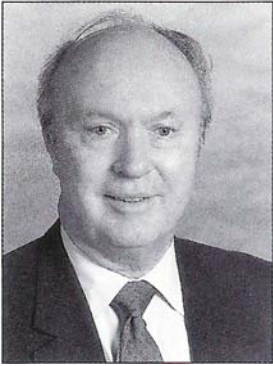


An aerial photograph showing four green combine harvesters working in a large, curved rice field. The harvesters are moving in a circular pattern, leaving distinct tracks in the golden-brown rice. The field is surrounded by a dark green border, possibly a canal or a different type of vegetation. The overall scene is one of active agricultural work.

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*Rice industry simmers:
market challenges,
resource constraints*



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UC research and education: engines of economic growth

Economic development is the keystone of UC President J. W. Peltason's "Strategic Initiatives for the '90s" announced in December 1992. Through partnership with government and business, the nine UC campuses and three Department of Energy labs will focus research and education efforts on restoring and revitalizing the California economy.

One initiative is to accelerate technology transfer from the University to industry, leading to new company and product development and the creation of jobs. Another element calls for the campuses to research and analyze legislative measures to stimulate economic development. A third initiative is to invigorate the food and agriculture sector through the research and extension programs of the Division of Agriculture and Natural Resources (DANR). Consistent with these objectives, the UC Riverside School of Engineering has initiated a five-county pilot project to establish a Manufacturing Extension System modeled on Cooperative Extension and designed to improve the flow of industrial technology and information to small- and medium-size businesses.

Agriculture has been a major contributor to California's economic development since statehood. It continues to be so in the 1990s. With \$19 billion of food and fiber produced annually on California farms and ranches, agriculture ranks as an important component of the California economy. When combined with production supply, food and fiber processing, manufacturing, and distribution industries, the agricultural sector provides nearly \$63 billion — or 9% — of California's \$697 billion gross state product. Directly and indirectly, this sector creates close to 10% of the state's total employment. In the Central Valley, the economic contributions of the sector are even more dramatic — nearly a third of all jobs and \$1 of every \$3 of personal income.

Many factors have contributed to the development of California's agriculture and its economic contributions to the state: abundant natural resources, a climate favorable to production of high-value products and geographic juxtaposition to rapidly expanding world markets, to name a few. Just as important have been the contributions of science and education which yielded productivity-enhancing technology and a highly skilled management force. Advances in science and education have made it possible to offer an increased quantity, quality, and variety of food and fiber at historically low real prices worldwide. Meanwhile, natural and human resources have been freed to produce goods and services in other sectors of the economy. Virtually every analysis of the contributions of science and education to agriculture, and thereby to economic development, confirm high rates of return — from 20 to 60%.

To maintain agriculture's long-term growth rate and its contributions to the California economy into the 21st century will be a major challenge. Constraints imposed by natural resource and

environmental policies, increasing production costs and intense competition in global and domestic markets will force successful firms to rely even more heavily on new and improved technology and management systems. California's rice industry profiled in the cover story is one example. Investments, public and private, in science and education will be pivotal to that future.

The erosion in public funding of agricultural research and extension at the University of California over the past 15 years, the alarming obsolescence of research facilities and, more recently, the precipitous cuts in the state operating budget for the University raise questions about UC's capacity to address agriculture's future science and education needs. A first order of business for the University, agricultural industries, and state government must be to reverse the debilitating trends in public support of agricultural research and education as promptly as state fiscal conditions permit. It would be ironic and costly if Californians failed to support future investments in science and education. Such investments have yielded high net social returns; they are essential to maintaining the competitive position of California's single most important economic sector — from which all Californians as consumers of food and fiber are the ultimate beneficiaries.

However, the private sector and the University must be prepared to shoulder responsibilities to avert continued erosion in the quantity and quality of agricultural science and education. There should be a re-examination of research and extension roles and a determination of the responsibilities, and comparative advantages, of the public and private sectors in meeting future needs. Ultimately, the private sector may increase direct support for research and extension programs; private industry may also assume more responsibility for programs and activities it performs best.

The University must re-examine its organization and methods of research, extension and teaching. It must reassess priorities, reassert its land-grant missions of research and education, and, where appropriate, rebalance its programs and deploy its resources in the context of contemporary realities. The University will be unable to meet future needs for agricultural science and education by adhering to organizational structures and methodologies developed decades ago. Its program priorities must accommodate the changing nature of science and education needs in a dramatically shifting external environment.

Science and education efforts produce long-term gains that are evolutionary in nature. As such, there is little that science and education can do immediately to reverse California's severe recession. However, science and education are the engines of California's long-term, sustainable economic growth. We should take advantage of our current economic difficulties to set in motion a science and education system that will ensure the future of California's agricultural economy.

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Cover photo: The beautiful curving lines of Sacramento Valley rice paddies — shown in this 1975 rice harvest photograph — are disappearing today as laser planing technology makes it possible to level fields with great precision.— *Photo by Jack Kelly Clark*

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This article is derived from a recent report by the UC Agricultural Issues Center (AIC) at Davis, "Maintaining the Competitive Edge in California's Rice Industry." The report is one in a series on selected agricultural industries in the state, including beef, dairy, canned fruit and rice. Copies of the complete report may be obtained from the AIC, UC Davis, Davis, CA 95616.



Jack Kelly Clark