



April 10, 2012

**To:** Julianna Thomas, *Capitol Director*  
Office of Assemblymember Linda Halderman

**From:** Tonya D. Lindsey, Ph.D., *Senior Policy Analyst*  
California Research Bureau

**Subject:** Medical Marijuana Cultivation and Policy Gaps

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Assemblymember Linda Halderman's office asked the California Research Bureau (CRB) to investigate gaps in State regulation of medical marijuana. Specifically, CRB was asked to research medical marijuana cultivation with regard to ensuring the safety of the product, the safety of the workers harvesting the product, and the protection of the environment.

To regulate medical marijuana cultivation and safety issues associated with it, a State agency must have jurisdiction over the enforcement of applicable law. As it stands, it is unclear if California law includes medical marijuana as a *bona fide* agricultural crop. If California does recognize medical marijuana as an agricultural crop, then the authority to regulate any pesticides growers use on it falls under the jurisdiction of California's Department of Pesticide Regulation (CDPR). Currently, there are no pesticide products registered and labeled for use on marijuana. Use of an unregistered pesticide on marijuana is a legal violation, and CDPR could confiscate all medical marijuana crops treated illegally with pesticides under California Food and Agricultural Code (CA Food & Ag Code) Section 14628 (a), something that may conflict with California's Compassionate Use Act of 1996.

A critical first step toward addressing regulatory gaps is to define medical marijuana legally:

- Is it an agricultural crop?
- If it is not a crop, then what is it?
- When is it a crop?
- When is it a medical drug?

Marijuana cultivation as an illicit activity is not publicly studied by growers. Most scholarly literature addresses marijuana use and criminality. To address medical marijuana cultivation, we searched CA Food & Ag Code and Water Code (CA Water), current scholarly literature, and other states' statutes, as well as consulted with California regulatory departments and university

experts. University of California (UC) and California State University (CSU) agricultural and social scientists provided us with their insights into what may be relevant to cultivating marijuana as well as anecdotal information about issues brought to them by marijuana cultivators. Anecdotal information is provided by anonymous phone callers with questions for scientists about marijuana cultivation and by scientists who interviewed people in the medical marijuana industry as a part of their research.<sup>1</sup>

This memorandum explains how the cultivation of a crop such as medical marijuana may be regulated and potential barriers to such regulation. First, we examine product safety and regulatory measures. Then after we discuss labor safety, we point to environmental safety issues. Finally, we offer options for moving forward.

## PRODUCT SAFETY

**Pests:** Geographic location and type of cultivation influences pest presence. Generally, the type of pest will vary by region. For example, pests plaguing crops grown on California's North Coast may be different than those found on crops grown in the Central Valley. In addition, UC researchers, such as Dr. Larry Godfrey of UC Davis, point out that indoor cultivation (e.g., a greenhouse, under grow lights) attracts insect and mite pests such as spider mites, bud mites, aphids, thrips, mealy bugs and whiteflies, and outdoor cultivation may include these same pests and/or flea beetles, root maggots, plant bugs, termites, and various caterpillars.<sup>2</sup> Specific to marijuana plants are hemp borers and hemp flea beetles, pests that cope with or counteract the powerful compounds found in marijuana to inflict plant damage. Animals are also pests found in outdoor grow areas. Rodents, deer, rabbits, and birds impact crops by destroying them. Dr. Anthony Silvaggio from CSU Humboldt finds that outdoor growers sometimes poach and poison these animals to control their impact.<sup>3</sup>

**Pesticides:** To control these pests, medical marijuana cultivators do use pesticides. Dr. Silvaggio explained that in every state in which he interviewed people in the medical marijuana industry, "the purchase and use of illegal pesticides is the norm, with [pesticides used for] spider mites being the most common for use indoors."<sup>4</sup> The use of these pesticides on medical marijuana is illegal because pesticides must be registered for use on a specific plant, crop, commodity, or site (CA Food & Ag §12648). For example, if food and agricultural inspectors identify a pesticide on medical marijuana plants that is registered for use on tomato plants, then CDFG may seize the medical marijuana plants and the site on which they grow.

The process and potential outcome of regulating pesticide usage on medical marijuana is complicated by marijuana's status as an illegal drug at both the federal and state levels and as a legally-used medicine in California. Where California does have regulations in place to address illegal pesticide usage on agricultural crops, enforcing the regulations may conflict with other California law. Thus, enforcing pesticide regulations as they stand currently may include seizure of all pesticide-treated medical marijuana. However, seizing marijuana grown for medicinal

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<sup>1</sup> We include anecdotes to call attention to information that is currently unavailable in conventional sources.

<sup>2</sup> Email correspondence with the author from Dr. Larry Godfrey. March 7, 2012.

<sup>3</sup> Email correspondence with the author from Dr. Anthony Silvaggio. March 28, 2012.

<sup>4</sup> Email correspondence with the author from Dr. Anthony Silvaggio, March 6, 2012 and March 28, 2012. Words in brackets added for clarity.

purposes may violate California's Compassionate Use Act of 1996, which includes ensuring that seriously ill Californians have the right to obtain and use medical marijuana. Seizing medical marijuana plants treated with pesticides may prevent patients from obtaining their prescribed medicine.

### ***California Regulation of Medical Marijuana as a Crop***

It is unclear if California law includes medical marijuana as a *bona fide* agricultural crop. If California does recognize medical marijuana as an agricultural crop, then the authority to regulate any pesticides growers use on it falls under the jurisdiction CDPR. Currently, there are no pesticide products registered and labeled for use on marijuana. Use of an unregistered pesticide on marijuana is a violation of CA Food & Ag Section 12973 and the Federal Insecticide Fungicide Rodenticide Act Section 2(ee), which both convey that a pesticide must be used in a manner consistent with its labeling. According to a department contact, CDPR has the authority to enforce pesticide laws and regulations on medical marijuana now, but they would need additional assistance and resources to enforce them; California authorities could confiscate all medical marijuana crops treated illegally with pesticides under CA Food & Ag Section 14628 (a).

### ***Legal Use of Pesticides on Crops***

Medical marijuana's status as a food crop is ambiguous. On the one hand, it may be argued that since people ingest marijuana as edibles as well as smoke it that it qualifies as a food commodity. CDPR's residue monitoring program includes only testing produce to ensure food safety. On the other hand, if medical marijuana is a non-food crop, then sampling would only take place in an investigation brought forth by a county agricultural commissioner's office. Developing a new program for testing non-produce would require significant funding. However, this point is debatable, and some might argue that since there are no programs for non-food crops such as cotton, that another non-food crop would not need this kind of regulatory practice.

The United States EPA (U.S. EPA) must establish a tolerance level for any pesticide used on a raw agricultural commodity or exempt the pesticide from tolerance levels before it may be registered for use. A tolerance level, or maximum residue limit, is the amount of pesticide residue allowed to remain on a food commodity. Once registered, a grower may use the pesticide legally on the specified crop. Agricultural inspectors then test plants to ensure that pesticide residue measures at or below tolerance levels. Currently, since there is no established tolerance level nor an exemption from establishing a tolerance level for any pesticide used on medical marijuana plants, any use of a pesticide is in violation of the federal Food Drug and Cosmetic Act, Section 408(6a). It is unlikely that U.S. EPA will establish a tolerance level for medical marijuana use as long as it is illegal federally.

If the U.S. EPA did establish tolerance levels, then California regulatory departments would need additional resources for collecting and testing medical marijuana for pesticide residue levels and/or for establishing a new program. According to a CDPR source, county agricultural investigators would require police escorts when entering a private home where licensed growers cultivate medical marijuana. Notably, however, the experience in Humboldt county with this type of practice was that "When code enforcement began using police escorts, the community

response was so strong that the policy was dropped.”<sup>5</sup> The CDPR would also need additional staff to sample plants for pesticides and to send the sample to the California Department of Food and Agriculture (CDFA), and the CDFA would need to update their laboratories. However, some argue that the process of sampling medical marijuana would be similar to that already established for organic carrots or potatoes. The need for additional staff is more speculation than fact.

**Organic Growing:** Growing organic, pesticide-free marijuana is an option, but it is important to understand that organic alone does not mean there are no pesticides used. There are pesticides used on organic crops, and these pesticides still must be registered for use just as conventional pesticides are.

Pests may be controlled through fertilization, irrigation, and cultural practice such as low-density growing.<sup>6</sup> However, while organic growing without pesticides may side-step CDPR’s seizure of crops grown with illegal pesticides, organic certification is problematic. Dr. Silvaggio pointed out that the organic certification industry is not allowed to certify an illegal crop and said the following about the current state of organic medical marijuana:

Anecdotal evidence from my interviews with the growers and law enforcement (and I’ve interviewed well over one hundred growers) indicates that there are very very very few 100% organic growers. Those dispensaries that claim to be organic (green certified, etc) are few, also, and those I have interviewed who do org certification (for oregon tilth, ccof) say that current mj org certification companies are far less rigorous than the food industry standard certs.<sup>7</sup> [sic]

If medical marijuana were legal federally, then organic certification and monitoring of it would either be done by the CDFA as a food or by the California Department of Public Health (CDPH) as a processed product. However, a grower may be exempted from certifying an organic crop or product:

A production or handling operation that sells agricultural products as “organic” but whose gross agricultural income from organic sales totals \$5,000 or less annually. (Code of Federal Regulations §205.101)

Small quantities would not have to be certified, but they would have to comply with applicable production, handling, and labeling (Code of Federal Regulations §205.101, §205.101, and §205.310, respectively) requirements and be registered (CA Food & Ag §46013.1). However, Dr. Silvaggio suggests that medical marijuana growers will likely exceed the sales limit and have to apply for certification as well as register.

**Seeds:** As with characterizing medical marijuana as either a food or non-food crop, regulation of marijuana seeds depends on definition. If medical marijuana seeds are agricultural seeds (CA Food & Ag §52254), then the authority to enforce seed law falls under the jurisdiction of the Seed Services program run by the Department of Food and Agriculture’s Pest Exclusion Branch. Regulation of medical marijuana would then include seed registration, clear labeling, and legal transport (CA Food & Ag §52351-52356; §52451-52456; §52481-52484, respectively).

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<sup>5</sup> Email correspondence with the author from Dr. Anthony Silvaggio, March 28, 2012.

<sup>6</sup> Email correspondence with the author, February 27, 2012. Some correspondents did not give permission to use their name.

<sup>7</sup> Email correspondence with the author from Dr. Anthony Silvaggio, March 6, 2012.

## LABOR SAFETY

Once a manufacturer or formulator registers a pesticide for use on a crop, there are regulations in place to protect workers from unhealthful exposure to pesticides at any grow site. A part of the process of registering a pesticide for use on a particular crop includes testing. The testing results, among other things, reveal dangers to workers and protective gear that must be worn to minimize exposure. Dr. Silvaggio notes that Trinity County law enforcement and agricultural commissioners reported that workers there had to be hospitalized for skin and respiratory problems brought on by exposure to Avid, a pesticide commonly sold for and used on medical marijuana illegally.<sup>8</sup>

While researchers also suggested that pesticides may be a non-issue for labor at certain types of grow sites, current regulations specifically address how to keep workers who come into contact with pesticides and pesticide-treated crops safer. On the one hand, at small-scale grow sites contact with pesticide-treated crops may be minimal because cultivation could be automated. On the other hand, CA Food & Ag Code includes regulations about pesticides, time limits to exposure, handling of pesticides, hand-washing facilities, farm storage, protective devices, and posting signage (§12980-12988).

## ENVIRONMENTAL SAFETY

**Water:** California's Water Code states that water must be used efficiently with conservation in mind (§10521). A UC researcher suggested that marijuana will do well under irrigation management, and, as a small-acreage crop, will use far less water than crops such as cotton.<sup>9</sup> Another UC researcher described that water use for medical marijuana crops would be similar to any other irrigated crop – enough water must be applied to account for water loss into the air and the amount of salt in the soil.<sup>10</sup>

Keeping groundwater potable is important for people, other animals, and plants. California's Food & Ag Code specifies the following about pesticide use on agricultural crops in regards to water:

Due to the potential widespread exposure to public drinking water supplies from pesticide applications to the land and the resultant risk to public health and welfare, the potential for pollution of groundwater due to pesticide use must be considered in the registration, renewal, and reregistration process. (§13141)

Thus, as a part of the current pesticide registration process, regulation already includes mandatory steps to keep drinking water safe. This part of the registration process includes a pesticide registrant submitting information about each active ingredient in each registered pesticide that may impact water quality (CA Food & Ag §13431).

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<sup>8</sup> Email correspondence with the author from Dr. Anthony Silvaggio, March 28, 2012. See also Mclean, Kate. "Pot and Pesticides: A Bustling Illegal Trade." *The Bay Citizen*, May 26, 2010.

<sup>9</sup> Telephone conversation with the author, February 27, 2012. Some correspondents did not give permission to use their name.

<sup>10</sup> Email correspondence with the author, March 11, 2012. Some correspondents did not give permission to use their name.

**Fertilizers and Compost:** Fertilizer use impacts water quality and animal life. Eutrophication, or the process of water taking on higher levels of nutrients such as nitrates and phosphates, increases the growth of organic materials and decreases oxygen content in water and is related to fertilizer use. These unintended consequences of fertilizing crops impact a variety of ecosystems as food supplies die off, biodiversity declines, and leisure activities such as sports fishing become less rewarding. To decrease the human contribution to eutrophication, cultivators may test and identify more exact nutrient levels needed to encourage bud and leaf growth.

Few refereed, scientific journal articles address the effects of fertilizer and compost use on marijuana plants. However, UC researchers speculate that their use influences the quality and expression of marijuana flowers at the bud stage.<sup>11</sup> Phosphorous encourages blooming while nitrogen stimulates leaf growth. For these reasons, phosphorous-rich fertilizers and monitoring nitrogen fertility may be important to encourage flower production but inhibit leaf growth. Similarly, nitrogen-rich fertilizers and monitoring phosphorus fertility may be important to encourage leaf growth.

Fertilizers used in California must be registered with the CDFA, and fertilizer manufacturers, distributors, and sellers must be licensed by the CDFA. Regulating fertilizer, unlike pesticides, appears to be more focused on regulating the manufacturers, distributors, sellers, and labeling than on establishing and enforcing compliance with thresholds of chemical levels found on food products. Licensees selling bulk fertilizer to unlicensed buyers must keep a record of those buyers. In particular, the CA Food & Ag Code stipulates that sales of ammonium nitrate be catalogued with information such as the purchaser's name, address, and date of sale (§14612.5).

## FURTHER OPTIONS

Currently, medical marijuana crops and seeds go unregulated as such by CDFA and CDPH. Unrecognized as a *bona fide* crop at the State or federal levels, medical marijuana may not be registered for use with pesticides, and, as such, California regulations aimed at worker and environmental safety go unenforced. Further, while current regulations may be enforced, confiscating medical marijuana grown with illegal pesticides conflicts with California's Compassionate Use Act of 1996. Medical marijuana growers may opt to grow pesticide-free crops as one way to avoid crop confiscation.

While medical marijuana's status as a *bona fide* crop may be debated, its status as a medical drug may also be important. Beyond its status as a food or non-food crop, does medical marijuana stop being a crop and become a California-legal medicine at dispensaries? According to a CDPR source, if it does, then the CDPR's jurisdiction may end at dispensaries and regulation may fall under the purview of another regulatory agency. Examining the regulation of herbal remedies may be one way to address the issue of medical marijuana as a medicine.

Subject-matter experts may be brought together to discuss the impact of medical marijuana on the environment, marijuana and/or hemp as a for-profit crop, environmental issues impacted by cultivation, and undertaking scientific research. A study bill may be drafted to propose data collection and analysis of medical marijuana's environmental and social impacts. There are UC

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<sup>11</sup> While the bud part of the plant is more often used than the leaves, some people do make hash from the leaves and juice the leaves. In this case, nitrogen use levels may be increased.

and CSU researchers studying the medical marijuana industry and/or who study crop cultivation and pests. California State University at Humboldt has a Marijuana Studies Workgroup where involved faculty currently engage in the scholarly study of medical marijuana and its relation to human and environmental health. In addition, the UC's Cooperative Extension/Agriculture and Natural Resources has faculty who have expertise in areas such as entomology, integrated pest management, and/or applied insect ecology. Finally, please, let CRB know if you would like us to engage in further research and if you have additional questions.

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