PRODUCTIVITY IN U.S. FOOD AND AGRICULTURE: IMPLICATIONS FOR RESEARCH AND EDUCATION

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Increased demand for U.S. farm exports—primarily food grains, feed grains, and oil crops—emerged as an important factor influencing food and agricultural research and education in the 1970s.[1] Maintaining producers' revenue remained as a motivating force in agricultural research. Also there was increased emphasis on new knowledge, first, to reduce the upward pressure on the cost of food, clothing, and housing to U.S. consumers; and second, to increase efficiency in the use of petroleum, natural gas, land, water, and other resources in farm production, and in the processing and distribution of food and agricultural products.

A major goal of science and education is to develop technologies to expand production of agricultural products, while maintaining the resource base for future production and improving the quality of the environment. Advancing technologies in primary farm production, processing, and distribution are necessary for achieving this goal. Advancing technologies stem from public and private research—there is no other source.

The USDA and land-grant universities are the public institutions with research and education directed to food and agriculture problems and issues. Research, on-campus education, and extension are the prime mechanisms for fostering productivity. Reservations have emerged regarding productivity growth in the food and agricultural sector. The basic issue is whether growth rates are declining, and finding means to sustain such growth in the face of an array of resource constraints and escalating costs. This paper examines productivity trends in the food and agricultural sector, identifies factors constraining capacity, productivity and output, and suggests research and education programs needed to relax the constraints.

Output is defined as the total volume of goods and services—the total product of a farm, the U.S. crop sector, total U.S. food and agriculture, or gross national product. Output is governed by current technology and the volume and composition of resources used. Increasing the input of resources is one means of increasing total output.

Capacity is the volume of output attainable when all available resources are fully employed, using the best available technology. The utilization of capacity is often cited as a measure of overall economic efficiency.

Productivity is the ratio of real output to real factor inputs—output per unit of input. Productivity is governed by the available technology and the organization and management of resources. Advancing productivity accounts for increasing real per capita income.

Total output results both from the total volume of resources used and the productivity of those resources. Technological changes stemming from research, teaching, and extension enhance resource productivity. Capacity also increases as the productivity of resources increases, as well as when the volume of available resources increases.

PRODUCTIVITY TRENDS IN U.S. FOOD AND AGRICULTURE

The U.S. food and agricultural sector is highly interdependent with other sectors of the economy. Modern agriculture depends on industrial inputs—for example, machinery, equipment, fuels, chemicals, and building materials—while other sectors of the economy, including consumers, could not survive without the primary products of agriculture.

Real costs of food, fiber, and housing are directly related to productivity in the production, processing, and distribution of farm products. Labor productivity, or output per unit of labor, is widely used as an indicator of efficiency in the general economy. Rising labor productivity is associated with new or improved mechanical, chemical, and biological technologies; more abundant and less expensive energy; increased efficiency in organization and management; a more efficient exchange system; increased availability and lower cost of capital (investment funds); and improvements in the education, skills, and motivation of the labor force. Deterioration in any of these factors adversely affects

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[1] "Food and agriculture" is defined to include all activities related to inputs used in agriculture, farm production and harvesting activities, and the storage, preservation, processing, and distribution of all products originating with farms.

costs to consumers—that is, prices will rise more rapidly.

With the oil embargo of 1973–74, the U.S. food and agricultural sector entered into a period of great uncertainty relative to changes in relative prices of land, labor, and energy. Rising oil, natural gas, and coal prices contributed to a more than doubling in costs of vital industrial farm inputs during the 1970s (Eddleman, 1980). The impact of OPEC intervention in the world crude oil market subsequently has been accompanied by rising cost of investment capital, apparent deterioration in the primary and secondary education system, and tax structures thwarting individual incentive to perform (Thurow). These and other factors had adverse impacts on important industries comprising U.S. food and agriculture during the 1970s.

Long-term (1958–72) and near-term (1973–79) annual rates of growth[2] in labor and other productivity measures were estimated for major Standard Industrial Classification (SIC) industry groups from the index numbers published by the Bureau of Labor Statistics and the USDA, Economics and Statistics Service.

THE AGRIBUSINESS ECONOMY

The productivity trends in the off-farm food and agricultural system are similar to trends in the industrial sectors of the economy. Productivity growth since 1973 for most of the industries that supply inputs for agriculture, process farm products and distribute them declined from the earlier period.[3] The major exceptions among the industries analyzed were in the milling and beverage industries. Each of the major components of the agribusiness economy is addressed separately.

Most industries supplying inputs used by the farm sector experienced lower annual labor productivity growth rates since 1973 than for the earlier period (Table 1). The largest growth rate declines were recorded in the agricultural chemical, nitrogen fertilizer, petroleum refining, brick and concrete, and motor and generator industries.[4] Productivity growth in the farm machinery sector was about the same in both periods.

The adverse impact of declining labor productivity growth rates in industries supplying industrial inputs to the farm sector is reflected in rising prices paid by farm producers. Farm producers cannot immediately pass increased input prices to the next link in the production-marketing chain as do less competitive sectors. Tweeten (1980a) estimated that during the 1963–77 period, each 1.0 percent increase in prices paid by farmers was associated with only a 0.7 percent increase in prices received by farmers. Declining productivity growth rates for firms supplying industrial inputs adversely affect farm costs and earnings.

Two trends in labor productivity are present among the processors of farm products (Table 1). Increases in labor productivity growth rates during 1973–79 occurred in grain milling (especially in wet corn milling), soft drinks, and cigarette manufacture. Growth in productivity for the sugar, candy, and breakfast cereal industries since 1973 was not significantly different from zero, while output per employee hour in the blended flour industry declined about 4 percent per year. Although the Bureau of Labor Statistics does not report productivity in meatpacking, output per hour, as inferred from the Industrial Production Indexes of the Federal Reserve, showed no change from 1971 to 1978.

Rail and truck transportation productivity growth rates have declined significantly since 1973 (Table 1). Reduced speed limits, fuel costs, availability of railcars, and track abandonments are major factors influencing productivity (Bureau of Labor Statistics).

At the end of the food distribution chain, labor productivity in retail food stores and food service establishments in 1979 was significantly below 1973 levels. Longer shopping hours for essentially the same volume of sales is the major source of this decline in food stores. Automated checkout systems are expected to increase labor productivity in food retailing. Although fast-food chains have made organizational and technological improvement, increasing hours of service and the large number of small, marginal enterprises retarded productivity in food service establishments (Bureau of Labor Statistics).

Slower production growth rates in the food processing and distribution sectors coincided with increased rates of food price inflation. During 1950–65, the annual rate of increase in food prices was 1.1 percent, which jumped to 3.9 percent during 1966–72, and to 7.7 percent between 1973 and 1979.[5] Annual wage gains outpaced the annual food price increase during 1950–65 (3.9%) and 1966–72 (6.2%), but barely kept pace during 1973–79 (7.5%). The real price of food during 1973–80, in terms of the real wage rate, was not significantly different from 1967 levels (Figure 1). Rising marketing costs are a major source of rising food costs, with increasing real labor costs having a great impact because labor directly accounts for 47 percent of total marketing costs.

[2] Annual growth rates are based on the linear least squares trend of the logarithms of the index numbers published by BLS and USDA, ERS. The analysis is based on near-term deviations from the long-term trends. The 1973–79 period generally coincides with the beginning of productivity growth declines in many sectors of the U.S. economy.

[3] In this section, the focus is on labor productivity, including output per employee hour or output per employee. A total productivity measure would have been preferred. However, the accessible multifactor productivity studies for these industries do not analyze the period subsequent to 1973.

[4] Several productivity indexes were obtained as unpublished data from the Bureau of Labor Statistics. They included agricultural chemicals (SIC 1870, 2879), fertilizers (SIC 2874, 2819), and farm and garden machinery (SIC 3520, 3523).

[5] Inflation rates in food prices subsided somewhat during 1980–82.

TABLE 1. Growth in Output Per Employee Hour: Major Sectors of the Agribusiness Economy

SIC Code	Industry	Annual Growth Rate (%)[a] 1958–72	1973–79
	Industrial farm inputs		
2870	Agricultural Chemicals	5.9	0.2[e]
2879	Agricultural Chemicals, N.E.C.	5.8	-6.2[e]
2819	Inorganic Chemicals, N.E.C. & Nitrogen Fert.	3.7	0.2[e]
2874	Fertilizers	5.4	3.9[e]
2911	Petroleum Refining	5.6[b]	1.5
3011	Tires & Inner Tubes	4.5[b]	4.0
3251	Brick & Structural Clay Tile	2.9	0.5
3271-72	Concrete Products	2.9[b]	0.9[e]
3272	Ready-Mixed Concrete	2.0	-0.04[e]
3520	Farm & Garden Machinery	2.3	2.3[e]
3523	Farm & Garden Machinery & Equipment	2.3	2.2[e]
3621	Motors & Generators	4.1[b]	0.3
371	Motor Vehicles & Equipment	3.7[c]	3.1
	Farm products manufacturing		
2026	Fluid Milk	3.8	3.5
203	Preserved Fruits & Vegetables	2.7[b]	1.9[e]
2041	Flour & Other Grain Mill Products	4.1[b]	4.9
2043	Cereal & Breakfast Foods	2.2[d]	0.8[e]
2044	Rice Milling	3.6[d]	2.5[e]
2045	Blended & Prepared Flour	2.9[d]	-4.0[e]
2046	Wet Corn Milling	4.0[d]	9.8[e]
2047-48	Prepared Feed For Animals & Fowls	4.4[d]	2.2[e]
2061-62	Raw & Refined Cane Sugar	3.5	1.5[e]
2063	Beet Sugar	3.4	0.6[e]
2065	Candy & Other Confectionery Products	3.6[b]	0.2[e]
2082	Malt Beverages	5.9[b]	5.3
2086	Bottled & Canned Soft Drinks	1.7	5.3
2121	Cigars	5.6[b]	3.4
2111, 2131	Cigarettes, Chewing & Smoking Tobacco	1.8[b]	2.9
	Distribution sector		
4213 Part	Intercity Trucking[f]	2.6[b]	1.1[e]
4213 Part	Intercity Trucking[f] (General Freight)	2.1[b]	1.4[e]
401	Railroad (Car Miles)	3.8[b]	0.8
205	Bakery Products	2.7[c]	1.0
54	Retail Food Stores	3.0	-1.0
58	Eating & Drinking Places	1.2	-2.4

[a]Calculated as the slope of a regression of the logarithms of output per employee hour on time.
[b]1954–72 [c]1957–72 [d]1963–72 [e]1973–78
[f]Output per employee

The Farm Economy

Productivity trends in the farm economy have not been fully clarified. Lee summarized the situation thus: "A year ago Vernon Ruttan stood before you and stated that productivity growth in agriculture had definitely slowed and that inflation was partly responsible. Today, D. Gale Johnson stood before you and said that productivity growth in agriculture had not slowed—was in fact growing faster than in the 1960's—and that inflation has had no measurable impact. Clearly the issue is not resolved and further investigation is in order."

The USDA statistics measuring farm productivity support the assertions of both Ruttan and Johnson, although they lend stronger support to Ruttan. Ruttan asserted that, since 1965, productivity growth in agriculture had slowed. When the 15 years 1965–79 are compared with the previous 15-year period, the growth rates of a broad spectrum of farm productivity measures declined significantly (Table 2). Total farm output per farm, per farm worker, per hour of labor, and per unit of an aggregated index of inputs; crop production per acre; and livestock production per breeding unit each show at least a full percentage point decline in the annual growth rate; these declines are all significant statistically.

Johnson asserted that multi-factor productivity growth in agriculture by decades had not slowed in the 1970s. Data available early in 1980 supported Johnson's conclusion regarding total fac-

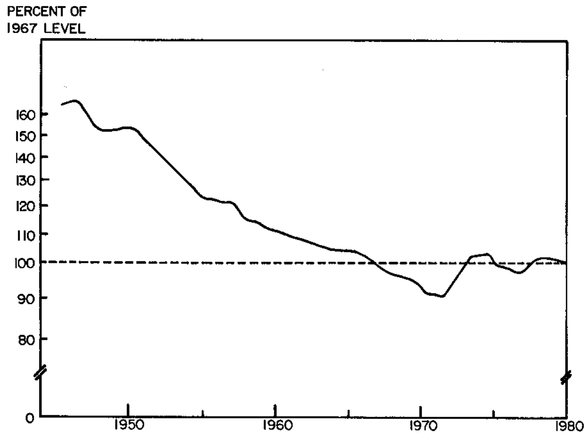

FIGURE 1. Real Price of Food*

*Consumer price index for food relative to private nonagricultural hourly earnings, adjusted for overtime and interindustry shifts.

TABLE 2. Annual Growth Rates[a] of Selected Productivity Measures

Fifteen year period	Total Farm Output: Per unit of all inputs	Per farm	Per farmworker	Per hour of labor	Crop production per acre	Livestock production per breeding unit
	----------	----------	----------	Percent	----------	----------
1920-34	0.43 (.28)[b]	0.12 (.45)	0.97 (.43)	1.00 (.24)	-0.99 (.46)	1.33 (.30)
1935-49	2.16 (.26)	4.14 (.33)	4.80 (.50)	4.80 (.21)	2.20 (.43)	1.44 (.20)
1950-64	2.33 (.10)	5.24 (.11)	5.08 (.09)	6.53 (.15)	2.75 (.19)	1.93 (.11)
1965-79	1.37 (.14)	4.27 (.28)	3.89 (.30)	5.49 (.19)	1.56 (.19)	0.89 (.17)

[a]Calculated as the slope of a regression of the logarithm of the indicator on time.

[b]Data in the parentheses are the standard error of estimate.

Source: USDA/ESS. *Economic Indicators of the Farm Sector: Production and Efficiency Statistics, 1979,* Stat. Bul. No. 657, February 1981.

tor productivity growth at 10-year intervals, but the revisions of the input index later in the year for the 1979 bulletin weakened these results (Table 3). Although the 1970s growth rate was not significantly less than the 1960s growth rate, it was a quarter of a percentage point lower. Johnson's analysis was based on a point-to-point estimate that started in a year when the actual productivity index was less than its "trend" value, biasing his estimating growth rate upward. When the broad set of productivity indicators was examined, both labor and livestock growth rates were significantly lower in the 1970s than 1960s (Table 4). The growth rates of the multifactor measure "total farm output per unit of input," and the single factor measure "output per farm" and "crop production per acre" were not significantly different between the 1960s and 1970s.

The observation of slower overall productivity growth since 1965 was generally substantiated on an individual commodity basis. However, there were significant regional and commodity differences. Crop production per acre has not increased since 1965 in the Delta states, the Southeast, and the eastern states. Crop production per acre has continued to increase in response to higher levels of chemical, fertilizer, and other purchased input use in the other farm production regions. In the South and East, the land and other inputs are so heterogeneous that expanding the acreage of marginal land exposes production to problems of soil fertility, pests, and climatic factors that cause yields to respond negatively to additional land use.

The regional disparity in crop production trends is borne out by individual commodities. Illinois corn and soybean yields generally characterize the state of production technology for those commodities, and the national average yield trend parallels the Illinois trend. But in North Carolina, for example, corn and soybean yields that had followed the national trend up to 1965 have shown no significant yield increases over the 1965 levels—and the soybean yields have drifted lower. Soybean yields in Arkansas show no overall increase since 1950 after the year-to-year variation is removed. Cotton yields in Mississippi, California, Texas, and the U.S. average yield peaked in 1965, but the trend in national yields can go up or down, based on the area planted in California or Texas. Wheat, rice, and many other crop commodities provide other examples of the disparities in levels, trends, and variability of crop yields.

TABLE 3. Total Factor Productivity Growth Rates in Agriculture

Period	D.G. Johnson	Point-to-point: 1978 Bulletin data series[a]	Log trend estimates: 1978 Bulletin data series[a]	Log trend estimates: 1979 Bulletin data series
	----------	---------- Percent per year	----------	----------
1940-49	1.7	1.68	1.81 (.35)[b]	1.81 (.35)
1950-59	2.4	2.37	2.34 (.19)	2.34 (.19)
1960-69	1.3	1.25	1.52 (.16)	1.52 (.16)
1970-79	2.1	2.08	1.58 (.29)	1.29 (.31)
1940-79	1.9	1.84	1.76 (.04)	1.73 (.04)
1950-79	1.9	1.89	1.84 (.06)	1.80 (.06)
1960-79	1.7	1.64	1.53 (.08)	1.44 (.08)

[a]Assumes the 1979 observation was 123.

[b]Data in parentheses are the standard error of the estimated growth rate.

Source: USDA/Economics Statistics and Cooperatives Service, *Changes in Farm Production and Efficiency, 1978,* Stat. Bull. No. 628, Jan. 1980.

USDA/Economics and Statistics Service, *Economic Indicators of the Farm Sector: Production and Efficiency Statistics, 1979,* Stat. Bull. No. 657, Feb., 1981.

D. G. Johnson, "Inflation, Agricultural Output and Productivity", *Am. J. Agr. Econ.,* 62(Dec. 1980):917–23.

TABLE 4. Annual Growth Rates[a] of Selected Productivity Measures

Decade	Total Farm Output: Per unit of input	Total Farm Output: Per farm	Total Farm Output: Per farm worker	Total Farm Output: Per hour of labor	Crop production per acre	Livestock production per breeding unit	Persons supplied per farm worker
	Percent						
1910-19	0.03 (.48)[b]	0.94 (.50)	1.02 (.49)	0.76 (.50)	-0.33 (.60)	N.A.	1.56 c
1920-29	0.62 (.32)	1.33 (.41)	1.25 (.39)	1.49 (.23)	-0.10 (.51)	2.32 (.24)	1.66 c
1930-39	1.12 (.80)	0.98 (1.17)	0.64 (1.10)	1.66 (.70)	1.13 (1.41)	0.74 (.54)	0.88 c
1940-49	1.18 (.35)	3.15 (.49)	2.71 (.61)	4.95 (.35)	1.32 (.50)	0.87 (.38)	2.99 (.58)
1950-59	2.34 (.19)	5.20 (.22)	5.13 (.17)	6.33 (.23)	2.38 (.37)	1.77 (.20)	5.58 (.30)
1960-69	1.52 (.16)	4.46 (.18)	6.76 (.31)	6.23 (.17)	1.75 (.21)	2.00 (.16)	6.67 (.29)
1970-79	1.29 (.31)	4.85 (.58)	3.57 (.60)	5.60 (.43)	1.64 (.57)	0.71 (.38)	3.49 (.37)

[a]Calculated as the slope of a regression of the logarithm of the indicator on time.
[b]Data in parentheses are the standard error of estimate.
[c]Calculated on a point-to-point basis and therefore no estimate of the standard error is available.
N.A. Not available.
Source: USDA/ESS. *Economic Indicators of the Farm Sector: Production and Efficiency Statistics, 1979.* Stat. Bul. No. 657, February 1981.

USDA/ESS. *Economic Indicators of the Farm Sector: Income and Balance Sheet Statistics, 1979.* Stat. Bul. No. 650, December 1980.

Productivity gains in the livestock industry take many forms: feeding efficiency (fewer pounds of feed per pound of gain), reproductive improvement (more pigs per litter), labor efficiency (fewer hours per milk cow), or facilities utilization (year-round farrowing operations). The growth of the large, confinement-type broiler "factories" and the antibiotic feed additives that permitted them are responsible for the phenomenal growth (more than 5 percent annually) of chicken production per laying hen during 1950–79. Similar forces enabled egg production per hen to increase at an annual rate of 1 to 2 percent. Productivity per cow has increased 2.9 percent per year since 1950 as a result of selective breeding programs, changes in breed composition, and high-energy rations in the dairy sector. The development of confinement facilities in the pork industry enabled producers to moderate the seasonal pattern of production by allowing fall farrowings to increase. The result of this change was to increase the annual pig crop per brood sow. The major innovation affecting productivity in the cattle industry has been the large-scale feeding operation that combines high-energy rations with a capital-intensive operation to reduce both the length of the feeding period and the hours of labor required to produce beef. Twinning in beef cattle holds promise for improved reproductive efficiency, but the liquidation phase of the cattle cycle has had greater adverse impact on the calving rate than have the positive technological improvements to date.

The geographical location of commodity production and the relative importance of different commodities regionally and nationally influence the overall national growth rates in measured farm productivity.

FACTORS AFFECTING PRODUCTIVITY GROWTH

A decline in productivity growth rates in many components of the food and agricultural sector is evident. The causes are multiple and complex. Dennison, Simon, Thurow, and Tweeten (1980b) identified a number of factors affecting productivity growth of major industries comprising the U.S. economy. These factors also influenced productivity growth in the food and agricultural sector.

Rising energy costs related to world crude oil price increases; expanded governmental regulations to protect health, safety, and the environment; entrance of inexperienced workers into the labor force; and realignment in terms of international trade to correct for a previously overvalued dollar adversely influenced economic performance.

Natural resource depletion—including oil, metallic ores, and soil—and employment shifts to low-productivity-growth service industries also restrain productivity growth over a long-term period, but probably were not the cause of the short-term decline characterizing the 1970s (Tweeten, 1980b).

Increased tax burdens of social programs, rising administered and negotiated wages in excess of labor productivity growth, and low rates of savings and investment meant slow capital formation at a time when it was needed to build alternate energy-producing capacity, provide more jobs and more output per worker. High interest rates further thwarted the innovation process.

Underinvestment in research and development stifles economic efficiency and productive capacity. The U.S. invests a smaller share of national income in research and development than do other leading industrial nations. Economists have examined the relationship between public investments in research and productivity change in the U.S. farm sector. Although all sources of productivity growth have not been accounted for, the reliability of the statistical estimates is sufficient to support three summary propositions: (1) productivity growth in the U.S. farm sector is closely associated with investments in research, and part of the recent slowdown in productivity growth is therefore attributable to lower real rates of public sector investment in agricultural research; (2) the research contribution to productivity is part of the larger contribution of an integrated system of higher education, extension services, applied research and basic research, wherein basic research improves the output of applied research (and vice-versa), and applied research improves the output of extension and the schooling activity; and (3) high rates of return to investment in public sector agricultural research (30 to 50 percent annually) indicate too little investment from a societal perspective (Evenson et al.).[6]

The adverse impact of these factors during the 1970s has been partially counteracted by improved biological technology; vastly improved communications, accounting and management technology and an improvement in transportation efficiency since the sharp 1974–75 decline. Without these technological advances and sustained productivity growth rates in many components of the food and agricultural sector during the 1970s, consumers' real cost of food would have escalated to much higher levels than actually occurred. Unless more efficient production, preservation, exchange and distribution technologies are forthcoming, U.S. and world consumers will be confronted with rising real costs of food, clothing, and housing. Whether or not this happens depends on the technological advance within the food and agricultural sector and the alleviation of the constraints to expanding output. Investments in research, extension and higher education, accompanied by monetary and fiscal policy and a tax structure that provides incentive to perform are the major determinants of future technological progress.

IMPLICATIONS FOR RESEARCH AND EDUCATION

The primary means for negating declining productivity growth rates are an ever-advancing technology and effective organization and management. Future affluence depends primarily on advancements in scientific knowledge and subsequent technologies, and improved decision and managerial skills of producers and consumers. New sources of productivity growth for the food and agricultural sector must be sought. This requires efforts to identify changes that can and should be made. New or improved technologies stem from research. Extension and higher education are channels for dissemination of technical advances, and for the embodiment of knowledge and skills in individuals.

Research and education programs that warrant increased emphasis include:

1. An increase in basic research to develop new technologies for expansion of U.S. and world agricultural production. Constraints on natural resources indicate that technological change bears much of the burden for expanded production. Basic research needs to include not only plants, animals, and human subjects, but also basic inquiry into storage, processing, distribution, and exchange processes.
2. A greater emphasis on research and education that promises to mitigate the impact of higher costs of using land and rising energy prices and interest rates. Such research should concentrate on conservation and efficient use of soil, energy, and water resources in primary production, processing, and distribution.
3. Increased emphasis on technologies that can be adopted by all segments of the farm production sector. Farmers are seriously threatened by a cost-price squeeze and cash-flow shortfalls to meet obligations. Publicly supported research and education will need to play a key role in improving efficiency—through technological, informational, and financial management advances—critical to survival of farms.
4. A substantially increased effort in research and education directed to increasing labor productivity in the post-harvest or marketing subsector. Two-thirds of the food costs

[6] For a recent study summarizing the results of numerous analyses of the returns to agricultural research, see Eddleman (1982).

to American consumers are attributable to marketing—assembling, processing and fabricating, transporting, wholesaling and retailing, and food service. Marketing costs are predominantly direct labor costs (47 percent) and embodied labor costs (an estimated 15 percent). Increased labor productivity in this sector, and particularly in the distribution subsector (wholesaling, retaining, and food service establishments), offers great potential for constraining rising food costs to American consumers. Closer coordination and conduct of research and development by publicly supported institutions and the private sector are warranted.

5. The development of new systems for increasing productivity and for controlling plant and animal pests—insects, diseases, and weeds—by means that do not adversely affect the environment or jeopardize the safety of the food supply.

6. New programs of research education aimed at mitigating the consequences of technological change on people and rural communities. Greater consideration must be given to societal interests in such normative values as nutritional needs; quality of life for farm laborers, farm operators, and agribusinessmen; environmental values; and income distribution impact on all who are affected by the technical advances.

Many problems must be addressed through basic and applied research, extension, and higher education programs. Past technological discoveries from public and private research and adoption of these technologies by farmers and agribusiness firms provided increased efficiency to offset rising costs. U.S. food and agricultural output and productive capacity were substantially expanded. The benefits to society were actual decreases in real food costs to American consumers. Increased research and education intensity are required now to restrain rising real food costs and to provide fair returns to farm producers and agribusiness firms.

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