California's pioneering farm labor law, hailed by former Gov. Edmund J. Brown Jr. as his greatest personal triumph, is under the strongest attack since its enactment in 1975.

Mr. Brown's successor, George Deukmejian, whose election was strongly backed by growers, has said he will cut off funds to the agency that administers the law on July 1 unless it accepts changes he is seeking. Governor Deukmejian has declared that the regulatory agency is biased in favor of the United Farm Workers, the union founded by Cesar Chavez, and that it is harming the state's $1.4 billion-a-year agricultural industry.

At the same time, pressure is growing within the Legislature to water down the law, the Agricultural Labor Relations Act, and some growers are planning a petition drive aimed at passing a state constitutional amendment that would further weaken it.

"Deukmejian is trying to gut the law," asserted Roberto De La Cruz, director of the United Farm Workers' field office in the Salinas Valley, once the scene of some of the nation's most violent clashes between growers and farm workers. "He's telling the growers that they can do anything they can get away with."

At a news conference this week in Sacramento, Mr. Chavez said that if the Republican Governor carried out the threat to cut off funds, the result would be "all-out war" with the union. Workers' Gains Jeopardized

Supporters of Mr. Chavez in the Legislature, which the Democrats control, say they are hopeful that they will be able to block Governor Deukmejian's efforts. But they say many of the gains made by California farm workers in the 1970's are in jeopardy.

The battle over the law is being waged largely with dollars. Growers contributed more than $500,000 to Mr. Deukmejian in his campaign last year, about 10 percent of his total spending. They contributed hundreds of thousands of dollars more to state legislators.

Mr. Chavez's union, meanwhile, has become one of the most powerful economic forces in state politics. Largely because of a provision of the farm labor act that allows it to deny jobs to workers unless they contribute part of their wages to the union's political fund, the union last year gave more than $700,000 to state candidates, more than any other single special interest group.

Many growers say they are not unhappy with most provisions of the law, which for the first time allowed farm workers to organize and bargain collectively. They object, they say, to how it was
applied under Governor Brown, a close political ally of Mr. Chavez. Board Accused of Unfairness

The growers assert that the five members of the Agricultural Labor Relations Board who set policy under the law, most of whom are political liberals appointed by Governor Brown, have administered the law unfairly and that their staff members have allied with Mr. Chavez rather than serving as unbiased governmental regulators.

"It's a joke," asserted Paul Bertuccio, who farms more than 2,000 acres in nearby San Benito County. Referring to a provision of the law that permits the staff to assess stiff penalties against growers who have not bargained in good faith or otherwise violated the law, he said, "They have a hearing, but it's a kangaroo court; no matter what you say, they've already decided you're guilty before it starts."

In his campaign, Mr. Deukmejian, whose conservative views closely parallel those of President Reagan and who has moved to ease regulation in several other areas, agreed with the growers and promised to make the board more even-handed.

Shortly after his inauguration he said, "We should ask the Agricultural Labor Relations Board to make fairness a standard instead of a joke; we will take every responsible step to insure that our farmers and ranchers have an environment in which they can thrive and prosper and not be the whipping boy of Government."

Board members serve four-year terms. Governor Deukmejian will not be able to appoint a majority until 1986. But soon after his inauguration he appointed David Stirling, a conservative Republican friend who is a former legislator, as its general counsel, the chief staff officer. Change in Agency's Direction

Mr. Stirling quickly moved to change the agency's direction. He transferred staff members whom growers had criticized out of key positions and began seeking to reduce some of the cash penalties levied against growers and to blunt Mr. Chavez's influence.

Fighting back, Governor Brown's five appointees to the board voted late last month to take away virtually all of Mr. Stirling's authority.

Last week it was Governor Deukmejian's turn to fight back. In a letter to Alfred Song, the chairman, he said the agency had "emasculated" Mr. Stirling's position and declared he would veto the its budget for the fiscal year starting July 1 unless it backed down and restored the general counsel's powers. Board members have so far refused.

"He's trying to dismantle the agency," said one board member, Jerome Waldie. "Agribusiness, his biggest contributor, has long had as its primary objective the elimination of the board," he went on. "He's trying to do the same thing that his tutor, President Reagan, did with E.P.A.; if he can't repeal a law, he'll enforce it at the minimum level, or maybe not enforce it at all." Latest of Union's Problems
For Mr. Chavez, the Governor's campaign to lessen his influence on the board is the latest in a series of problems faced by the union. Enactment of the law culminated a 13-year campaign to organize the nation's first union of farm workers. Before the law was passed, farm workers in California often earned less than $2 an hour. Now workers covered by union contracts in the Salinas Valley and in several other areas of the state earn a base wage of more than $6 an hour, along with medical and pension benefits. Many, working at piece rates, earn two or three times as much as the hourly base rate.

But as it has evolved from a social movement into a conventional labor organization, the United Farm Workers has lost much of the financial and political backing from liberal supporters that it had in earlier years.

Despite its gains, the union has been unable to win contracts with growers employing many thousands of farm workers who earn the minimum wage of $3.35 an hour. Political Influence Diminished

More than half the union's members, Mr. Chavez said recently, are illegal aliens, a status that not only makes their membership precarious but, because they cannot vote, has eroded the influence of what was once regarded as an influential voting bloc in the state.

Spring planting, delayed by the worst storms in decades, is under way again in the agricultural valleys of California. But Mr. Bertuccio, after 41 years of farming, said he was so tired of battling the board that he planned to sell his land for housing and industrial development.

Mr. De La Cruz, the union's field director here, laments the Governor's challenge to the board. "It's too bad," he said. "The law has been working. There's been peace in the fields."