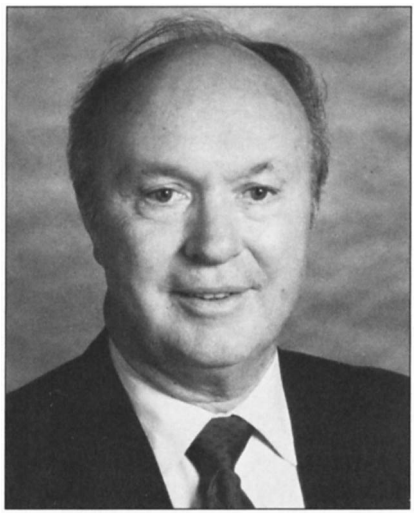

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The value of international scientific exchange

The coupling of scientific research and graduate teaching in American universities has kept the United States at the forefront of science in agriculture during most of this century. Many thousands of scientists, American and foreign, have graduated from U.S. land-grant universities to assume positions of leadership throughout the world in science in the private sector, in government, and in universities.

American universities have had liberal policies in training foreign students, particularly since the end of World War II. Some of the graduates have remained in the United States, but most have returned to their native countries carrying with them new knowledge and research experience. As the international community of scientists has grown, as the scope and rigor of research has expanded globally, and as improved transportation and communication have spanned national boundaries, so has the exchange of scientists and scientific information multiplied.

Some question whether such a free-flowing exchange of scientists and scientific information is in our best interests as a major agricultural production and exporting nation. Clearly, the benefits to foreign countries from the training of their students at the University of California, the interaction of scientists, and the exchange of scientific information have been substantial. And there is little doubt that those benefits have been translated into improved agricultural productivity and increased output in many of those countries.

Are we eroding U.S. agricultural competitiveness by facilitating the flow of knowledge from American universities to universities and research institutions abroad? In addressing such questions, we should first be reminded that the benefits from international exchange by no means flow in one direction only.

No better example of the value of international exchange to California's agriculture can be found than that of germplasm, and plant and animal materials. Very few of the more than 200 agricultural commodities produced commercially in this state are native to California; only a handful of the 1,000 or more commercially grown crops in the United States originated here. Early explorers and colonists introduced livestock and cereal crops from Asia and Europe; almonds, walnuts, and pears came from England and the Mediterranean region; wine grape varieties were brought from France, Spain, and Italy; tomatoes and corn originated in South America; rice is from Japan and India—and the list goes on.

Despite the wealth of plant materials and livestock that have been successfully adapted to our climate and growing conditions, our dependence on continued access to genetic resources and new introductions from around the world is as important today as it ever was. We rely on the cooperation of foreign scientists and governments, for example, in the search for genetic characters conferring pest and disease resistance and for natural predators and parasites of pests. Without free exchange within the scientific community, there would be little impetus for the sharing of ideas and materials. The successes we have enjoyed with biological control of the citrus black scale, walnut aphid, spotted alfalfa aphid, grape leaf skeletonizer, and Klamath weed, as examples, have all been the result of obtaining natural enemies from their native habitats. Without access to the materials and cooperation from the scientific communities familiar with these areas, it would be difficult if not impossible to explore or exploit the potential of biological control.

Should we attempt to restrict the training of foreign students in the U.S. universities and the international exchange of scientists and scientific information? The response, I believe, should be unequivocally "no." Such exchanges may increase competition for some California products in some markets, even those in the United States. But recent development experience shows convincingly that foreign economic growth benefits U.S. agriculture as a whole. In many developing countries, such growth requires increased agricultural productivity. California agriculture in particular stands to gain from international economic development because of its production of high-value and value-added products. Demand for such products is relatively sensitive to changes in income.

Markets for agricultural products as well as scientific knowledge are multilateral. To approach competitiveness by restricting export of U.S. technology and scientific information is to ignore the many other contributing factors—rigid, poorly constructed farm policies, economic policies that constrain demand for farm products, protectionist trade policies that limit or prevent access of U.S. farm products, for example.

Furthermore, policies to restrict international exchange run the risk of isolating U.S. scientists. Our access to the rapidly enlarging pool of foreign scientific knowledge would be restricted, in the long run undermining the very quality of U.S. science itself.

Rather than attempting to restrict international scientific exchange, which in all likelihood is a practical impossibility in any case, we need policies and strategies to strengthen our access to foreign scientific information. We should try to capitalize more effectively on the enrichment of science that comes from such exchange. And we need systems to transfer technology and science-based information from the laboratory to domestic users as promptly and effectively as possible.