

Growers say cannabis legalization excludes small growers, supports illicit markets, undermines local economies

The survey sample was small, but results suggest regulations may need to be modified to incentivize grower participation in state licensing programs.

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With the legalization of cannabis for recreational use in 2017 (State of California 2016a), the Government of California embarked on an unprecedented, multi-agency initiative to regulate the production of an agricultural crop worth up to \$20 billion per annum (Arcview Market Research 2014), the largest cash crop in California (Carah et al. 2015). The state initially projected \$1 billion in tax revenue from cannabis sales following legalization for recreational use (McGreevy 2018). Building off recent regulations for medical cannabis production (State of California 2016b), the state created a new licensing system for growers producing cannabis for recreational use, which like medical cannabis, would be distributed legally to the public through state-licensed dispensaries.

The CalCannabis Division of the California Department of Food and Agriculture (CDFA) issues cannabis cultivation licenses. To cultivate for legal markets for recreational (or medical) use, cannabis

Abstract

In 2018, we surveyed cannabis growers about their experiences with California's commercial cultivation legalization system. Our results suggest high rates of noncompliance with the new regulations. Of the respondents, 31% reported income from cannabis and had not applied for cultivation licenses, indicating a violation of state regulations. These findings highlight the need to further explore conditions that might incentivize growers to apply for cultivation licenses. Respondents' answers and comments indicate modifications to cannabis cultivation licensing programs might be needed to reduce compliance costs and regulatory inconsistencies and to overcome threats of legal repercussions from enhanced bureaucratic oversight. Growers characterized legalization as a process that excludes small growers, contributes to an increase in black market sales and undermines the economies in rural communities. More research is necessary, including on the socioeconomic and environmental contributions that unlicensed small cannabis growers make to rural regions.

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The state initially projected \$1 billion in tax revenue from cannabis sales.



growers are required to get a CDFA cultivation license and comply with State Water Resources Control Board (SWRCB), California Department of Fish and Wildlife (CDFW) and Department of Pesticide Regulation (DPR) requirements; all county and local regulations, including land use ordinances; and any additional mitigation stipulations necessary to obtain California Environmental Quality Act (CEQA) approval (CDFA 2019). Depending on farm location and cultivation practices, growers may also require road development permits, water diversion permits, wastewater discharge

permits and CDFW lake and streambed alteration agreements.

CDFA has the authority to issue renewable annual cultivation licenses; it can also issue nonrenewable provisional licenses to growers who demonstrate that CEQA compliance is under way (State of California 2018a). Once growers have obtained a license for cultivation, they must, among other requirements, tag all plants with radio-frequency identification tags to track the product from its point of origin to commercial sale, maintain 24-hour video surveillance of all plants,

record the names of and time-stamp all individuals who enter the fenced cultivation area and report the weight of any discarded plant material (State of California 2017).

Prior to sale, growers are required to hire third-party testing laboratories to confirm that their crop meets quality assurance guidelines for cannabinoid levels, moisture content, residual solvents and processing chemicals, pesticides, microbial impurities, foreign material, terpenoids, mycotoxins and heavy metals (State of California 2018b). Growers must also pay state and county cultivation taxes. As of 2019, state cultivation taxes per dry weight ounce were \$9.25 for flower, \$2.75 for stem and \$1.29 for fresh plant (CDTFA 2019). County cultivation taxes vary, and some counties have yet to develop cultivation license guidelines. Additionally, growers must

pay licensed distributors to transport their cannabis from the farm to testing sites and dispensaries (State of California 2019a).

Counties and municipalities may enhance state cultivation requirements or ban cannabis production entirely within their jurisdiction (fig. 1). The SWRCB or CDFW may also effectively ban cultivation by refusing to issue licenses in locations where they determine cultivation may have an adverse environmental impact (CDFA 2019). Further, counties and municipalities may prohibit cannabis sales or impose business or sales taxes in addition to the state's retail sales tax rate of 15% (CDTFA 2019).

The cultivation licensing system was broadly intended to facilitate cannabis growers' entrance into the legal market while protecting public safety, limiting environmental impacts and preventing the distribution of illegally grown cannabis. However, the extensive cultivation and reporting criteria, coupled with



FIG. 1. Commercial cannabis cultivation and sales regulations in the 10 counties where growers participating in a survey reported growing cannabis, August 2018. Percentages indicate proportion of survey respondents per county ($n = 34$). Three counties — Siskiyou, Sacramento and Nevada — do not allow commercial cultivation aside from exemptions in unincorporated regions. Sources: Humboldt County 2019; Mendocino County 2018; Nevada County 2018; Sacramento County 2018; San Luis Obispo County 2018; San Mateo County 2018; Santa Cruz County 2018; Siskiyou County 2018; Sonoma County 2018; Trinity County 2018.

the high costs of obtaining licenses, may be creating disincentives for growers to comply with the regulations. Noncompliance increases the risk of failure in the state's policy to transition growers to legal markets. As of April 2018, the state had approved 3,490 temporary licenses for cultivation. (The state's ability to issue temporary licenses ended Jan. 1, 2019, after which date the state was authorized to issue provisional or annual licenses.) The president of the California Growers' Association estimated the number of the state's cannabis growers to be around 50,000 (Staggs 2018).

Compared to other forms of legal crop cultivation, little is known about cannabis production dynamics in California. The dearth of research is attributed to challenges in obtaining federal funding to study federally illicit activities and the disincentives for clandestine growers to share information with outside parties (Short Giannotti et al. 2017). Accounts that do exist characterize the industry as emerging in the 1960s with the back-to-the-land movement giving rise to a proliferation of small farms in California's North Coast region (Potter et al. 2011; Raphael 1985).

To avoid detection, cultivation took place in remote regions, including forested hillsides in Humboldt, Mendocino and Trinity counties known as the Emerald Triangle (Corva 2014). In 1983, California collaborated with the federal Campaign Against Marijuana Program (CAMP), deploying helicopters to eradicate plants on private property (Corva 2014). Enforcement efforts increased the crop's value in illicit markets, thereby incentivizing continued cultivation (Corva 2014; Polson 2019).

In 1996, the Compassionate Use Act decriminalized the use and cultivation of cannabis for medical purposes in California; it allowed counties to authorize production of up to 99 plants per medical card (State of California 1996). Accounts of medical cannabis cultivation describe small family farms, in contrast to the consolidated, intensively farmed industrial agricultural operations throughout California (Guthman 2004; Polson 2018; Raphael 2012; Walker 2004). In 2012 and 2013, Google Earth satellite images of Humboldt County landscapes suggested an average of 67 plants on outdoor grow sites ($n = 2,407$, standard deviation 75) and 86 smaller plants in greenhouses ($n = 2,021$, standard deviation 89) (Butsic and Brenner 2016).

A comparison of Google Earth images between 2012 and 2016 in Humboldt and Mendocino counties, however, documented an 80% increase in the number of cultivation sites and a 56% increase in the average number of total plants per site (Butsic et al. 2018). Although still small in scale compared to traditional agriculture, cannabis production was expanding, and it was expanding in part in ecologically sensitive remote watersheds, where histories of cultivation corresponded to concerns about ecological stress from water diversion and fragmented forested landscapes (Butsic and Brenner 2016; Butsic et al. 2018; Carah et al. 2015; Wang et al. 2017).

The increase in cultivation sites and production densities may be due to relaxed enforcement and subsequent increased market competition. In 2012, California abandoned CAMP and replaced it with a new program, the Cannabis Eradication and Reclamation Team (CERT), which effectively reduced enforcement and redirected it to public lands (Corva 2014; Polson 2019). In 2017, the Drug Enforcement Administration estimated that 70% of the nation's cannabis supply came from California (DEA 2017).

How legal cannabis production will develop remains unclear, but it will be strongly influenced by if and how existing growers participate in the state's cannabis regulatory system. The recreational cannabis market could create a demand for ecologically beneficial production (Bennett 2018). Access to legal markets might also create opportunities for growers to brand their products as socially or ecologically sustainable, or to emulate other forms of legal agriculture and organize collectively to overcome market competition (Cook 1995; Short Giannotti et al. 2017). Conversely, if regulations limit access to the legal market, growers may either cease production or cultivate for illicit markets.

To characterize the ecological and socioeconomic effects of cannabis policy changes and better understand cultivation practices, we conducted an anonymous survey of California cannabis growers from July 1 to Aug. 15, 2018. The objective was to document relationships between aspects of production and growers' experiences with the legalization system and the regulatory environment. Results on cultivation practices are covered in Wilson et al. 2019 (p. 119, this issue). Here, we report respondents' experiences with legalization.

Online anonymous survey

Given the legal risks cannabis growers might assume when reporting their practices, we deployed an online, anonymous survey to try to access a wide range of growers. We distributed the survey through the listservs of several prominent California cannabis grower organizations in July 2018. We administered the survey using the Qualtrics survey platform (Qualtrics, Provo, Utah), which encrypted participants' IP addresses so that responses were collected anonymously.

We estimated that 17,500 email addresses received the survey, not all of which necessarily represented cannabis growers or were active emails. Because we were unable to view the listservs or contact growers directly, and given the uncertainties surrounding estimates of the state's number of cannabis growers, we were unable to estimate a response rate. We were also unable to follow up with growers directly to increase participation. For a full discussion of the survey methods, see Wilson et al. 2019.

In the survey, we asked questions relating to compliance, including "Have you applied for a state or county license to grow cannabis?" We also asked growers to

report their income received from cannabis cultivation. We determined growers who had not applied for a license but who reported income received from cannabis to be out of compliance with state and county regulations.

Additionally, we asked growers three open-ended questions: respondents who indicated they had not applied for a license had an opportunity to explain why; growers were invited to comment on the state licensing system and how it could be improved; and they could share any additional information about their farms. We manually coded qualitative responses for thematic trends. We characterized farm size based on California state licensing criteria (State of California 2017): small farms were 10,000 square feet or less, medium farms were 10,001 to 22,000 square feet and large farms were those over 22,000 square feet. (1 acre = 43,560 square feet, 1 hectare = 107,639 square feet.)

We received 101 responses, with variations in response rates among questions. Within this group, 36 growers provided feedback about their participation in state and county licensing initiatives, and 35 on the income they received from cannabis cultivation. We received feedback about the ways in which the legalization system could be improved from 30 participants. Although this is a small number of cannabis growers compared to estimates of the grower population, preliminary conclusions regarding grower perceptions can be drawn from this sample for the purpose of guiding future research on California's cannabis policy.

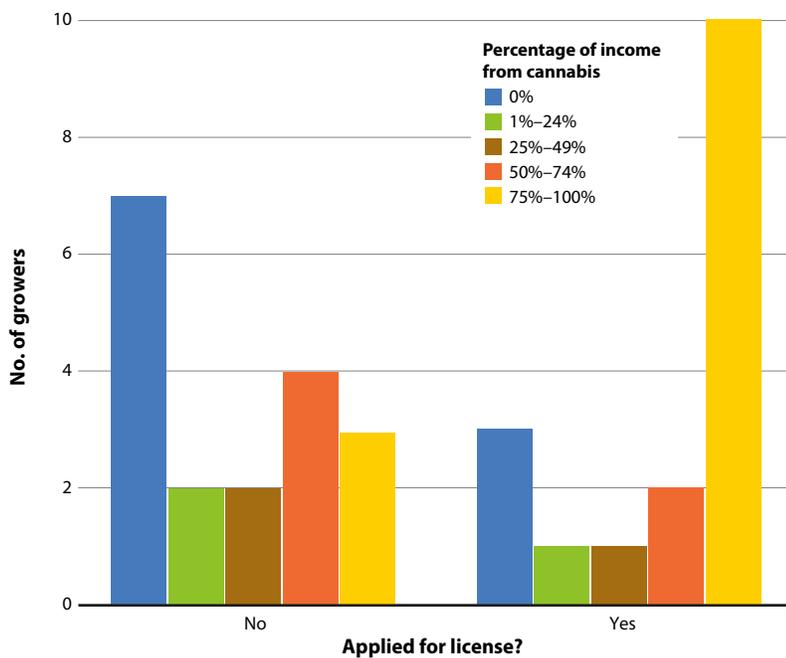


FIG. 2. Over half of survey respondents indicated that they had not yet applied for the necessary licenses to cultivate cannabis but received income from cannabis cultivation.

Demographics

Growers who answered the survey questions about compliance reported farming in 10 California counties: Siskiyou (3%), Humboldt (26%), Trinity (3%), Mendocino (30%), Nevada (17%), Sonoma (9%), Sacramento (3%), San Mateo (3%), Santa Cruz (3%) and San Luis Obispo (3%) ($n = 34$). Commercial cultivation and sales regulations varied between and within these counties (fig. 1). The growers who both answered questions about compliance and also provided feedback about the legalization system farmed cannabis for an average of 20 years (range: 3 to 50 years) ($n = 30$). Their ages ranged from 34 to 70, with an average age of 53 ($n = 29$); 69% identified as male, 28% as female and 3% as other ($n = 32$).

Compliance, cannabis income

Of the 36 growers who provided feedback on their participation in state or county licensing initiatives, over half (53%) reported that they had not participated in them (Wilson et al. 2019). Of the 35 growers who reported both on participation in licensing initiatives and income sources, 31% reported income from cannabis and had not applied for cultivation licenses, indicating their noncompliance with state and county regulations. Among the growers who had not applied for cultivation licenses and who also reported on income sources ($n = 18$), 39% indicated that they obtained no income from cannabis, 11% received less than a quarter of their income from cannabis, 11% received between a quarter and half, 22% received between half and three-quarters and 17% received more than three-quarters of their income from cannabis (fig. 2). Among those who had applied for state or county licenses and reported income sources ($n = 17$), 17% reported receiving no income from cannabis, 6% received a quarter or less, 6% received between a quarter and half, 12% received between half and three-quarters and 59% received all of their income from cannabis cultivation.

Nonlicensed growers who supported their livelihoods from cannabis cultivation and explained their noncompliance ($n = 10$) said they were unable to apply because of county cultivation bans or unformulated guidelines (70%) and cost constraints (40%). Additionally, 20% indicated they planned to apply. A small grower from Siskiyou County explained, “I live in a ban county. I plan to apply in a nearby city once the city puts a cultivation ordinance on the books.” A small grower from Mendocino County specified that the plant “track and trace” provisions of the licensing system were cost prohibitive.

Disincentives to seek licenses

Compliant and nonlicensed growers also commented on the state's licensing system and how it could be improved ($n = 30$). All respondents except one (who

argued that the regulation favored larger corporations, without specifying how) identified specific limitations of the system related to at least one of three themes: costs, regulatory inconsistencies or alterations needed to production practices.

Costs

Of the growers who commented, 70% identified costs as inhibiting compliance with state legalization initiatives. A medium-sized grower from Mendocino County described the multi-agency licensing system as “Too many departments asking for too many fees.” A small, nonlicensed grower from Nevada County attributed increased costs to regulations around sales and transport: “I would be willing to pay my fair share of taxes on products sold if I could continue to be responsible to test and transport my own product, deal directly with dispensaries as I did for years.” Similarly, a small grower from Mendocino County, who had applied for a license, described lost profits from distributors controlling the pricing structure: “The distributor is controlling prices and gouging farmers because regulations prevent small farmers from taking their products to other licensees.”

Regulation inconsistencies

Respondents (37%) identified possible inconsistency between county, regional and state production regulations as constraining their engagement with the legalization initiative. A large grower from Humboldt County said, “Often, one agency will approve a project, and the other agency involved doesn’t. Then, you are in violation with the approving agency if you don’t do the work, and in violation with the other agency if you do the work.”

Standard practices illegal

Respondents (40%) identified difficulties in altering their production practices to comply with the new regulatory system. A small grower from Mendocino County indicated that new regulations made previous standard practices illegal: “My situation is totally standard: well fenced-in area, no environmental impact. I grow tomatoes, etc., in hoop houses, and now, because I applied for a license, I suddenly must get a permit for hoop houses that have been here for 15 years.”

Effects on production

A group of growers ($n = 32$) also commented on the effects of state cannabis legalization on production. Their remarks focused on three themes: exclusion of small growers, an increase in unregulated market exchanges and alterations to local economies.

Exclusion of small growers

Respondents (50%) explicitly stated that legalization privileged larger, wealthier operations or put small organizations out of business ($n = 32$). A small grower

from Humboldt County explained, “There was a pretense at both county and state levels of recognition that the transition to ‘legal’ pot (more correctly the transition from felony to misdemeanor pot regulation) should allow time for small producers to adapt, because the economic effect of wiping them out would devastate communities across the state.

No such policy came into effect.” Another experienced small grower in Humboldt County said, “Small farmers are being left out and corporations are taking over.”

An active unregulated market

Growers (19%) indicated that legalization corresponded to a rise in unregulated market exchanges ($n = 32$). A small grower from Siskiyou County argued that local bans “let the black market growers operate with impunity where I live.... I want a license. I have vended to the same dispensaries for 10 years. My cannabis has always been tested. I grow organically and conscientiously.” A medium grower from Trinity County argued that the “thriving private [illicit] market has no incentive or ability to cross over.” A small grower from Humboldt County reflected, “Only the large black market farms are surviving. All small cottage farms have closed up.” A medium grower from Trinity County indicated that workers also avoid the legal market: “There is a labor shortage for on-the-books workers. The private [illicit] market is able to pay the same rate or more but taxes are taken out so workers look for unregulated farms to work at first.”

Altered community economies

Respondents (25%) indicated that the legalization initiative was altering community economies ($n = 32$). A small grower from Nevada County argued, “Counties, by creating prohibitive (or no) ordinances that allow commercial cultivation, are disregarding the extent to which longstanding small cannabis businesses support their communities. We are already seeing the impact on local business — empty restaurants and storefronts in our once bustling town.” A medium grower from Mendocino County, who had applied for the necessary state licenses, explained, “All cannabis farmers aren’t rich outlaws. We are these communities.”

Concern for the environment

Growers (33%) identified the environment as a concern or made note of their own practices relative to the environment ($n = 32$). A small grower from Humboldt County explained, “We love our home and have always practiced our business with the environment foremost in our mind. We are being blamed for the degradation of our home when it was logged several times and there were no fish when we got here. We have all worked

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to heal this land and weed is the reason we had the time and resources.” The concern for the environment reported in our survey suggests a willingness among growers to produce their crops in ecologically beneficial ways, regardless of their compliance status.

Potential regulatory improvements

Several survey participants suggested strategies for improving the regulatory system. A medium grower from Humboldt County, who had applied for two cultivation licenses, argued, “An opportunity to mitigate or a timeline to amortize costs will help small farmers who cannot afford the intense costs associated with regulations.” A small grower from Sonoma County, who was not licensed, suggested, “Keeping grows limited in acreage so that smaller growers can compete is crucial in my mind and will lead to a more diversified agricultural system.”

Legal and black market access

Growers’ responses suggest high rates of noncompliance and characterize legalization as a system that legitimizes the cultivation activities of an exclusive set of growers: large growers with the financial resources to locate their farm in a legal jurisdiction, pay licensing fees, alter their practices and increase production to

In 2018, \$2.5 billion of cannabis was sold through legal markets, and the state received \$345 million in tax revenues.

comply with new laws and remain competitive in legal markets. It is likely that rates of noncompliance within the broader cannabis grower population are even higher than reported in our data, as our survey reached only growers registered on industry listservs; and, even though it was anonymous, it covered illegal livelihood activities, creating potential disincentives to accurately declare practices.

Respondents’ accounts of small growers’ exclusion from newly regulated cannabis market opportunities — due to the misalignment of the regulations with existing practices and the costs of compliance — echo the literature on governmental and nongovernmental regulation and certification of production practices in other sectors, in which codification of regulations or standards has led to formal and informal exclusion of some growers from commodity markets (Bodwitch 2017; Côte and Korf 2018; Dwyer 2015; Getz and Shreck 2006; Lund 2011; Milgroom 2015; Putzel et al. 2015).

In the United States, for example, structural exclusion has been documented in the voluntary, third-party certification of organic agriculture, because its particular standards and onerous costs have facilitated the dominance of agribusiness at the expense of small growers (Buck et al. 1997). Similar exclusionary tendencies are also a defining effect of the rise of the food safety regulatory regime, comprised of both state regulations and market-driven audit requirements (Baur et al. 2017). Our research indicates similar patterns with the legalization of cannabis: the burden of compliance not only favors larger producers over smaller ones but also shifts the profit-making opportunities from producers to nonproducers (Foley and McCay 2014; West 2012).

The illicit market continues in California, and the two markets, legal and illicit, likely influence one another. Disincentives for small growers to participate in legal markets can also be attributed to, along with the factors already discussed, the demand for cannabis in the illicit market channels, both in and out of state (Caulkins et al. 2015; Klieman 2016; Short Gianotti et al. 2017). As of June 2019, 39 states had yet to legalize cannabis for recreational sales (Berke and Goulde 2019). In California, state and county taxes increase the legal cannabis price, and that higher price may also contribute to in-state illicit market demand. To meet industry analysts’ estimates of \$1 billion in tax revenue (McGreevy 2018), at least \$7 billion of cannabis needs to be sold through legal markets (Kreiger 2019). In 2018, \$2.5 billion was sold, and the state received \$345 million in cannabis tax revenues (Kreiger 2019).

Research needs, policy considerations

Accounts from noncompliant growers of the effects of legalization indicate a need to explore strategies that will incentivize growers’ participation in legal markets.



Their accounts also raise questions for more research on the socioeconomic and environmental effects of the state's licensing system.

California's new cannabis regulations put limits on transportation and distribution (State of California 2017), and consolidate supply chains through a limited number of registered distributors (State of California 2019b). Further analysis on the effects of supply chain consolidation on compliance rates is needed to understand how nonenvironmental aspects of the licensing system influence cultivation practices.

Further research is also warranted on small-producer cooperatives, which in other agricultural sectors have improved the collective access of growers to information, credit and markets, while also enhancing regulatory compliance, community development and innovation (Fischer and Qaim 2012; Reed and Hickey 2016). Grower organizations in the cannabis industry include county and statewide policy and lobbying groups, as well as private marketing and environmental advocacy initiatives (Polson 2019). Yet, given the historically clandestine nature of production, industry-led cooperatives in the cannabis sector likely do not exhibit the political and economic influence at the state level that is exhibited by cooperatives in other sectors (e.g., almonds). At this point, producer organizing can receive only limited support from UC Cooperative Extension (UCCE) personnel because of the restrictions on use of federal funds for cannabis research or development.

Little is known about the ways in which noncompliant growers presently organize to access illicit markets. It is possible that a reliance on clandestine markets creates disincentives to collective production and market access strategies. Illicit growers may be more likely to organize their resources to avoid detection, and, without access to crop insurance or crime reporting, to protect their operations. Understanding forms of cooperation in clandestine markets may help identify social as well as economic factors most likely to facilitate compliance (Winter and May 2001).

State legalization of cannabis production presents an opportunity for growers to better manage risks and enhance returns. To this end, there is a need for further research and policy exploration of potential participation incentive mechanisms, such as tax credits, crop insurance, small business development grants, extension and training. These mechanisms could promote environmental objectives, community development goals and regulatory compliance. More understanding of what incentivizes growers would help UCCE identify extension efforts most likely to enhance growers' control over the distribution of economic benefits from legal cannabis cultivation. Analyses of relationships between land use zoning, farm licensing requirements and compliance costs would help inform outreach with state, county and municipal policymakers to promote regulations most likely to elicit compliance and reduce enforcement costs.

The high rates of nonlicensed production coupled with growers' accounts of the effects of legalization on communities indicate a need for more systematic research on the socioeconomic contributions that nonlicensed growers are making. Because cannabis has historically operated as a cash economy, it is likely that the majority of income from cultivation has been spent locally; cash from cannabis is difficult to transport and invest elsewhere (ERA Economics 2017).

These contributions to local communities were largely unaccounted for in the state's economic analysis of the medical cannabis cultivation regulations, on which the recreational cultivation licensing program was based (ERA Economics 2017). The analysis identified "significant costs" of regulation for growers, including costs related to local and state licensing, cultivation plan preparation, water and pesticide use approval, farm record maintenance, business license applications, track and trace system operation, processing, legal labor, consultants and farm inputs (ERA Economics 2017). The analysis did not address regional effects — for example, the possibility for decreased spending in places with histories of cannabis cultivation as cultivation expands elsewhere and intensifies market competition. Interviews with leaders of cannabis organizations and distributors, growers, and representatives from county employment and benefits departments, among others, to document the socioeconomic changes they experience and witness in this transition to a regulated cannabis market will help build this knowledge base.

The state's economic analysis suggested that labor compliance costs would be the most significant direct regulatory cost for growers (ERA Economics 2017). In-depth analyses with growers and workers are needed to illuminate the characteristics of the cannabis labor force and its trajectory since legalization (ERA Economics 2017). To mitigate the negative consequences of legalization for growers and rural communities, the exclusionary and racialized effects of regulation (Polson and Petersen-Rockney 2019, this issue; Polson 2019) also need to be better understood.

Improving social and environmental outcomes

Cannabis legalization in California could legally authorize the activities of tens of thousands of growers. However, our survey results suggest that the regulation structures and costs may be creating disincentives to participate in legal markets — in effect, incentivizing ongoing participation in the illicit market. Given the low number of respondents in our survey, more research is needed to understand the extent to which our results reflect broader trends. An improved understanding could inform efforts to ensure legalization corresponds to improved outcomes for growers as well as the environments and communities in which cannabis is grown. [CA](#)

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