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A new era— but a continuing challenge

Abundant and inexpensive water and energy have been essential in the prodigious growth and productivity of California's food production system. And current "no-growth" concepts notwithstanding, as long as there are more people to be fed, there must be further growth in productivity. We are entering a new era, however, in which supplies of water and energy will be restricted and the costs and competition for their use will be increased.

Irrigation has been the key factor in turning our semiarid valleys into the most productive agricultural resource in the nation. Most of California's diversified agriculture is also heavily dependent on readily available and low cost energy. Since California produces many of the fruits, nuts, and vegetables consumed in the U.S., supplies and costs of energy and water affect not only farmers in California but consumers throughout the United States.

Increasing water storage capacities in California is unlikely, and would require a financial commitment that would raise water costs. Whether we store and distribute water above ground or pump it from the ground, it is going to be more expensive. A rise in the cost of fossil fuel energy has been predicted many times. Thus, the era of abundant and inexpensive water and energy is coming rapidly to an end.

Research aimed only at increased agricultural productivity may result in unacceptable rises in costs and depletion of resources needed for other uses. Just as the automotive industry is being forced to develop more energy-efficient automobiles, the agricultural industries need more water- and energy-efficient

crop plants. To achieve this goal, our agricultural scientists must frame research questions with conservative use of these two vital resources in mind.

Entering this new era of agricultural research need not be abrupt. Many basic studies are already underway, seeking ways to improve the photosynthetic efficiency of plants, increase biological fixation of nitrogen, improve irrigation systems, achieve recycling, develop integrated pest and disease management systems, and searching for new crops. As long as 15 years ago, leading agriculturists in California pointed out that the resources utilized in agriculture were being depleted and were becoming more costly. It has taken a drought and an oil embargo to make these predictions a reality for a large majority of people.

Those of us in agricultural research must show no hesitancy in accepting the serious challenge of learning to use our water and energy resources more efficiently. Beyond merely conserving these supplies for the U.S., this research could benefit the agriculture of developing nations in particular; it could be instrumental in releasing them from having to choose either constant food shortages or significant investments of capital.

The new era for agricultural research seems not only required by our realization of the finiteness of the earth's resources, but also beneficial for the greatest number of people. I am confident that if we ask the right questions science will lead us successfully through the period of doubt.