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Increasing Productivity and Efficiency in Agriculture

Efforts to enhance agricultural productivity have two major objectives. One is to generate income growth for the producers of agricultural commodities. Another is to make agricultural commodities available to consumers on increasingly more favorable terms.

These two goals have at times appeared to be inconsistent or in conflict. During periods when the growth of productivity has lagged behind the growth of demand, the commodity component of food costs has risen. During periods when demand for agricultural commodities has stagnated, commodity prices have sometimes declined more rapidly than production costs. Yet during most of the last half century both consumers and producers have shared in the economic dividends generated by productivity growth. Consumers in the United States have access to food on more favorable terms than at any time in the past. And most farm families today enjoy a level of living that was not available to earlier generations.

This is not to imply that all is well in rural America or in the nation's agricultural research system. During the last 5 years a global recession and the rising value of the dollar have dampened the demand for U.S. farm commodities abroad and high interest rates have imposed severe financial burdens on farmers and their suppliers. These have combined to force severe deflation in land values and a financial crisis for many farmers.

These difficulties have prompted some critics to suggest a moratorium on agricultural research and technology development. Such a moratorium, it is suggested, would result in slower growth in agricultural production and permit domestic and international markets to absorb surplus production capacity at no real cost to consumers or producers.

Such reasoning is seriously flawed. The capacity of American agriculture to expand its foreign markets and retain its domestic markets depends on continued declines in the real costs of production. American agriculture has achieved its preeminence in the world by substituting knowledge for resources. This knowledge, embodied in more productive biological, chemical, and mechanical technologies and in the managerial skills of farm operators, has given the United States a world-class agricultural industry at a time when many other sectors of our economy are losing their preeminent position. A necessary condition for U.S. agriculture to retain its status is enhancement of both public and private sector capacity for scientific research and technology development. The costs, to both consumers and producers, of failure to maintain and enhance our efficiency in production would greatly exceed the adjustment costs resulting from abundance.

It is important for both producers and consumers that the agricultural research mission not be too narrowly defined. Research should provide farmers and policy-makers with the knowledge needed to adjust to the changes driven by national and international economic forces. Research should also be directed to the design of more efficient institutions to protect both our production capacity and the income of farm people from the costs resulting from the integration of U.S. agriculture into world markets. Society should also insist that agricultural research be concerned with the effects of agricultural technology on the health and safety of agricultural producers, with the nutrition and health of consumers, with the impact of agricultural practices on the esthetic qualities of natural and modified environments, and with the quality of life in rural communities.

New sources of productivity will be needed if U.S. agriculture is to maintain its preeminence. From 1955 to 1965, increased levels of fertilizer accounted for a yield gain of two bushels of corn per year. By the early 1980's, higher levels of fertilizer use were accounting for less than half a bushel per year yield increase. The gains in productivity growth that can be expected from traditional sources will be inadequate to meet even the relatively slow growth in demand for U.S. agricultural commodities that is now anticipated over the next several decades. During the last half century U.S. agriculture has experienced rapid gains in both output per worker and output per hectare. New sources of productivity growth consistent with changing resource endowments and the dramatic growth of scientific opportunity must be sought.—VERNON W. RUTTAN, Department of Agricultural and Applied Economics, University of Minnesota, St. Paul 55108