The Agricultural Mechanization Controversy

Philip L. Martin and Alan L. Olmstead

Summary. Attorneys of California Rural Legal Assistance are suing the University of California on behalf of 19 farm workers, alleging that publicly funded mechanization research displaces farm workers, eliminates small farmers, hurts consumers, impairs the quality of rural life, and impedes collective bargaining. This article reviews the evidence and finds that it does not support the charges. The mechanization lawsuit is important because applied research by universities is often authorized by legislation stipulating multiple goals, leaving researchers and universities vulnerable to lawsuits alleging that only some of the legislative goals are being pursued.

Five years ago attorneys for California Rural Legal Assistance (CRLA) filed a lawsuit, on behalf of 19 farm workers, that charged the University of California (UC) with unlawfully spending public funds on mechanization research that displaced farm workers. The trial began in March 1984 but was halted 6 weeks later when the judge became seriously ill. The case is scheduled to begin again before a new judge in November, so the controversy over publicly supported agricultural mechanization seems destined to continue.

California Rural Legal Assistance charges that "the basic policy goal" of mechanization research by UC is to develop "machines and other related technology in order to reduce to the greatest extent possible, the use of labor as a means of agricultural production" (*1*). Mechanization research is construed to include the development of machinery, crop varieties, chemical herbicides, growth regulators, and laborsaving methods of handling, transporting, and processing crops. CRLA alleges that such research (i) displaces farm workers, (ii) eliminates small farms, (iii) harms consumers, (iv) impairs the quality of rural life, and (v) impedes collective bargaining. The damages suffered by individual farm workers "are difficult to ascertain or compute" (*1*, p. 19), so CRLA has demanded that all mechanization research by UC be halted until the university creates a fund equal to the sum earned from agricultural license and royalty payments to be used to assist and retrain farm workers.

Federal and state governments allocate over $1 billion annually for agricultural research, and the Council of Economic Advisors reported that "the annual return to taxpayers from investing in agricultural research has been about 50 percent" (*2*). Mechanization research constitutes a small and declining share of publicly funded agricultural research expenditures. Even though only 47.5 scientific man-years of fruit and vegetable mechanization research were publicly funded in 1981 (*3*), opponents of mechanization claimed a major victory when they persuaded former Secretary of Agriculture Bergland to withhold Department of Agriculture funds for research projects when "the major effect of that research will be the replacing of an adequate and willing work force with machines" (*4*).

The outcome of the UC mechanization case could have broad implications for the larger research community. Because the legislation allocating public research funds usually contains multiple goals, a CRLA victory could inspire other advocacy groups to allege that university researchers are systematically pursuing only one of the legislative goals and to seek to stop such research until public interest review committees give their approval. A similar lawsuit could allege, for example, that university-developed information technologies displace clerical workers, and could seek to halt such research.

In this article the five CRLA charges are discussed and the evidence for each is examined. The lawsuit raises important issues about the consequences of publicly funded agricultural research, but we conclude that CRLA's evidence for each charge is ambiguous at best.

Farm Workers

The CRLA lawsuit alleges that "the principal purpose of defendants' [UC's] commercial mechanization projects is to replace workers with machines . . . thus directly threaten[ing] the jobs, livelihood, and well-being of the hundreds of thousands of the State's most vulnerable workers who cultivate and harvest California's crops, and impose upon taxpayers the attendant costs" (*1*, p. 13). CRLA argues that mechanization research by UC has or will displace workers in a variety of fruit and vegetable crops, including grapes, oranges, peaches, lettuce, and tomatoes. The lawsuit alleges, in particular, that the mechanical tomato harvester developed by UC researchers reduced the peak number of tomato harvest jobs from 50,000 in 1963 to 18,000 in 1970.

Tomatoes—worth $1.1 billion in 1982—are the most valuable vegetable grown in the United States. There are two kinds of tomatoes: hand-harvested fresh tomatoes, whose production is concentrated in Florida, and processing tomatoes, almost all of which are harvested mechanically in California. The California processing tomato harvest was mechanized in the 1960's after UC plant scientists developed a uniformly ripening tomato and engineers built a machine that could cut the plant, shake off the tomatoes, and move them past electronic and hand sorters. Employment and wage data are scant, but the best available evidence indicates that, before mechanization in 1963, 38,000 Mexican and 6,000 American men picked and sorted 2.5 million tons of processing tomatoes in California (*5*). Today, fewer than 8,000 harvest workers, primarily American women, ride the machines and sort more than twice as many tomatoes (*6*).

Mechanization reduced harvest employment, but it is not clear whether the tomato harvester, on balance, destroyed or created jobs in California. When the bracero program that began admitting temporary farm workers from Mexico in

Philip L. Martin is associate professor of agricultural economics and Alan L. Olmstead is professor of economics and director of the Agricultural History Center, University of California, Davis 95616.

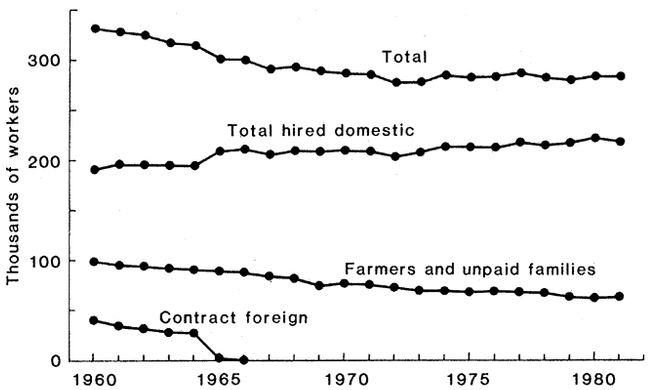

Fig. 1. Agricultural employment in California, 1960 to 1961 (*26*).

1942 was terminated in 1964, many tomato growers and processors believed that the tomato industry would be forced to follow its work force to Mexico, as happened to canned asparagus. Thus it could be argued that mechanization helped to keep processing tomatoes in the United States, thereby preserving jobs for American workers. In any case, the expansion of tomato acreage facilitated by mechanization created jobs for irrigators, equipment operators, and cannery workers.

The focus on tomatoes by CRLA obscures important shifts in California agriculture and could give the misleading impression that agricultural employment opportunities have declined drastically. In fact, since 1960, job losses due to mechanization have been more than offset by the expansion of labor-intensive agriculture in California. Mechanical harvesters of tomatoes, cotton, and sugar beets, along with herbicides that displaced hand hoers and the introduction of bulk bins and forklifts into fields and packing sheds, eliminated several hundred thousand seasonal farm jobs throughout the state (*7*). But affluence, population growth, and awareness of health increased the demand for labor-intensive fruits and vegetables, creating new jobs faster than these technological changes eliminated them. The average annual number of domestic farm workers employed in California was 192,000 in 1960, 211,000 in 1970, and 224,000 in 1980 (Fig. 1). University research led to the creation of many of these new jobs; plant breeding research, for example, helped to triple strawberry yields in the 1960's and 1970's and lengthened the harvest season from 2 to 6 months, substantially increasing the demand for labor.

Mechanization also affects the nature of harvest jobs and the life-cycle employment patterns of farm workers. Most fruits and vegetables are picked by young men for piece-rate wages (such as 40¢ per bucket of tomatoes). However, stooping and lifting 40- to 60-pound bags or working on ladders in extreme heat takes its toll on the workers' backs, and few individuals continue to do such work for more than 15 years (*8*). Older workers gravitate from piece-rate harvesting jobs that enable young workers to earn $5 to $10 hourly to lower wage but easier irrigation or hoeing jobs in U.S. agriculture or they return to Mexico. Even if there had been no mechanical tomato harvester, the tomato work force of the 1960's would have quit harvesting in the 1970's. All industries experience worker turnover, but turnover in the hand-harvest labor market is particularly rapid. Mechanization reduces the arduous nature of harvest work and permits remaining farm workers to operate equipment and sort commodities for longer periods.

Small Farms

Land-grant universities are required to expend public research funds "to promote the efficient production, marketing, distribution, and utilization of products of the farm . . . and to promote a sound and prosperous agriculture and rural life" (*9*). CRLA charges that mechanization research eliminates small farms because the new machines require large acreages to operate efficiently. It argues that, by adopting laborsaving machinery and spreading its fixed costs over more acres, large farms can reduce commodity prices enough to force small farmers out of agriculture.

Much of the evidence for this charge is obtained from the processing tomato industry. CRLA alleges that the number of processing tomato farms in California decreased from 4000 in 1963 to 600 in 1973, while the average acreage planted in tomatoes increased from 32 to 363 acres. Since a tomato harvester costs $150,000 or more, mechanization makes "entry into tomato production possible only for the wealthy" (*1*, p. 16).

The CRLA does not include data sources in its brief, but *Census of Agriculture* statistics do not confirm the extreme structural shifts in the tomato industry adduced by CRLA. Growers of fresh and processing tomatoes are not separated in these statistics, which show that the number of tomato growers in California decreased 36.5 percent between 1959 and 1978, from 2724 to 1729, and the average tomato acreage per farm increased 164 percent, from 57.6 to 152.3 acres. Indeed, the tomato industry in California experienced more structural changes in the 20 years before mechanization; between 1945 and 1964, the number of tomato farmers decreased 63 percent and the average acreage in tomatoes per farm tripled.

Mechanization contributed to the increase in the average tomato acreage on farms in the 1960's and 1970's, but other factors were also important (*10*). The completion of the California water system in the 1960's allowed the very large farms in the San Joaquin Valley to produce tomatoes. Fresno County, for example, increased its share of the state's total acreage planted in processing tomatoes from 2 percent in 1965 to 22 percent a decade later. Farms elsewhere in California that had produced tomatoes and several other commodities began to specialize more in tomatoes.

Concentration and specialization in tomatoes mirrors broader changes in agriculture and in the nonfarm economy. During the 1920's, there were more than 80 automobile producers in the United States compared to five today. The number of farms in America peaked at 6.8 million in 1935, then dropped sharply in the 1950's and 1960's as farmers were pushed by overproduction and low prices and were pulled out of agriculture by relatively high and stable industrial wages. The efficient and ambitious farmers who remained bought additional land to utilize new machinery efficiently, and the average size of farms increased from 213 acres in 1950 to 401 acres in 1978 (*11*). Even without a mechanical tomato harvester, there would have been concentration and specialization in the tomato industry because other factors also promote fewer and larger farms. For example, federal support payments put floors under the prices of some commodities, stabilizing prices and encouraging farmers to expand. Inflationary expectations, ambitious farmers, and farm credit

programs also stimulate the growth in farm size.

Furthermore, it is a mistake to assume that a machine's characteristics necessarily dictate farm size. Social scientists testifying for CRLA emphasize the tendency of laborsaving harvest machinery to require more acres to operate efficiently than the average-sized farm contains. According to these witnesses, if researchers develop a peach harvester that requires 50 acres to operate at lowest costs, but the average peach farm has only 30 acres, then research is promoting larger peach farms instead of being scale-neutral. However, custom harvesting, equipment sharing, and rental markets can permit the efficient use of machinery on small farms, helping to diminish any scale economies associated with machinery. In 1982 California farmers spent $307 million on custom work and rental equipment, more than they spent on electricity.

Mechanization is one of several factors that have generated the bimodal structure of agriculture. There are 2.4 million farms in the United States, but a small percentage of large and specialized farms produce most of the nation's food and fiber (Fig. 2). In 1981 farms that sold $100,000 or more in farm products accounted for 68.4 percent of cash farm receipts and earned $19.9 billion, or 101.5 percent of total net farm income of $19.6 billion. At the other end of the sales spectrum, the farms that sold less than $20,000 each in products collectively accounted for 6.5 percent of cash farm receipts and lost $1.6 billion on farming. These small farms still had family incomes above the U.S. average because their farming losses were offset by $29 billion in nonfarm income.

Many mid-sized farms that sell $20,000 to $99,999 in farm products annually have been in trouble recently, apparently being too big to permit the operator to have a nonfarm career but not big enough to reap economies of scale. The 674,000 mid-sized farms were 26.7 percent of all farms in 1981 and accounted for 25.1 percent of farm sales, but earned only 6.5 percent of net farm income. Mid-sized farms obtained only $6.2 billion in nonfarm income and $1.3 billion in net farm income in 1981, yielding lower average total household incomes than small farms. Small farm households averaged $13,000 to $24,443 versus $9,285 to $12,358 for mid-sized farms, while the 1981 median household income in the United States was $20,243 (*12*).

Some of the struggling small and mid-sized farmers undoubtedly need technical, managerial, and marketing assistance. However, many of these farms are operated as hobby or tax-loss enterprises. It may not be in the public interest to reallocate research funds to benefit primarily 2 million farms that produce less than one-third of the nation's farm products until much more is learned about the diverse goals, motives, and needs of these farmers.

While farm production has become increasingly concentrated, the number of small farms continues to increase. Rural population growth exceeded urban population growth in the 1970's, and the number of small farms in California has increased by more than 4 percent annually since 1978, with most of the increase in the very small class having sales of less than $5000 (*13*). The structure of agriculture is becoming polarized: large and specialized farmers produce 70 percent of the nation's food and fiber while numerous small farmers, who depend on their nonfarm incomes, contribute little to total farm output. Mechanization plays a role in this evolving structure of the U.S. farming industry, permitting some farmers to manage large units efficiently while allowing others to operate small farms as part-time or hobby operations.

Consumers

Scientists who believe that their research has helped to make agriculture the crown jewel of the American economy might be surprised by the CRLA charge that mechanization research has not "benefited the interests of consumers" because mechanization concentrates production and raises prices to consumers. This implausible conclusion rests on a peculiar interpretation of events in the processing tomato industry. CRLA alleges that the retail price of a can of processed tomatoes rose 111 percent between 1964 and 1975, compared to only 41.9 percent for hand-picked strawberries and 74.2 percent for all processed fruits and vegetables (*1*, p. 17; *14*).

Retail price comparisons can be misleading for several reasons. First, prices reflect the influence of demand and supply conditions, so prices should rise fastest for commodities whose per capita consumption increases most rapidly and/or whose yields increase slowly. The 1960's and 1970's were the decades of the pizza and pasta revolutions, in the course of which annual per capita consumption of tomato paste and sauce jumped 82.5 percent, from 8.0 pounds in

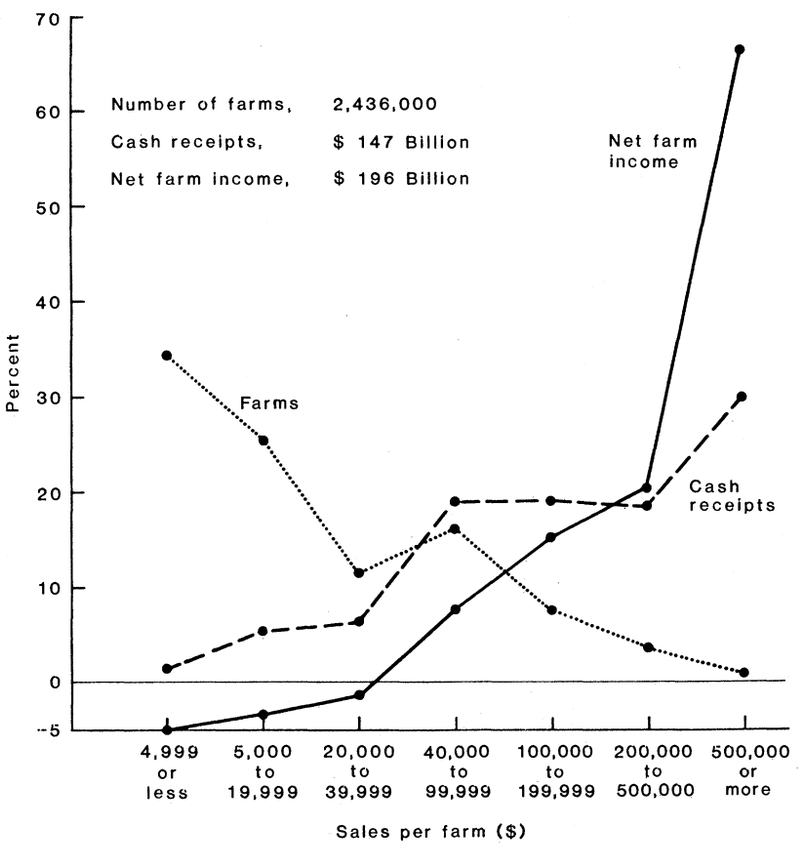

Fig. 2. Farm structure in the United States, 1981 (*27*).

1962 to 14.6 pounds in 1979, while per capita consumption of all processed vegetables that are canned increased only 17.7 percent, from 45.2 to 53.2 pounds. Furthermore, processing tomato yields in California increased 15.7 percent between 1964 and 1975, compared to 50.4 percent for strawberries, the commodity CRLA chose for comparison (*15*).

Critics of mechanization often allege that the quality of machine-harvested products is inferior to hand-harvested commodities, inspiring allegations that the tomato harvester is responsible for the "hard" tomatoes sold in supermarkets. This is false: the tomato harvester was developed to harvest processing tomatoes (that is, tomatoes to be cooked), not fresh market tomatoes. To maximize the selling period, most fresh tomatoes are picked when they are green and then ripened with ethylene gas. This procedure is followed whether the tomatoes are picked by hand or machine. Mechanical harvesting improves the nutritional quality of many commodities because machines permit the harvest to be accomplished quickly, when the commodity is at its peak quality (*16*).

Rural Life

California Rural Legal Assistance charges that the mechanization projects of UC "have had a severe detrimental effect on the quality of life in rural California . . . [because] residents of rural California communities, with the larger-scale cropping patterns resulting from mechanization, have much less access to a wide variety of businesses and private and public services than those who live in communities with smaller-scale, nonmechanized cropping patterns" (*1*, p. 18). The research cited to support this charge is a 1940's comparison of two California towns that allegedly were similar except that one (Arvin) was surrounded by large farms and the other (Dinuba) was surrounded by small farms (*17*). Goldschmidt (*17*) reported that large farms lead to more income inequality, fewer nonfarm businesses and public services, and less community spirit.

It is very hard to find two towns that are identical in all respects other than the size of their surrounding farms. Careful reanalysis of the data on Arvin and Dinuba indicates that the two farming communities were not similar (*18*). Farmers in Dinuba found water at relatively shallow depths, so family farms could pump it at low cost; Arvin farmers had to drill wells several hundred feet deep. Dinuba was older and had developed labor-intensive vineyards and orchards, while Arvin farmland had been brought into production several decades later when costs and prices favored field crops that are grown on larger acreages. Differences in transportation facilities, soil characteristics, and other factors undermine the cogency of CRLA's assertion that farm size and the quality of rural life are linked.

More recent studies also conclude that large farms can diminish the quality of life in rural towns (*19*). But the towns in question are surrounded by enormous farms averaging more than 2,000 acres each, with some units controlling more than 50,000 irrigated acres. These farms have whole fleets of harvest machines; for example, one cotton farmer in California operates more than 50 mechanical cotton harvesters. Clearly, the economic advantage associated with one machine is not the determining force behind such

Table 1. Labor requirements for major California commodities, 1976 (*25*). The total hours for heavy manual labor, light manual labor, and semiskilled labor does not equal total man-hours because irrigation and equipment operator hours are excluded. NA, information not available.

Commodity	Acres (thousands)	Peak employment statewide	Total man-hours (millions)	Heavy manual labor hours (millions)	Light manual labor hours (millions)	Semiskilled labor hours (millions)	Mechanization (percent)
			Fruits				
Grapes	570.7	118,650	51.34	27.42	14.92	9.21	
Raisin	236.7	39,300	20.99	12.59	5.25	3.36	7
Wine	270.8	2,750	21.66	11.70	5.85	4.11	25
Table	63.2	76,600	8.69	3.13	3.82	1.74	0
Oranges	197.7	5,630	26.68	19.75	1.07	5.87	
Navel	114.9	NA	15.51	11.48	0.62	3.41	0
Valencia	82.8	5,630	11.17	8.27	0.45	2.46	0
Peaches	71.5	12,970	16.41	10.92	3.07	2.58	
Clings	49.8		9.62	5.96	1.92	1.83	20
Freestone	21.7		6.79	4.96	1.15	0.75	NA
Lemons	47.5	4,080	6.95	4.73	0.76	1.46	NA
Plums	24.7	7,750	5.78	4.22	0.98	0.58	0
Cherries	13.0	10,900	3.70	3.37	0.11	0.22	10
Pears	37.5	7,450	8.59	3.35	3.78	1.46	0
Apples	21.6	NA	4.09	2.70	0.90	0.53	15
Olives	30.7	NA	3.22	2.30	0.31	0.61	0
Nectarines	13.1	NA	3.30	2.21	0.66	0.43	NA
Avocados	29.1	NA	3.05	2.18	NA	0.87	0
Apricots	27.9	10,360	3.73	2.05	1.12	0.56	15
Grapefruit	16.5	NA	2.23	1.65	0.09	0.49	NA
Subtotal	1,101.5	177,790	139.07	86.85	27.77	24.87	
			Vegetables				
Lettuce	156.1	7,100	12.49	6.24	1.87	4.38	NA
Tomatoes							
Fresh	29.8	28,150	5.36	4.47	0.30	0.59	10
Processing	269.8	NA	14.54	NA	8.29	6.25	100
Celery	19.4	NA	4.62	2.72	0.55	1.35	35
Broccoli	51.0	NA	4.08	2.19	0.80	1.09	0
Cantaloupes	36.3	5,720	4.18	1.63	1.44	1.11	NA
Cauliflower	26.2	NA	2.53	1.57	0.47	0.49	0
Asparagus	32.1	5,790	1.77	1.43	NA	0.34	0
Subtotal	620.7	46,790	49.57	20.25	13.72	15.6	
Total	1,722.2	224,580	188.64	107.1	41.49	40.47	

large farming units. This extraordinary size is the result of land, water, and credit factors, not mechanization research. There is no evidence to support CRLA's inference that a machine that operates at lowest cost on 50 acres of peaches when the average farm has 30 acres will diminish the quality of rural life.

Collective Bargaining

California Rural Legal Assistance alleges that "mechanization projects have assisted and will continue to assist California agribusiness in attempting to thwart the efforts of farmworkers to act and bargain collectively concerning their working conditions" (*1*, p. 19). Such research allegedly runs contrary to the 1975 California Agricultural Labor Relations Act, which grants organizing and bargaining rights to farm workers and declares that "the policy of the State of California [is] to encourage and protect the right of agricultural employees" to organize and bargain with their employers.

Seven unions represent about one in six California farm workers (*20*). The largest union is the United Farm Workers (UFW), headed by César Chávez. The UFW members are concentrated on corporate fruit and vegetable farms. Although the UFW's policy toward mechanization has not been consistent, the union typically includes a mechanization clause in its contracts that requires the employer to bargain with the union over the introduction of laborsaving equipment and permits the union to call a strike if no agreement on laborsaving machines is reached. The UFW is not a party to the mechanization lawsuit.

Farm worker unions have four sources of bargaining power: strikes, control over the supply of labor, political action, and consumer boycotts. Since consumer demand for food is inelastic, strikes often backfire because, by reducing production, they increase the prices and profits of farmers who are able to continue harvesting. Farm worker unions find it hard to halt production entirely because farm labor contractors supply far more (illegal) workers than do union hiring halls. Thus the unions devote most of their resources to political and legal actions and to consumer boycotts. Political action has won for these unions special legal protections such as quick elections and a make-whole remedy that can provide back pay to workers if their employer refuses to bargain in good faith over legitimate bargaining issues, including the decision to mechanize harvesting. Consumer boycotts have been successful because corporate farms often produce a branded and premium-priced product that is vulnerable to a boycott or because nonfarm subsidiaries and retailers can be picketed by striking farm workers. These political action and boycott weapons are not directly affected by mechanization.

Implications

The debate over farm mechanization research has been framed by critics who read the broad goals of federal and state agricultural research legislation and charged that UC researchers helped only agribusiness instead of the entire rural community they are supposed to serve. The CRLA lawsuit was viewed initially as a publicity-seeking stunt, but after the judge dismissed a request by UC that the issue be resolved in a legislature, not a court of law, research administrators were forced to reevaluate the merits of mechanization research.

Agricultural research has been an important stimulant to the growth in U.S. productivity and in agricultural exports. Economists usually oppose applied research by universities when there are few externalities and private firms can capture the benefits of their own R&D efforts. The benefits of inventing a new machine are more likely to be captured by the developer than the benefits of creating a new strain of wheat, and in fact most mechanization research has been conducted by the private sector. But development of the tomato harvester, the machine to which CRLA devotes most of its attention, required the teamwork of engineers, plant scientists, and food processing researchers in a way that the private sector was unlikely to accomplish. Many of the fruits and vegetables that continue to be hand-harvested will require a similar coordinated effort of scientists and engineers if mechanization is to succeed. When society can benefit through reductions in food prices, there may be an economic case for supporting public research even if no consideration is given to safety and health or to U.S. immigration problems. Land-grant universities can coordinate such research efforts efficiently.

A basic question is whether society should continue to encourage the historical process of mechanizing dangerous and undesirable jobs. For decades, makers of public policy have sought to eliminate such jobs by promoting research and enacting health and safety standards that make workers more expensive relative to machines. Clearly, research that eliminates stooping and lifting can lengthen the working lives of harvest employees and thus can help to achieve important social goals. Applied university research has developed backsaving harvest machinery and in-field conveyor belts that create seasonal jobs for local women. Mechanization and new plant varieties have lengthened harvest seasons and significantly reduced the migrancy of farm workers (*21*).

Cotton and sugar beets, which depended on armies of workers, were mechanized in the 1950's, and many nuts (such as almonds and walnuts) and vegetables (such as processing tomatoes) have now also been mechanized. The major labor-intensive commodities in California that continue to be hand-harvested include grapes, citrus and deciduous fruits, lettuce, fresh tomatoes, and other vegetables. Heavy manual tasks such as harvesting accounted for 56.6 percent of the 189 million man-hours needed to produce California's major labor-intensive crops in 1976 (Table 1). Without further mechanization, the $7.1-billion fruit, vegetable, and horticultural industry in California will continue to employ 200,000 to 300,000 illegal aliens or undocumented workers (*22*).

American agriculture has become increasingly integrated into the international economy. During the 1970's the value of U.S. farm exports increased more than five times, and the favorable balance of agricultural trade increased 13-fold, helping to offset the increased cost of oil imports. The ability to compete differs significantly by commodity, with highly mechanized U.S. crops being the most successful in international markets. In 1983 the United States exported three-fifths of its wheat production but only 5 percent of its fruit and vegetable output. American farmers face increasing competition in these labor-intensive crops from Israeli olives, Turkish raisins and apricots, Colombian roses, and Brazilian and Spanish citrus. The fruit and vegetable industry, which has already shifted in the U.S. from the northeastern garden states and the Midwest to the West and South, is becoming a global industry that searches out the least expensive areas for production. Slowing the rate of mechanization is a prescription for increasing the industry's vulnerability to foreign producers and intensifying the pressure on American fruit and vegetable farmers to import foreign workers who are willing to work for low wages. This could complicate the nation's already serious immigration dilem-

ma and perpetuate the "harvest-of-shame" wages and working conditions that isolate the harvest labor market from other U.S. labor markets.

Instead of preserving a labor-intensive industry dependent on alien workers in the United States, a rational strategy might be to phase out dependence on foreign workers by mechanizing wherever possible and importing more of the commodities that cannot be mechanized. If immigration reforms reduce illegal immigration, farmers will demand legal foreign workers, as during the bracero period. An integrated policy to phase out dependence on foreign workers, generate research funds, and establish a program to assist displaced workers could be financed by a foreign-labor payroll tax to be paid by the employer as a percentage of his wage payments to legal foreign workers (*23*). Farmers who did not rely on foreign workers would not be burdened with such a tax, while those who depended heavily on foreign workers could generate substantial research and assistance funds (*24*).

Fruit and vegetable growers paid one-third of the nation's $12-billion farm wage bill in 1982. If half of this $4-billion wage bill were earned by legal alien workers after immigration reforms reduced illegal immigration, a 10 percent employer payroll tax would generate $200 million annually to reduce the fruit and vegetable industry's dependence on foreign workers. A 10 percent tax would be reasonable because employers would save this much by hiring legal foreign workers, who do not participate in the Social Security program (7 percent) and in most unemployment insurance systems (3 percent). A $200-million tax could triple the total amount spent annually on fruit and vegetable engineering research ($5.7 million) and on farm worker employment and training programs ($64 million). Furthermore, such a tax would make legal foreign farm workers more expensive, encouraging farmers to recruit more American workers instead of simply selecting workers from the vast labor forces of Mexico and the Caribbean.

The CRLA mechanization lawsuit avers that UC scientists received public funds to conduct research with broad policy objectives, but that the research conducted benefited only agribusiness. CRLA has asked a judge to halt the expenditure of public funds on mechanization research until an external review procedure is established to ensure that research proposals have satisfied the broad policy objectives of the enabling legislation. This review procedure is to be augmented by a farm worker assistance fund equal to the amount earned from mechanization patents and royalties.

The mechanization lawsuit touches a responsive chord because of widespread sympathy for farm workers. CRLA supporters consider the mechanization research conducted by UC as an example of how powerful agribusiness interests use public institutions at the expense of powerless workers and consumers. But the empirical evidence mustered by CRLA is, as we have seen, ambiguous at best. The illegal or undocumented nature of the farm work force indicates a need to support mechanization research programs in order to create more desirable jobs and to keep the American fruit and vegetable industry competitive in the international economy.

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28. This work was supported by research grants from the University of California, Davis; the German Marshall Fund; the Rosenberg Foundation; and the National Endowment for the Humanities. We are indebted to W. Johnston, A. McCalla, J. Midgely, S. Sheffrin, B. French, C. McCorkle, G. King, E. Learn, D. Gardner, H. Carter, P. Lindert, and R. Garrett for helpful comments. R. Amon provided research assistance.