

Stakeholder perceptions of the impact of cannabis production on the southern Oregon food system

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Abstract

The passage of Measure 91 (Oregon Legalized Marijuana Initiative, 2014) in Oregon legalized the production of cannabis for recreational sale. Since legalization, there has been a significant increase in cannabis production across the agricultural landscape of southern Oregon. Southern Oregon's Rogue Valley now hosts 314 licensed recreational

cannabis growers who share a changing agricultural landscape with orchards, vineyards, vegetable farms, seed industries, and ranches. The Rogue Valley Food System Network (RVFSN) convened focus groups across the region to explore the perceived impacts of the cannabis industry on the food system. These impacts were coded and categorized for use in the development of future research questions. Stakeholders identified environmental impacts, land use policy, agricultural best practices, water resources, financial opportunities,

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resource competition, and a changing cultural landscape as areas in need of further research. This research brief informs work by lawmakers, land use planners, researchers, managers, and farmers in developing research, policies, and projects to address challenges and realize opportunities associated with the changing agricultural landscape in states where cannabis production is expanding.

Keywords

Marijuana, Cannabis, Food Systems, Oregon, Rogue Valley, Agriculture

Introduction

The production and commercial sale of cannabis in the United States has increased significantly over the past decade (Stoa, 2017), due in large part to individual states passing laws that legalize cannabis. Oregon was the first state to abolish criminal penalties for possession of cannabis, in 1973 (Blachly, 1976). Then, in 1996 California became the first state to legalize medical marijuana. Two years later, Oregon, Alaska, and Washington followed suit. Oregon's Medical Marijuana Act (1998) specifically allowed for the cultivation, possession, and use of cannabis by those in possession of a medical marijuana card issued by a doctor.

Washington and Colorado were the first states to legalize recreational use of cannabis, in 2012. In 2014, Oregonians passed ballot initiative Measure 91 by 56% of the vote, legalizing the cultivation and non-medical use of cannabis (Oregon Legalized Marijuana Initiative, 2014). That same year, Alaska also legalized the recreational use of cannabis, with California following in 2017. Today 31 states and the District of Columbia have legalized medical marijuana, and nine states and the District of Columbia have legalized recreational marijuana, with an additional 15 states exploring recreational cannabis laws.

There are both potential risks and opportunities associated with the emerging cannabis markets. These include an increased flow of cash into a community (Victory, 2014), an increase in property values (Victory, 2014), the development of large-scale farming operations (Heimlich & Anderson, 2001), the creation of cannabis appellations (legally defined and protected geographical

indication used to identify where a crop is grown) (Stoa, 2017), and competition for natural resources (Bauer et al., 2015; Stoa, 2017; Vana, 2016).

In certain cases, cannabis cultivation poses significant threats to the health of watersheds. Stream diversions that may increase erosion may be used for flood irrigation on large outdoor farms. Some cannabis farms are also illegally removing irrigation water from streams and other water sources (Vana, 2016), which may lower the water table and affect summer flows for fish runs. A study of the Eel River watershed in California concluded that cannabis operations without regulation could outstrip water supplies (Stoa, 2017). However, correct implementation of farming policies would retain the ability to effectively regulate water usage (Stoa, 2017).

Federal restrictions on cannabis complicate other aspects of production and distribution as well. For example, because it is an illegal activity at the federal level, banks are prohibited from taking money from the cannabis industry. Therefore, depositing revenue earned from cannabis production poses a risk not only to those doing the banking, but also the banks themselves (Moscow & Felz, 2015). Additionally, state land-grant universities and other federally funded institutions are at risk of losing funding if they engage in any education or research activities related to cannabis production. Historically, farmers have relied on Extension research and education to improve their production methods and adopt best management practices.

Several states are coming out of an era of quasi-legalization and decriminalization. Ironically, this state of reduced punitive measures and legal risks associated with cannabis has paved a road for an increase in illegal cannabis grow operations, or what are called trespass grows (Vana, 2016). Without a regulatory framework encompassing cannabis cultivation, these trespass grows pose an unusually high risk for adversely affecting the environment and farming communities.

Because the federal government prohibits the production, distribution, and consumption of cannabis, states that have legalized any of these aspects must create and enforce their own laws and regulations. Federal law empowers states to legislate on

behalf of their citizens' health, safety, and welfare. Therefore, state and local policies must be implemented to both combat the increased risks and capitalize on the opportunities associated with a market boom. Tax regimes and environmental protection standards must be developed to compensate for the new wave of agri-business emerging in states where cannabis is grown.

The purpose of this study is to explore the ways in which cannabis production affects the food system of one region. While cannabis production and sale has effects that extend beyond the food system generally, this work focuses on how rural agricultural landscapes are affected by rapid growth in the cannabis industry. This exploratory work utilizes stakeholder focus groups to elicit the range of perceptions, opportunities, and concerns expressed by individuals involved in the changing landscape. Findings will be used to inform the selection of future research questions designed to inform states and counties seeking to develop and implement cannabis-related policies.

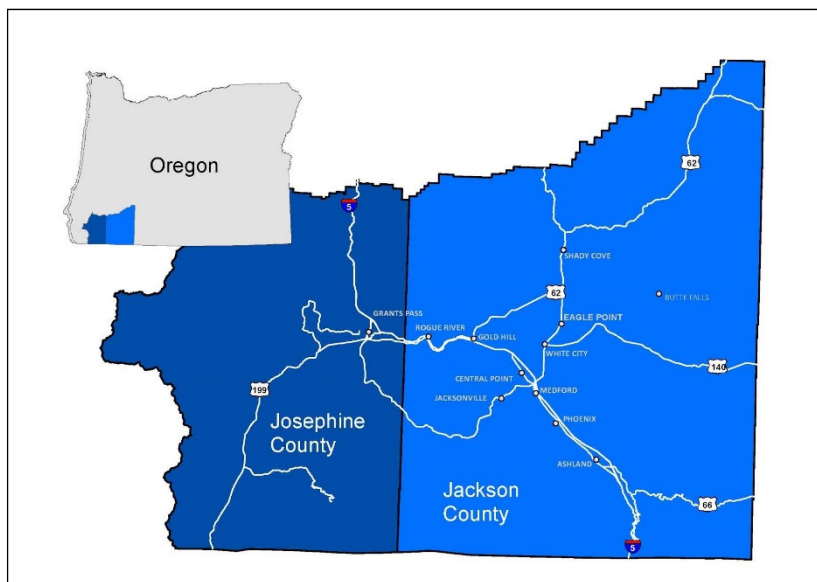
Cannabis Industry in Southern Oregon

Southern Oregon's Rogue Valley (see Figure 1) has a long history of commercial agriculture, beginning in 1885 with the first commercial apple orchards established in the Medford area. During the late

1800s and early 1900s, apples represented the largest agricultural commodity, peaking with about 400 growers and 10,000 acres (4,047 hectares) in 1910 (Oregon State University [OSU] Extension Service, 2007). By 1930, however, pears supplanted apples, primarily due to a regional climate and soil types better suited to pear production. During the 20th century, the Rogue Valley was also home to thriving dairy, alfalfa, hops, and small grain production. The region was identified as an excellent grape-growing region in the late 20th century, with a climate similar to the Bordeaux region of France (OSU Extension Service, 2007). During the 21st century, dominant agricultural crops have been pears, grapes, cattle operations, and dairy (U.S. Department of Agriculture [USDA], 2012). As the first state to decriminalize cannabis possession in 1973, Oregon gained a reputation as being more tolerant of marijuana use. Due to its climate and geographic isolation, southern Oregon, in particular, became a stronghold of illegal marijuana production in the 1980s (Johnson, 2017). By 2006, one estimate suggested that Oregon was the fourth largest indoor cannabis-producing state and the tenth largest cannabis-producing state overall (Gettman, 2006).

While southern Oregon's Rogue Valley has been a destination site for indoor and outdoor growing for decades (Gettman, 2006), Measure 91 dramatically increased the amount of cannabis cultivation. Today there are 314 licensed recreational growers in Jackson and Josephine Counties alone (Oregon Liquor Control Commission, 2018). Medical marijuana production is harder to track. In May 2018, the Oregon Health Authority released a report assessing the state's medical marijuana program. The report cites major challenges the state is facing in regulation and enforcement, including an inability to validate grow site locations, a lack of inspections and enforcement of grow sites, and insufficient and inaccurate

Figure 1. Southern Oregon's Rogue Valley (Jackson and Josephine Counties)



reporting and tracking methods. As such, determining the scope of medical marijuana currently being grown and processed in southern Oregon is difficult (Cabauatan-Vasquez & Yan, 2018).

The Rogue Valley had an estimated population of 303,831 people in 2017, 92% of whom reported their race as white alone (U.S. Census Bureau, 2017). Jackson County reported a median household income of US\$51,409 and Josephine County reported a median household income of US\$44,426 in 2017 (U.S. Census Bureau, 2017). The Rogue Valley is located within what has been referred to as “The State of Jefferson,” a largely rural area of southern Oregon and northern California historically and culturally rooted in forestry, mining, and agriculture (Lalane, 2017). The region has a history of secession movements rooted in a cultural and political identity distinguishing the region from urban areas to the north and the south (Lalane, 2017).

Research Methods

In December 2016, the Rogue Valley Food System Network (RVFSN) sought an academic partnership for the purpose of developing an exploratory study to address how cannabis production affects the regional food system. The network planned a series of stakeholder meetings and sought assistance on ways to use the findings as a form of needs assessment for future research. While some research needs, such as research on water requirements in cannabis, were already known, little was known about how the growth of the cannabis industry was affecting the regional food system overall. RVFSN hoped to facilitate stakeholder meetings for the purpose of both setting a civil tone for

community discourse, and identifying variables of interest for further study.

The RVFSN was formed in 2014 by a group of organizations, agencies, and businesses working to create a secure, sustainable food system accessible to all (RVFSN, 2018). In 2016, the organization voted to form a working group focused on the impact of cannabis production on the food system. The group was composed of individual representatives from RVFSN as well as community stakeholders with an interest in the relationship between the expanding cannabis industry and the food system. Formation of the working group stemmed largely from constituents’ interests in better understanding the growing conflicts between food producers and cannabis producers. Initial work focused on exploring the perceived opportunities and challenges associated with the changing landscape. The authors of this paper were members of that working group but did not have control over all decisions made during the planning process. Researchers were invited to disseminate the information generated during this community process to a broader audience. The stakeholder perceptions recorded in these meetings are described here as an exploratory study to inform future work investigating the impacts of cannabis on the food system.

The RVFSN held eight meetings designed to foster a community conversation about the changing agricultural landscape (see Table 1). Participants

Table 1. Description and Timing of Cannabis Community Meetings

Date	Meeting Type	Participants
April 5, 2017	Initial Stakeholder Meeting. Purposive sample of stakeholders across study area.	18
July 19, 2017	Public Interest Meeting with panel. Discussions not coded for analysis. Used to advertise community meetings.	150
August 31, 2017	Facilitator Training Meeting. Purposive sample of diverse stakeholders across study area.	15
September 7, 2017	Grants Pass Community Meeting	11
September 11, 2017	Talent Community Meeting	8
September 13, 2017	Little Applegate Community Meeting	10
September 18, 2017	Rogue River Community Meeting	18
September 20, 2017	Applegate Community Meeting	15

for the initial stakeholder meeting and the facilitator training meeting were selected through purposive sampling (Adler & Clark, 2011). The public interest meeting and all five community meetings were advertised by community facilitators and the RVFSN in local newspapers, discussion boards, social media, and local businesses. Facilitators took notes on wall-mounted notepads in all meetings. Additionally, a student research assistant took electronic field notes during all discussions (Kleiber, 2004). Digital notes taken during the meeting and facilitator-generated notes were compared to improve note accuracy during coding. No digital or voice recordings were taken during the community conversations because of concerns expressed by cannabis growers (Kleiber, 2004).

The first focus group took place in April 2017. Participants were selected using a purposive sample technique based on contacts from participating RVFSN representatives (Adler & Clark, 2011). A total of 18 recreational cannabis growers, medical cannabis growers, food producers, farmers growing both cannabis and food crops, ranchers, land use planners, and water resource managers participated in the meeting. Participants were divided into several discussion groups with representation across perspectives and were then prompted by research facilitators to address three primary objectives:

1. Identify potential opportunities or collaborations between the cannabis industry and food system.
2. Identify threats and challenges associated with the growing cannabis industry with specific emphasis on challenges to the existing food system.
3. Identify strategies for engaging in constructive and civil discourse with community members on how to leverage opportunities and address challenges.

During the initial stakeholder meeting, participants suggested small community-based focus groups to further explore the posed questions with a wider range of stakeholders. The working group identified community-based facilitators based on feedback from the original stakeholder meeting.

Three co-facilitators whose interests balanced each other were selected to facilitate meetings in each of the five communities in southern Oregon. Co-facilitators worked together to select an appropriate community venue and market the focus group to community members. Co-facilitators were carefully selected from each of the representative communities, each holding a different perspective on the impact of the cannabis industry on the food system.

Three months after the initial stakeholder meeting, a regionwide informational session exploring the opportunities and challenges associated with the growing cannabis industry on the food system was held in Medford, Oregon. The event was widely publicized by news outlets and trended across social media. Panel participants included a recreational cannabis grower, a water resource manager, a land use law consultant, a viticulture and agricultural labor specialist, and two academic facilitators. Panelists spoke for 10 to 12 minutes each and were then asked to collectively answer questions curated from the 150-person audience by the facilitators.

During the concluding 15 minutes of the regionwide forum, the community-based co-facilitators were introduced to the audience broadly. All those wishing to participate in further discussion were then asked to meet with the co-facilitators from their home community. Contact information was collected from interested parties.

All co-facilitators were asked to participate in a facilitation training session led by Southern Oregon University and Oregon State University Extension. Facilitators were trained on strategies for leading constructive conversations in tense environments, remaining objective during discussions to encourage full participation of attendees without bias, and ways to brainstorm ideas without judgment from participants.

Finally, co-facilitators held community-based focus groups in each of their respective towns. Focus groups explored the same three questions posed in the initial focus group. Several groups additionally chose to focus on strategies for further discussion. In total, 51 community members participated in the community-based focus groups.

An undergraduate research assistant attended

all meetings throughout 2017 as an objective note taker. In addition, notes generated by the facilitators during the community conversation were collected for analysis. Neither audio nor video recordings were made of the community stakeholder meetings because of concerns regarding the frequent disclosure of illegal growing and marketing (Kleiber, 2004). (In pilot interviews, cannabis growers had expressed concern regarding recordings of any kind.) All notes from the original stakeholder meeting and five community-based discussions were then digitized and coded by hand for common themes by two independent researchers (Kleiber, 2004). Each unique discussion topic during a meeting was treated as an independent occurrence of a theme or concept. Researchers met after coding was complete to explore intercoder reliability (Adler & Clark, 2011). Minor inconsistencies with coded themes were resolved by collapsing theme concepts.

Results

Ten themes were identified from the field notes taken during group meetings. Although some differences in discussion topics did exist between geographic locations, no systematic analysis of responses between geographic locations was attempted due to the small sample sizes and lack of repeated meetings in each community. A total of 531 unique conversations were coded, and the relative frequency of each theme was additionally explored (see Table 2). Although the researchers' focus was placed specifically on the impact of the cannabis industry on the food system, discussions repeatedly addressed opportunities and challenges of the growing cannabis production industry that extended beyond its impact on the food system. All findings have been included here, although some findings only marginally address the impact on the food system.

Environmental Concerns

Both food producers and long-time cannabis producers identified

an overall lack of agroecological understanding as a challenge. They argued that many of the newer cannabis producers do not understand soil health, the need for reduction in chemical usage, and the value of polycropping. Discussions of soil health often overlapped with land use concerns regarding soil compaction caused by heavy equipment, gravel, and/or high tunnels on exclusive farm use (EFU) lands. Overuse of chemicals, chemical runoff, and the possibility of raptor mortality as a result of rodenticide use were all mentioned as challenges. Cannabis producers further discussed regulations that prohibit composting in cannabis production as well as perceived constraints for intercropping food crops within cannabis production. Cannabis producers and food producers discussed work happening locally to develop "best practices guides" for new producers.

Environmental resource managers frequently discussed chemical runoff. One specific issue described in multiple meetings involved the accumulation of rodenticides in raptors. Some stakeholders attributed regional raptor mortality to an increase in cannabis production. These concerns are now being explored in more detail in terms of how cannabis production affects wildlife habitat (Franklin et al., 2018).

Regulatory Framework

Participants expressed concern and confusion regarding the regulatory framework for cannabis production and distribution. Recreational and

Table 2. Rank Order and Frequency of Coded Themes

Rank Order	Discussion	Frequency	Relative Frequency
1	Environmental Concerns	83	15.6%
2	Regulatory Framework	81	15.3%
3	Land Use Policy	81	15.3%
4	Resource Competition	59	11.1%
5	Financial Capital	58	10.9%
6	Cultural Change	56	10.5%
7	Educational Needs	41	7.7%
8	Leadership Development	28	5.3%
9	Stigmatization	24	4.5%
10	Corporatization	20	3.8%
	Total Discussions	531	

medical cannabis growers were most likely to express these concerns, but concerns were shared by neighboring food producers and urban dwellers as well. Specific confusion was noted between federal versus state policy as well as medical versus recreational policy. Cannabis producers expressed a lack of understanding of the laws that regulate their industry as well as concern over who is involved in making those decisions. Government overreach was discussed in several situations, often within minutes of a discussion of the need for stronger regulations. Although not all growers disclosed whether they grow cannabis legally or illegally, some evidence existed that legal producers were more likely to express a desire for stronger regulation. Finally, many discussions revolved around the persistence of black-market cannabis production throughout the region. Licensed growers expressed frustration over competition for resources and land with illegal producers. Frustration over licensed growers supplementing their income with illegal out-of-state sales was also mentioned regularly. Cannabis producers and food producers remarked on their estimates of how much of the cannabis grown in their region is illegally produced or sold, with some estimating that as much as 95% of all cannabis is sold illegally from both licensed and unlicensed grow sites.

Land Use Policy

Land use planning and zoning regulations differ among counties and are often poorly understood. Cannabis growers expressed concern that state and county officials can disagree over specific land use laws. For example, one focus group recorded a discussion between a local county employee and a state employee who disagreed over whether cannabis could be produced on rural residential zoned properties. Food producers in particular expressed concern over county regulations that restrict cannabis production to EFU zoned properties. EFU zoned lands are selected for zoning restriction based on having prime agricultural soils; however, cannabis production practices often involve laying gravel or sand over these soils for production in large high tunnels using imported soils. Thus, many food producers remarked that they were concerned that cannabis growers were adversely affecting

prime soils that might not be recoverable if cannabis production declines in the future. Some food producers argued that cannabis should be produced in commercially zoned properties. In addition, concern was expressed over the aesthetics associated with the required fencing, traffic, noise, and odors.

Resource Competition

Not surprisingly, a significant portion of the conversation between cannabis growers and food producers revolved around a perceived sense of resource competition for land, water, equipment, services, and labor. Food producers expressed concern over competition for water resources. Similarly, legal cannabis producers expressed concern over the same with illegal growers. While the region relies on water rights to allocate water as a resource, surface and groundwater are illegally accessed, and enforcement is strictly complaint-driven in the rural landscape.

Food producers reported being unable to source labor, services, and equipment as cannabis producers vie for the same local supplies and services. As noted above, some opportunity was expressed in this area to see the costs of materials come down through increased regional buying power, but immediate concerns revolved around shortages and longer waiting periods for goods and services. Food producers report losing labor to the cannabis industry. Recreational and medical growers reported internal competition, and both expressed frustration with the illegal market for competition. Regional housing shortages were also discussed as a part of this conversation, though most seemed to recognize that the housing shortage stems from a range of factors beyond the rise in the cannabis industry. As was noted in the theme of land use, an overall competition for available land has caused a perceived significant increase in land costs.

Financial Capital

One of the opportunities regularly discussed revolved around the idea of increasing financial capital in the region. Participants discussed the overall potential benefits of increased spending by cannabis producers. Specific to the food system,

benefits discussed included increased buying power for shared equipment, irrigation infrastructure, and overall rural development. Tax revenue was also discussed, but it was contested by participants. Two tax revenue challenges were identified regularly. First, current tax revenue is allocated within the county of purchase rather than production. As such, rural production counties like those in southern Oregon do not realize much of the total tax revenue. Second, as was mentioned already, cannabis producers perceive that most of the production at this point is still illegal and untaxed. The complex dynamic between legal and illegal production described here is consistent with research immediately to the south in northern California (Polson, 2013).

Cultural Changes

Concerns related to rural development included near-universal unease with outsiders moving into the region. This concern was expressed in a variety of ways, including consternation that the locals are being pushed off their land. Concerns were also expressed regarding an influx of people of color. Specific mention was made of migrant Latino and Hmong workers and/or owners.

In addition, participants expressed anxieties about crime, labor relations, and overall changes to community structure. Some participants discussed their anxieties around increased crime as connected to racially driven concerns centered around migrant labor. Increased crime was also discussed independent of race as being driven by a largely cash-based economy, increased use of firearms, and the reported connections between sex slavery and migrant farmworkers. This concern was raised by participants, including cannabis producers who reported suspicion of sex slavery by neighbors.

Additional concerns included the gentrification of rural landscapes and an overall fear of how a boom-and-bust economy might lead to long-term community infrastructure struggles. In many cases, the problems listed above were also listed as potential opportunities. Some participants spoke about the opportunities for seeing an increase in racial and ethnic diversity in the region as well as a resurgence of young farmers who have come to the region to grow cannabis.

Educational Needs

Cannabis producers specifically, but other participants as well, noted the need for educational materials on a wide range of issues. Specifically, they spoke about the lack of support they are receiving from Oregon State University Extension Services and local research institutions. They spoke of the need for training programs for cannabis farmers, regulatory training, medical research on the health benefits of cannabis, and educational conferences for networking and information-sharing. One opportunity expressed in this area included long-time food producers being able to market themselves as farming consultants in the cannabis industry as a source of supplemental income.

Leadership Development

Extension-based services, beginner farmer and rancher programming, grant-writing assistance programs, and lobbying have largely been led by institutional leaders in food production. However, cannabis growers expressed concern that no such leadership has emerged in their field. They regularly asked questions about who will advocate for their concerns, provide training, and coordinate efforts to support industry interests. Other participants felt that there was no organized effort to communicate the challenges being addressed to state-level decision makers. The historical “State of Jefferson” concept was discussed on numerous occasions as rural residents of southern Oregon expressed concern that their region was serving the demands of urban regions to the north and south without support or appropriate compensation.

Stigmatization

Stigma and perception of cannabis production were widely discussed as challenges in the industry. Cannabis producers spoke about their concerns of federal legislation that stigmatizes state legalization. They further spoke about the challenges this places on banking, as many banks continue to navigate federal law prohibiting dealings with cannabis growers. The resulting cash economy is further stigmatized, as legal businesses find themselves paying for services or supplies with large sums of cash. Other participants, including food producers,

described the difficulty of working with cannabis growers due to stigmatization. They described being concerned about how community members might feel about them if they are seen collaborating with or sharing resources with cannabis producers. Focus group participants did not discuss the moral arguments surrounding the legalization of cannabis. This lack of perspective may have been the result of self-selection.

Corporatization

Although discussions largely revolved around a contestation over resources, values, and community structure, participants also discussed concern over the influence of outside corporate interests. Food producers and long-time cannabis producers fear the region will be opened up to large agribusiness interests and outside investments. Many of the participating cannabis producers identify themselves as “locals” with long histories of production (either food or cannabis) in southern Oregon. Several told stories of neighbors whom they perceived were working for large corporations. Whether real or perceived, there was a sense that local economies were being replaced by corporate investments that would not benefit the local region. They also expressed concern over a shift in values away from land and community stewardship to businesses rooted in financial gains. Resource competition seemed to drive this conversation, as “local” was subjectively defined in most cases as those who currently live in the Rogue Valley. Several of the most outspoken cannabis producers in this argument had moved to Oregon within the past couple of years but were actively promoting restrictions on any new licenses.

Discussion

The stakeholder perceptions explored here collectively contribute a valuable lens into how cannabis legalization unfolds on a rural landscape. Stakeholders expressed a range of fears, anxieties, and excitement about how the cannabis industry might continue to develop in southern Oregon. As states continue to contemplate or implement legalization of cannabis production, a constructivist approach to understanding social and environmental

problems can be useful in research and policy development.

A constructivist research lens, alone, however, was not the intent of the RVFSN cannabis working group. Perceptions were intended to drive research to address opportunities and concerns. Multidisciplinary research in cannabis production is needed and includes agricultural and environmental scientists to look at best practices in production; hydrologists to look at water use, flow, and availability; sociologists to explore labor and rights issues; land use planners to explore appropriate zoning; legal experts to address clarity in laws; and communication experts to address the confusion growers and neighbors feel regarding law.

Researchers interacted individually and in groups with cannabis growers, neighboring food producers, land use planners working with cannabis growers, water resource specialists, cannabis policymakers, and concerned citizens. The perceived risks and opportunities reported here were constructed through careful listening and observation. However, the limitations of this research include its exclusive focus on stakeholders' perceptions. Participating researchers did not attempt to correct conversations involving concerns or opportunities that diverged from existing research findings. The questions drawn out of focus groups require further research to support or refute stakeholders' claims. Furthermore, our research was confined to exploring how cannabis production is affecting the food system in the Rogue Valley alone. The extent to which these findings can be generalized to other growing regions remains unclear. Finally, the cannabis industry in southern Oregon is reportedly changing as a result of legalization in California. Increased competition and increasing supply have resulted in price decreases that may affect concerns and opportunities. It is presently illegal at both the state and federal level for cannabis products to move across state lines. However, as noted above, stakeholders currently report that because so much of the market is actually in states where it is still illegal to grow, this may have little impact on overall sales. Federal legalization of cannabis would likely increase market potential through legal market access.


Conclusions

While cannabis remains illegal at the federal level, states are increasingly decriminalizing and promoting cannabis production and in-state sales. The focus group analysis conducted here may be helpful in the development of research, land use policy, regulation, and enforcement strategy. Findings suggest that communication between policymakers and cultivation regions will be necessary to address the changing landscape for food producers and rural communities generally. Decriminalization after a history of prohibition has further led to widespread confusion and/or misinterpretation of state law. Improved communication between states and growers, states and counties, growers and counties, and between growers themselves may be necessary to avoid disputes.

Additional research addressing the perceived concerns presented by community members and stakeholders will be needed to verify the qualitative research presented here. Initial findings have been used and will continue to be used by researchers and practitioners interested in further exploring the relationship between cannabis and the food system. Results have informed local efforts to begin quantifying water use in cannabis production and in comparing water use to that of local wine grape

production. Other researchers are currently exploring the impact of cannabis production on wildlife.

While stakeholders in this study spoke about opportunities and concerns generally, researchers focused on questions regarding the impact of cannabis production on the regional food system. Many of the concerns voiced were beyond the scope of this research. Additional research will be needed to understand the broader effects of a changing cannabis economy. For example, concerns of a growing sex trade industry associated with the cannabis industry were not explored here in detail, nor were enforcement strategies for illegal growing operations or interstate trade.

In summary, there is a perception among stakeholders that the emergence of a cannabis economy in southern Oregon is affecting the regional food system. These impacts include a number of challenges related to land use, environmental degradation, and resource competition. However, effects also include opportunities for shared resource use, rural economic development, and educational collaboration. Additional research will be needed to explore the perceived impacts of cannabis production on the food system as discussed in stakeholder meetings. 

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