production costs of agricultural commodities.--Costs to produce most major commodities have increased steadily over the period 1974-78. Increases in costs range from 20 percent to produce a hundredweight of milk to over 40 percent per acre for cotton and sorghum.

Price spreads and marketing costs.--Consumers paid more for food in 1977 even though farmers received about the same amount as they did 3 years ago. This widening gap between what consumers pay and farmers receive was due largely to a persistent rise in food marketing costs. Monthly price spreads between the farm and retail level are maintained for more than 50 commodities on both a national and regional or individual city basis. In addition, cost components are measured annually for selected commodities.

Farmer-to-consumer marketing.--There were over 13,000 farmer-to-consumer direct-marketing outlets in the United States in 1976. Farmers view these as alternative markets to increase their income. Consumers see them as a means of getting fresher, higher quality foods at less cost. Consumers also see social and cultural benefits from direct contacts with farmers and visits to farms and the countryside. Nearly 60 percent of U.S. households purchased food in 1977 from at least one of the five types of direct markets studied. Few persons experienced problems with direct-market buying. Among those who did, travel inconvenience was the leading complaint. The market that increased most in popularity between 1977 and 1978 is the type of farm or orchard which offers pick-your-own produce.

Historical perspectives on small farms and farm strikes.--The threatened strike by the members of the American Agricultural Movement led to the preparation of a staff paper on past farmers' strikes. Events substantiated the paper's conclusion that an actual farm strike was most unlikely. Past threats of strikes combined with political pressure have resulted in legislation favorable to farmers.

Analysis of the structure of fertilizer industries.--Many smaller fertilizer plants are owned by firms specializing in other industries, such as fossil fuels and chemicals. However, many of the newer fertilizer plants, some not yet open, are owned by firms specializing in that product. As a result, the proportion of total fertilizer capacity owned by fertilizer firms appears to be increasing. Many of the smaller, older plants may close before the larger, newer plants can be put into operation. If this happens, there is the possibility of domestic nitrogen deficits by the early 1980's.

Many of the newer plants have more efficient methods of processing than those built one or two decades earlier; thus, the overall usage of critical raw materials (such as natural gas) per ton of product may decline. Prices to farmers are not likely to decline substantially from their 1971-73 levels, however, because the costs of energy and capital have risen dramatically.

Feed-manufacturing industry.--In 1975, 6,340 feed-manufacturing establishments produced 104.5 million tons of formula feed. About 5,590 establishments had the capacity to produce over 1,000 tons. Of this number, 58 percent produced between 1,000 and 10,000 tons in 1975. Average utilization of capacity for the industry was 80 percent. Establishments with capacities of 1,000 to 9,999 tons used an average of 33 percent of their capacity. Establishments with the largest capacity, 50,000 tons and over, utilized 137 percent of their defined capacity. Corporations used 85 percent of their potential, and cooperatives used 68 percent. Utilization rates for single-owner and partnership establishments were between those two levels.

Energy research.--Studies on the feasibility of converting agricultural wastes and byproducts to energy indicate that there are difficult technical, economic, and structural barriers to be overcome before bioconversion can be widely adopted in U.S. agriculture.

About 760 million acres of land in farms is used for crops, pasture, range, and forest. Most of this land produces residues or has potential for biomass production to generate energy. However, the feasibility of doing this is still questionable. Costs are high, additional conservation measures would be necessary to prevent degradation of the land, and if land is taken out of food, feed, and fiber production, the cost of these products would rise or alternative sources would have to be found.

Food and Nutrition

Economic analyses of food consumption and human nutrition are provided to public and private officials to aid them in making decisions on food policy, food assistance programs, and food consumption, prices, quality, and safety.

Summary of Accomplishments

Bulletins and staff reports were prepared primarily for USDA and Congressional officials. They reported results of economic research on such topics as child-feeding programs, food and feed additives, food demand, cash instead of commodities in the school lunch program, food labeling and other shopping aids, the impact of gardening on the food supply, direct farmer-to-consumer food marketing, and consumer attitudes toward the food system.

Five seminars on national food policy conducted during fiscal year 1978 were attended by over 500 professionals. A full proceedings of the seminar series on food policy issues was published.

Examples of Specific Accomplishments

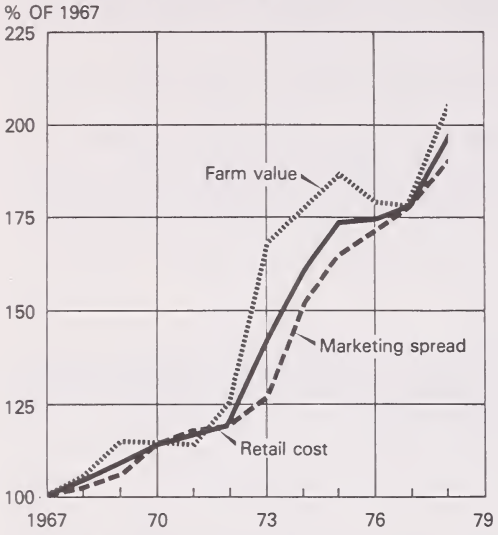
Drug use in animal feed.--The U.S. economy would recover quickly from a more restrictive policy on the use of growth-inducing drugs in animal feed. Such restrictions would initially decrease production and, thus, would increase farmers' costs and consumer prices. After 5 years, however, production and prices for most affected animal species would recover.

Revised demand and consumption data.--A study of food demand in the United States was conducted to provide improved estimates of the way consumers and marketers react to changes in prices, incomes, and supplies of food. The results show that the response of food demand to price and income changes is lower than indicated in previous studies.

Major studies investigating the impact of changing household age and sex composition on food consumption choices and expenditure patterns were completed. These results provide an important new body of information about the effects of household composition on food expenditure patterns.

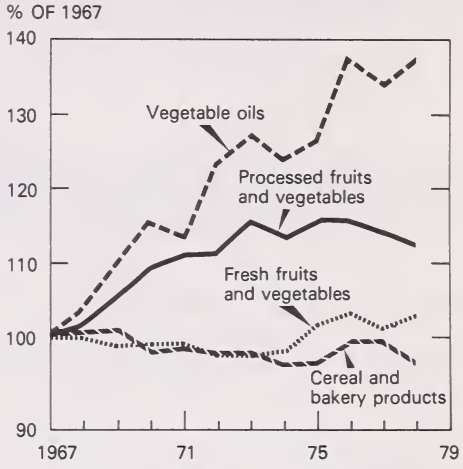
A new total-food-expenditure series was developed which makes it possible to analyze changes in the total consumption of food on an annual basis. It provides more complete coverage than either the narrower expenditures series for domestically produced farm foods or the Department of Commerce personal consumption expenditure series (PCE).

RETAIL FOOD COSTS, FARM VALUE, AND MARKETING SPREAD



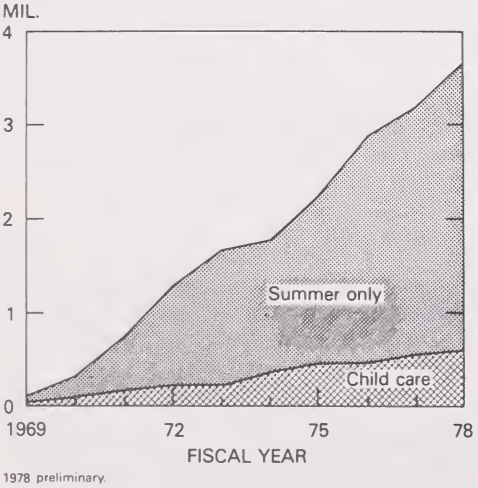
For a market basket of farm foods. 1978 preliminary.

PER CAPITA CONSUMPTION OF SELECTED CROP PRODUCTS



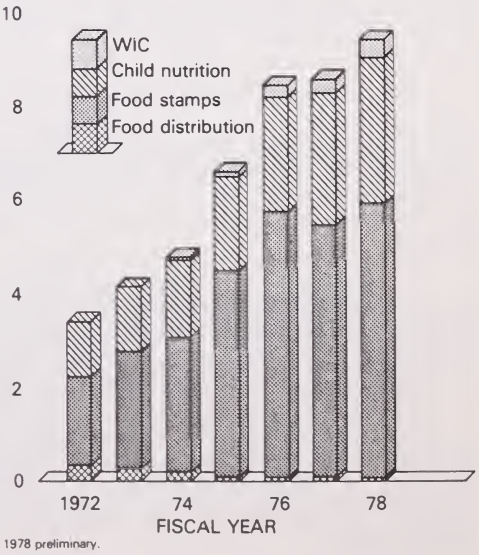
Items combined in terms of 1957-59 retail prices. Processed fruits and vegetables include potatoes and sweet potatoes. Fresh fruits and vegetables exclude melons. Cereal and bakery products include grain.

NUMBER OF CHILDREN IN THE CHILD CARE AND SUMMER FOOD SERVICE PROGRAMS



1978 preliminary.

USDA FUNDING FOR FOOD ASSASSISTANCE



1978 preliminary.

Relative usefulness of shopping aids.--In two phases of a nationwide survey taken in 1976 and 1977, food shoppers indicated a relatively high level of interest in food labeling information and other shopping aids. The greatest shopper interest was expressed in open dating, prices on food packages, and an indication of whether a frozen food product had been thawed prior to purchase. Slightly less interest was expressed in storing instructions, USDA grades for processed fruit and vegetables (which may be confused with USDA inspection), and ingredient information. Little interest was expressed for nutritional information, unit pricing, the drained weight of canned food, and the name of the manufacturer.

Beef: consumer preferences and attitudes.--The effect, if any, of the 1976 changes in the beef grading standards appear to be very slight. Consumers serve beef about every other day, with ground beef being slightly more popular than roasts and steaks combined. Overall satisfaction with the eating qualities of beef is good, but consumers are least satisfied with the amount of fat they find. Food shoppers purchase more than half of their ground beef in a lean form, such as ground chuck, ground round, or extra lean; most of them trimmed fat from their steaks and roasts before eating. Consumers most frequently choose USDA choice over prime and good grades; however, slightly over one-third select the USDA good steak as their first choice.

Gardening's impact on the food supply.--The trend and importance of home production of fruits and vegetables was studied in a national probability sample of households in 3 consecutive years, 1976-78. While the rate of home gardening did not change much from year to year, the percentage of households with fruit or vegetable gardens increased from 43 percent to an estimated 49 percent. In 1977, 34 million households had fruit or vegetable gardens. The average household that had a garden and froze some of its home-grown produce processed an average of 81 pounds by that method. Households that canned produce from their gardens put up an average of 132 pounds. Per capita consumption of processed fruits and vegetables from home gardens was about 11 percent of all processed fruits and vegetables in 1977, indicating that home production of fruits and vegetables does have an impact on the market system.

Summer food service program.--The per-meal cost of providing meals for the summer food service program for children was studied at the request of and in cooperation with the Food and Nutrition Service (FNS). In 1977, based on a rating system developed by FNS, the quality of a sample of lunches prepared onsite rated significantly higher than that of a sample of lunches from vending machines. Results will be used by Congress and FNS in program development and administration to achieve the best quality-cost balance possible.

Agricultural and Food Policy

An important function of the agency is to analyze a broad range of alternative Federal programs and policies regarding their national and regional effects on farm prices, farm incomes, food costs, exports, and the structure and organization of U.S. agriculture.

Summary of Accomplishments

Much of this work concentrates on the major commodity programs, but it also includes analyses of crop insurance, import restrictions, indemnity, and other farmer-related programs. Most of this work is performed for USDA policy officials, the Congress, and others involved in Federal-level decisions.

A wide range of staff papers, briefings, and reports aided policymakers in the development of agricultural policies and legislation. This past year, emphasis was

placed on the evaluation of the proposal by the American Agriculture Movement for parity price supports; alternative crop insurance and disaster relief programs; options on meat imports; dairy policies and programs; grain reserve needs; various types of sugar programs, and others.

Examples of Specific Accomplishments

American Agriculture Movement proposals.--The American Agriculture Movement proposed a program that would set U.S. farm commodity prices at 100 percent of parity and would effectively control markets to ensure that these prices were received. An analysis of such a program indicates it would: (1) increase retail food prices 20 percent the first year and 6 to 7 percent per year thereafter, (2) reduce consumption of certain foods, with red meat showing the greatest decline, (3) reduce feed use 9 percent the first year and increase it 2 percent per year thereafter if farmers continue feedlot feeding, and (4) reduce U.S. exports by 13.5 million metric tons the first year, with the value of exports increased by $7.5 billion; by 1982/83, the value of exports would be almost $10 billion above 1977/78.

The study also indicates that: (1) the equivalent of nearly 75 million acres of land would be idled by 1982, (2) realized net farm income would increase by about $20 billion annually above current levels, (3) much of the increase in income would go to present landowners, because of changing tenure arrangements, (4) farmland values would increase 12 percent or more annually, (5) there would be 3 percent more farmers by 1982 than there would be under current programs, and (6) the overall real growth rate of the economy would be reduced by one-half percentage point and unemployment would be increased by less than one-half percentage point at the end of 2 years.

Grain reserve program.--Major findings of analyses of the impact of alternative grain reserve programs on the wheat and feed grain economy are: (1) the need for a reserve depends upon one's expectations of the magnitude of sudden demand shocks, (2) producers would gain under the reserve provisions of the 1977 farm bill, but the amount of gain would depend on the incentives provided to encourage producers to hold reserves, (3) a farmer-held reserve would produce higher grain prices and higher producer income than the regular CCC program, (4) a CCC-held reserve with high loan rates would produce the highest producer income, but would lower export sales, and (5) a targeted stock level coupled with a producer-held reserve and appropriate release guidelines could provide considerable price stability.

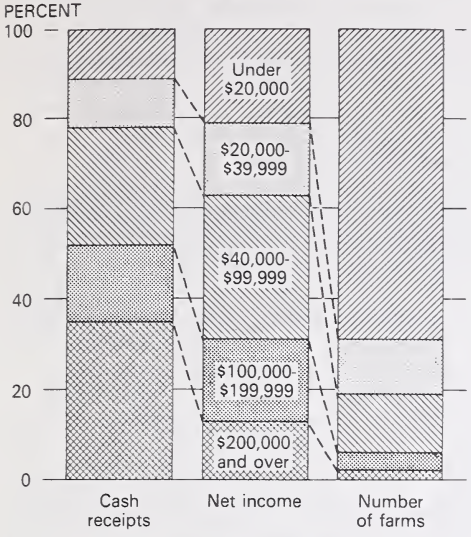
Commodity programs.--An analysis of alternative program provisions that might be used to implement the 1977 farm bill indicates that parity prices are incomplete indicators of farmers' well-being, because they do not adjust for improvements in farm production efficiency. Furthermore, if they were used to establish loan rates at full parity for corn, wheat, and cotton, Government costs would increase about $15 billion, food prices could rise as much as 25 percent, farm income would increase, exports and domestic consumption would decrease, and huge stocks or large acreage set-asides would occur.

An evaluation showed that bushel allotments for grain producers with parity prices for domestic use would have similar effects to the above, but would not affect exports very much.

Allowing grazing on set-aside acreage would increase the demand for feeder cattle and would reduce beef supplies, since gains would be slower than in feedlots. The grazing privilege would be worth an average of $20 per acre.

Paying farmers for acreage diversions according to their individual bids would reduce considerably the cost to the Government. However, this process could create some undesirable regional production dislocations.

CASH RECEIPTS, NET INCOME, AND FARMS BY SALES CLASSES



1977 data. Net income before adjustment for inventory change.

Cash Receipts, Net Income and Farms by Sales Classes, 1977

	Cash receipts	Net income[1]	Farms
	Million dollars		*Thousands*
Farm sales classes:			
$200,000 and over	35,357	2,637	55
$100,000-199,999	16,867	3,569	107
$40,000-99,999	25,469	6,439	348
$20,000-39,999	11,089	3,208	321
Under $20,000	10,668	4,278	1,875
All farms	99,450	20,131	2,706
	Percent of total sales		
Farm sales classes:			
$200,000 and over	35	13	2
$100,000-199,999	17	18	4
$40,000-99,999	26	32	13
$20,000-39,999	11	16	12
Under $20,000	11	21	69
All farms	100	100	100

[1] Before adjustment.

Data from *Farm Income Statistics*, July 1978 (ESCS).

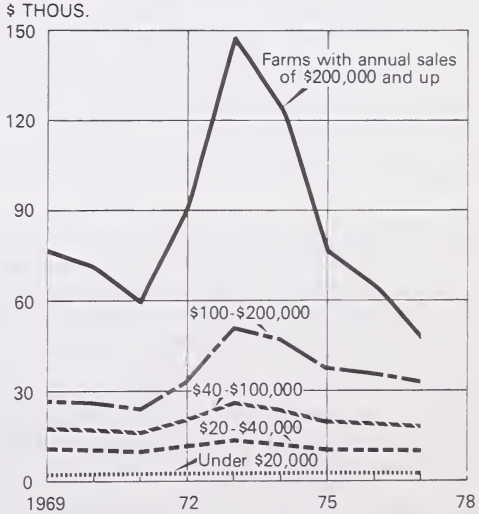
Net Income Per Farm by Sales Classes

	1975	1976	1977
		Number	
Farms with annual sales:			
$200,000 and over	47	53	55
$100,000-$199,999	93	104	107
$40,000-$99,999	314	341	348
$20,000-$39,999	323	323	321
Under $20,000	1,990	1,917	1,875
		Dollars	
Net income[1] for farms with annual sales:			
$200,000 and over	76,681	65,302	47,946
$100,000-$199,999	37,613	35,789	33,356
$40,000-$99,999	19,812	19,052	18,502
$20,000-$39,999	10,254	9,926	9,993
Under $20,000	2,231	2,206	2,282

[1] Before adjustment for inventory change.

Data from Farm Income Statistics, July 1978 (ESCS).

NET INCOME PER FARM BY SALES CLASSES



Net income before adjustment for inventory change. Data from Farm Income Statistics, July 1978 (ESCS).

Disaster assistance for farmers.--Studies undertaken to evaluate alternative options for providing disaster assistance to farmers indicate that an expanded system of crop insurance could be implemented that would increase the level of protection to about $15 billion (compared to about $230 million in 1978) at a cost to the Government of $550 million per year. This expansion in crop insurance would require a substantial increase in sales effort, a subsidy of about 50 percent of the premium, and a reduction in the availability of other disaster assistance programs. The studies show that there are alternative ways of involving the private insurance industry in providing the disaster protection programs, but the Federal role must include the assumption of most of the financial risks. The analyses indicate that an expansion of the involvement of the insurance industry in sales activity may be necessary to reach target levels of participation, but a system of maximum private involvement could be substantially more expensive than a federally administered and operated program.

Eliminating wool import tariffs.--An analysis covering the period 1978-81 examines the economic impacts of three alternative tariff levels on imports of raw apparel wool. These alternatives are: (1) continuing the current apparel wool and compensatory tariffs of 25.5 cents per pound, (2) reducing tariffs 60 percent, and (3) eliminating tariffs. Reducing or eliminating tariffs would have little effect on U.S. wool producers, because their incomes are maintained largely by the National Wool Act incentive payments. In addition, U.S. mill use would increase an estimated 7 million pounds, tariff revenues would decline about $20 million per year, and retail prices of wool products could decline 1 to 2 percent, with a net benefit to the U.S. economy of up to $35 million annually.

Dairy pricing policy.--A policy of eliminating class I price differentials for fluid milk would have little effect on aggregate U.S. milk production, but substantial regional shifts in production would occur. Analysis indicates that the Lake States, Corn Belt, and Plains regions would produce more milk by 1985, with 80 percent of the gain occurring in the Lake States. Six regions would produce less milk, with 40 percent of the overall loss occurring in the Northeast. The cheese industry would be faced with the most severe structural adjustments. An estimated 25 fewer cheese plants would be needed in the Northeast and South Central regions by 1985. This would be offset by the need for 15 additional plants in the Lake States and Corn Belt.

Eliminating minimum class I prices under milk marketing orders would increase the Minnesota-Wisconsin manufacturing milk price, which is used as a basis for pricing, and so would reduce the effective price paid by handlers for fluid milk across the country. The greatest reduction in fluid milk prices would occur in the Northeast, South, and West. In addition, pockets of excess grade A reserves probably would be created in several locations, especially in the upper Midwest, Northeast, and West. Producers in regions with a high proportion of manufactured dairy products, such as the Lake States, Corn Belt, and Plains, would receive higher prices and higher net farm income than under the current price structure. Conversely, farmers in the Northeast, South, and West would receive somewhat lower prices.

Sugar policy research.--Studies of sugar policy options and issues indicate that: the average total cost of producing raw sugar in the United States in 1978 was about 15 cents per pound; consumer costs for the period 1979-82 may differ by $3 to $4 billion under alternative domestic policy options; beginning in 1979, even though some improvement in world sugar prices may be expected, domestic grower returns will likely remain a function of domestic price support measures; due to a significant range in production costs, individuals and regions would be affected differently by alternative price or income support measures; and, due to differences in the size of farms, a payment limitation would become restrictive in sugarcane areas before it would affect sugar beet areas.

Meat import policy.--Analyses were conducted of proposals to introduce counter-cyclical changes in the 1964 Meat Import Act and their probable effects on the

domestic beef cattle economy over the 1979-88 cattle cycle. They indicated that the proposals would tend to increase beef consumption during the buildup years of the cattle cycle and would tend to moderate the downward trend of supply during the period of herd liquidation. Over the entire cattle cycle, most of the proposals would tend to increase beef imports, but the effects on the level of domestic cattle prices would be minor. Prices would, however, be more stable.

Foreign Demand, Supply, Trade, and Development

This research and analysis focuses on U.S. trade policies and programs and estimates and forecasts of U.S. agricultural trade, prices, and foreign financial and monetary conditions. Continuing analyses are conducted of foreign economic developments, long-term projections for the supply and demand of U.S. agricultural products by foreign nations, and special topics such as commodity reserves, price stabilization, monetary adjustments, tariffs, trade barriers, and transportation costs.

Summary of Accomplishments

A wide range of data, information, and analysis was developed in support of the international trade negotiations and other aspects of foreign agricultural trade, policies, and programs. Major work was completed on long-range projections of the world grains-oilseed-livestock economy, the nature and implications of global climatic changes, prospective foreign markets for U.S. agricultural commodities, and the impact of other countries' policies on U.S. agricultural trade. Special studies assessed world food needs and analyzed international policies and agricultural trade. Analytical support was also provided for various food aid and technical assistance programs.

Detailed economic position papers for 33 countries with recommended repayment terms were completed in support of the P.L. 480 food aid program. The handbook on procedures and recent legislative changes affecting P.L. 480 was updated for use by industry and Government officials.

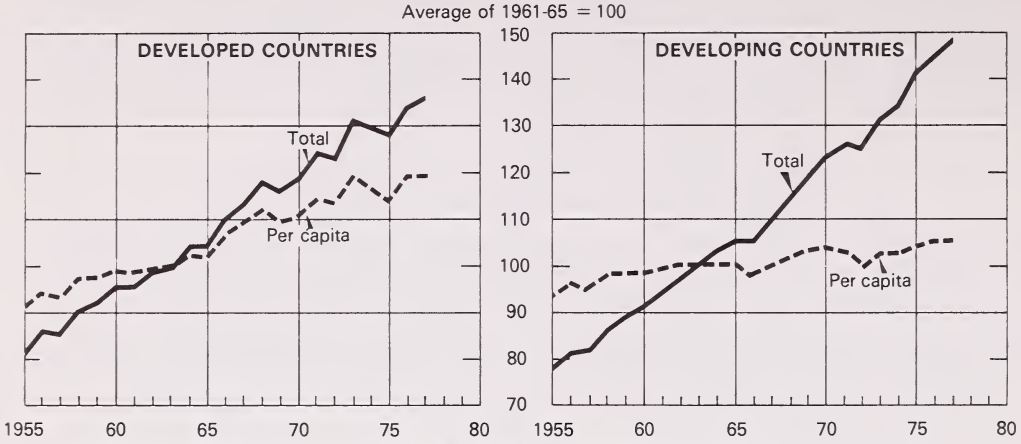
Technical assistance was provided to Algeria, Argentina, El Salvador, Iran, and Kenya. Assistance also was provided to the Southeastern Consortium for International Development (SECID). This group, sponsored by the U.S. Agency for International Development (AID), prepared agricultural sector investment papers for nine southern African countries. Major analyses also were presented to an interagency study on Puerto Rico, ordered by President Carter at the request of the Governor of Puerto Rico.

Examples of Specific Accomplishments

World agricultural situation and outlook.--An extensive and comprehensive analysis was completed of world agricultural developments by commodity and region. Analyses also were made of overall world demand and financial conditions, U.S. agricultural trade, price movements, and developments in international food and trade policy. These analyses provide both the foundation and overall perspective for more specialized outlook and situation work.

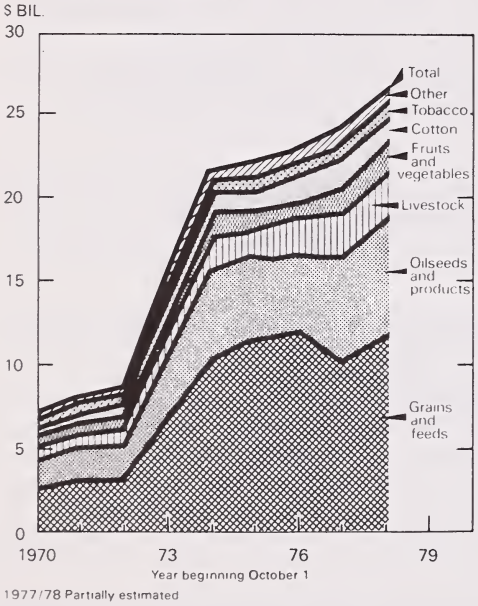
World supply, demand, and trade projections.--Development work was completed on a world grains-oilseed-livestock (GOL) model. The GOL model can make alternative projections to the years 1985 and 2000 of production, consumption, trade, and prices of major commodities for the various world regions. It can be used to answer questions such as: the impact of weather- and climate-induced yield variation on U.S.

CHANGES IN AGRICULTURAL PRODUCTION



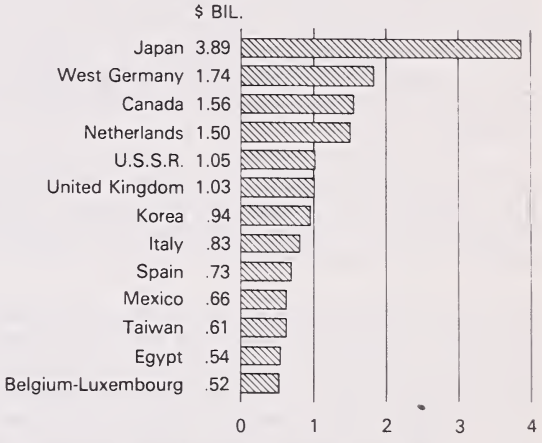
Developed countries include United States, Canada, Europe, U.S.S.R., Japan, Republic of South Africa, Australia, and New Zealand. Developing countries include South and Central America, Africa (except Republic of South Africa), and Asia (except Japan, People's Republic of China, and Vietnam).

U.S. AGRICULTURAL EXPORTS BY PRINCIPAL COMMODITY GROUPS



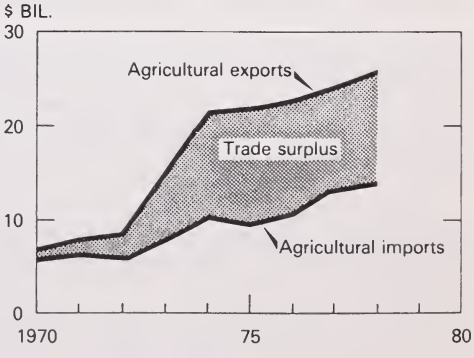
1977/78 Partially estimated

WHERE WE SHIP OUR AGRICULTURAL EXPORTS



1977 data. Adjusted for transshipments through Canada and Western Europe

U.S. AGRICULTURAL TRADE BALANCE



October-September years. 1977/78 partially estimated.

agricultural trade; world prices and sources of foreign demand; and the impact of lower demand from the European Community and elimination of export subsidies.

Food needs of the low-income countries remain large relative to current food production and volume of food moving in world trade. Limited foreign exchange will restrict imports as an alternative to domestic production of food. Accelerated growth in food production, increased export earnings, and substantial growth in buying power are needed to meet all food needs.

U.S. agricultural exports totaled $26.6 billion for fiscal year 1978--more than 3-1/2 times the value of 1968 exports. Grains, oilseeds and products, and animals and products were the commodity groups mainly responsible for the gain in U.S. farm exports in recent years.

Impact of foreign policies on U.S. agricultural exports.--The Canadian policy of making Canadian feed grains more competitive with U.S. corn in eastern Canada has adversely affected U.S. exports. The U.S. share of eastern Canada's feed grain imports was 10 percent during 1976/77, compared with nearly 23 percent in 1975/76 and an average of 37 percent since 1970/71.

The Japanese Government's controls on the import, resale, and price of wheat have been adjusted in recent years to encourage rice consumption to the disadvantage of U.S. wheat exports to that country. Analysis indicates that Japan has the capability to attain most of its ambitious agricultural production goals for 1985/86; however, the net social costs would amount to nearly $8 billion.

International policies and world agricultural trade.--The capital required to stabilize foreign exchange earnings of the less developed countries under the UNCTAD Integrated Nations program is estimated to be $600 million for nonstockable goods and $1.7 billion with the inclusion of stockable goods. Sugar and copper would dominate this program and account for almost 90 percent of the total costs.

Climatic change and world agriculture.--Twenty-four prominent climatologists from seven countries were surveyed for their views on the probability of specified climatic events in the future. Opinions varied widely about temperature trends to the end of this century. In general, it was suggested that the climate would resemble the average for the past 30 years, with a possible slight global warming. They concluded that technological changes on the yields of wheat, rice, corn, and soybeans in the United States and seven other major producing countries would likely be much greater than the effects of weather.

Improving forecasts and methodologies.--Further progress was made in the development of world net trade models to improve the agency's capability to forecast world grain trade and price levels. Seasonal adjustment methods were developed and evaluated for improving and updating forecasts of U.S. agricultural exports. A soybean model is being added to the system.

Work was continued to improve, on a country-by-country basis, the knowledge of factors affecting foreign imports and exports and to analyze the impact of U.S. trade policies and programs. In addition to improvements already made in the capability for analyzing the European Community, analytical models have been completed for Japan, Iran, and Australia. They are now being used to help estimate U.S. forecasts of grain, oilseeds, and oilseed products.

A computer system has been developed to provide more timely and comprehensive statistical summaries of changes in world commodity trade. It includes a 20-year series of annual and monthly U.S. and foreign prices, including prices from the farm to the export market.

Studies were made of the economic relationship in the feed-livestock sectors of those world regions that account for the greatest share of U.S. exports of corn, soybeans, and other feedstuffs and of the demand factors that determine livestock consumption in Japan and the European Community. The results provide a better basis for estimating demand for U.S. products.

Agriculture and trade of centrally planned countries.--Studies were undertaken of agricultural developments in the centrally planned countries and on the impact of these developments on U.S. agricultural exports. An analysis of 1976-80 agricultural development plans in Eastern Europe indicates that imports of protein feed throughout the region will increase in coming years and that the United States is likely to remain the dominant grain exporter to the region. Despite pressures to increase grain production, imports by the Peoples' Republic of China will rise, creating new opportunities for U.S. grain exports. Only scanty information is available on soybean production in the PRC. However, indications are that PRC soybean production has likely declined since the fifties under pressures to increase grain production. This drop in production explains steadily dropping PRC exports during the period and the country's occasional importing of soybeans in recent years. An analysis of the U.S.S.R.'s plans for 1981-85, together with projections of Soviet grain production and grain requirements, suggests that the U.S.S.R. will continue to be a major, but highly variable, grain importer. There is no indication of a leveling off of feeding rates in the U.S.S.R.

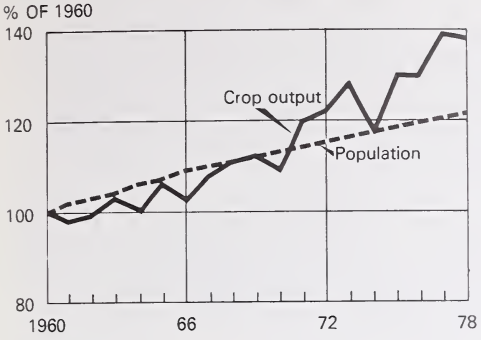
Natural Resource Conservation and Management

Research on the supply, demand, and control of natural agricultural resources aids in planning and managing Federal land and water programs. Specific objectives of this research are: to inventory the availability, productivity, current use, ownership, and rates of depletion or improvement of land, water, and energy resources; to analyze the economics of developing new farmland, irrigation technology, and conservation investments, and to investigate the need for Federal aid in such programs; to evaluate the effect of domestic and foreign ownership on the availability of natural resources to agriculture and the impact on the structure of agriculture; to examine the impact of credit and various taxes on natural resource use; to develop national and regional economic analysis tools to aid decisionmaking on natural resources; to provide planning assistance and economic analysis for Federal resource conservation and development, small watershed, and river basin planning programs; to provide economic evaluation for resource development in selected developing countries; and to provide technical assistance in land reform and land tenure issues as part of the U.S. foreign aid program.

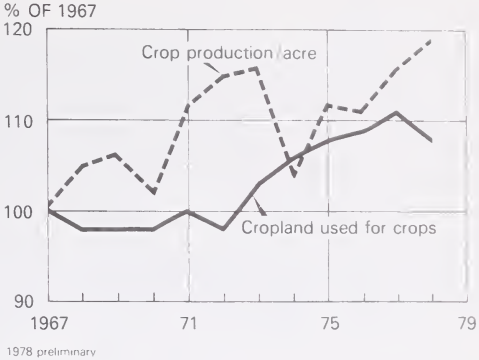
Summary of Accomplishments

Data from 60,000 landowners have been collected as part of a national landownership survey. Additional follow-on surveys will add to the data needed for analysis of landownership, irrigation, and other aspects of resource use. Assessment of proposed Department of the Interior rules concerning the 160-acre limitation issue was completed. Eight comprehensive river basin studies were completed in cooperation with the Soil Conservation Service (SCS) and the Forest Service (FS). Also, 10 resource conservation and development (RC&D) and small watershed program studies were completed for SCS. A feasibility study was begun on systems to monitor foreign investment in U.S. real estate.

HOW CROP OUTPUT COMPARES WITH POPULATION INCREASE



CROP PRODUCTION PER ACRE AND CROPLAND USED FOR CROPS

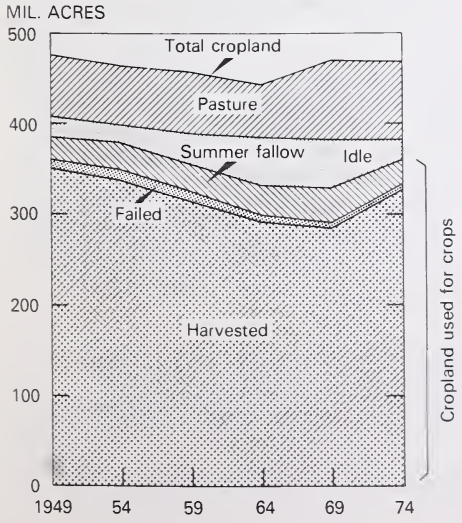


1978 preliminary

Cropland Output, Crop Production Per Acre, and U.S. Population

	1975	1976	1977	1978
	Percent of 1960			
Cropland output	130	130	139	138
U.S. population	118	119	120	121
	Percent of 1967			
Cropland used for crops	108	109	111	108
Crop production per acre	112	111	116	119

MAJOR USES OF CROPLAND



Major Uses of Cropland

	1959	1964	1969	1974
	Million acres			
Total cropland	458	444	472	465
Harvested	317	292	286	322
Failed	10	6	6	8
Summer fallow	31	37	41	31
Idle	34	52	51	21
Pasture	66	57	88	83

Examples of Specific Accomplishments

160-acre limitation.--Of nearly 11 million acres of irrigable land served by Bureau of Reclamation projects, only 500,000 to 1 million acres are held in excess of the 160-acre limitation placed on recipients of public irrigation water. About 90 percent of the excess land is held in California, with Texas, Arizona, Nebraska, Montana, and Wyoming accounting for 7 percent. If the limitation rule were enforced, an estimated 950 to 1,000 new farm operations would be created in California; 630 in the Westlands Water District and 350 in the Imperial Valley. While these would be smaller than current farms, the research indicated that they would be able to compete fully in the production of irrigated crops. Population changes in these areas are uncertain due to potential offsets in displaced workers on excess lands. Population increases of 4,500 to 5,000 would require local government expenditures of about $3.2 million per year. In the North Platte and Columbia River Basins, most excess land holdings would probably be handled through ownership transfer within families rather than by sale; only 30 to 50 new farms would be created in each of these regions.

Irrigation and energy.--A survey of irrigation pumping in 1974 reveals that over 35 million acres were irrigated with water pumped from wells, rivers, and lakes. About 260 trillion Btu's of energy, costing $594 million, were required to pump the water. Electricity and natural gas were the primary energy sources used. Pump irrigators are especially vulnerable to increasing energy prices, which will make it uneconomical for some farmers to continue their present level of water use and their current cropping patterns. Opportunities to pass on higher energy costs are limited, and major economic adjustments will be necesary.

Mined-land reclamation in the West.--Earth handling typically accounts for 70 to 80 percent of reclamation costs, which currently range between $2,000 and $9,000 per acre of mined land and average about $3,500. These costs range from about 2 cents to about 34 cents per ton of coal mined, and average about 5 cents--less than 1 percent of the price of coal. Fragile environments, however, cannot always be successfully reclaimed at these costs.

Agricultural impacts of oil shale development.--Nearly 2 trillion barrels of oil are contained in oil shale rocks in Colorado, Utah, and Wyoming. However, costs, technological limitations, and environmental problems stand in the way of obtaining this oil. Water for oil shale development in Colorado would probably have to be diverted from agriculture. As much as 20 percent of irrigated farming in Colorado could be lost, but irrigation losses in Utah and Wyoming would be slight.

Locational impact of Western coal development.--Electric utilities have already concluded contracts to obtain a major portion of their long-term coal needs. Based on these contracts, coal production from Montana, North Dakota, Wyoming, Colorado, Utah, Arizona, and New Mexico is projected to increase from 65 million tons in 1975 to 286 million tons in 1985. Coal production in northeastern Wyoming is projected to rise from 3.5 million tons in 1975 to 106 million tons, by far the largest increase. Other large increases will occur in Rosebud County, Mont., and the Four Corners area of New Mexico--all strip-mined coal. By 1985, strip mining will be taking about 6,000 acres annually. Deep-mined coal from central Utah is projected to increase from 3 million tons in 1975 to 16 million in 1985. With a 3-year delay of certain key plants, western coal output would rise to only 230 million tons by 1985.

Changes in land use.--Land used for crops increased sharply after 1972 in response to a strong export demand for farm products. Slightly more than 1 million acres of agricultural land annually had shifted to urban, transportation, and water reservoir uses between 1969 and 1974.

An evaluation of declines in the cropland base and the amount, location, and quality of land with cropland potential indicates that 7.4 million acres of the urban and

water conversions between 1967 and 1975 were from prime farmland. When all noncropped land with potential for cropland was analyzed, only 15 million acres were found to have no limitations for crops.

Federal taxation and incentives for foreign investment in U.S. real estate.--U.S. farmland purchases by nonresident foreign investors have caused some concern about comparative tax treatment of U.S. and foreign investors. It was found that U.S. tax provisions give some foreign investors an advantage. A number of countries have tax treaties with the United States. These treaties allow foreign investors in the 60-percent tax bracket for ordinary U.S. income an advantage ranging from 12 to 15 percent for farmland that appreciates at a rate of about 8 percent per year.

Federal tax incentives and conservation easement donations.--A number of organizations are now encouraging the donation of scenic or conservation easements in an attempt to preserve open space. Due to the combined effects of such charitable donations on Federal income, capital gains, and gift and estate taxes, it is possible for some wealthy donors to receive tax benefits of up to 123 percent of the value of the easement. The donation of a conservation easement is likely to be economical only for taxpayers with high incomes and considerable taxable wealth.

Analytic models and procedures.--Water resource planners use normalized prices in the planning process, with these prices estimated from a linear trend applied to historic prices. During periods of highly variable prices, this procedure is inadequate. A more sophisticated methodology has been developed based on a statistically distributed lag procedure.

A national model for pesticide impact assessment treats livestock as an independent, predetermined activity, and a goal-programming model estimates feed requirements by livestock class and region.

A land and water resource and economic modeling system was developed to support evaluation of Departmental conservation programs.

River basin planning assistance.--A number of studies were conducted for the Soil Conservation Service to provide a wide variety of information needed for river basin planning and for operating the resource conservation and development and small watersheds programs.

One river basin study in southwest Ohio found that soil losses could be reduced 40 percent by doubling the proportion of conservation tillage on soils subject to erosion. Another in the San Joaquin Valley of California showed that a drainage improvement program could increase farm net revenues by $40 million. A report on the effects of small watershed development on land values in the Great Plains region revealed that such developments generally resulted in less than a 10-percent increase in land values. A methodological report was prepared on the use of input-output analysis to estimate direct and indirect economic impacts on a region from the implementation of natural resource development plans. It detailed the limitations of input-output analysis, the conditions under which it should be used, and its relationship to other techniques.

Environmental Quality

This research focuses on the economic and social impacts of Federal environmental quality standards, regulations, policies, and programs on agriculture and rural areas. Some of the specific objectives of this research are: to assess economic implications of agricultural pesticide regulations on producers, consumers, and local communities;

to develop nationwide information on pest control, including chemical, biological, and cultural control methods; to determine cost effectiveness and economic impacts of alternative pest control strategies, including integrated pest management; to assess the economic and environmental effects of soil and water conservation, pollution abatement, and waste utilization programs and policies on farm production, farm costs and incomes, consumer prices, water quality, and other factors; and to develop improved economic research tools for policy analysis and program evaluation of pest control and water quality programs, projects, and practices.

Summary of Accomplishments

Public and private decisionmakers were provided estimates of costs and benefits to farmers of recommended management practices for nonpoint pollution control and estimates of the effects these practices have on water quality. Information also was provided to municipalities, plant managers, rural communities, and farmers on investments and annualized costs of alternative systems for recycling and aerating sludge and effluents.

Economic assessments of potential regulatory actions were provided to the Environmental Protection Agency (EPA) for seven pesticides; however, a decision has been made on only one.

Examples of Specific Accomplishments

Assessments of pesticide regulations.--Economic assessments were made of the uses of trifluralin, endrin, toxaphene, DBCP, pronamide, diallate, and amitraz.

Trifluralin is used extensively for controlling weeds in cotton and soybean production. EPA was petitioned in February 1977 to immediately suspend the use of this herbicide. EPA denied this petition based on ESCS findings that farmers would lose $520 million in the first year and about $313 million per year in the long run.

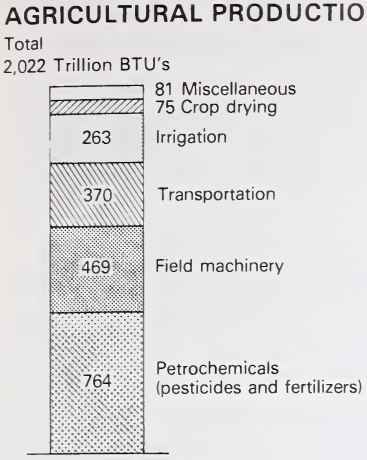
Endrin is used to control mice in orchards, to protect conifer seeds from rodent damage, and to control cutworms in wheat production. If endrin were cancelled, apple growers would lose $4.3 million the first year, with losses increasing over time as roots became damaged and trees died; annual production costs for conifer seeds would increase by $165 per acre in the Rocky Mountains and $43 per acre in the South; and wheat producers would lose $25 million annually.

Toxaphene is an insecticide used on cotton, cattle, wheat, soybeans, sorghum, and peanuts. Its cancellation would cost high-volume users up to $145 million in the first year. Cotton producers would be most heavily affected, but a number of specialized, low-volume users could lose effective control over pests.

DBCP is a soil fumigant used in peach, citrus, grape, pineapple, soybean, cotton, peanut, and vegetable production. Its cancellation could cost U.S. farmers $128 million. Based on a benefit-risk analysis, EPA has canceled the use of DBCP in peanut and most vegetable production, but retained its use on the other crops under restricted conditions.

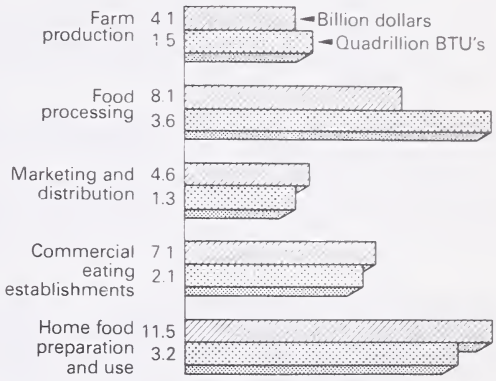
Pronamide is used principally to control weeds in lettuce and alfalfa seed production in the Western States. Expected crop losses to lettuce producers from its cancellation would range from $24 to $37 million per year.

ENERGY USED IN AGRICULTURAL PRODUCTION



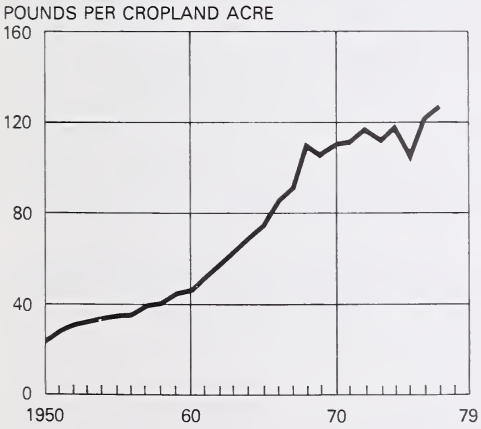
1976 data

ENERGY USED IN U.S. FOOD SYSTEM

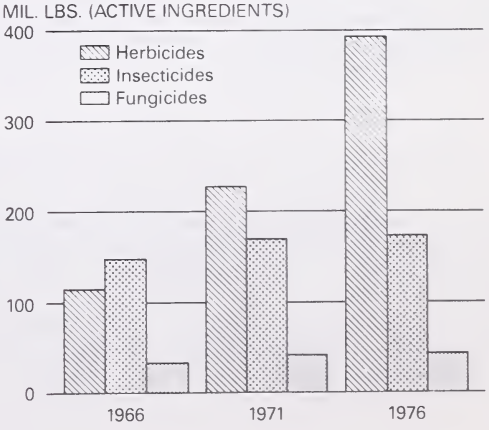


1975 data

FERTILIZER NUTRIENTS USED PER ACRE



VOLUME OF PESTICIDE SALES



Diallate controls wild oats in sugar beet, flax, lentil, and pea production in the Northern Plains and Pacific Northwest. Without this herbicide, farm returns would decrease about $7.6 million, with $7.1 million of it borne by sugar beet producers.

Amitraz is the only effective material currently under consideration for registration as a summer control of pear psylla in pear orchards. It is more expensive than currently registered insecticides, but is far more effective. Without effective pear psylla control, western pear growers would have lost about $3.7 million in 1977 and cumulative losses could be $33.1 million by 1981.

Controlling agricultural nonpoint pollution.--The effects of various strategies to control excess erosion and sedimentation from field crop production in a watershed of the Iowa River in Iowa were examined. A 10-ton-per-acre gross erosion limit would reduce the amount of sediment deposited in the Coralville Reservoir by 68 percent and increase production costs by 2.5 percent. An erosion limit of 3 tons per acre would increase costs 17 percent, but would decrease sedimentation by 91 percent.

Sludge composting for land application.--The costs and results of processing sludge into compost by either the windrow or aerated pile methods are not significantly different. Windrow composting requires a higher initial investment of $4 to $8 per dry ton, while the aerated pile method requires higher operating expenses of $1 to $21 per dry ton. Both methods are feasible when processing about 70 dry tons of sludge daily, and both provide compost suitable for land application.

Land application of wastewater.--Few States have specific regulations controlling land application of wastewater. For the most part, however, State water-rights laws contain enough flexibility, through their emphasis on encouraging reasonable uses of water, to enable land application systems to operate legally.

Impact of wastewater treatment regulations.--The cost of achieving high levels of wastewater treatment varies with the size of the treatment facility. Average costs for a treatment facility with a capacity of 500,000 gallons per day are 2-1/2 to 3 times higher than for one with a capacity of 10 million gallons per day. This is very costly for many small rural communities. However, the burden can be reduced by tailoring the required treatment level to the natural assimilative capacity of receiving streams. Existing cost-sharing rules do not reduce the relative cost differences between small and large communities for advanced wastewater treatment.

Dairy-processing waste treatment.--Dairy plants using municipal wastewater treatment facilities would find it less costly to remain with the municipalities and pay a higher use charge rather than construct their own private treatment systems. For dairy plants without access to municipal waste treatment systems, a ridge-and-furrow land disposal system costs less than either a stabilization pond or an aerated lagoon irrigation system. A ridge-and-furrow system meets all discharge limitations for surface water because there is no effluent discharge.

Rural Development

Rural development research provides information to improve the effectiveness of decisions of Federal, State, and local agencies that plan and manage programs for the development of rural communities. The research deals with demographic trends, manpower programs for rural labor, rural well-being indicators, revenue sources for local governments, adequacy of community services (such as water, sewerage, medicine, education, housing, energy, credit, and transportation), and the impact of Federal programs and policies on rural growth.

Summary of Accomplishments

Research has provided analyses of farm population trends, population decentralization, rural employment and differences between urban and rural earnings, the effects of Government job and welfare programs, rural education problems, the availability of health care and facilities, housing credit problems, housing conditions of hired farmworkers, the effects of coal development on rural communities, the extent of employment shifts in rural areas, the geographic distribution of Federal outlays, and indicators of social well-being.

Examples of Specific Accomplishments

Trends in farm population.--The U.S. farm population continued a long-term decline in 1977, decreasing to 7,806,000 persons for a loss of 447,000 from 1976. About 80 percent of the decline were white farm residents, and 20 percent blacks, Indians, and other ethnic groups. Partial data indicate that the rate of loss for 1978 will be much smaller than the sizable declines experienced from 1974 to 1977. The number of farm residents in 1977 employed primarily in nonagricultural industries was--for the first time--essentially equal to the number working in agriculture. This reflects the increasing number of farm families who rely on both farm and nonfarm income; the great majority of employed farm women work off rather than on the farm.

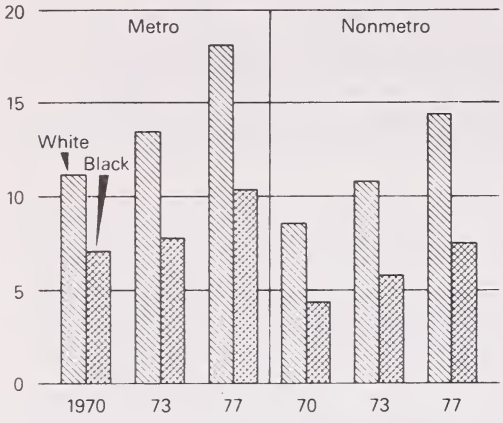
Decentralization of U.S. population.--New data show that one-eighth of the 1975 population in nonmetro areas had moved there within the previous 5 years. Such new residents are rather young (median age, 27.5 years), are well educated (median school years completed, 12.6), are disproportionately White (49 percent), and earn a somewhat higher income than other nonmetro residents. They are employed mainly in professional, managerial, and technical positions.

Nonmetro areas gained population from metro areas in all age categories except that of 15 to 24 years old. The migration to rural areas and small towns continued without letup during 1975-76. About 400,000 more people moved into nonmetro counties than moved out of them during the year. Thus, the total nonmetro population is growing despite declines in the farm sector. That pattern reversed the trend of the 1960's and is very widespread. Two-thirds of the nonmetro counties that had population declines in the 1960's have experienced population growth in the 1970's. Most nonmetro counties still losing population are doing so at a much slower pace than earlier. Areas of continued loss are located largely in the Great Plains and western Corn Belt where farming still dominates the economy.

Shift in manufacturing employment to nonmetro areas.--Manufacturing employment increased 11.3 percent in nonmetro areas between 1967 and 1973, while declining 3.2 percent in metro areas. The shift of manufacturing employment to nonmetro areas can be attributed both to a favorable mix of rapid-growth industries and to favorable competitive conditions which permitted nonmetro areas to increase their share of employment in 17 of 21 manufacturing industries. Manufacturing industries appear to prefer smaller cities. Cities with a population of more than 300,000 are losing large shares of both slow- and fast-growth industries to nonmetropolitan and smaller metropolitan areas. Nonmetropolitan areas also are benefiting from a favorable industrial structure. These areas appear to be taking on some of the traditional functions of the large metropolitan areas by beginning to specialize in fast-growth industries and income-elastic products.

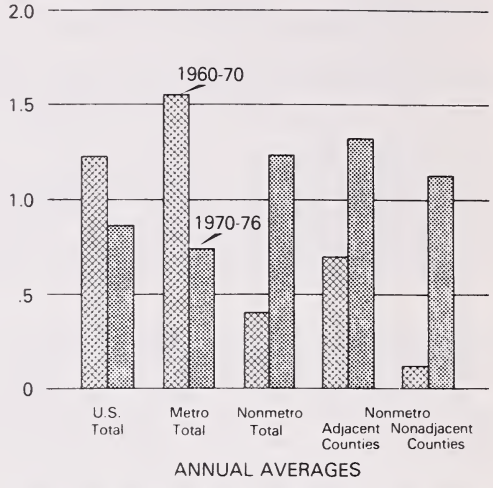
The construction of the interstate highway system is a factor in the decentralization of both population and total employment and in the shift of manufacturers from large cities to smaller cities, rural towns, and the open country. During the period 1967-75, nonmetropolitan counties with interstate highways had more rapid population and

MEDIAN FAMILY INCOME



The median is the middle value with half the families below and half above
Source: Bureau of the Census

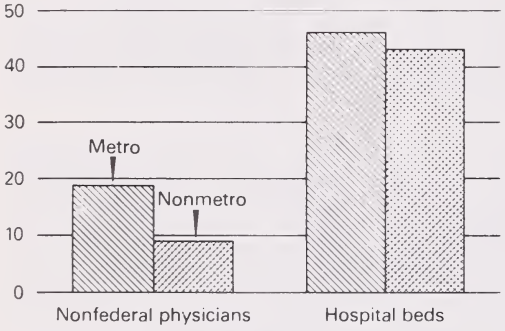
POPULATION CHANGE



ANNUAL AVERAGES

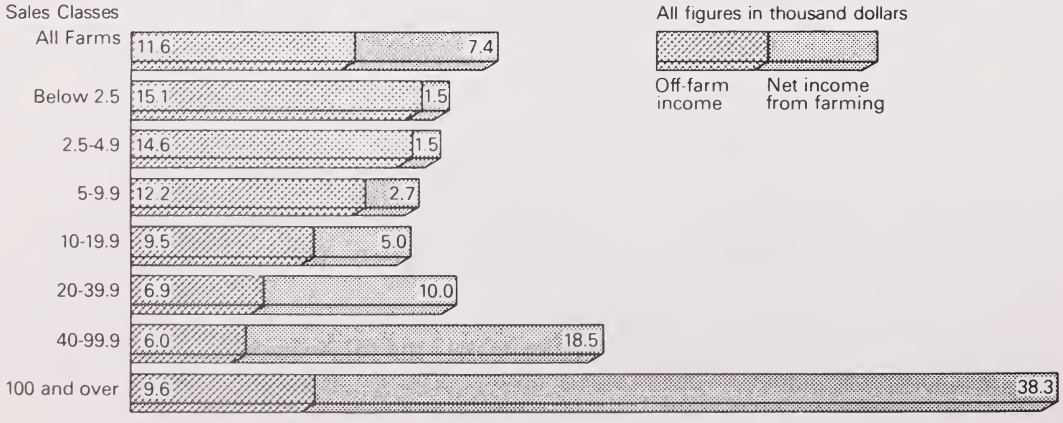
Adjacent counties refer to those bounding standard metropolitan statistical areas as defined in 1974. Source: U.S. Bureau of the Census.

PHYSICIANS AND HOSPITAL BEDS



1975 data. Source: American Medical Association and American Hospital Association

FARM AND OFF-FARM INCOME PER FARM OPERATOR FAMILY BY VALUE OF FARM PRODUCTS SOLD



1977 data. Net income before inventory adjustment and includes nonmoney income from farm food and housing

employment growth than either metropolitan counties or nonmetropolitan counties without these highways.

Metropolitan-nonmetropolitan earnings differentials.--Earnings of workers in metropolitan areas in 1973 averaged 25 percent greater than those of workers in nonmetropolitan areas. This difference resulted from the dissimilar distribution of occupations, even within the same industries. Most industries that pay higher than average salaries are not proportionally represented in nonmetropolitan areas. In addition, nonmetropolitan areas have a higher proportion of lower paying occupations. These two factors account for about one-third of the earnings difference between metro and nonmetro areas. The primary cause is that companies' central headquarters are usually located in urban areas, while production facilities are located at the least-cost location. In the manufacturing, transportation, and wholesale trades, professionals are concentrated in metro areas while workers in craft and other occupations are more heavily concentrated in nonmetro areas.

Evaluation of the Program for Better Jobs and Income.--The Federal Program for Better Jobs and Income (PBJI) could have a significant impact on rural areas, particularly in the South, because it makes more poor people eligible for financial assistance by including young and middle-aged male-headed families, childless couples, and single individuals. These groups are generally excluded from current Federal welfare programs. A disproportional number of young and middle-aged male-headed families and childless couples in poverty reside in nonmetro areas, and a disproportionate share of nonmetro poverty is located in the South, where welfare benefits tend to be lower than in other States. As a result, a larger share of PBJI's benefits would go to the South and to rural areas.

A major aim of the jobs program is to help participants learn marketable job skills. Rural labor markets, however, generally have fewer alternative occupational opportunities than urban markets, and there are likely to be fewer nonmetro employment opportunities for persons with specific job skills. Thus, it will be more difficult to develop an effective program in rural areas.

Geographic distribution of physicians.--The number of non-Federal physicians located in nonmetropolitan counties with populations less than 10,000 declined from 2,423 in 1960 to 1,994 in 1974. This increased the number of people per physician in rural areas from 2,037 to 2,438, continuing a trend begun in the 1940's. This contrasts with the national trend, in which the number of people served by one physician declined from 852 to 658 during the same period. Counties with populations between 10,000 and 25,000 also experienced increases in population per physician.

Analyses show that the number of physicians in a geographic area is determined by the area's population, the prices charged by physicians, and the overall quality of life in the area. The location of physicians also is influenced by the rate and volume of Medicare-Medicaid reimbursements.

Small-farm profile.--A profile of farms with annual gross sales of less than $20,000 indicates that although small farms represent over 70 percent of all farms, they account for only 10 percent of the food and fiber sales. However, small-scale farmers control 31 percent of total farm assets and, compared with larger farms, their assets are relatively debt free. A typical family living on a small farm earns about $15,000 per year, with more than 80 percent of its income derived from nonfarm sources. Approximately 20 percent of the small-farm population is estimated to fall below the poverty line. Small-scale farmers tend to be older and less educated than other farmers. Four percent of the small-farm population are minorities, but more than 90 percent of all minority farmers fall in the small-farm category.

County indicators of social well-being.--Indexes of social well-being measure dimensions of socioeconomic condition, health status, family status, and social pathology. Analysis shows a substantial degree of variability in well-being within and among regions, States, and metro/nonmetro counties. One study of Ohio counties focused on the relationship among those four indicators, Federal outlays for selected kinds of programs, and social and demographic characteristics. The factors found to be related to quality of life were different for metropolitan and nonmetropolitan counties. For example, metropolitan counties in Ohio with more serious health conditions received higher levels of Federal human resource outlays than did nonmetro counties with similar health conditions.

Housing conditions of hired farmworkers.--The housing conditions of hired farmworkers in 1975 may not have been much different from that of farm operators or the rural nonfarm population. In 1975, there were 2.6 million farmworkers occupying about 2 million housing units. Ninety-two percent of the farmworkers lived in single-family units quite similar in characteristics and quality to those occupied by the farm operators. Inadequate housing was closely associated with household incomes.

Migratory workers occupied about 7 percent of the 2 million farmworker housing units. While the quality of their permanent homes could not be determined, the housing occupied by migrant workers during their travels was found to be markedly inferior to that occupied by most farmworkers. Fifty-two percent of the houses were single-room units, 75 percent of the units lacked complete plumbing, 74 percent of the dwellings had a complete kitchen (installed sink with piped water, range or cooking stove, and refrigerator), about 50 percent of the units were connected to a public water system, and 28 percent had no heating equipment. The quality of housing occupied by migratory farmworkers was far below that of most farmworkers.

Effects of coal development in the Northern Great Plains.--A prototype model, Coaltown II, has been developed to project employment, population, net migration, ancillary wage levels, labor force participation rates, and expenditures and revenues for local schools, towns, and counties affected by coal mines. The model is a product of a continuing study of the effects of coal development in the Northern Great Plains. The study indicates that total population changes due to coal mining in Montana up to 1985 will likely be small. The major fiscal problems of local communities result from wage inflation and uncertainty in the rate and timing of growth. Communities also have severe finance problems when large numbers of workers, requiring additional facilities and services, move in before the mine, power plant, or other facility to be built provides an offsetting tax base. A problem also occurs when workers live in a different taxing district than the one where the mine or other facility is located; a local government that has an active mine in its jurisdiction should have an adequate tax base to finance the additional services, but jurisdictions where the workers live would have to provide new services without an improved tax base.

Research and Technical Assistance for Cooperatives

Through research, technical assistance, and educational and informational programs, advice is provided to large and small farmers, co-op officials, and other rural people on how to develop new cooperatives and how to improve or expand existing cooperatives. Assistance is provided to all farm cooperatives to assist them in developing cooperative management skills. Depending on the need, the commitment to individual projects could be a single specialist for a short time or a substantial team for a longer time. The development of new cooperatives is an important part of the overall program. Farmers' requests are responded to in a number of ways: by providing them with advice on how to organize; by conducting feasibility studies; by educating and

training members, directors, and key employees; and by following through after incorporation to ensure a successful operation.

Summary of Accomplishments

During the past year, studies were conducted on the structure of the red meats industry, the financial profile of cooperatives, the use of industrial bonds by cooperatives, and other financial, organizational, legal, social, and economic aspects of cooperative activity. Data were collected to monitor changes in cooperative structure, operation, and growth. The agency served as a central storehouse of data and information about U.S. farmer cooperatives.

Examples of Specific Accomplishments

Cooperative development.--Assistance is being provided to 25 cooperatives in various stages of development. These cooperatives deal with broilers, feeder pigs, vegetables, fruits, crafts, and fish. Six of the cooperatives are in a preliminary planning stage, two are being studied for feasibility, six are being helped with financing through the Farmers Home Administration and other sources, and 11 are in the implementation stage. In addition, a fieldman was stationed in California to help former migrant workers develop production-marketing cooperatives. These individuals jointly lease lands and pool their limited resources, mainly to produce strawberries in irrigated areas.

Cooperative survival in a changing environment.--Extensive research recently completed in cooperation with Purdue University defines what farmers must do if their cooperatives are to survive. Farmers must: select a marketing strategy to adjust better to the changing environment; increase their financial commitment; improve marketing, not just selling; do more and better long range planning; make greater use of multicooperative organizations; develop or improve market information systems; and expand product research and development.

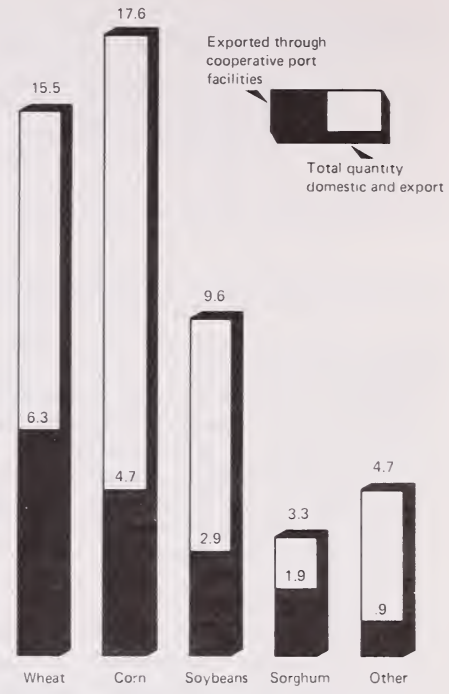
Cooperative directors.--These directors play a key part in ensuring that the needs and desires of the membership are heard and accommodated as the size and operational sophistication of farmer-owned cooperatives grow. A study of the attitudes and participation of over 1,800 farmers as directors on cooperative boards found that most directors believe cooperatives should function according to the traditional principles of cooperation. The majority of the directors believe they are responsive to members' needs, but that they should do more in reviewing complaints of members. In general, the directors felt that the boards have considerable knowledge concerning the cooperatives' strengths and weaknesses and exercise effective control over cooperative operations.

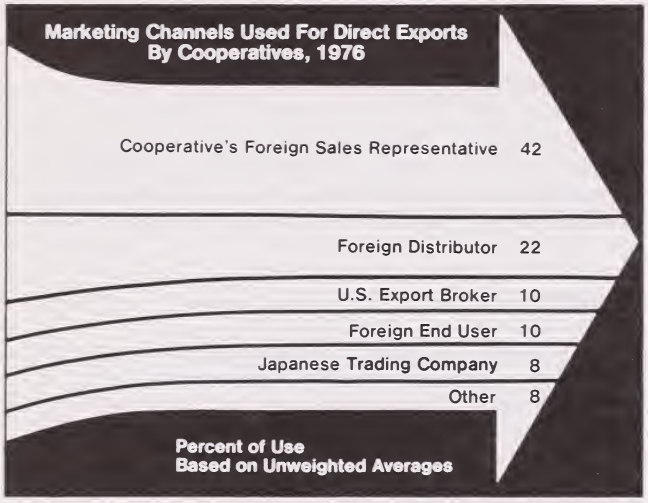
Export markets.--With relatively stable domestic consumption of agricultural products, export markets play a major role in determining the level of producer income. A study of cooperatives in the Mississippi Delta shows that export marketing of soybeans could be improved by establishing a coordinated, direct export marketing system to replace the present fragmented cooperative structure. In order to maintain a data base, a survey was made of U.S. cooperatives that shows the quantities and destinations of various commodities currently exported on a direct basis.

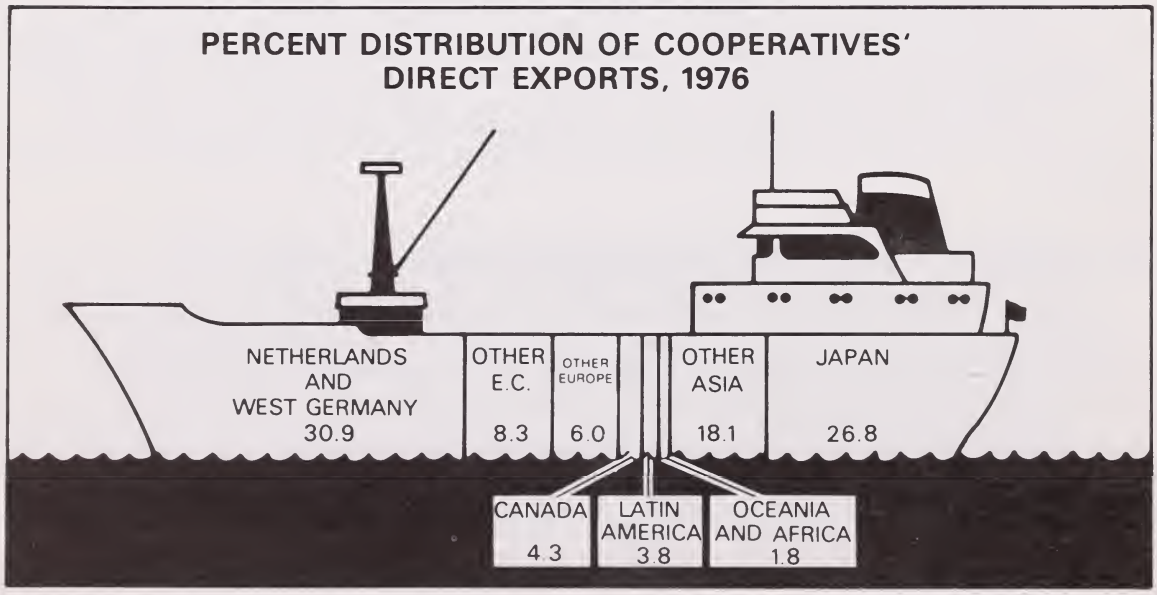
Joint operation of transportation and packaging facilities.--Several cooperatives were assisted in developing and evaluating plans for joint trucking, piggyback, private railcar, and product-packaging programs. Results of a study in the East are expected to substantially reduce energy requirements and provide a 20-percent reduction in cooperative transportation costs. A similar study in the West shows that cooperatives

VOLUME OF GRAIN HANDLED BY PRIMARY REGIONAL GRAIN COOPERATIVES, FISCAL YEAR ENDING 1977

MILLION METRIC TONS







currently lease or own over 9,000 tank and covered hopper cars to move farmers' grain, fertilizer, and other products. Cooperatives are losing about $9 million yearly on these cars, however, because of recurring railcar shortages. The study recommends that a clearinghouse be established to help shift railcars among cooperatives to better utilize available railcars and to provide better service for small cooperatives which otherwise cannot justify railcar operations.

Cooperative machinery serivce.--A study examined the structure, policy, and problems of farm machinery services in six cooperatives. It was found that successful operations hinge on management that can effectively coordinate machinery operations with other cooperative activities, on intimate knowledge of machinery demand in the area, and on a reliable repair and service capability. Two cooperatives ceased operations because they failed to meet these conditions.

Livestock.--Producers and their cooperatives continue to ask for assistance and research as they see the decline of the open market and low cooperative market shares. A task force on the future role of cooperatives in the red meats industry encouraged the cooperatives to explore the feasibility of extending their operation to meatpacking. Other task forces are searching for ways to improve the role of cooperatives in the pricing process.

Fishing cooperatives.--The relatively few fishing cooperatives are small, poorly capitalized, and generally limited in function. Technical assistance has been provided to a number of fishing cooperatives to improve their management and facilities and to coordinate the marketing of their landed catches, both to the fresh market and to processing plants.

Cooperative mergers.--Six local cooperative merger studies and one major regional merger study show that mergers provide additional benefits to members, especially the smaller or weaker ones. New benefits include making supply or marketing services of one cooperative available to members of another; eliminating duplicated or overlapping services; improving purchasing power and receiving more quantity discounts on supplies; increasing volume and resources; and adding local fieldmen and custom services to aid farmers.

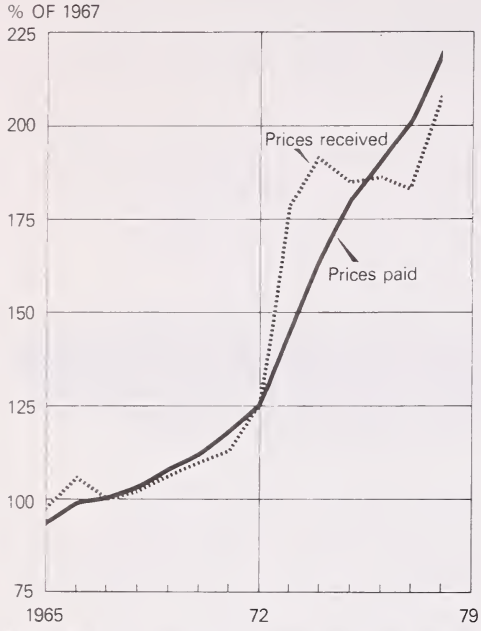
Broiler producer groups.--A growing interest in grower ownership of production and processing facilities suggests a dissatisfaction with the present marketing system. Broiler producer groups have helped to achieve cooperative ownership of facilities and operations in both Maryland and Alabama, and are developing and evaluating plans to do so in Virginia. Assistance to Maryland producers resulted in their starting a broiler-processing operation in November 1977. The Alabama group has applied for financing and loan guarantees to start its processing operation.

Craft cooperatives.--These cooperatives have been effective in improving the returns to craft producers by reducing their costs and improving marketing. Help has been given to artisans in Pennsylvania and North Carolina to develop and evaluate plans to organize cooperatives. Craft cooperatives have been helped to develop new markets and training programs.

Crop and Livestock Estimates

Work in this area provides accurate, comprehensive, and timely agricultural statistics on: crop acreage, production, and disposition; livestock inventories, production, and disposition; prices received and paid by farmers; and other related data for the agricultural sector at the national, State, and county levels. Changes in farm program legislation, expanded trade in agricultural products, continued shifts in

PRICES RECEIVED AND PAID BY FARMERS



Prices paid includes commodities and services, interest, taxes, and wage rates. 1977 forecasted.

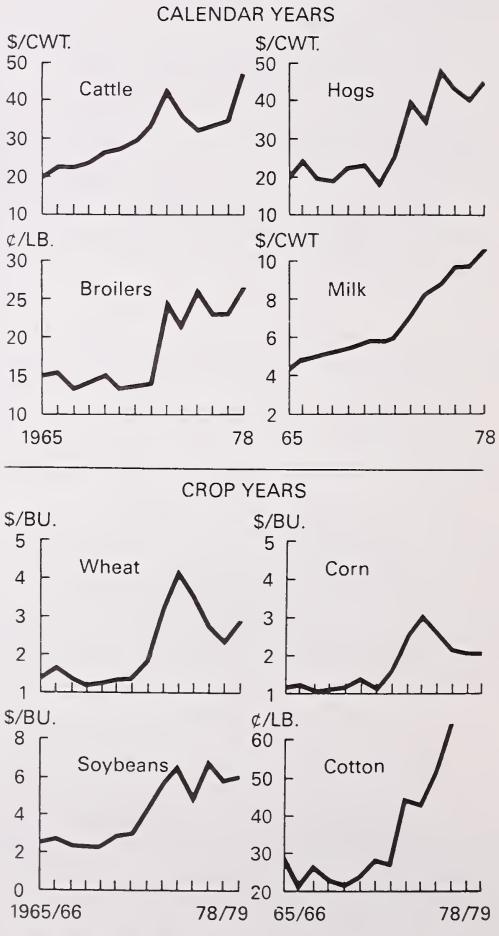
Prices Received and Paid by Farmers

	1971	1972	1973	1974
	Percent of 1967			
Prices received:				
Farm products	113	125	179	192
Crops	108	114	175	224
Livestock	118	136	183	165
Prices paid[1]	118	125	144	164

	1975	1976	1977	1978[2]
Prices received:				
Farm products	185	186	183	208
Crops	201	197	192	202
Livestock	172	177	175	215
Prices paid[1]	180	191	202	219

[1] Includes commodities and services, interest, taxes, and wage rates. [2] Forecast.

PRICES RECEIVED BY FARMERS FOR MAJOR COMMODITIES



1978 and 1978/79 preliminary.

seasonal production patterns for commodities, and careful attention to marketing strategies by producers are associated with the growth in demand for information and data.

Summary of Accomplishments

National, State, and county crop and livestock estimates were collected, processed, and published, and research was focused on improving USDA's statistical methods. Crop and livestock estimates focused on acreages, types and production of farm crops, number of livestock on farms, livestock products, stocks of agricultural commodities, value and disposition of farm products, and prices received and paid by farmers. During FY 78, ESCS published 483 national reports (172 crop and price reports, 261 livestock, dairy, and poultry reports, and 50 other reports).

Examples of Specific Accomplishments

Increasing data accuracy and dependability.--In FY 78, the December and June enumerative surveys, which are area-frame-based probability surveys, were again conducted in the 48 contiguous States.

The 1977 December enumerative survey obtained information on livestock and poultry and on fall seedings of wheat and rye. The sample consisted of 26,012 area tracts selected from the previous June survey, supplemented by a list sample of 23,139 large livestock and poultry operators. Sample selection of tracts concentrated on wheat and livestock.

The 1978 June enumerative survey obtained information on planted and harvested acres of crops, land use, livestock, farm labor, farm grain stocks, and farm numbers. The area sample consisted of 15,847 land segments, with an average of 7.8 tracts per segment. The area sample was supplemented with list samples of 10,797 large cattle operators and 6,353 large hog operators.

New area sampling frames stratified by current land usage were completed for Alabama, Louisiana, North Carolina, and Virginia. Replicated samples of land area segments were selected from these frames and also for Mississippi. New area frames also were completed for Georgia and South Carolina, but not in time for the 1978 enumerative surveys. These States will have a replicated sample for use on 1979 surveys. This completes the replacement of the old master sample in all States. Beginning in 1979, all States will have replicated samples for economic surveys that are independent of June enumerative surveys. Twenty-six States will have replicated samples for the June enumerative survey. Replacement of the older land-use area frames has been started, with new frames under construction for California, New York, and Pennsylvania. The California and New York frames will be ready for sampling for the 1979 June enumerative survey.

Multiple-frame livestock and poultry surveys.--Emphasis on program improvements of multiple-frame surveys continued during the year. Multiple-frame surveys are conducted in all States; December 1 and June 1 for hogs, and January 1 and July 1 for cattle. In addition, 14 States were involved in the hog and pig inventory estimates for March 1 and September 1 that utilize multiple-frame surveys. Multiple-frame surveys utilize two sampling frames: a list of farms stratified by size of operation, and the land-area frame used in the June and December enumerative surveys. The lists are updated annually from Federal, State, and industry sources. State statistical offices (SSO) in Virginia, Alabama, and Arkansas continued the multiple-frame approach instituted during FY 73 in estimating chicken inventories and layers. Probability samples, selected for monthly surveys, were rotated to reduce respondent fatigue and

provide more up-to-date control data. The Texas SSO, with State funds, uses a multiple-frame approach in estimating the annual December 1 chicken inventory.

Objective yield surveys.--Objective yield surveys for wheat, corn, cotton, and soybeans continued in the major producing States. The sample sizes and States were unchanged from the previous year. There were some adjustments in sample allocations to States. There were 17 States in the wheat program with 2,510 samples (1,880 winter wheat, 400 other spring, and 230 durum); 12 States for cotton with 2,390 samples; 17 States for soybeans with 1,915 samples; and 18 States for corn with 3,200 samples.

Following special training, about 700 enumerators interviewed farm operators and made field counts and observations monthly through the growing season and harvested a sample of the mature crop. The survey concluded with post harvest observations to determine harvesting losses. Results from these surveys were used as major indicators of yield. Enumerators also asked farmers the kind and application rate of fertilizer applied to wheat, corn, cotton, and soybean sample fields. Twelve States provided corn samples to the Northern Regional Research Center of USDA's Science and Education Administration (SEA) to determine the extent of aflatoxin.

A special project to evaluate objective yield procedures for cotton was continued for the second year in Mississippi and Texas. Five gins were selected in each State to weigh cotton from 25 fields in each State. Thirty plots were laid out in each selected field prior to harvest. The object was to determine whether significant differences occurred between the estimates of production in the fields as determined by objective yield procedures and the actual production determined by weighing the cotton at the gin. Results are currently being analyzed to determine if changes are needed in the program.

Objective yield surveys were continued in 11 major fall-crop potato States, which produced 92 percent of the national crop. A total of 2,100 samples were assigned to these States to provide the primary yield indicator. Probability surveys also were conducted in these States to obtain primary indications of planted acreage.

Supplemental funds for a tart-cherry objective yield survey in Michigan were again provided by that State. In addition to providing data for the mid-June forecast of production using a sample of 300 orchards, data were collected to update forecasting parameters and to determine harvesting losses.

Objective yield surveys were conducted for burley tobacco in Kentucky to supplement indications obtained from mail surveys. Plant counts were made in 120 fields; at time of stripping, the average weight of cured leaves per plant was obtained. In addition, leaf count and measurement work were conducted in a subset of 40 fields and were used in forecasting the crop.

Potato quality stocks survey.--A survey to determine quality of potato stocks is operational in the Red River Valley of North Dakota and Minnesota. Changes in weight and grade are measured between the time potatoes move into and out of storage.

Marketing-channel survey.--A marketing-channel survey was conducted to determine where producers sold selected farm commodities. Data were collected in 46 States in February and March for 34 commodities. The survey data provide information needed to implement improved sample designs and allocations for the prices received program in FY 79.

Probability sampling.--An improved data collection procedure to obtain information about prices received by farmers for six major commodities (corn, soybeans, oats, barley, wheat, and grain sorghum) was begun in February 1977. The procedure involves a monthly probability sample of about 2,000 mills and elevators. In 1978, State

statistical offices reviewed lists and stratification procedures and updated the universe. Average response rate for 1978 surveys through October was 77 percent. In addition to monthly prices, the probability survey also provides the primary indication of current monthly marketing percentages. Preliminary analysis indicates that the survey will provide marketing percentages at the U.S. level which are comparable with past marketing patterns.

Additional data and services.--White corn production forecasts and June acreage estimates for Indiana, Iowa, and Kansas were discontinued for the 1978 crop year. Planted and harvested acreage and production estimates for the other seven major producing States were published during the season. End-of-season estimates for all 10 States will be included in the 1978 annual crop summary.

The national Weekly Weather and Crop Bulletin was published in cooperation with the U.S. Department of Commerce. This publication has wide public interest, because it relates to current conditions and progress of crops and helps bridge the information gap between monthly crop reports. Crop comments are supplied by the State statistical offices, while precipitation, temperatures, and other related weather information come from the National Oceanic and Atmospheric Administration. The weekly summary was upgraded during the year by including additional weather data and periodic reports on weather conditions and crop development in foreign countries. Information for foreign countries was provided by the Foreign Agricultural Service and the World Food and Agriculture Outlook and Situation Board.

California and Arizona were designated as speculative States for upland cotton beginning with the 1978 crop year. Adding these two Western States to the existing speculative States of Texas, Mississippi, Arkansas, and Louisiana increased the percentage of U.S. cotton production handled under the tighter security procedures to more than 80 percent.

Data on monthly sales of field crops, 1967-76, were published in Statistical Bulletin 600. Plans are to continue publishing these data annually on a current basis.

During the year, the 5-year historic review was completed on all crop and livestock items. Revised estimates were published, generally covering the period 1969-74, in a series of statistical bulletins by subject.

Information about the type and variety of potatoes planted in the 11 fall objective yield States was published in October 1978. The data indicated the proportion of total potato acreage by variety and type for farms on which objective yield samples were located.

Fruit-tree surveys were conducted in Illinois, Minnesota, and Wisconsin, continuing the State rotational system established in FY 76.

An October 1 forecast of sunflower production was initiated in Minnesota, North Dakota, South Dakota, and Texas. The 1978 annual summary will include estimates of acres planted, acres harvested, yield, and production for oil and nonoil varieties for the four States.

Production of foliage plants in Georgia and data on foliage plants and anthuriums in Hawaii were included in the 1978 annual report. In the latter State, data were obtained through State funds. Also, at industry request, data on the number of rose plants produced were substituted for data on the area in production.

Information on the quantity of producer-owned grain stored off-farm was collected in conjunction with the January 1, 1978, grain stocks survey. The information was used

to determine the magnitude of grain moved off-farm but still under the control of the producer.

State statistical offices in California, Georgia, Mississippi, Oregon, and Washington issue a weekly egg-type chick hatchery report as part of the weekly broiler placement release. Reports for California, Mississippi, and Georgia show individual estimates of eggs set and chicks hatched for each of the five States and the five-State total. In Washington and Oregon, the respective State estimates and a total for the Pacific Coast States are published for eggs set and chicks hatched. An estimate of pullets placed is also published in Oregon.

The three multiple-frame poultry States (Alabama, Arkansas, and Virginia) conducted a December survey of commercial egg producers by type of flocks for estimates of laying flocks and other classes of chickens. These States also use probability sampling for making monthly estimates of hens and pullets of laying age, rate of lay, and egg production. The list frame covers over 95 percent of the hens and pullets, and the area frame represents the other 5 percent. Probability sampling has significantly improved the accuracy of the monthly estimates and has minimized the number and size of monthly revisions.

The number of turkey breeder hens in flocks on December 1 is now being published by breed and age group in response to the needs of the turkey industry.

Alabama, Arkansas, and Virginia continued to publish separate monthly estimates of market and hatching eggs. Georgia and South Carolina, other States making this separation, conduct the work with State funds.

The federally inspected livestock slaughter reporting system, involving the Food Safety and Quality Service (FSQS), the Agricultural Marketing Service (AMS), and ESCS, continued to provide weekly federally inspected slaughter by class, number of head slaughtered, live weight, and dressed weight. This reporting system minimizes duplicated efforts to provide timely slaughter statistics, while providing to each agency the control to carry out its mission.

New series of data were published in the annual hogs and pigs, cattle and calves, and sheep and lamb reports. These series provide data users with preliminary supply and disposition information at the time of the release of the species inventory reports.

Historic estimates were published on: the number of agricultural service workers in California, Arizona, Florida, Texas, and the United States who were employed by a firm which contracted with the farmer to do a job rather than being employed directly by the farmer; farmworker numbers by standard Federal regions and the United States; the number of workers by regular and seasonal status; the percentage of hired workers employed by size of farm work force; the percentage of workers receiving gratuities by type of gratuity; and of the average hourly payment rate by type of gratuity provided.

A separate estimate on concord grapes was initiated at the request of the Concord Grape Association and first published in January 1978. It is planned to continue publishing this variety breakdown in the January and July noncitrus fruits and nuts annual summaries.

Price index studies.--Agreements with the University of Minnesota were renewed to continue studying the effects of various agricultural prices on prices paid indexes. One study recommended that the program on fertilizer be expanded to include inventory stocks and quantities sold in addition to prices. Another suggested that prices paid indexes are feasible for individual commodities or groups of crops.

Determination of resource allocation by commodity grouping.--The University of Minnesota examined survey costs on a commodity group basis for various levels of sampling error. Based on benefit-cost ratios, the study suggested that the allocation of resources to different crop and livestock estimates was near optimum.

Agricultural information and data collection system.--An agreement was continued with Michigan State University to examine the relationship among the decisionmaking process, economic analysis, and statistical data systems for agriculture in defining an improved agricultural information system. Initial emphasis has been on the prices received data series and its relationship to structural marketing concepts.

Rapid data transmission.--The computer network and camera copy processing via computer have enabled dissemination of crop and livestock estimates to the 48 contiguous States within minutes after the Washington D.C. release time. User demand for the network system precipitated a significant expansion in reports placed on the system in 1978. Acreage, crop production, U.S. grain stocks, milk production, cattle on feed, cattle inventory, hog and pig inventories, and potato stocks were placed in the network system earlier. The following reports were added in 1978: weekly crop and weather summary, weekly broilers, weekly turkey hatch, weekly export sales, livestock slaughter, agricultural prices, vegetables, and 17 economic situation report summaries. Data released in this manner go to the SSO's and into a network library to which the public has access. The data are quickly channeled to the news media, enabling farmers and farm-related businesses to have the latest information when making management and marketing decisions.

Providing data to the public.--Emphasis is still being placed on providing data to the news media, giving fast access to the data by all users. Major reports processed on computers can also be received directly from the network at release time. This system is particularly useful to users in need of large volumes of detailed data quickly.

Supplying estimates via machine-readable media to users for analysis purposes continued to expand. Data tapes containing U.S. and State estimates series and county estimates on selected crops are available from the crops data base system.

List frame development.--Work is continuing on the construction of a list of farm operator names and addresses to be used as a single sampling frame for all surveys of farm operators. This should improve the overall accuracy of the total statistical program, increase efficiency in the day-to-day management of list activities, reduce respondent burden, and improve the quality of the list. The use of computer programs is satisfying three major requirements: (1) the design and implementation of a sophisticated procedure to delete duplication when names of farm operators are obtained from more than one source, (2) the design and implementation of an efficient method of updating names and addresses in order to keep the list current, and (3) the design and implementation of automated, sophisticated, sample-select procedures.

Nonsampling errors.--Survey evaluation studies are being conducted to measure bias from several sources. A seven-State project measured information about differences in survey indications due to the method of data collection and the length of time a respondent has remained in the sample, telephone interviewer bias, and the impact of check questions on the questionnaire. Two reports were issued concerning the potential nonsampling error in livestock estimates resulting from nonrespondents. These reports showed livestock estimates to be biased downward by 2 to 5 percent, because more nonrespondents had livestock than those who responded, and because nonrespondents had larger herds.

Another study has been designed to minimize respondent recall bias in numbers of hogs and pigs reported for successive survey periods. A proposal has been developed to evaluate nonsampling errors in farm production expenditure surveys by comparing survey

data reported in a single interview for the entire year with records of expenses maintained on a farm management system throughout the year.

A working paper and a report have been prepared on missing data problems. Other reports are to be issued on estimates for nonrespondents based on current supplementary information and on the imputation of data for missing items or bad data.

An evaluation has been made of alternative estimators that take advantage of high correlations between survey periods. A new sampling procedure will be implemented in one State to evaluate the rotation of 50 percent of the sample in each survey and further study the alternative estimators.

A new method of constructing hog and pig index values for stratification was devised in Iowa. The resulting sample allocation reduced the expansion factor in all strata with no overall increase in sample size.

Improving operational programs.--In FY 78, new area frames were constructed for Alabama, Georgia, Louisiana, and Virginia, and work on new frames for California and New York was begun. For the California frame, heavy emphasis is placed on developing techniques to utilize satellite imagery for improved land-use stratification. Satellite imagery was used as the basic source for establishing optimum strata, and the entire frame will be digitized to improve area measurement accuracy and to provide data storage on computer files that can be retrieved for future sampling error research.

Sampling error research is underway to analyze the variance of segment size, the correct use of random numbers, and the applicability of cluster analysis for grouping stratum blocks for sampling.

Research has continued in the effort to develop, test, and implement a system to build a list sampling frame. Among the attributes of the new system is a sophisticated set of software which will automatically detect duplication between names and possible duplication between classes of operations. A list frame has now been built for the pilot State. Initial list building efforts are nearing completion in nine additional States.

Corn within-year models.--The investigation of within-year models for corn was continued. The study was designed to forecast corn yield for each of nine Missouri cornfields. Weather variables, including daily minimum and maximum temperatures and daily precipitation, were collected in an effort to improve the early forecast potential of the within-year model and to give a basis for checking changes in forecast levels as the growing season progresses. Final production estimates were obtained from elevator deliveries to serve as a check against the field methods tested. After preliminary results are obtained, data sets for 1977 and 1978 will be combined for a more detailed analysis of the performance of these methods of forecasting corn yield.

Weather/yield model evaluation.--Through a cooperative agreement with the University of Missouri, an aggregate corn weather/yield model was tested in 1977 and 1978. At a State level, the model performed much better in six Midwestern States than expected based on the Missouri field-level study. This suggests that it may be possible to obtain a more reliable forecast for larger areas than for smaller areas.

Remote sensing and soil moisture.--The 1978 LANDSAT yield and production study and the SCS water stress study were conducted in conjunction with the 1978 corn and soybean objective yield surveys in Iowa. This research investigates the relationships among soil moisture, LANDSAT data, and crop yield. Most previous research with satellite data has focused on estimating crop acreages. For corn, this involved obtaining

additional data at maturity on the final biological yield (grain yield not adjusted for harvest losses) for each of the regular objective yield sample fields in Iowa. The additional effort provided yield data on eight plots distributed throughout each field. These data are designed to improve the precision of field yield estimates so that meaningful relationships with satellite imagery might be detected.

Cotton yield and ginning research.--The second and final year of the cotton yield and ginning research study was conducted in the Mississippi Delta and the Texas Panhandle. The research is designed to evaluate the cotton objective yield survey methods used to estimate yields of seed cotton and lint. Gin data, collected for each of the research fields, provided a basis for evaluating the estimates. Preliminary analysis indicates that individual field estimates were not particularly reliable. However, when data from all fields in a study area were combined, the mean seed cotton estimate compared favorably with the mean yield measured at the gins. Analysis also indicates that harvest losses were greater where cotton strippers were used for harvesting, as in the Texas Panhandle. These losses were approximately 2 percent of the seed cotton yields. Current estimating methods may not be adequate to deal with this. The use of regression equations to convert seed cotton estimates to lint cotton yields also was investigated. This method contrasts to the ratio conversion currently used.

Cotton yield and simulation.--This study was conducted in Mississippi in 1977 and 1978. Weather, soil, extensive plant growth, and plant mapping data were collected in three fields each year. The data will be used to evaluate a detailed weather and physiological model which should provide a better understanding of the relationship between growth and development characteristics of cotton and cotton yields.

Soybean objective yield research.--This study was conducted during the 1978 crop year in sample fields in Illinois. It will evaluate an alternative to the present method of obtaining soybean yield data, which requires several plants to be clipped and removed from the field in order to make detailed counts and chemical analysis. The study will evaluate several features of this method: the practicality and ease of obtaining the counts, farmer cooperation, accuracy in relationship to the operational method, effects on the forecasting models, accuracy of forecasts, and the usefulness of additional information from the chemical analyses.

Soybean development and yield.--Another soybean study was conducted in eight central Iowa fields in cooperation with Iowa State University. Its purpose was: to evaluate a bivariate method of measuring stages of both vegetative and reproductive crop development; to study alternative methods of forecasting and estimating yield; and to study the relationship between satellite imagery and stages of development and yield.

Soybean yield and its relationship to satellite imagery is being studied as part of the 1978 LANDSAT yield and production study referred to for corn. For soybeans, this involves obtaining more precise estimates of final biological yield for the entire regular objective yield sample of fields throughout Iowa.

Winter wheat.--A study of four fields in Ellsworth County, Kans., was conducted for two purposes: to run individual field-level growth models using a large amount of input data and compare the forecasts to yields obtained upon elevator delivery of grain; and to provide weight measurements on wheat heads for use in a weather/yield model developed at Kansas State University. The feedback information would allow the simulation model to converge toward the actual yield and, at the same time, would indicate the capability of earlier season forecasts when feedback was not available.

Future weather simulation and evaluation of weather/yield models.--A model for generating, by computer simulation techniques, daily precipitation and maximum and minimum temperatures was developed and validated. The model is quite simple and inexpensive to run, yet it generates sequences of weather very similar to historical

data from Columbia, Mo., on which it is based. The model was developed to help in testing yield forecasting models which require weather data from the forecast date to plant maturity and to determine dates on which forecasts can be made with an acceptable level of error. Many independent sequences of daily weather can be used in these models, so that the variability of forecasted yield due to uncertainty about future weather can be studied.

The capabilities of weather/yield models to provide estimates of final yield and to forecast expected yield during the growing season are being evaluated. These models range from simple aggregate regression approaches to those modeling detailed processes.

Improving estimation using remote sensing.--Since the launch of LANDSAT I (formally ERTS I) in July 1972, the potential of remote sensing has been evaluated as a means of improving crop production estimates. Early studies indicated that LANDSAT could be used to provide fairly precise crop acreage estimates for multiple-county areas when nearly cloud-free data are available at a time when the various crops reflect energy differently from one another.

Also, additional yield data were collected that will be used to determine relationships between LANDSAT data and yields. Analysis will begin as soon as all yield data and satellite data are available.

Grazing Fees.--Data on rental charges for pasturing cattle on privately owned grazing lands were collected for the Forest Service and the Bureau of Land Management in the June and December enumerative surveys. Grazing fee information was collected in all States except Alaska and Hawaii in the June survey, but was limited only to the Western States in the December survey.

Aflatoxin corn study.--Samples of mature ears of corn from the regular corn objective yield survey in 12 States were provided to SEA's Federal Research Lab in Peoria, Ill., for use in determining the incidence and level of aflatoxin. States included in the 1978 program were Ohio, Indiana, Illinois, Iowa, Nebraska, Kansas, Kentucky, Missouri, North Carolina, Virginia, Texas, and Georgia. Enumerators in Georgia also made early season observations for green mold.

Fuelwood and fencepost survey.--A pilot survey for the Forest Service was made in Arkansas, North Dakota, and Pennsylvania to determine the quantity of wood that had been cut to be used as fuel and fenceposts. The survey was combined with the regular June enumerative survey in the three States. The pilot effort was to determine if reliable estimates by State of the amount of such wood cut could be developed using the June survey.

Feed grain set-aside program.--A telephone survey was made in 10 major grain-producing States to determine farmers' plans to participate in the 1978 feed grain set-aside program. The information is needed to evaluate farmers' reaction to the feed grain program that had been announced. The survey was sponsored by the Agricultural Stabilization and Conservation Service.

Commodity futures trading.--Information on farmers' use and awareness of the Commodity Futures Markets was collected in the 1977 December enumerative survey. Comparable information was collected in the 1976 December survey. The Commodity Futures Trading Commission sponsored the collection of the futures trading information.

Farm labor.--The quarterly agricultural labor survey was used to collect detailed information on wage rates and other related items for the Employment Standards Administration of the Department of Labor. In addition, the Employment and Training

Administration provided funds in FY 78 so the sample size could be maintained at a level that would provide usable State estimates on the number of seasonal workers.

Data changes.--The 48-State acreage update survey to measure changes from planting intentions as reported about June 1 was discontinued in 1978 to reduce survey costs and respondent burden. Special survey activities were conducted in Illinois, Indiana, Iowa, Missouri, and Ohio, however, because of the late 1978 planting season. In Iowa, all June enumerative survey tracts with planting intentions reported were revisited in July and planting verified or corrected. In the other four States, a followup to the June acreage mail survey was conducted to estimate changes from planting intentions.

White corn production forecasts and June acreage estimates for Indiana, Iowa, and Kansas were discontinued for the 1978 crop year. Planted and harvested acreage and production estimates for the other seven major States were published during the season. End-of-season estimates for all 10 States will be included in the 1978 annual crop summary.

The production of timothy seed declined to a very low level in Wisconsin, Indiana, and Pennsylvania, so estimates were discontinued in these States. Alabama and South Carolina each produced less than 1 percent of the U.S. tall fescue production, so all estimates were discontinued for these two States. With declining importance of hairy vetch, estimates were discontinued for Nebraska, Oklahoma, and Texas; production estimates will be continued for Oregon at the request of the American Seed Trade Association. Merion bluegrass is declining in popularity and will be combined with other common varieties; statistics for Merion and other bluegrasses will be titled Kentucky Bluegrass Seed beginning with the 1978 crop.

The coverage of all crops was reviewed in relationship to States included in the estimating program for each crop. For each field crop, the U.S. estimate includes a minimum of 95 percent of total production. As a result of the review, 14 State field crop estimates were dropped and one was added. In addition, eight State estimates for fruit, nut, and vegetable items were dropped. Estimates for blueberries have been added in five States.

Weekly and monthly estimates of eggs set and poults hatched by State were discontinued September 1, 1978, due to the declining importance of light breed turkeys. The U.S. and a nine-State totals for these items are still available.

The data base created for 1969-75 historical review was updated. Separate 5-year historical summaries (1969-74) were published for fresh market and processing vegetables in December. For other reports, fresh market and processing vegetables were combined in the same publication.

Full implementation of the program to decentralize all data collection to the field was completed. Plans are also being made to develop an automated edit and summary system to allow States to summarize cold storage inventories, rather than doing so in Washington. Industry-requested changes in the frozen fruit and vegetable series will begin in 1979. These changes will not increase response burden.

An evaluation has been made of alternative estimators that take advantage of high correlations between survey periods. As a result, a new sampling procedure has been implemented in one State to rotate 50 percent of the sample in each survey. This will reduce the response burden.

Plans for High-Priority Work in 1979

High-priority programs receiving added attention in ESCS in fiscal year 1979 are in three categories: farms and rural areas, agricultural statistics, and cooperatives.

Farms and Rural Areas

Research in this category includes family farm issues, foreign investment in U.S. real estate, rural credit availability, commodity distribution programs, research in foreign developed countries, resource economic surveys, direct-marketing surveys, economic assessments of energy use, pest management, and economic development and the rural labor force.

Family Farm Issues

A continuing national concern is the need to maintain a viable farming sector that provides opportunities for a large number of individuals and families with considerable management independence and freedom. This concern is deepening, because of trends to larger and fewer farms. New research is being initiated to support the annual report to the Congress on this topic. The work that is planned would examine the causes and consequences of the changes that are occurring, including the interaction of social, economic, technological, and political forces.

Foreign Investment in U.S. Real Estate

ESCS will study the feasibility of a system to monitor foreign direct investment in agricultural, rural, and urban real property, including the feasibility of a national multipurpose land data system. Four general types of systems will be studied, focusing on technical, economic (cost), administrative, legal, and institutional criteria and constraints. These types are:

Type 1: A centralized Federal registration system which places the burden or responsibility of registering on the foreign entity or its representative.

Type 2: A Federal system utilizing available sources of foreign investment information, such as the Securities and Exchange Commission, the Federal Trade Commission, and the Internal Revenue Service.

Type 3: A national multipurpose land data system, including data on foreign direct investment. This system would focus on local government records (principally tax assessment, but including title records), land-use records, and files of county offices of Federal agencies.

Type 4: Periodic statistical surveys to provide national benchmark data, such as those of the Bureau of Census and the USDA rural landownership survey.

Rural Credit Availability

Rural credit conditions, particularly for business and industrial uses, are poorly understood. ESCS is studying relationships between national money markets and the credit markets faced by various segments of the rural community--businesses, governments, and households. Research begun in 1978 into industrial and nonagricultural business credit conditions will be considerably expanded and will focus on the impact of credit availability on rural development. Conditions in selected credit markets will be analyzed to help policymakers and researchers evaluate rural credit policy options.

Commodity Distribution Programs

Research will be initiated to determine economic effects of Commodity Credit Corporation purchase decisions on farm income and on recipients. Another will examine the impact of using cash in lieu of commodities in the national school lunch program.

Research in Foreign Developed Countries

Policies and economic conditions of foreign developed countries, which account for about 60 percent of U.S. agricultural exports, have an important impact on the size of U.S. agricultural exports to these countries, on the U.S. balance of payments position, and on U.S. food prices and farm income. ESCS is expanding its data and research program to provide improved information on agricultural and trade issues involving these countries. This research will focus on: admission of new members (Spain, Portugal, and Greece) into the European Economic Community; interrelationships between the feed-livestock sectors of major grain-soybean importing countries; and seasonal trade patterns in West European agricultural imports and short-term trade forecasts.

Resource Economic Surveys

A detailed analysis will be made of data collected last year on ownership, size of holdings, various characteristics of owners (including citizenship), the condition of their cropland, and their conservation efforts. In addition, a series of follow-on surveys on investment and disinvestment in cropland, changes in land use, and ownership transfers will allow more intensive analyses in these areas.

Direct-Marketing Surveys

Direct marketing of agricultural products can help some producers get higher returns and consumers pay lower prices. The Farmer-to-Consumer Direct Marketing Act authorizes continuing USDA surveys to determine the extent of direct marketing of agricultural products in the United States and to identify methods of direct marketing in each State. ESCS will carry out provisions of the act by collecting and comparing direct-marketing data with conventional marketing data. Unique costs associated with direct marketing, if any, will be identified. Companion research will evaluate relative costs and returns to farmers from alternative marketing methods, as well as consumer benefits.

Economic Assessments of Energy Use

Conservation of oil and natural gas, development of coal and oil shale, and conversion to renewable fuels such as solar energy and biomass can help the Nation become less dependent on imported fuel. ESCS will expand its research on rising energy costs, supply problems, and conservation techniques. The program will develop information on energy used in irrigation and food processing, investigate the economic relationship between energy use and the food production and processing industry, and integrate energy components into scientific economic models to aid policy analysis.

Pest Management

The tradeoff relationship between agricultural production and environmental quality has forced researchers to take a more interdisciplinary focus on pesticides. Biological research efforts emphasize alternative pest control strategies--biological, cultural, and integrated control--which reduce or eliminate the need for pesticides. Economic analysis is required to determine the feasibility of such control methods. ESCS research will focus on:

* economic implications of technically feasible biological, cultural, and integrated pest control methods and programs,

* economic effectiveness of selected large-area pest control and/or eradication and quarantine programs,

* economic and social aspects of environmental health benefits derived from adoption of biological and cultural pest controls,

* benefit-cost techniques, mathematical models, and new models to evaluate alternative methods of pest control, and

* delivery and information systems, economic incentives, and macroeconomic aspects of integrated pest management programs.

Economic Development and the Rural Labor Force

Research based on highly aggregated secondary data indicates rural economic conditions have improved during the last few years. Questions left unanswered by this research relate to how benefits of growth are distributed among population groups, the effect of economic development on the labor force participation of these groups, and the relationship among development and local participation in Government income maintenance, economic development, and manpower programs. ESCS will study a rural multicounty area which has grown rapidly in employment and population. The data needed to research these issues will be obtained from surveys of the area's households, firms, and government agencies. The surveys will permit cross-referencing, so that it will be possible to integrate labor demand and supply analyses and analyze the distributional effects of economic development among population groups.

Agricultural Statistics

Work in this area includes improved price statistics, grain-stocks ownership, and improved weather data.

Improved Price Statistics

Results of a nationwide point-of-purchase survey, to be performed in early 1979, will be used to develop improved methods for determining prices that farmers pay for production items. Related work will focus on placing all crop prices received items on a probability basis, and on a pilot program utilizing probability methods for prices received by farmers for livestock.

Grain-Stocks Ownership

ESCS will conduct surveys to determine the amount of major grains and oilseeds stored off-farm that is still owned by producers or for which the producers have not been paid. Such data will be used to develop monthly marketing weights to determine farmers' monthly cash flow in connection with farm income data. Grains included are corn, oats, barley, grain sorghum, wheat, and rye. Oilseeds include soybeans and flaxseed. The feasibility of obtaining information from the ESCS monthly probability survey to obtain prices farmers receive for grains and oilseeds will be explored. This survey vehicle may provide more useful and more timely marketing information than the quarterly ESCS grain-stocks surveys.

Improved Weather Data

Improved weather data will be made more rapidly available in the "Weekly Weather-Crop Bulletin." The content of the bulletin will be expanded to include data on solar energy, precipitation on a 6-hour-period basis, and intensity of precipitation; the reporting period for all States will be standardized; and the national release of the bulletin will be expedited. In addition, ESCS will expand its research to improve early season (2 to 3 months before harvest) crop yield forecasts by identifying relationships among weather (including temperature and precipitation), agricultural practices (such as fertilization, soil preparation, and weed control), and plant processes as they influence crop yield. Aim of the research is to establish how these variables interact to produce crops and then to determine which of the variables can be estimated or projected and used in specially created forecast models which are, in turn, based on biological process models.

Cooperatives

Work in this category includes cooperative policy, cooperative management and finance, and cooperative marketing and purchasing.

Cooperative Policy

The public and policymakers will get additional co-op policy information and data from expanded ESCS work on such issues as relative size and market share of cooperatives, the scope of their activities and trends in vertical integration, and distinctive structural and operational characteristics of agricultural cooperatives that warrant special or different treatment by public agencies. Research also will identify and describe cooperatives involved in Federal and State marketing orders and committees and examine the impact of such orders on operations of cooperatives.

Cooperative Management and Finance

ESCS, working with educational institutions, will help establish formal educational programs, emphasizing cooperative management. New research will focus on the problems of membership participation and control in both small and large cooperatives.

Research in cooperative finance will study ways cooperatives can obtain adequate member capital on an equitable basis; programs for systematically redeeming capital of inactive members also will be studied, as will the role of directors and management in incorporating these efforts in long range financial planning.

Cooperative Marketing and Purchasing

Added ESCS research on poultry cooperatives will aid technical assistance and cooperative development efforts. This research will focus on benefits of cooperative integration in the broiler industry, alternatives for cooperative activity among poultry producers in fringe production areas, and opportunities for cooperative poultry marketing.

ESCS will also expand its grains and oilseeds marketing assistance to cooperatives. As multinational grain-trading firms integrate backward toward the source of supply, local cooperatives are faced with increasing procurement, pricing, and organizational pressures. Expanded ESCS research and technical assistance in this area will help cooperatives continue to operate effectively in the face of these grain-marketing pressures.

A study of cooperatives in the fertilizer industry will measure differences, if any, in the cost of fertilizer to patrons from cooperatives and noncooperatives and other firms; changes in market structure and prices; the impact of cooperatives on production and distribution techniques and costs; and any other ways the operation of cooperatives may have enhanced competition and benefited farmers and the public.

Dairy cooperatives are facing a major problem of providing members a market for their total milk supply. Basic concerns are to develop a cooperative plant structure and milk-hauling systems needed to furnish customer plants with fluid milk supplies tailored to their needs and to process the remaining supply at minimum cost. Alternative plant locations and milk supply movements will be identified that best serve the Northeast, an area of current major concern. Advisory assistance provided to cooperatives making changes to achieve more effective marketing will emphasize ways cooperatives can meet the growing financial requirements.

Research Needs for the 1980's

The following areas of data development, research, analysis, and technical assistance demonstrate ESCS' perception of important new program initiatives for the early 1980's.

Resource Management

Research needs in this area include water quality, conservation, and management; and economic modeling and resource surveys.

Water Quality, Conservation, and Management

Water available for irrigation decreases because of a declining water table and because of increasing energy costs for pumping. Increased pollution reduces the quality of the Nation's streams, rivers, and lakes, threatening public health, wildlife, and esthetic values of waterways. More data and analyses are required to supplement Federal decisions on legislation and policies relative to the supply, quality, conservation, management, and use of water. New research is needed to focus on:

* economic impacts of forces (rising energy prices, inflation, declining ground water levels, technology development, water quality programs) affecting the availability and costs of water,

* economic efficiency and equity of different water conservation strategies (water pricing, recycling, irrigation scheduling),

* conservation practices and programs to determine cost-effective ways to conserve soil and water and reduce pollution, and

* off-site impacts of agricultural practices and programs on water quality, water supply, and related costs and benefits.

Economic Modeling and Resource Surveys

Emphasis on planning and evaluating land and water conservation programs has increased. This has expanded the need for more intensive analyses of program costs, benefits, and consequences. Two activities need to be undertaken to:

* conduct an annual survey of landowners and farm operators to gather reliable national and State data on a 5-year rotating basis on conservation and environmental practices, irrigation and water use, cropland development, rural-urban land-use changes, and landownership and water rights, and

* develop an analytical system for land and water resource evaluation.

An improved analytic capability would aid analysts and program managers in identifying conservation program needs and evaluating effectiveness of existing programs. This

work would contribute directly to USDA's 1984 conservation program plan required by the Resource Conservation Act of 1977.

Structural Changes in Agriculture and Rural Areas

These research needs include the role of small farms, structure and organization, regulations and competition, pricing systems for commodities, transportation, and rural economic growth.

The Role of Small Farms

Effective policy aimed at improving the well-being of the Nation's small-farm families is forestalled by the lack of reliable information and analyses. Key research questions include: What are the proportions of their farm and off-farm earnings? What is the appropriate role of traditional farm price and income assistance, research, cooperatives, or extension programs in solving their income problems? What is the role of rural development programs? What new programs can help?

Information is needed on the characteristics of small-farm operator families, their farming operations, their goals, and other issues in order to plan the most appropriate policies. A detailed review of technical assistance programs and investigations of alternative assistance programs also are needed. Programs to aid small-farm families might include inducements for rural industrialization, technical assistance in producing and marketing farm products, public sector employment, welfare reform, and local co-op advisory services.

Structure and Organization

The structure and organization of U.S. agriculture might evolve toward larger and fewer farms, increased concentration of wealth in agriculture, increased vertical integration and contractual linkages with agribusiness, reduced decisionmaking autonomy and independence of farmers, and increased vulnerability of farmers, marketers, and consumers to inflationary pressures. Underlying these changes are such factors as Government programs and regulations, market instabilities, new technologies, changing organizational arrangements, escalating land prices, national, State and local tax policies, and increased capital requirements for farming. USDA and Congressional officials would benefit from expanded research on the impacts of Federal programs, market conditions, technological developments affecting structure and organization of agriculture, and alternative program and policy options. New data and analyses on economies of size in agriculture would be required for this research program.

Regulations and Competition

The food industry operates under a myriad of Federal, State, and local regulations. It also has become highly concentrated and characterized by many of the competitive practices of the industrial sector--product differentiation and advertising, nonprice competition, and high product turnover, for example. Useful, expanded research on regulations and competition would:

* determine effects of Government regulations, technology, and competition on food and fiber costs,

* identify marketing methods, such as cooperatives, that would improve small and part-time farmers' access to markets and consumers' opportunities for high-quality food at reasonable prices, and

* assess impacts of alternative regulatory and market competition policies upon producers and consumers and upon performance of the food marketing and distribution sector.

Such analysis is needed to cover all major industries and important regulations.

Pricing Systems for Commodities

Over the years, there have been marked changes in the marketing of farm production--some traditional wholesale markets have disappeared, terminal markets are being displaced, and contracting and vertical integration increasingly dominate the exchange process for many products. These and other changes raise serious questions about the efficiency of these new markets in promoting price discovery and the effectiveness of traditional price-reporting mechanisms in helping the process.

Studies are needed to compare commodity-pricing systems to determine current problems, improve pricing information, analyze alternative systems, formulate recommendations for industry or Government pricing improvement programs, and develop proposals for institutions to improve pricing system performance from the farm to retail levels.

Transportation

Changes in transportation--deteriorating railroads and poor roads and bridges--and a variety of Government regulations and programs are adversely affecting rural America. Information is lacking to effectively represent the interests of agriculture and rural communities in the decisionmaking process which sets Federal programs, regulations, and policies.

New research is needed to evaluate the efficiency of alternative transport systems for grains, soybeans, and other commodities, as well as the rates and user charges necessary to recover Government and private industry costs and investments. Research should also examine farmer cooperative transportation and distribution needs; particularly, how to adapt to rail abandonment and to make the most effective use of cooperative owned and leased equipment and storage facilities. Other research could investigate the growing mobility problems of rural people.

Rural Economic Growth

Rural area development is affected by many social, economic, and institutional factors. Comprehensive economic models are needed to systematically relate development variables as a basis for analyzing, projecting, and forecasting development of rural areas. National forecasting models can be modified to provide projections of employment and income for metro and nonmetro areas by region. Additional work can be focused on models of population change (including migration) to provide similar short-term forecasts and projections of this key variable. Such efforts would contribute to a synthesis of research and analysis of rural conditions which would provide policy guidance on the scale and location of future public facilities and service investments.

Food Safety, Quality, and Nutrition Policy

An enlarged research program relating to USDA food safety, quality, and nutrition programs is needed. Such work should focus on:

* economic impacts of Federal regulation of drugs and additives in the production, manufacture, distribution, and storage of food,

* changes in food grades and standards for consumers, producers, and food marketing firms,

* cost effectiveness of alternative nutrition educational programs, and

* the roles of prices, income, family size and composition, advertising, product labeling, health status, and attitudes on consumers' food-purchasing habits.

Foreign Markets

Research needs in foreign markets include comprehensive country analyses, agricultural yield potentials, and sources of economic growth.

Comprehensive Country Analyses

Reliable forecasts and projections of U.S. farm exports require a thorough understanding of the economies and policies of major foreign countries. ESCS analysis of major export commodities needs to be expanded to identify and measure the economic, policy, and institutional relationships of the countries which most significantly affect U.S. agricultural trade. Special attention would be given to market development efforts, subsidies, credit, adjustments in trade barriers, food aid, technical assistance, and economic and agricultural policies in foreign countries.

Agricultural Yield Potentials

There has been little systematic research on the potential for increased yields and other factors critical to world food production. Work is needed to analyze national, regional, and experimental yield series, obtain views of world experts on likely growth patterns for production of cereals and oilseeds, and evaluate world land availability for agricultural use. The results could be used to improve long-term projections of U.S. exports and for policy analyses. Crop specialists might be organized to obtain a consensus about how future crop technology would affect yields.

Sources of Economic Growth

The relationship between national economic growth and expansion of international trade is not well understood. Yet, measurement and understanding of that relationship is crucial to the development and implementation of policies directed to social and economic development abroad and for expansion of U.S. trade. Research is needed to identify key social, economic, policy, and institutional variables from selected countries and determine their interrelationships. This would improve understanding of the growth process and USDA's ability to project foreign economic growth. Such work would help analysts project international trade and would improve understanding of the impacts of alternative U.S. development assistance, trade policies, and export programs.

Cooperatives

Research needs in this area include legal-economic assistance, farmers' attitude, and consumer assistance.

Legal-Economic Assistance

Most farmer cooperatives are small and most of their members operate small farms. These cooperatives, exposed to a wide variety of laws, operate without thorough knowledge of the legal issues confronting them. There is a need to develop and maintain within ESCS a central source of legal information--including publications--that farmers, cooperatives, lawmakers, and others can use as they operate in a complex legal environment. Information on antitrust laws and how they apply to business corporations, agricultural production and distribution, and cooperative business also should be developed. Farmers, their co-op officials, and others should be solicited to help identify priority research topics.

Farmers' Attitudes

About 7,500 U.S. cooperatives provide marketing, farm supply, and related services to farmers. However, little research has been done to determine how and why farmers use cooperatives. A survey of membership is needed to provide much of this understanding. Such an effort should obtain basic data on the extent of farmers' memberships in cooperatives and the extent to which they use various types of cooperatives for input and marketing services. Farmers could be asked to appraise present services of cooperatives, quality of supply inputs handled, and member financing methods used. They also could indicate how current services could be improved and what new services are needed.

Consumer Assistance

There is no Federal source of information or assistance for consumer cooperatives, a form of organization increasingly in demand. A consumer cooperative research program is needed to acquire and analyze basic data and provide information to consumer groups. Consumer cooperatives, like farmer cooperatives, need technical assistance, with primary emphasis on the transition from dependence upon volunteers to a fully staffed organization.

Data Improvements

Data improvement research needs include prices received and prices paid, use of satellite data, weather/crop yield forecasting, and variability in cost of production.

Prices Received and Prices Paid

A program to improve the reliability of data on prices received and paid by farmers was initiated in FY 77 and needs to be continued. Data on prices received for crops and livestock should be available for all States and commodities on a probability basis, as should data on prices paid for production. This would permit sampling errors to be calculated which would provide improved data for decisionmaking.

Use of Satellite Data

An expanded role in USDA's research and development of satellite remote sensing would facilitate making estimates and forecasts of crop acreage, land use, and production earlier in the season. Such research should concentrate on developing acreage estimates for States and smaller geographic areas for as many as 10 classes of land.

Weather/Crop Yield Forecasting

Early crop forecasting is critical for farmers, marketers, and Federal officials. ESCS forecasting capability needs to be improved by developing better methods for earlier forecasting and investigating the impact of production inputs and weather on crop yields in different regions. Cooperation of the Science and Education Administration, State experiment stations, and land grant universities is needed to develop data on crop yields, plant characteristics, technological factors, economic variables, and weather and to evaluate a series of yield projection models.

Variability in Cost of Production

Implications of using cost of production data as the basis for establishing farm price supports have not been fully analyzed. If additional data were available for major commodities, more reliable estimates of cost of production for different sizes of farms and for farms in major producing areas could be provided. It would also be possible to analyze more rigorously factors causing variations in production costs and to measure the impact of using cost of production as a price support benchmark on changes in farm size, ownership patterns, and the ability of farming operations to survive economic shocks.

Publications and Services

ESCS issues hundreds of reports, newsletters, and bulletins each year on the latest agriculture and rural topics and research. Subscriptions to the major periodicals listed below are available through the Superintendent of Documents, U.S. Government Printing Office (GPO), Washington, D.C. 20402.

The monthly FARMER COOPERATIVES magazine features articles about farmer cooperative technical and research projects and examines current cooperative issues. Free to cooperative members and others working directly with cooperatives; others may subscribe through GPO at the above address ($10.10 per year; $12.65 foreign).

AGRICULTURAL SITUATION, published 11 times a year, examines current trends and research in agriculture, featuring a tabular summary of key agricultural statistics and review of economic and marketing developments affecting farming. Free to active crop reporters; others may obtain single free copies of the report from ESCS Information, Room 550-GHI, USDA, Washington, D.C. 20250. To subscribe ($5 a year; $6.25 foreign), contact GPO.

AGRICULTURAL OUTLOOK brings together the outlook for food and agriculture, including sections related to commodities, food, marketing, world agriculture and trade, and farm income. The monthly report updates commodity, food, and situation reports, and features current data on farm income, prices, production, and general economic indicators. Annual subscriptions are available ($17 domestic; $21.25 foreign) from GPO.

The monthly FARM INDEX magazine features ESCS research findings and their implications, a digest of the agricultural outlook, and brief reviews of current ESCS research--all in nontechnical language. Subscriptions are available ($9.50 yearly; $12 foreign) from GPO.

AGRICULTURAL ECONOMICS RESEARCH, a technical quarterly featuring articles on methods and findings of research in agricultural economics, includes reports on work in progress and articles on research methods and new areas of study. Subscriptions are available ($6.50 domestic; $8.25 foreign) from GPO.

WEEKLY WEATHER AND CROP BULLETINS summarize the previous week's weather and its effects on crops and farm progress for each State. Order through the Agricultural Climatology Service Office, Room 1258-South, USDA, Washington, D.C. 20250; $13 annually.

The following reports also are available from ESCS Information, Room 0054-South, USDA, Washington, D.C. 20250.

OUTLOOK AND SITUATION REPORTS for individual commodities are issued throughout a crop year and are updated in the monthly Agricultural Outlook magazine. The reports analyze supply and demand, price, and outlook for cotton and wool, dairy products, fats and oils, feed, fertilizer, fruits, livestock and meat, poultry and eggs, rice, sugar and sweeteners, tobacco, vegetables, and wheat.

Approximately 175 various RESEARCH REPORTS, STATISTICAL BULLETINS, and COOPERATIVE EDUCATIONAL BULLETINS are published through ESCS yearly, covering virtually all topics of agricultural research, including commodity production, marketing, natural

resources, rural development, and assistance to cooperatives. Single free copies of the research reports are available through ESCS Information.

The 1979 CROP REPORTING BOARD CATALOG, outlining reports of estimates on production, stocks, and prices of commodities and the release dates of the reports, is available free from the ESCS Crop Reporting Board, Room 0005-South, USDA, Washington, D.C. 20250.

FARMERS' NEWSLETTERS, designed to help farmers make production and marketing decisions, are issued free at critical times during a crop year for oilseeds, cotton, wheat, livestock, and feed. A general category also is included. To subscribe, send your name and address to ESCS Information, indicating which newsletter (by crop) you wish to receive.

Farmers, businesses, and others who need information can obtain it quickly through a COMPUTER REPORTING SERVICE network. This automated system offers summaries of situation reports, crop and livestock estimates from the Crop Reporting Board, and agricultural supply and demand estimates. Access is through the user's own terminal; there is a charge for computer time. For more information about this service, contact the Secretary of the Crop Reporting Board, Room 0233-South, USDA, Washington, D.C. 20250.

THE FARMER'S NEWSLINE report, featuring 60 seconds of the latest crop, livestock, and farm economic information, is changed each weekday at 4 p.m. Washington, D.C. time. Call toll free (800)424-7964.

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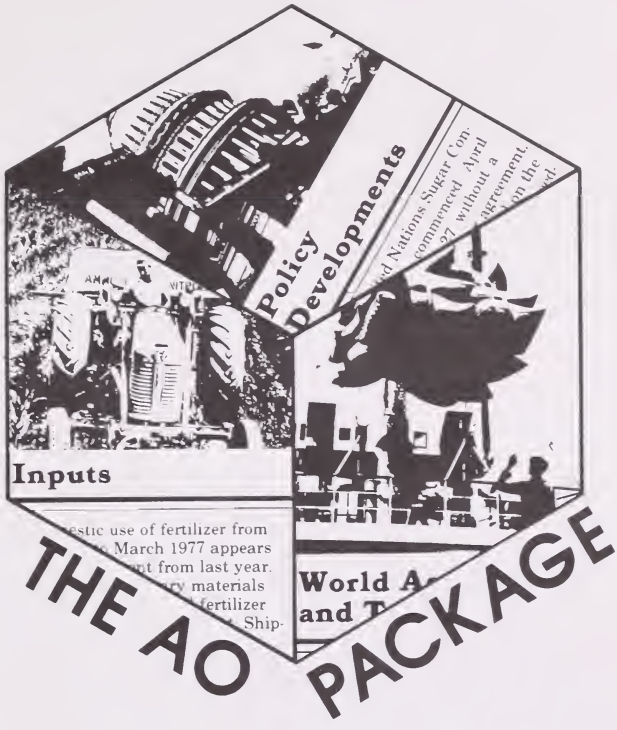

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