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U.S. and Soviet Agricultural Research Agendas

Disparities between the United States and the Soviet Union in investments in research and development have been detailed in recent reports.* The Soviets edged out the United States in percentage of gross national product (GNP) committed to total R & D in 1968. They have since increased that lead to 3.4 percent of their GNP compared to 2.2 percent for the United States. By any criterion—percentage of GNP, number of scientists per 10,000 in the labor force population, or absolute numbers—the Soviet Union leads the world in R & D investment.

Nowhere is the gap widening more rapidly than in the area of investments in agricultural research. Reports in the mid-1970's suggested that one-third of the world's agricultural research was conducted in the United States. This is not true in 1980. There are now more than 60,000 agricultural scientists in the Soviet Union and more than 150,000 supporting personnel. They man 48 agricultural experiment stations and 175 research institutes. By comparison, there are around 12,000 agricultural scientists in the United States receiving public support—the combined total in the U.S. Department of Agriculture's Federal Research and State Agricultural Experiment Stations—and a nearly equal number from the industrial sector and others outside the land grant system: a total of 25,000 for the nation.

The number one agricultural research priority in the Soviet Union is stability of production. Seventy percent of the land is not favorable for agriculture, being marginally cold or marginally dry, or both. A related priority is breeding of plants for higher yields and better adaptation to climate variations, mechanization, and resistance to pests. Increasing production of animal products is high on the list. There is a problem in producing sufficient grain and fodder to feed the increasing numbers of livestock. Seed production of forage crops is difficult because of the short growing season.

Soviet scientists are world leaders in wheat genetics (they have moved winter wheat production 200 miles farther north), the development of high-yielding hybrid dwarf sunflowers, and research to reduce environmental stresses on crops and livestock. Expenditures beyond those in the United States are being made for research on photosynthesis, genetic improvements in crops and livestock, forage production, water management, and the soil sciences. There are 21 centers for animal breeding, and institutes in every republic for mechanization, soils and fertilizers, and pest control.

Agricultural academicians hold eminent positions in the Soviet academies—in medicine, engineering, and their National Academy of Sciences. Thirty-four have been designated as heroes. One single advantage of the U.S. agricultural system over the Soviet system is a climate that dependably produces an abundance of crops and livestock. That advantage can be overcome in time by the significantly greater technological inputs now directed by the Soviets into the management of resources, their genetic improvement programs, and their research emphasis on control of the basic biological processes that limit the magnitude and stability of crop production.

The Soviet Union, with its resources of climate, land, and water, its technological inputs, and economic incentives, cannot consistently meet its food needs. The resource base can, however, change with time and technology. The recent imposition of a grain embargo for strategic purposes will accelerate the change. Meanwhile, the share of total R & D expended for agricultural research in the United States has fallen from 39 percent of the total in 1940 to 2 percent in 1980. All this should stimulate debate in Congress, the White House, the federal agencies, and the National Research Council about corrective measures for the low level of support for agricultural research, the kinds of research to be done, and how such research should be managed.—SYLVAN WITTWER, *Director, Michigan State University Agricultural Experiment Station, East Lansing 48824*

*L. E. Nolting and M. Feshbach, *Science*, 1 February 1980, pp. 493-503; National Science Board, *Science Indicators—1978* (National Science Foundation, Washington, D.C., 1979); J. Rhea, *High Technology*, February 1980, pp. 54-61.