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Orchard Entanglements:
Political Ecologies of Almond Production in California and Spain

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ABSTRACT

Orchard Entanglements:

Political Ecologies of Almond Production in California and Spain

Emily Reisman

Almond production in California has recently experienced an unprecedented boom accompanied by rapid expansion and concerning levels of water, fertilizer and managed pollinator use. This system stands in stark contrast to that of Spain, the largest exporter of almonds globally until the 1970s, where nearly all production is rain-fed and low-input. This research investigates three elements of almond production's political ecology spanning these two geographies. (1) How and why did almonds become problematized? (2) What is the relationship between demand for almonds and their ecological entanglements? And (3) what agroecological production systems exist and how do relationships beyond the farm impact their resilience? Almonds here are taken as a case study for revealing how public dialogue tackles the tension between profit and public good, for demonstrating agricultural intensification as a material-semiotic process, and for developing a politics of more-than-human care which can strengthen resilience through relations. In doing so it pushes for a more-than-human approach to agrarian political economy, taking the materiality of agroecosystems as inherent to their sociality. This research finds that almonds attracted attention because they represented frictions between market signals and ecological signals, that the intensification and expansion of California almond orchards is a cause rather than a result of consumer demand, and that Spain's

alternative systems need networks of care relations, not just sound agroecological practices, to be resilient in the face of global change.

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INTRODUCTION

1. Orchard Entanglements

Almonds in California have recently experienced an unprecedented boom. Over a 20 years period production more than doubled, while total value of production multiplied six times over (USDA 2015). Almonds are now California's most profitable export crop, taking the crown from the state's renowned wine industry. While almonds are not the most water intensive crop in the state, they use upwards of 10% of the developed water supply and continued expansion has placed them at the center of public concern. Almond orchards have simultaneously become the largest managed pollination event in history, and while the origins of honeybee decline are complex, almond orchards are inextricably tied into their welfare. Such an intensive production system is particularly striking when compared with Spain, the world's largest almond producer until the mid 1970s. In contrast to California, over 90% of Spanish almond orchards are non-irrigated and require no large-scale pollinator relocation. Rather than a crop of wealthy Westward settlers, in Spain, almonds became a favored crop of low-resource peasant producers for their capacity to thrive despite hot dry summers, cyclical droughts, and marginal land. These farmers tend to privilege practices that enhance orchard resilience over those which confer rapid profits. Yet agroecological practices alone may not be enough to protect farms from the rising threats of climate change and plant disease.

This research investigates three elements of almond production's political ecology. (1) How and why did almonds become problematized? (2) What is the relationship between demand for almonds and their ecological entanglements? And (3) what alternative systems exist and how do relationships beyond the farm impact their resilience? Almonds here are taken as a case study for revealing how public dialogue tackles the tension between profit and public good, demonstrating agricultural intensification as a material-semiotic process, and developing a politics of more-than-human care which can strengthen resilience through relations. In doing so it pushes for a more-than-human approach to agrarian political economy, taking the materiality of agroecosystems as inherent to their sociality. My research ultimately shows that almonds attracted attention because they represented frictions between economy and ecology, that the intensification and expansion of almond orchards is the cause rather than the result of consumer demand, and that alternative systems need more than sound agroecological practices to be resilient in the face of global change.

2. Approach & Methods

This project considers social processes as products of more-than-human relations, unable to be fully explained by human activity alone (Bennett 2010; D. J. Haraway 2016; Latour 2017; Panelli 2010; Robbins 2007; Sundberg 2011; Tsing 2014; S. Whatmore 2006). It also views capitalist relations as always variable, incomplete and fraught with frictions (Gibson-Graham 2006; Tsing 2005). Together these commitments depart from scholarly practices that treat human and more-than-

human processes as separate realms and those that assume the totalizing effects of global capitalism. Doing so does not require radically new experimental techniques (Dowling, Lloyd, and Suchet-Pearson 2016) but rather couples widely-used interview and archival techniques with appropriate training in geophysical and ecological processes, explicit attention to the influence of more-than-human phenomena in data collection and analysis, and a presentation of results that reflects the dynamism of almond landscapes.

2.2 Data Collection & Analysis

I conducted a media discourse analysis, archival analysis and a total of 188 interviews to inform the results presented here.

For the media analysis, I used Google News search engine to conduct a Boolean search for “almond” AND “California” AND “water” published between January 1, 2014 and November 8, 2016. I saved stable images of the top 109 articles. Upon detailed review, 22 articles were eliminated as duplicates or for lacking relevance, leaving 87 articles for analysis.

Using open coding facilitated by qualitative analysis software, I coded the text with emergent themes, progressively grouped themes, and finally theorized a relationship between these themes.

To uncover historical patterns, I drew on archival data including government records, almond production manuals, conference proceedings and agronomic studies. In California this included visits to the Special Collections at the University of

California at Davis and the Paso Robles Historical Society, as well as access to the digitized newspapers maintained by the Library of Congress. In Spain the library of the Ministry of Agriculture and the Biblioteca Bartolomé March provided invaluable documentation.

Interviews provided an abundance of data, of which only a portion is analyzed here with additional publications forthcoming. Through semi-structured interviews, typically 1-2 hours in length, I was able to chronicle the first-hand experience of almond growers, researchers, beekeepers and other industry participants during a period of rapid change: a global boom (rising prices) and a disease outbreak in Spain. Often these interviews were coupled with site visits to farms. Participants were recruited through snow-ball sampling and randomized cold calls where possible. In both locations I sought to capture a range of farm sizes (relevant to local variation) and regional dynamics. There are several reasons for the difference in interview coverage in each location. First, the socioecological diversity of Spain's almond growing regions, compared to California's relatively more homogenous almond production systems, required a broader range of perspectives to achieve saturation. Second, beekeepers did not play a significant role in almond production in Spain and thus were not included. Finally, the California almond industry was reeling from a wave of negative press coverage during the 2012-2016 drought and thus recruiting participants was much more difficult.

	Spain	California
Growers	52	34
Researchers	18	8
Beekeepers	0	19
Other: co-operatives managers, nurseries, processors, industry groups, marketers	48**	9
TOTAL	118	70
**many interlocutors in this category were also almond growers but are counted only once		

3. Results

My research shows that almonds attracted attention because they represented frictions between economy and ecology, that the intensification and expansion of California almond orchards is a cause rather than a result of consumer demand, and that Spain's alternative systems need more than sound agroecological practices to be resilient in the face of global change.

In 2014 journalists accused almonds of "sucking California dry" for using roughly one gallon (3.79 liters) of water per nut during the state's record drought. Eye catching statistics set off a cascade of news articles elaborating the almond problem interspersed with retorts defending almond production from becoming the scapegoat of Californian's accumulated water griefs. How and why did almonds become a water problem? Chapter 1 examines how and why almonds became a flash point for public

debate surrounding water use during the drought through a media analysis of 87 journalistic articles spanning the rise and fall of the great almond debate. While stunning statistics triggered alarm and policy changes buoyed interest in almond production, I argue almonds captured the attention of news writers and readers because they embodied a pervasive concern over the appropriate role of profit in water use. Almond anxieties centered on four disquieting market dynamics: the speed and scale of landscape transformation wrought by a new food fashion, the indifference of global trade to local troubles, the concentration of power in the food system, and a trend towards high-value permanent crops. Almonds remained in the public eye despite recharacterizations of their efficiency because they are a boom crop; exemplary of how neoliberal logics fail to address water as a public good. Building on political economic theory, this chapter rearticulates Polanyi's theory of the 'double movement' as an ideologically diverse and relational process. A Polanyian analysis of the almond debate demonstrates the utility of this approach for synthesizing, validating and furthering meaningful dialogue on water politics.

Consumer trends are often blamed for agricultural boom-bust cycles and their associated socioecological ills. Chapter 2 argues against consumer blame, demonstrating that almond intensification effectively ratcheted up consumer desire, not the other way around, through coordinated state-supported marketing campaigns. This chapter brings together agrarian political economy with critical nutrition studies, theorizing the ascent of the almond from a seasonal specialty to a "superfood" as a series of spatial fixes alleviating the pains of chronic overproduction. In doing so I

infuse David Harvey's well-known theorization of the spatial fix with feminist attention to material semiotics, arguing that the spatial-fix is a material-semiotic process with important psychosocial dimensions often downplayed in the historical materialist tradition. Drawing on historical archives, advertising materials, interviews with current and recently retired almond industry marketing professionals, and observation at the annual industry conference from 2015-2018, I show that as almond production surges the industry must constantly work to change the way consumers see almonds (from seasonal specialty to superfood) and the way they see themselves (from sophisticated to superhuman). While consumers resist and reinterpret the shifts in food meanings fashioned to compensate for overproduction, a century of effective material-semiotic fixes attests to the industry's influence on foodways. The case of almonds is used here to situate the broader superfood trend and its imagined "super" subjects as produced through the political economy of industrial agriculture. Understanding the political economic underpinnings of superfoods reveals not only the historical foundation of this contested contemporary food phenomenon, but also sheds light on the metamorphoses of food meanings fundamental to agrarian capitalism.

Critics of almond production often characterized the nut as an inherently water or resource intensive crop, yet the agroecologically-situated cultivation practices of Spain prove otherwise. To maintain such systems however requires more than just sound agroecological practices, subsidies (such as those funded by the European Union's Common Agricultural Policy) or premium prices (as pursued by

organics or protected geographical indicators); it takes a network of relationships. Farms do not exist in a vacuum, but rather are woven into the socioecological fabric; to be resilient that fabric is as important as the farm itself. The case of Mallorca's rapid almond decline demonstrates that a disease outbreak can quickly ravage even diverse agroecological systems premised on resilience if the maintenance work to sustain them has been eroded. Almonds were once "the gold of Mallorca," a source of modest wealth and pillar of diversified farming systems for small holders on the largest of Spain's Balearic Islands. Now researchers believe nearly every almond tree on the island will be dead within five years. The introduced bacteria Xylella fastidiosa, enabled by its spittle-bug vector, and emboldened by climate change, has flooded the xylem of these rainfed trees, impeding the flow of fluid and nutrients until the tree can no longer survive. This chapter enrolls feminist theorizations of care, material-semiotics, and agential realism to deepen the ethical implications of a plant epidemic. I argue that by attending to the care relations underlying pathogenicity we can shift from narratives of landscape purification toward a more-than-human politics of care.

CHAPTER 1:

The Great Almond Debate:

A subtle double movement in California water

ABSTRACT

In 2014 journalists accused almonds of "sucking California dry" for using roughly one gallon (3.79 liters) of water per nut during the state's record drought. Eye catching statistics set off a cascade of articles elaborating the almond problem interspersed with retorts defending almond production from becoming the scapegoat of Californian's accumulated water griefs. How and why did almonds become a water problem? This article charts the rise and fall of the almond debate through a media analysis of 87 journalistic articles spanning two years. While stunning statistics triggered alarm and policy changes buoyed interest in almond production, I argue almonds captured the attention of news writers and readers because they embodied a pervasive concern over the appropriate role of profit in water use. Almond anxieties centered on four disquieting market dynamics: the speed and scale of landscape transformation wrought by a new food fashion, the indifference of global trade to local troubles, the concentration of power in the food system, and a trend towards high-value permanent crops. Almonds remained in the public eye despite recharacterizations of their efficiency because they are a boom crop; exemplary of how neoliberal logics fail to address water as a public good. This paper rearticulates Polanyi's theory of the 'double movement' as an ideologically diverse and relational

process. A Polanyian analysis of the almond debate demonstrates the utility of this approach for synthesizing, validating and furthering meaningful dialogue on water politics.

1. INTRODUCTION

1.1 The problematization of almonds

Between 2014 and 2016 journalists accused almonds of "sucking California dry" for using roughly one gallon of water (3.79 liters) per nut during the state's record drought (Associated Press 2015; Canon 2015; Li 2014; Miller 2015; Willis 2014a; 2014a). Eye catching statistics set off a cascade of articles elaborating the almond problem interspersed with retorts defending almond production from becoming the "scapegoat" (Gonzalez 2015; Holthaus 2015; N. Johnson 2015) of Californian's accumulated water griefs.

While the gallon per nut statistic gained almonds their fame as heavy water users, almonds are in some ways a surprising target for such intense scrutiny. According to the estimates of a 2013 USDA survey of California, rice uses the most water per unit land, followed by alfalfa, then corn, with almonds falling roughly equivalent to other fruit and nut crops (R. Johnson and Cody 2015). Viewed by total water applied throughout the state, alfalfa fields draw 37% more water than almond and pistachio orchards, and irrigated pasture applies just 12% less than tree nuts (Medellín-Azuara et al. 2016). Of course measurements of something as slippery as water, with its complex material flows and social entanglements, are never as objective as an administrative assessment may present. In the almond debate,

quantification of water use both propelled and deflected attention to almonds. The Almond Board of California even funded a water footprint analysis in hopes of countering media representations, advocating for metrics more favorable to the industry such as water use relative to nutrient content and economic output (Fulton, Norton, and Shilling 2018).[1] Numbers can never be fully detached from matterings. The almond debate made clear that how, when, where, why and for whom water flows were worthy questions whose devilish details could not be easily disregarded.

How and why did almonds become a water problem? The significance of this question is three-fold. First, processes of problematization make implicit claims as to who and what should be controlled (Foucault 1985; Foucault and Kritzman 1990). While on the surface it may have appeared that writers wanted almond orchards or consumption to be modified, analysis of the almond debate discourse shows that specific trends in agri-power formations, rather than merely almonds, were under scrutiny. Second, examining the almond debate reveals frustrations that extend beyond water to growing concern over the friction between market cycles and ecological cycles. Recognizing this concern makes it more difficult to dismiss almond media coverage as public misunderstanding of quantitative claims or mere hype, as those portraying almonds as a scapegoat often explained. Finally, the problematization of almonds provides an opportunity to clarify and broaden Polanyi's theorization of the double movement.

[1] This same report, to the funders dismay, estimated that almonds use 12 liters (3.17 gallons) of combined blue, green and grey water per nut, 70% more water than the original 'gallon per nut' circulated in the media.

In this article I demonstrate the significance of recognizing a double movement that occurs in a more subtle form than explicit political action, as an undercurrent that fuels debate. I do this for several reasons. First, it helps explain the sudden outcry over a previously uncontroversial crop. Such explanation makes it more difficult to dismiss media or other expressions of public concern as ill-informed (Swerdloff 2015) or "completely ridiculous" (Richard Howitt quoted in Westervelt, 2015). Second, a Polanyian perspective helps to illuminate why the neoliberal logics of efficiency, marketization and consumer responsibility were ultimately insufficient in resolving concern over water use. Asserting the public character and inherently non-market origin of water is crucial to substantive water reform. Third, this paper argues that recognizing a subtle double movement shows how resistances to the precarities of markets are woven into the fabric of everyday life. Such resistances are not always as clear or resolute as direct calls for political reform. They may take the messy, indeterminate form of collective dialogue distributed and discussed among a wide array of actors. Scholarship may be all the more valuable for providing synthesis and analysis of subtle double movements that do not sound a singular rallying cry.

News media may be a particularly fruitful arena for extending double movement theory. In the pursuit of perpetual novelty, news media provide fertile ground for the emergence and contestation of new social problems (Schoenfeld, Meier, and Griffin 1979). Newspapers, magazines, radio, television and news websites are a suite of apparatuses, each embedded in its own constellation of power relations, that stimulate and mediate information circulation. They can be both

megaphone and muzzle; amplifying debate while also moderating its boundaries. While journalism is nowhere near the idealized "public sphere" of Habermas (Calhoun 1992), it is nonetheless a fundamental forum for democratic processes (Dahlgren and Sparks 1991).

This chapter traces the common threads of concern among news writers that thrust almonds into the spotlight. In doing so I hope not only to explain how and why almonds became a water problem, but also to make a theoretical argument for seeing double movements in places we less often expect. First, I provide historical context followed by an explanation of data collection and methodology. Next I characterize media coverage by describing the arc of the story's momentum and sourcing practices. The theoretical analysis is divided into two sections titled "Market Anxieties" and "Market Solutions?." The first exposes the political economic roots of the almond debate and the second makes the case that the debate should be interpreted as a market critique despite the appearance of common neoliberal logics. I conclude by reviewing how the almond debate exemplifies public pressure to recognize water as a public good.

1.2 The Double Movement: embracing ideological plurality and relational agency

I use the almond debate as a case study to examine how a Polanyian 'double movement' may not require the shared identity, intentionality, or discrete action typically associated with the social movements to which the concept is commonly applied. Social movements such as the food sovereignty and agroecology movements

contribute immensely to critiques of market governance, but they are not the only places to look for resistance to market influence. Agri-food scholarship, by so tightly linking the double movement with social movements, risks forgetting Polanyi's broader original formulation. This analysis demonstrates that a double movement can also appear in forms that are more subtle, ideological diverse, and potentially much more widespread.

In *The Great Transformation* Polanyi denounced the idea of markets as inherently self-regulating. He theorized the constant struggles surrounding the marketization of social life as part of a double movement in which the extension of market ideology into new spheres is unavoidably met with counter-efforts to protect society from the market's perils. The double movement concept portrays attempts to "disembed" economic exchange from the social world like a stretched rubber band, inevitably stretching too far and rebounding to reembed the economy within social relationships. Thus the utopian fantasy of a purely market-based society is never completely fulfilled (Polanyi 2001).

According to Polanyi, double movements are especially likely in historical processes that marketize what he calls "fictitious commodities": land, labor and money. While treated like commodities, they are not produced for markets, thus political projects to make them subject to the free market are fraught with socioenvironmental crises. Land is not only real estate, but the entirety of the biotic and abiotic environment. Critiques of ecosystems services show the limits of

commodifying species, water, air, or nutrient cycling, as rooted in their fundamentally non-market origin (Brockington 2011; Gomez-Baggethun and Ruiz-Perez 2011; Kull, Arnauld de Sartre, and Castro-Larrañaga 2015). Because fresh water can only be produced for the market under costly and rare conditions,[2] it is a likely candidate for resistance to market governance. A large body of scholarship addresses resistance to neoliberal water governance (Heynen et al. 2007; Boelens and Vos 2012; Roberts 2008) and the qualities that make water a particularly "uncooperative commodity" (Bakker 2005). In the case of the almond debate, water was not undergoing a new political process to increase market control. Instead, drought provoked a crisis of legitimacy over the influence of markets on water use.

Amidst the revival of Polanyi's work, the double movement and embeddedness concepts have evolved to address some of the weaknesses in their initial formulation. It is widely acknowledged that Polanyi "failed as a prophet" (Block 2008) to predict a conclusive double movement that would bring an end to laissez-faire social dislocations. His conception of action and reaction is overly mechanistic and notably silent on the details of how exactly collective discontents coalesce into an effective countermovement (Levien 2007). As Granovetter shows, Polanyi risks a false dichotomy between the "social" and the "economic" because even exemplary acts of market exchange require elaborate networks of social

[2] Desalination is an exception here, but remains less than 1% of fresh water supplies in California as well as worldwide. Wastewater 'reclaimed' for use in agriculture might also be considered to be produced for the market but currently remains limited to few municipalities and applications. Regional water geographies may make desalination or reclaimed water a more significant portion of overall usage.

relationships (Granovetter 1985; Granovetter and McGuire 1998). Embeddedness requires some essentialized notion of the economic (Krippner 2001), and yet economic calculus is not a timeless property of existence but a representational apparatus produced through historical processes (Mitchell 2008). Confusion surrounding embeddedness may stem from contradictions within the text (Gemici 2007), evidence that Polanyi perhaps discovered the "always-embedded market" as he was writing about it (Block 2003).

There is no pure form of de-socialized market from which to swing towards or away. Instead, the double movement explains how market ideology as a mode of governance becomes politically untenable. While Polanyi may have taken the existence of a socially disembedded market at face value, his argument is rooted in the powerful insight that markets are deeply dependent on state power and social relationships to function. The sterile, mechanistic, universal, self-regulating market is thus a fiction destined to be exposed in all of its entanglements. The double movement is a crisis of legitimacy: a pendulum swing between market fundamentalism and a recognition of the inherently political character of economic exchange (Dale 2012). Markets are not inherently less-social than other institutions, but they are unsatisfying arbitrators of human and more-than-human welfare.

The hopeful message of the double movement has led many to use it as a framework for explaining social movements arising to counter neoliberalism. In the agricultural context, the double movement has been invoked to analyze movements

for welfare reform, land reform, food sovereignty, agroecology, local food, fair trade, ecolabels, and regulation of genetically modified foods (Holt Giménez and Shattuck 2011; Freidmann and McMichael 1989; Alkon and Mares 2012; Holt-Giménez and Altieri 2012; Goodman 2004; Guthman 2007; Worster 1990; Carroll 2016). Such projects at times take embeddedness as a variable rather than a constant, seeking to determine the relative embeddedness of a given food-system configuration (Hinrichs 2000), or merging embeddedness with a higher degree of connection to local ecologies (Murdoch, Marsden, and Banks 2000). Polanyi's description of a disembedded or rembedded economy are ultimately less helpful than his acknowledgement of the self-regulating market as an impossibility. A double movement occurs in the always socially-embedded economy when the veneer of market self-regulation wears thin. This tendency toward self-protection questions liberalism's political validity, not its sociality or relative proximity.

In addition to reframing *what* exactly a double movement is (as a crisis of legitimacy rather than an act of re-embedding), I aim to show that who engages in one and how need not be as discrete or ideologically pure as often described. Existing scholarship has highlighted double movements evident in social movements which fit the oft-cited definition of "networks of informal interactions between a plurality of individuals, groups, and/or organizations, engaged in political or cultural conflict, on the basis of shared collective identities" (Diani 1992). Yet a double movement does not rely on collective identity. This chapter illustrates how a double movement need not be limited to social movements with shared goals for social change. Furthermore,

participants in market critique may not see themselves as questioning the legitimacy of markets, yet as a whole the double movement tendency to resist market governance remains evident. In this way I argue the double movement concept could benefit from both a broadened arena of application and a relational model of agency. In this case, ideologically diverse journalistic writers stimulated and circulated a lively discussion about water use which rarely makes explicit market critiques, yet when examined collectively the subtle undercurrents of resistance to market dynamics became clear. This broadening of the double movement concept's application resonates both with Polanyi's formulation and with critiques of atomism.

When Polanyi described the self-protecting tendency of society to shield individuals from market instability, he saw it as largely unplanned. A wide variety of counter-movements, he described, arise to address very specific practical frustrations.

> The countermove against economic liberalism and laissez-faire possessed all the unmistakable characteristics of a spontaneous reaction. At innumerable disconnected points it set in without any traceable links between the interests directly affected or any ideological conformity between them (Polanyi 2001, 156).

Most of those seeking to control market uncertainty were not driven by a unified ideology, he argued, but by first-hand experience with the weaknesses inherent in market dynamics. Polanyi cites the topical diversity, broad geographic range, and historical contingency of political reforms to protect the social fabric. Writing during the rise of fascism in Europe, he noted how agrarian protectionism which resists the marketization of land and its produce could be motivated by fears of dust-bowl soil

degradation, by counter-industrial romanticism, by feudal conservativism, or by fascist fantasies of autarky. Regardless of motive, the market was ultimately an insufficient mechanism for manifesting a desired social goal. Polanyi looked at policy change as historical evidence of a double movement, showing how state intervention acted to correct the perils of child mine labor, cheaply executed gas infrastructure, or poor urban sanitation. In contrast to many readings of the double movement as a revolutionary rejection of liberalism, Polanyi shows that supporters of these laws were most often "convinced supporters of laissez-faire" and even "uncompromising opponents of socialism" (ibid. p. 153). Their desire for a publicly-funded fire brigade was not an ideological denouncement of liberalism; it was simply a practical move to safeguard the public against the insufficiencies of a market-driven approach. The diverse actors and ideological impurity of the double movement tendency toward societal self-protection are clear in Polanyi's writings. While he takes a world-historical macro perspective, a similar multiplicity could be expected at the micro-level within a single matter of concern.

Here I arrive at an opportunity to integrate Polanyi's theory with more contemporary relational theory in a way that decenters the agencies of individual actors. Looping back to Granovetter's revival of Polanyi, Granovetter's fundamental concern was the problem of atomism in economic sociology. Whether utilitarian and "under-socialized" or structuralist and "over-socialized", theories of economic life suffered from the same assumptions of the liberalism it aimed to critique: the unit of analysis as decision making by an individual actor (1985). Polanyi could be accused

of atomism as well, seeing advocates for market controls as primarily self-interested and tightly bound to follow the path imposed by their class position. Yet the collective momentum he describes as the double movement leaves room for a relational approach.

The relational turn in sociology and geography places interactions as the cite of analysis (Prandini 2015). In Donati's theorization, relationships between social actors have emergent properties and powers (2010). Crossley positions relational theory as a middle ground between atomism and holism, showing that networks of relation are both irreducible to their constituent parts and unable to be determined by organicism (2011). Latour in his recipe for "reassembling the social" emphasizes the need to examine relational processes without presupposing who the players are or what qualities they possess (2005). Relational approaches decentering individual agency and acknowledging the crucial role of social processes as more-than-human have taken a particularly prominent place in environmental scholarship (Castree 2003; Whatmore 2002). This chapter develops existing relational theory in the context of Polanyi's double movement.

What might a relational double movement look like? It would not be limited to isolated moments of action, but would be recognized as a set of interdependent, interacting elements with a cumulative effect. Feminist scholars point out that patriarchal culture privileges a masculine form of agency imagined as an independent, decisive actor demonstrating control, freedom, and choice (Isaacs 2002). A relational approach to agency, by contrast, emphasizes context and contingency, showing action

as an interdependent process (Bathelt and Gluckler 2003). I discuss the great almond debate to demonstrate how a double movement can emerge in a more subtle context than a social movement, as an ideologically diverse and relational process. In this case a wide range of journalistic voices feed off of one another, enrolling almond trees and water flows, to produce a lively, albeit fleeting, double movement market critique. A decentered model of agency allows the double movement to embrace a heterogeneous landscape of actors collectively grappling with the limitations of markets. Most of the individual media articles analyzed here would not, taken alone, convey a message of market critique, yet together a distinct pattern emerges. The fact that the almond debate resonated with so many writers speaks to a collective energy around shared concerns, despite a lack of a shared goals, ideology or identity. The movement of the double movement lies in the momentum of the debate itself.

2. HISTORICAL MOMENT:
CALIFORNIA WATER AT THE BOILING POINT

The subtle double movement of the almond debate came at the apex of mounting tensions over water use in California. During its early statehood, the California Gold Rush of 1849 incited a population explosion, and much of the rapidly accumulated wealth was invested in rural land for rainfed wheat and cattle grazing. Contrary to narratives naming major infrastructure as the driver of agricultural expansion (Worster 1985), the area of land in production has changed little since the late 19th century, overproduction of agricultural commodities was already a problem before widespread irrigation, and groundwater pumping intensified production long

before the building of dams (R. Walker 2004). Rather than a necessity, widespread irrigation was a yield boost promising to increase rural wealth and taxable incomes while continuing the settler colonial project of drawing white landowners westward (Stoll 1998; R. Walker 2004; Worster 1985). Because infrastructure costs far outweighed expected profits, the national Bureau of Reclamation took over these projects, using public funds and urban hydropower payments to expand the irrigation supply and substantially subsidize private agribusiness (Pisani 1984). As early critics had feared (Clawson 1944), the Central Valley Project which now irrigates California's almond empire contributed to rural land speculation and exacerbated existing inequalities. By the early 21st century, urban expansion, agricultural intensification, aquifer depletion, riparian species decline, and climate change threatened a water management crisis.

Almond orchards were expanding during a period of extreme drought and changes to water policy on three fronts: water conservation, ground water regulation, and surface water infrastructure. Almond acreage had more than doubled in the period from 1997 to 2014 (National Agricultural Statistics Service 2016). During that period, an average of 38,155 acres (15,441 hectares) of new almond plantings took root each year; equivalent to roughly 60 square miles (154 km^2) of new orchards, or 1.25 times the size of San Francisco, annually. During the same period in which acreage doubled, the value of almond production went from 1.2 Billion to 7.4 Billion, multiplying over six-fold (NASS 2016) and overtaking wine as the state's most valuable export crop. California's almond industry was thriving.

In 2014 when almonds were experiencing their fastest and most lucrative growth, California was grappling with an extreme drought. The period between 2011 and 2014 was the second driest in the state's recorded history (Seager et al. 2014). High temperatures exacerbated water stress as California simultaneously logged its warmest winter yet. Almond growers felt the drought, with little to no surface water supplies from the state's aqueducts and elevated evapotranspiration rates. But almonds were too valuable to lose. A single year of reduced irrigation causes reduced yields for years to come. While some orchards were removed, most almond farmers either pumped more groundwater, reallocated water from less profitable crops, or replaced mature trees with new saplings that temporarily required less irrigation. Thus while California's water supplies dwindled and farmers struggled, almond groves flourished.

Media attention to almond production preceded and then coincided with three contentious moments in California water policy. In September 2014 California passed long-awaited legislation to regulate groundwater through the Sustainable Groundwater Management Act (SIGMA).[3] While heralded as a major step in addressing falling water tables and subsidence, the act was heavily criticized for its timid timeline: full compliance across the state by 2040. On April 1, 2015 California Governor Jerry Brown responded to the drought by announcing the first mandatory water restrictions in the state's history, forcing all municipalities to cut water use by 25%. The restrictions notably exempted the state's largest water user, agriculture. The

[3] CA Senate Bill 1168 and 1319, Assembly Bill 1739.

governor was also accelerating preparations for an ambitious infrastructure plan to tunnel fresh water from the Sacramento River underneath the Sacramento-San Joaquin River Delta to increase flows for farms and cities farther south. During the time when almonds became the valley's poster-crop for water waste, this highly controversial project was moving forward without the necessity of voter approval by seeking financing through bond purchases by its downstream beneficiaries.

Given a multi-year drought, historic high temperatures, and water policy struggles on three fronts, debates over agricultural water use were reaching a boiling point. Were almonds simply the unlucky scapegoat targeted by frustrated urban Californians eager to let off steam? How and why did almonds become a water problem?

3. DATA COLLECTION AND METHODOLOGY

To answer this question, I conducted a media analysis spanning the rise and fall of digital media coverage addressing almond production and water use in California. Journalistic media was the almost exclusive venue for the problematization of almonds. In interviews with civil society organizations, academics, industry groups and farmers, many expressed surprise at the "media blitz" surrounding almonds, a crop which had never been singled out by groups active in water policy reform and whose place in the spotlight faded quickly when the press moved on. While a media analysis does not capture all other relevant forms of expression on the topic, it was the catalyst and central forum for dialogue in this case.

With cookies and caches deleted, I used Google News search engine to conduct a Boolean search for "almond" AND "California" AND "water" published between January 1, 2014 and November 8, 2016.[4] I saved stable images of the top 109 articles. Upon detailed review, 22 articles were eliminated as duplicates or for lacking relevance, leaving 87 articles for analysis.

Using open coding facilitated by qualitative analysis software, I coded the text with emergent themes, progressively grouped themes, and finally theorized a relationship between these themes.[5] Codes were attributed to statements of concern (eg. rapid orchard expansion, drought), explanatory statements (eg. rising demand), descriptive attributes of almond production (eg. profitable, efficient), and supporting evidence used to justify or counter the problematization of almond production (eg. quantitative irrigation metrics, moral value of food production). To understand what kinds of voices were enrolled as expert testimony, all quotations and referenced sources were coded by source type.

Google News search results do not represent the totality of online media coverage of the almond debate, but rather cover a wide spread of perspectives and formats (Google News 2017). According to a concurrent Pew Research Center report, 81% of adult news readers access digital news (2016). Online coverage also overlaps a great deal with print and broadcast media. Of the digital articles analyzed, 50% have

[4] January 1, 2014 is one month prior to the first article on the topic. November 8, 2016 was the date on which the search was executed, several months after the topic had lost its media momentum.
[5] Beyond counts of code frequency, no software-based analytical techniques were used to draw inferences from the data. QDA software served as a database to facilitate organization and retrieval of data, codes and memos.

analogous print formats, 33% are web exclusive and 17% are transcriptions of radio or television. Traditional newspaper formats made up 42% of coverage, followed by 26.1% print or digital magazines, 17% broadcast, and 14.8% others not easily categorized. Although the almond debate centered on California, the vast majority of news sources were national (70.5%), followed by regional (21.6%), and international (8%) sources. This indicates that while the almond drama was framed as a California problem, engagement in the debate was far from limited to the state's boundaries.

4. MEDIA COVERAGE

To characterize media coverage of the almonds debate I briefly describe the story arc and sourcing practices before diving into a theoretical discussion of the content.

4.1 Story Arc

In early 2014 almonds were yet to be framed as the poster crop for water waste. "How the drought is devastating California's #1 food export: almonds," (Zhang 2014) and "California almond farmers face tough choices in face of drought" (Associated Press 2014) ran the headlines by Gizmodo and the Los Angeles Daily News in February of that year. Then on February 24th environmental magazine Mother Jones planted a seed of concern with a short article and infographic about the water footprint of various foods titled "It takes how much water to grow an almond?!" (Park and Lurie 2014). Despite the headline, almonds were not the focus of the article in which a head of broccoli topped the list of "thirsty" foods and the almond came in fifth. The earliest pointed articles critiquing the almond boom came

from regional newspapers; the San Jose Mercury News reporting on sinking groundwater levels (L. Krieger 2014), then the Sacramento Bee, writing "California almond farmers, lured by high profits to expand orchards, face a drought struggle" (Kasler 2014). Journalists then turned up the flame as Slate Magazine ran a piece titled "10% of California's water goes to almond farming", NBC News wrote "That's nuts: almond boom strains California water supply" and Mother Jones returned with a stinging accusation: "Your almond habit is sucking California dry" (Philpott 2014). Mother Jones would later be described as the source of the 'almond-shaming,' perhaps for its memorably inflammatory headlines or because it is easily dismissed as a radical environmentalist publication, but concern had been brewing among a wide range of sources.

Over the next two years, almond orchards would become an icon of California's water conflicts. The chronology of publications importantly reveals that concerns about almond production had already reached a fever pitch by July 2014, *predating* all of the policy changes described in Section 2. While policy struggles undoubtedly buoyed interest in almond production as tensions rose over agricultural water use state-wide, they were not the initial or exclusive source of concern. As this chapter will develop further, the phenomenal profitability of almonds was central to critiques. It is telling that coverage of almonds as a water problem drops off abruptly as the price of almonds fell in late 2016. Almond acreage and water use would continue to grow steadily but fail to garner continued attention without the boom-time rapid accumulation of riches.

4.2 Sourcing

A close look at sourcing, who is cited or referenced in an article, reflects which forms of knowledge are privileged by news media. Existing scholarship shows a strong tendency for news media to conform to hierarchies of authority which privilege government over civilian sources (Brown et al. 1987; Sigal 1974; Walejko and Ksiazek 2008), even among environmental reporters (Lacy and Coulson 2000). Thus one might expect that critiques of almond production would favor the perspectives of titled outsiders. To the contrary, the single most cited group was almond growers (23.4%). Slightly less prevalent than almond growers were academic sources (18.3%), almond industry (9.5%) and government agencies (9.5%), environmental non-profits (7.9%), agricultural services firms (7.1%), policy think tanks (5.5%) and politicians (4.7%). Two source types were notably rare; only one article cited Native American groups' water concerns and another included the story of a family who had lost access to drinking water due to sinking water tables. The prevalence of academic sources and limited coverage of marginalized groups conforms to patterns of hierarchical knowledge claims. However, coverage of the almond debate put growers' voices front and center and placed data from the almond industry at the same level as that of government agencies, showing an atypical deference to the authority of farmers and their advocates.

5. MARKET ANXIETIES

Almonds attracted ire because they embodied the irreverence of the market toward California's water struggles. Growers earned record profits while reservoirs

dried and water tables sank. Yet while a few conspicuously wealthy farming corporations were painted as villains, journalists rarely accused farmers of greed. Farmers were simply acting in their best economic interest. As one grower put it bluntly, “farmers are not foolish… you go where the money is” (Monahan et al. 2015). The blame was not directed at farmers but at the absurdity of market logics resulting in "a situation that in many ways defies the laws of nature" (Gumbel 2015). Of course California’s “defiance of nature” is indisputably tied up with longstanding public subsidies for water infrastructure and the legacies of inequality built into settler-colonial property rights (Hundley 2001; R. Walker 2004; Worster 1985). The market economy is only ever imagined to be a discrete entity divorced from historic power relations and its own discursive origins (Mitchell 1998; 2008). Reporters were keen to mention California’s eccentric water history, but this was nothing new. Almonds took the limelight for their role as a boom crop against a familiar backdrop.

Almond anxieties centered on four disquieting market dynamics: the speed and scale of landscape transformation wrought by a new food fashion, the indifference of global trade to local troubles, the concentration of power in the food system, and a trend towards high-value permanent crops.

5.1 Insatiable Demand

Journalists described the mercurial rise in almond plantations with a flurry of astonishing statistics about the rising popularity of this once unassuming nut. “America’s consumption has more than tripled over the past decade” (T. Walker 2015) and “Americans now consume more than 10 times as many almonds as [they]

did in 1965" (Hamblin 2014). Some attributed the boom to food fashions such as "vogue aversions to meat protein," (ibid.) or a fad fascination with almond milk by "ignorant hipsters" (Philpott 2016). Behind this trend, writers noted the spectacular ascent of almonds had been bolstered by innumerable health claims. "They've been touted as a remedy for cancer, arthritis, heart disease and even Alzheimer's. Not surprisingly, perhaps, given their growing fan base, the farmers of California's Central Valley have been planting them like there's no tomorrow" (Willis 2014a). Unlike other foods commonly critiqued for being water-intensive, notably beef, [6] almond consumption was both skyrocketing and considered potentially dispensable. "That's half a Los Angeles worth of the state's precious water going to a single small region for a crop that is not exactly a dietary staple" (Madrigal 2014). Almonds were a "luxury food" whose absence, one author posited, would not profoundly affect the daily life of Californians (Ferro 2015). The almond boom revealed how dwindling water supplies could be swept up in the vagaries of the latest market trend.

Demand for almonds was seemingly insatiable and reporters depicted farmers following a simple economic logic of maximizing returns. "The value of each kernel has gone up dramatically, and growers are looking for the best return on their investment, so they're still planting almond trees at an alarming rate," one farmer told BBC's Peter Bowes (cited in Hamblin, 2014). Thanks to the spectacular demand, almonds were spectacularly profitable. "For farmers those margins are too big to

[6] While overall meat consumption is gradually increasing in the United States, beef consumption has held relatively stable (USDA 2017).

resist, even during a drought" (T. Walker 2015). "It's a high-value crop and the money's been good the past five years," another grower explained. "It always feels good to point the finger at people making money" (Westervelt 2015). Yet in a culture that often positions wealth accumulation as an admirable human achievement, something was different about almonds. Private almond wealth relied on public water resources and was advancing blind to shortages or environmental conditions. Even without a drought, the almond boom exacerbated the disconnect between economy and ecology. "The almond trade has become so lucrative that we're growing them in the desert" (Zhang 2014). Farmers too critiqued the expansion. "They shouldn't be growing almonds or walnuts in those areas, including parts of the state that are naturally too dry and too cold for almond trees" one almond grower reported (Knickmeyer 2015). Agricultural booms had happened before, but the almond boom revealed just how blind the forces of supply and demand could be to the forces of nature.

5.2 Global Markets Overpowering Local Governance

Something about rising demand for almonds further unsettled onlookers; it came from abroad and had accelerated most dramatically in China. While almond exports to the European Union were higher than to the entire Asia Pacific Region (Almond Board of California 2016), China's rapid growth received the bulk of the export anxiety. "Nearly 70% of the almonds produced in California are for export. And where do most of them end up? China. This does little to quell criticism that the Chinese - with their booming economy - may soon, quite literally, be sucking this

place dry" reported the BBC (Willis 2014b). "Two-thirds of California's almonds go overseas, fueled by the tastes of China's growing middle class" (L. Krieger 2015). Or as one television transcript began, "Asia's love of nuts is draining California dry" (NBC 2014). For many, sending these well-watered almonds overseas exacerbated the almond boom's absurdity. In part, this might be explained by the fact that Americans not engaged directly in agricultural industries are largely unaware of the profound dependence of American agriculture on exports to absorb surpluses (Winders 2009).[7] The Almond Board of California has worked persistently to introduce and expand Chinese consumption of almonds through advertising and trade negotiations, even working with the Chinese government to establish a standard word for almonds which was not previously in common use given their historic rarity in the region. In part, it reveals the naturalization of Western wealth built on unequal trade and disproportionate critique of rising wealth elsewhere that has made "China fear" a contemporary American phenomenon (He and Lyles 2008; Navarro and Autry 2015; Zhao and Tan 2007). In part, it reveals a NIMBY (Not In My Backyard) attitude, that ignores the ecosocial impacts of intensified agriculture abroad for the benefit of American appetites (Benson and Fischer 2007; Galt 2017; Soluri 2005). In part, it speaks to a common misperception that California exports more 'virtual' water than it imports (Fulton, Cooley, and Gleick 2012). I would remiss not to acknowledge the naiveté and sinophobia of unduly emphasizing Chinese almond consumption, but for

[7] This includes political efforts to reduce trade barriers, public funding for advertising campaigns through the USDA's Market Access Program, and funding by government-enforced marketing orders to drive up consumption of American agricultural products abroad.

the purposes of this analysis I wish to focus on what export anxieties reveal about concerns over the relationship between global markets and California's water stresses.

For reporters engaged in the almond debate, exported almonds represented a loss of control over regional resources increasingly at the whim of global market fluxes. Water supplies were bounded by precipitation and the volume of underground aquifers, but demand for almonds was not. State water policy reform inched along, meanwhile a spike in demand abroad had instant effects. Rising wealth in China, and with it the willingness-to-pay for exotic foods, meant that global markets might have more power over California's water use than most Californians, particularly those historically disempowered. In response to prioritizing irrigation supplies over river flows for salmon, a member of the Klammath River Yoruk tribe lamented, "Not only are they asking the Native Americans to sacrifice their culture, but we're doing it so we can sell almonds to the Chinese," (Bland 2014). Despite the seeming placelessness of the almond as commodity, water could not be so easily detached from histories, land and livelihoods. Export anxieties reveal a friction between the abstraction of commodification and the place-bound quality of water's flows. They also reveal an underlying tension between the scale of market power and governance, suggesting that global market forces played an outsized role in affecting the state's water.

5.3 Concentration of Power

It was not only the trendiness of almonds or their foreign destinations that provoked controversy. The almond boom epitomized the ascendency of agricultural

tycoons and investment firms. “A relatively large amount of California’s dwindling water supply goes to large corporate farms growing, and expanding by tens-of-thousands of acres, water intensive nut trees; primarily profitable almond trees” wrote Politicus (Rmuse 2015). Wonderful Orchards, the largest almond-growing corporation in California owned by Stuart and Lynda Resnick, epitomized the extravagant wealth and political power reporters found most disturbing. These “Beverly-Hills billionaires…raking in profits” (Scow and Hauter 2015) are known for their “sprawling agricultural holdings, controversial water dealings, and millions of dollars in campaign contributions to high-powered California politicians” (Hertsgaard 2015). Many writers highlighted the Monterey Plus Amendment which effectively put the publicly subsidized Kern County Water Bank under the Resnicks’ private control (Felde and Novak 2014; Gumbel 2015; C. Krieger 2014). The Resnicks touted their profits (Hertsgaard 2015) and were even met with protests at their Los Angeles office where demonstrators held signs reading “More Resnick Almonds = Less H_20 for CA” (Gumbel 2015). Reporters were largely sympathetic to farmers struggling with drought restrictions but the Resnicks were far from struggling. “The large growers do get water during this drought, but it’s the small farmers that get hurt” (Carson 2014). Almonds more than any other crop at the time embodied the unchecked power of agribusiness giants to tilt water distribution in their favor.

In addition to established agribusiness moguls, almonds were the jewel crop of a new suite of agricultural investors. “California almonds are becoming one of the world's favorite snacks and creating a multibillion-dollar bonanza for agricultural

investors" (Knickmeyer 2015) with heavy demand drawing "hedge funds and big corporations into the business" (CBS/AP 2016). The Economist reported that a private equity firm, Terrapin Fabbri Management, had "bought a dairy company and some vineyards and tomato fields in California, and converted all to grow almonds, whose price has soared as the Chinese have gone nuts for them" (Philpott and Lurie 2015). "John Hancock Agricultural Investment Group in 2010 bought the 12,000-acre [4,856 hectare] Triangle T Ranch of Los Banos… and converted it to almonds…Trinitas Partners, a Silicon Valley-based private equity firm, is turning 6,500 acres [2,630 hectares] of rugged eastern Stanislaus County land from grazing to almonds" (L. Krieger 2014). "The TIAA-CREF retirement fund also boasts of its California almond operation as one of the world's biggest" (Knickmeyer 2015). While individual almond farmers were often described as motivated to maintain a rural livelihood, investors distilled farming to pure profits. Investors had the capital to drill deep wells, rapidly transition large swaths of land to nut crops, and sustain periods of low returns. Many were troubled by the notion that a few private firms with no long-term commitment to the land could be earning profits from something as scarce, essential, and inherently public as water. As a favored crop of agricultural magnates and farmland investors, almonds spurred concern over the potential for a boom crop to concentrate power into fewer and fewer hands.

5.4 The Specter of Permanent Crops

The almond boom not only showed the capacity for markets to place California's water at the whims of food fashions, to give global markets more power

than California residents, and to place more land under the control of agribusiness giants and investors, the long-lived nature of tree crops risked an increasingly inflexible future. “Almond trees, which must be watered even when they’re not producing, have been gradually displacing fields of row crops that can be fallowed when the weather turns dry. That means by planting almonds, farmers are locking in future water use for decades to come—a troubling trend” (Holthaus 2015). As commodity prices fluctuate, and land and input costs rise, cropping patterns in California have economically intensified, gradually shifting from annual row crops to higher-value orchard and vineyard crops (Soulard and Wilson 2015). These permanent crops take years to reach maturity and reduced irrigation one year affects production in subsequent years. With a dramatically higher upfront investment than annual crops, farmers are reluctant to impair their growth in any way. “The problem is that not only do almonds…need more water, but the farmers choosing permanent crops cannot fallow them in a dry year without losing years of investment” (Barringer 2014). Agricultural economists call this lack of flexibility ‘demand hardening’ and reporters feared that with it, dependence on groundwater pumping would become firmly entrenched (Philpott 2014). The fact that almonds take years to produce a viable crop raised the stakes for farmers. “Letting the trees die would be a catastrophe, so they sometimes pay exorbitant prices or dig ever-deeper wells” (Charles 2015). Almonds were a case study in how high prices for tree crops could tighten the grip of the market on California’s water not only during a drought but for the foreseeable future.

Almonds raised alarms because they showed how the forces of supply and demand had led agriculture down a problematic path towards rapid change, limited local resource control, concentration of power, and entrenched dependence. Furthermore, many worried that the drought itself was driving prices higher and exacerbating market frictions with local ecologies.

6. MARKET SOLUTIONS?

Unease with the market's sway over water was at the heart of the great almond debate. This does not mean critics viewed market dynamics as having sole influence over water use, nor that markets were detached from historic power relations. Amidst a legacy of problematic water politics, almonds were a case study in how powerful market dynamics seemed to make a bad situation even worse. Yet despite concern with markets, reporters frequently proposed neoliberal solutions privileging the market logics of pricing, efficiency and individual choice. Is it a fair assessment to describe the almond debate as a double movement even if it included many neoliberal propositions? Given the hegemony of neoliberal ideology (Barnett 2005; Cerny 2008; Harvey 2007), even among the alternative food movement (Guthman 2008), it would be surprising to find a food-related debate that was not peppered with market-based solutions. Futhermore, Polanyi's original formulation of the double movement explicitly acknowledged that supporters of markets controls were also avid economic liberals. I propose that one reason the almond debate persisted for nearly two years was that these market-oriented framings were ultimately inadequate at addressing the root concerns.

6.1 Improved Marketization of Water

"If the price of water moved according to the laws of supply and demand, ecological limits would provoke change. When there was a drought, the price of water would go up and farmers would install efficient irrigation, rather than flooding their furrows. Or, when water grew scarce and costly, thirstier crops would become less profitable, and farmers would turn to more efficient foods" (N. Johnson 2015). California's seniority-based water rights system provides very low-cost water to senior rights holders through publicly funded infrastructure. "Last year farmers in the Central California Irrigation District … paid $17 per acre-foot (13.79 USD/km^3) of water used, a price that is a fraction of the cost of storing water and pumping it across the state" wrote a San Francisco Chronicle columnist, "Supplying agriculture with market-priced water, rather than cheap, highly subsidized water, may provide a means to make better decisions" (Baldocchi 2015).

California's antiquated and hierarchical water policy unquestionably reinforces inequalities in water access and props up the production of low-value water-intensive crops like rice. However, the almond boom was most alarming because it showed that if expected profits were high enough, farmers would continue to pay for expensive water. "Some almond farmers are paying up to $2,000 per acre-foot (1622 USD/km^3) to keep their trees alive" (Walters 2015). Coverage of the almond boom explained that during the drought, prices on the state's water trading market shot up. One grower recounted how water typically selling for $55 an acre-foot (44 USD/km3) was bid-on up to $2200 per acre-foot (1784 USD/km3) (Ibarra

2014). When water became more expensive, growers chose to irrigate their most valuable crop: almonds. When surface water deliveries were reduced to zero, many paid the price of extracting their own water by investing in digging or deepening wells. Even when priced on a competitive market, record water bids did not seem to be slowing down almond expansion. At some point water might be prohibitively expensive for orchards, but the almond boom shocked people because despite unprecedented prices and million-dollar drilling projects that limit had not yet been reached.

6.2 Efficiency

Many almond debate contributors explained appropriate water use as a question of efficiency optimization, whether economic, technological, or caloric. Defenders of the almond industry pointed to the highly profitable crop's ability to maximize dollars per drop. Reporting on an Almond Board funded study, The Independent wrote, "figures from UC Davis suggest that almonds generate more jobs for the state economy per unit of water consumed than alfalfa, rice, beans or corn" (T. Walker 2015). Yet it was just such economic efficiency that journalists showed was complicit in allowing global markets to hold increasing sway over California water. The sensational profitability of almonds, which made them the economically efficient choice during a drought, simultaneously contributed to the rising influence of agribusiness tycoons and investors, as well as deepened dependence on groundwater.

Even farmers argued against economic efficiency as the sole arbiter of water use. After all, many critics pointed out that agriculture is "little more than a blip in the state's economy" (Knickmeyer 2015), contributing only 2% of the state's GDP despite using 80% of its developed water. One frustrated grower penned in an op-ed to the Sacramento Bee,

> What is a more important use of water than growing food? Not 'more valuable,' in terms of dollars and cents; by that measure, every major league professional athlete is more valuable to society than every kindergarten teacher. No, what's more important? There are few industries that are truly essential to maintain life. Agriculture is one of them (Wenger 2015).

Urban uses such as lawns or swimming pools, even if their celebrity owners were willing to pay millions, were trivial, growers argued, compared to the ethical value of food production. Beyond a few hard-lined economists, very few were content with ceding the responsibility of water allocation entirely to profit maximization.

Technological efficiency claims aimed to show how improvements in water use per volume of production made almonds a superior crop. "Almost three quarters of almond farms in California are fed with micro-drip sprinklers that irrigate at the roots of each tree to avoid waste, according to the trade association. Almond growers contend they have reduced consumption per pound by a third in the last 20 years" (Marois 2015). Yet in an effect known as the Jevon's Paradox (Sears et al. 2018), it is likely that efficient irrigation enabled the territorial expansion of almonds into increasingly arid lands (Taylor and Zilberman 2017).

Perhaps optimizing caloric intake for minimal water use would be the ideal, as in the water-footprint logic. "Almonds are much more efficient water-users, per

calorie, than dairy or beef, for example" (Holthaus 2015). Such calculus, in addition to neglecting food's deeply symbolic place in human life, assumes the substitution of animal products for plant-based foods by conscientious consumers (see section 6.3). With meat production in the US at an all-time high (USDA 2015), this argument served as little more than shifting the blame.

6.3 Consumer Choice

Perhaps the most memorable consequence of the almond debate (and most feared by industry) was an implication of consumer responsibility in California's parched landscapes. Almonds were featured in The New York Times' elaborate infographic titled "Your contribution to the California Drought" (Buchanan, Keller, and Park 2015) or Mother Jones' "How Thirsty is Your Food?" comparative chart (Park and Lurie 2014). The water footprint logic implores buyers to take responsibility for the water used to produce the foods they consume. "They're only growing almonds because consumers, American and Chinese alike, asked them to. And until that changes, they're going to keep growing them" (Blackmore 2015). Yet as the Food and Water Watch Director proposed in the Huffington Post, "While some have suggested that people boycott almonds or make other changes in their diet, the realities of the global food system are such that corporate agribusiness will continue to abuse our water and simply export the crops we wouldn't be buying. In other words, we can't shop our way out of the crisis" (Scow and Hauter 2015). Writers feared the power of individual consumers to change their purchasing paled in

comparison to the almond industry's marketing efforts to ramp up consumption around the world.

No level of marketization, efficiency, or enlightened consumption could fully tackle the disconnect of ecology and economy brought on by a food fad, expansion of export markets, consolidation of power in agriculture or the political economic pressures driving California towards the inflexible water demand of high-value permanent crops. Neoliberal logics could not fully respond to anxieties over the precariousness of water flows guided by private profit. Furthermore, the presence of neoliberal logics coexisting with market critiques seen in the almond debate substantiates the theoretical argument of this paper, that double movements can appear as subtle, ideologically impure, undercurrents emerging through dynamic dialogue.

7. WATER AS A PUBLIC GOOD

The almond debate repeatedly replayed dueling quantifications of California's agricultural water use. Either agriculture used 80% of the state's developed surface water or roughly 40% of all water including 50% for environmental purposes. What better evidence for a fictitious commodity than contestation of how much of this irreproducible resource should even count? The almond boom showed how the fate of California's water was tied to market fluxes. While the hierarchical water rights system prioritizes historic users over others, since 1914 California water law has recognized the public character of water. "California's waters cannot be owned by individuals, groups, businesses, or governmental agencies. But permits, licenses, and

registrations give individuals and others the right to beneficially use reasonable amounts of water" (California Water Boards 2018). Should a public good be able to produce a sudden burst of private profits during a time of scarcity?

The almond boom revealed a striking moment when dollars trumped drought. Without sufficient controls, an agricultural gold rush could produce rapid conversions to more water-intensive crops, give significant influence to export markets, concentrate agribusiness power and deepen future water dependencies. The visibility of landscape transformation, the expected lifespan of orchards, the specific evapotranspiration rates that allow almonds to consume high quantities of water, all contributed to the implicit assertion that markets are inadequate arbiters of water.

Theoretically, the almond debate helps bring attention to Polanyi's double movement theorization as a crisis of liberalism's legitimacy with the possibility for diverse and uncoordinated resistances. Agri-food scholars have used Polanyi's ideas to further understandings of food activism and to cohesively frame the proliferation of food movements as a response to neoliberal globalization (Holt Giménez and Shattuck 2011). This paper experiments with using a Polanyian frame to examine the micro-level politics of agri-food problematization. In doing so I make the case that the *movement* of the double movement may appear at times more subtly than a social movement. It can emerge as a tendency to publicly question the market's sway over fictitious commodities that arises through discordant dialogue among participants without a shared identity or defined goal.

Scholars inspired by Polanyi have been critiqued for unsubstantiated optimism, interpreting small perturbations as revolutionary rather than as mere adjustments to capitalism (Burawoy 2010). This paper does not mean to make mountains of molehills but rather to repurpose the double movement analytical tool towards more modest ends. The almond debate is far from an organized movement to overthrow hegemonic neoliberalism, and the analysis presented here is limited to its journalistic dimensions which could be enhanced by additional sources. It deserves a Polanyian analysis, however, because the double movement concept can shape more productive conversations about resource politics and imbue a fleeting media controversy with lasting significance. Journalism and online media play a crucial role in the articulation of social problems, and yet are too easily delegitimized. A Polanyian analysis helps to synthesize a cacophony of voices and explain the persistence of a seemingly minor matter. It validates concern while avoiding a reductive and defensive volleying about whether or not almonds are especially deserving of blame. It inserts a critical ingredient into conversations about water politics: an acknowledgment of the limitations of markets to achieve socially acceptable outcomes. It creates links to other calls for an improved agri-food system rooted in values that run deeper than momentary profits.

Almonds became a California water problem because they demonstrated the market's sway over water use and tested many people's comfort threshold for allowing a public resource to serve private profit. Individually, a report on almonds during the drought may have appeared as mere cocktail-party fodder, the latest in a

line of demonized foods serving as ethical indicators among urban elites. Taken as a whole, however, the great almond debate shows that much more was at stake.

CHAPTER 2:

Superfood As Spatial Fix: the ascent of the almond

ABSTRACT

In the twenty-first century, a widening array of unassuming fruits, vegetables, seeds and grains have been crowned "superfoods." While many are exotic imports marketed to Western consumers through neocolonial narratives, others are familiar domestically-grown supermarket staples spectacularly rebranded. Why has "superfood" status become so central to the American produce industry? What sort of subjectivities does a superfood cultivate among consumers? This chapter charts the ascent of the almond to superfood status as the latest in a series of spatial fixes alleviating the pains of chronic overproduction. The spatial-fix is a material-semiotic process with important psychosocial dimensions often downplayed in the historical materialist tradition. Drawing on historical archives, advertising materials, interviews with current and recently retired almond industry marketing professionals, and observation at the annual industry conference from 2015-2018, I show that as almond production surges the industry must constantly work to change the way consumers see almonds (from seasonal specialty to superfood) and the way they see themselves (from sophisticated to superhuman). While consumers resist and reinterpret the shifts in food meanings fashioned to compensate for overproduction, a century of effective material-semiotic fixes attests to the industry's influence on foodways. The case of almonds is used here to theorize the broader superfood trend and its imagined "super" subjects as produced through the political economy of industrial agriculture.

Understanding the political economic underpinnings of superfoods reveals not only the historical foundation of this contested contemporary food phenomenon, but also sheds light on the metamorphoses of food meanings fundamental to agrarian capitalism.

INTRODUCTION

In the twenty-first century, a widening array of fruits, vegetables, seeds and grains have been crowned "superfoods." Products with superfood status are on the rise, as the market is expected to grow by more than 17% annually by 2023 (Technavio 2019). Many so-called superfoods carry exotic appeal. Sourced from distant lands and associated with traditional foodways of indigenous peoples, they have been "discovered" through neocolonial encounters (Sikka 2016). The sudden popularity of these products has dramatically reshaped the socioecological dynamics surrounding quinoa in South America (Jacobsen 2011; Kerssen 2015), acai berry in the Amazon (Weinstein and Moegenburg 2004), argan oil in Morocco (Lybbert, Magnan, and Aboudrare 2010; Turner 2014), and baobab fruit in Southern Africa (Wynberg et al. 2015), with many more cases yet to be explored. Other purported superfoods, however, are neither new nor exotic for American audiences. They are familiar, domestically grown (when in season), fruits and vegetables gaining unprecedented acclaim: almonds, blueberries, broccoli, cranberries, Brussel sprouts, spinach, carrots, avocado, apple, beet root, the list goes on. Why have such unassuming features of the produce aisle suddenly become heralded as superfoods? What kind of subjectivity does this new superfood framing cultivate among eaters?

This paper examines the case of almonds as a first crack at linking the political economic foundations of a domestic superfood phenomenon with the qualitative distinctions of superfood subjectivity.

As I will show, almonds have risen to superfood status through consistent efforts by almond producer groups to alleviate the pains of chronic overproduction. Rising production from increased acreage and agricultural intensification prompted the Almond Board of California in the 1990s to begin funding nutrition science, influencing health-claim labeling, and advertising almonds as a healthy food. The spectacular success of these efforts, as well as concurrent trends toward high protein diets and increased snacking, sent American almond consumption soaring. Such popularity, combined with high-yielding orchard management, super-charged growers' profits and attracted new kinds of investment capital. A resulting planting frenzy promises to boost production by 30% in just 4 years (Fleischmann and Muir 2018), threatening a price crash. While almond marketers expand geographically to increase sales around the world, the American market requires a shift in strategy to boost buying. As the health message no longer suffices to grow sales, advertisers have shifted registers from wholesome sustenance to superfood spectacle.

The centrality of advertising to the California almond industry's success presents an illustrative opportunity to link bodily spatial fixes with the meaning-making practices embedded in efforts to actively shift foodways. To analyze how and why almonds have become a superfood, I draw on historical archives, advertising materials, interviews with current or recently retired almond industry marketing

professionals, and observation at the annual industry conference taking place in 2015, 2016 and 2018.[8] This study does not attempt to characterize almond consumers and their direct experiences but rather showcases how the industry progressively reimagines the meanings ascribed to almonds in hopes of increasing sales.

Why has "superfood" status become so central to the almond industry at this specific historical moment and what kinds of consumer subjectivities does it cultivate? Superfood claims have risen astronomically since 2011 and are expected to proliferate (Mintel Group 2016; TechNavio 2019). Understanding their political economic context reveals not only the historical foundation of this contested contemporary food phenomenon, but perhaps more significantly, sheds light on the metamorphoses of food meanings fundamental to agrarian capitalism. First, I root my analysis by arguing the importance of semiotics to the spatial fix, contextualizing the superfood phenomenon, and grounding my analysis in critical nutrition scholarship. Then I delve into the almond case study, charting the ascent of the almond in American culinary culture as a series of material-semiotic fixes to familiar crises of agrarian capitalism. Finally, I use the case of almonds to consider the broader superfood trend and its imagined "super" subjects as produced through the political economy of American agriculture.

[8] The interviews with seven almond industry professionals at Blue Diamond and the Almond Board of California described here formed part of a larger study involving 70 interviews with growers, researchers, farm service providers and industry representatives. All interviews took place in California between June 2018 and March 2019. Conferences presented an especially instructive opportunity to witness how worrisome overproduction is for the industry and the specific strategies almond marketers deploy to foment almond consumption.

1.1 Engaging the Semiotics of the Spatial Fix

The perpetual expansion of the almond industry both domestically and abroad exemplifies the familiar pattern of a spatial fix to capitalism's internal crises. David Harvey's theorization of the spatial fix makes two significant claims: (1) that the instability of overproduction provokes geographic restructuring and (2) that this restructuring is always in tension with the place-bound quality of infrastructures necessary for the production and circulation of capital (1981).

Capitalist economies suffer from cyclical episodes of surplus accumulation which then pose a risk of rapid devaluation. To avoid a painful devaluation period, the ever unstable accumulation of surplus capital buys itself time through market expansion (Harvey 2006). The drive to expand markets as a spatial fix to overproduction is characteristic of imperialism and the uneven development of globalization (Jessop 2006; Smith 2008). Importantly, the spatial fix is imagined as a solution but functions more like the fleeting "fix" of an addiction, as the problem soon returns (Harvey 2001). The spatial fix provides short term relief but the underlying predicament is ultimately magnified (Schoenberger 2004).

As elaborated by Harvey, fixity is a central problem within capitalism because there is always tension between capital's mobility and its fixedness in a particular place (2001). While capital accumulation requires new frontiers for expansion, it also requires territorial configurations such as factories, roads, water conveyance or other

infrastructures that fix capital to specific spaces. These infrastructures create a degree of path dependency and rigidity despite pressures toward flexibility and expansion. States are thus implicated both in territorializing capital as well as facilitating its global circulation (Brenner 1998).

It is well documented that American agriculture suffers from chronic overproduction (Cochrane 1993; Winders 2009). Where supply management has failed, farm economic viability has depended upon the expansion of foreign markets for American agricultural products (Graddy-Lovelace and Diamond 2017). Expansionism is limited, however, by the purchasing power of those new customers and/or the willingness of the state to subsidize foreign market development. Reallocation of agricultural products to non-food uses, such as biofuels, serves as another strategy, albeit with risks for exacerbating food insecurity (Gillon 2016). While non-food uses might be viable for grains sold for pennies per pound, almonds selling on the commodity market for over 30 times that price can only profitably be sold for human consumption.[9]

Human digestive systems can only physically process so much, making demand for food highly inelastic. In addition, the famed economic principle Engel's Law states that as wealth increases the portion of income spent on food falls (Zimmerman 1932). For these reasons, the food business is supremely competitive. Thus in addition to off-loading American products abroad and shifting agricultural

[9] Fruits and vegetables with relatively lower prices per weight than nuts also contain a high level of water weight, making them heavy to transport and generally inefficient for non-food uses.

products toward non-food uses, the body of American consumers itself is increasingly a site of an eternally inadequate spatial fix (Guthman 2015). This is evident in the fact that food marketing over the past few decades has progressively enticed consumers to eat more (Nestle 2013), a pattern of "accumulation by engorgement" (Guthman and DuPuis 2006, 442) with significant public health implications. This spatial fix at the site of the body demonstrates the mutual constitution of production and consumption (Coles 2016), as capitalist processes reshape not only agricultural production but also eating practices and bodily processes. The meaning-making processes accompanying such material reorderings merit closer attention.

The spatial-fix is a material-semiotic process, with important psychosocial dimensions often downplayed in the historical materialist tradition. As an ontological claim, material-semiotics asserts that matter and meaning are fundamentally inseparable (Barad 2007). As an analytical approach, material-semiotics looks for the active, ongoing ways in which matter and meaning are relationally enacted (Law 2019; Mol 1999). In a seminal text insisting on the unity of matter and meaning, Donna Haraway describes bodies as "material-semiotic nodes" that cannot be understood physiologically without their array of accompanying conceptual apparatuses (Haraway 1991, 208). Political economic analyses of capital accumulation often trace commodity flows without attending to the on-going meaning-making practices required for them to function. On the other hand, studies of discourse in the Foucauldian tradition, often fail to address the materiality inherent to discursive practice. Following Haraway's merging of Marxian attention to the

material with post-modern attention to the semiotic (Eglash 2013), I seek to draw political economic and cultural studies of food closer together through a material-semiotic analysis of the relationship between overproduction of a food and its shifting culinary culture. Superfoods, as a distinctly discursive and profoundly political economic phenomenon, provide an illustrative case.

Through the almond case, I find that the semiotics of a spatial fix parallel Harvey's two postulates concerning the material ordering of capitalist economies. (1) The instability of overproduction provokes *semiotic* restructuring; the meanings of almonds must shift to expand their profitable consumption. This fix is the addictive sort which delays, rather than solves, the crisis as meanings (tightly linked with their target markets) become saturated. (2) Meaning-making practices are, like material infrastructure, significant investments which fix the industry to a semiotic configuration from which it is unlikely to deviate without significant cost. Rather than deem this process a distinct "semiotic fix", I wish to highlight the simultaneity of material and semiotic reordering as an inherent, underappreciated, quality of the spatial fix.

1.2 Contextualizing Superfoods

Before diving into the details of superfoods as the latest iteration of a material-semiotic spatial fix, it is important to contextualize the superfood phenomenon. There is no agreed upon definition of a superfood beyond a recognition that such a broad claim likely does more to drive sales than to inform eaters

("Superfoods or Superhype?" 2018). The term superfood, however, has become so widely used that it entered the Oxford English Dictionary in 2007 as "a nutrient-rich food considered to be especially beneficial for health and well-being." As the qualifiers "considered" and "especially" suggest, the superfood concept reflects belief that a single food can possess an exceptional level of quality. In practice, superfood is a discourse more than a designation of material substance (Loyer 2016).

The term superfood fits within the functional foods category, but with important distinctions. According to nutrition scientists, functional foods are those which "provide health benefits beyond the provision of essential nutrients (e.g. vitamins and minerals) when they are consumed at efficacious levels as part of a varied diet on a regular basis" (Hasler 2002). The framing of functional foods relies on a mechanistic model of the body in which a targeted input can produce a desired result. For example, Omega-3 fatty acids are claimed to reduce levels of LDL cholesterol which in turn reduces risk of heart disease. By contrast, the superfood designation, while rooted in many of the same reductionist claims of nutritionism (Scrinis 2013) and a factory-like conception of metabolism (Landecker 2013), embraces the indeterminate outcomes of a given food. The superfood narrative supplements functionality with an element of enchantment, often suggesting that the benefits of a given food are intangible felt experiences of vitality, high spirits and the glow of overall wellness (Wolfe 2009). Superfoods claim to stack functions, providing a high density of beneficial dimensions within a single item. They also convey a sense of limitless benefits to consumers, shifting away from the

recommended dosage medically-styled discourse of functional foods and towards a designation of inherent incalculable goodness. Functional foods call awareness to specific phytochemicals and their benefits, whereas the superfood message is simplicity. Above all, the word superfood rolls off the tongue more readily and has gained powerful momentum as a culinary meme. Product introductions including the word "superfood" more than tripled between 2011-2015 (Mintel Group 2016), and food industry analysts predict an astounding 17% compounded annual growth rate in the superfoods market by 2023 (TechNavio 2019).

The superfood phenomenon is part of a broader counter-culture critique of industrial food systems emphasizing whole foods and, to a lesser extent, intergenerational culinary wisdom. Yet it is also a powerful advertising tool eagerly adopted my food marketers. This dualism is less a contradiction than the norm (Belasco 2007). Even more importantly, the superfood concept would not be possible without extensive single-food scientific research overwhelmingly, if not exclusively, funded by industry groups (Nestle 2018). Nutrition scientists are typically much more interested in understanding the impact of diet or specific nutrients on the body than assessing the merits of a single food. Yet for academics relying on external funding for professional advancement, food industry grants are an appealing opportunity to pursue rigorous research that centers on the "compatible interests" of academics and industry (Dixon and Banwell 2004). For nutrition scientists at private consulting firms or working within the food industry the need for contributions to broader nutritional knowledge diminishes. The relationship between research and industry is a central

tension within the field, as evidenced by controversies resulting in a 2009 code of ethics (American Dietetic Association and Commission on Dietetic Registration 2009) and ongoing debates about the influence of global food corporations on scientific associations (Simon 2015). A similar concern has surfaced in pharmaceutical trials, where industry funding is consistently associated with more favorable results (Sismondo 2008). Unpacking potential bias towards industry in nutrition research would require a systematic review, one which would be severely complicated by the scarcity of non-industry funded studies about single foods such as almonds.

While nutrition science cumulatively contributes to the functional food and superfood trends, both terms have raised alarm among nutrition scientists who warn consumers against believing in "magic bullets or panaceas" (Hasler 2002) and emphasize the need for a well-rounded diet (Lunn 2006). The European Union actually banned the use of the word "superfood" on product labels unless accompanied by an authorized health claim in 2007. Thus superfoods appear to be the latest trend in the corporate co-optation of both the alternative food movement and scientific institutions.

1.3 Theorizing Superfood Subjectivities

Eating right has become a powerful "technology of the self" (Foucault 1988) through which individuals govern their own bodies, thoughts, and behaviors. Nutritionism, which considers isolated nutrients as the fundamental unit of food

knowledge, is now the dominant paradigm for relating food to wellbeing (Scrinis 2008). The rise of the nutricentric citizen is part of a century-long food system transformation "that has mobilized the material and symbolic values of nutrition with 'a will to govern'" (Dixon 2009).

Critical nutrition scholars point to the ideological projects embedded in American food reform. Early nutrition research emphasized economic efficiency to avoid labor unrest. World War II mobilized nutrition as a tool for instilling service to the nation as a daily routine (Biltekoff 2013). Mid-century dietary guidelines centered the laboratory as the ultimate site of food expertise in order to control food discourses and forge subjects accepting of state authority over household affairs (Mudry 2009). Alternative food movements emerging in the late twentieth century, knowingly or unknowingly reinforce neoliberal subjectivities of autonomy, individual responsibility, entrepreneurship, and self-improvement (Biltekoff 2013; Guthman 2008; Türken et al. 2016). Over the last century food has taken on increasing political weight as a site of perpetual anxiety and a forum for governing our relationship to our bodies (Scrinis 2013). As Melanie Dupuis suggests, the distinctly American "ingestive subjectivity" which posits that acts of choice have the power to purify the individual also reflects persistent attempts to purify the societal body from unwanted otherness (DuPuis 2015). Food reform is social reform whether enacted by social workers, scientists, governments, or celebrity chefs.

Analyses of food reform movements have emphasized the influence of dieticians, nutrition scientists, social workers and counter-culture entrepreneurs in

shaping ideologies of eating, but what of agribusiness? The idealized eaters conjured in corporate food advertisements can be just as moralizing as those of nutritional guidelines or foodie blogs. Exposure to advertising has increased with the digital age (Media Dynamics Inc. 2014), and US advertising spending hit an all-time high in 2018 (MAGNA 2018), likely expanding the influence of private sector visions for proper eating. Scholars and popular critics increasingly blame food advertising for undermining food reform efforts by encouraging children to consume fast food, processed foods and sugary drinks (Bittman 2012; see Boyland et al. 2016 for a meta-analysis of this extensive literature). With the exception of milk (DuPuis 2002) however, little been said about the social values embedded in promotional campaigns in line with (and at times directly influencing) recommended nutritional guidelines. While agribusiness-funded ads for whole foods might be presumed to reinforce the message of government-issued dietary rules, the controversy surrounding superfoods shows this is not always the case.

Of course, the public and private sectors permeate one another constantly. As political scientists Guardino and Snyder argue, the state is an active participant in the expanded role of corporate promotional media. They define the Capitalist Advertising and Marketing Complex (CAMC) as a "range of closely connected corporate and state institutions involved in widening the scope and advancing the power of commercial promotion in the broader economy" (2017). Produce advertising is far less controversial than marketing soda to second graders, but it is no less a pillar of twenty-first century state-supported agrarian capitalism. While Nestle warns

consumers against believing industry-funded nutrition science touting the benefits of blueberries, pomegranates or pecans (2018), she does not venture an analysis of how superfood messaging might influence consumers beyond misinforming them. Why has "superfood" status become so central to the US produce industry? What kind of work does the superfood phenomenon do for agrarian capitalism? The ascent of the almond provides some clues.

2. THE ASCENT OF THE ALMOND

2.1 Overcoming the Seasons

A century ago almonds in American culinary culture were a strictly seasonal treat. This is a bit surprising considering there is no urgency to consume them directly after harvest, as with perishable fruits and vegetables. It is a reminder, however, that food cultures have historically been closely tied to the temporality of farming. In the Northern Hemisphere almonds are harvested in late August through October, sold and processed in October and November and, until the mid-twentieth century, marketed exclusively as a winter holiday specialty. Almond cultivation was likely introduced to California by the Spanish missionaries but did not take on a commercial scale until the post Gold Rush population boom of migrating Anglo-Americans in the 1860s. Orchards gradually took root across along the Sacramento River Valley when a growing settler population and a surplus of capital made farming an attractive business opportunity. As word spread of the crop's lucrative potential and orchards expanded, almonds' popularity among farmers began to clash with its culinary niche.

There were simply too many almonds to sell them for only a few months out of the year.

Prices were unstable, and growers grumbled they were at the mercy of middle-men who pitted them against one another to keep prices low. The global grain glut of the 1890s prompted a golden age of cooperative organizing in American agriculture (Filley 1929; Saker 1990; Stoll 1998), and almond growers soon followed suit by selling collectively at regional hubs. These regional cooperatives, however, continued to undersell one another. After a painstaking process to overcome mistrust, alliances were forged in 1910 to bring 80% of production under the umbrella of a single entity: the California Almond Growers Exchange. The influence of this momentous unification cannot be overstated. California affords the only climatic conditions in North America suitable for almond cultivation and growers suddenly had a near monopoly on their product.[10] Cooperation brought astonishing results. In the decade following the formation of the Exchange, growers received prices 50% higher than before it was established (Tucker 1920, 5).

Good prices set off a planting boom and fears of overproduction were not far behind. In 1919 the crop was double that of 1918. The president of the Exchange warned almond growers of a grim future if they failed to address the looming surplus of their product. The charismatic leader of the young organization, T. C. Tucker, sent

[10] Imports from Europe were not directly in competition with California almonds at this time because European almonds were sold shelled to reduce shipping weight and were largely destined for the confectionary trade.

out a special booklet pleading with growers to fund advertising that would increase demand. “The success of the Exchange, with the consequent higher prices to the grower, has resulted in a large increase in the acreage of almonds in California. This increase is making it necessary to develop new markets to absorb the greater tonnage and this can only be done effectively or satisfactorily be cooperative effort” (Taylor 1918, 47). Because almonds take three to five years to produce their first crop, rapidly expanding young orchards were visible evidence of mounting production on the horizon. Unlike an annual crop, which could be changed year to year in response to market signals, a permanent crop with substantial up-front investment prompted growers to dig in their heels.

“You will have much to worry about…if you fail to supply the necessary funds for advertising and development,” Tucker warned in hopes of bolstering his organization’s budget (Tucker 1920, 16). While today nearly all almonds are removed from their shell before reaching consumers, in the early 20th century California almonds were sold in-shell to be cracked and eaten around the fireside during the winter holiday season. Imported almonds from Europe arrived in the US pre-shelled, to be used as an ingredient in baking and candy bars. Due to the high costs of labor in California, shelling (done by hand with small mallets or simple crank machinery) was uneconomical. Thus to increase demand, the nascent California almond industry aimed the full force of its advertising zeal at shifting patterns of home consumption.

“The consumer will consume only to the extent that you create a demand by educating him in the value and attractiveness of your product” Tucker instructed

growers (Tucker 1920, 7). The industry faced two challenges: almonds were sold strictly seasonally and were closely associated with special occasions. The exchange found convincing a wholesaler or retailer to stock almonds after January 1 to be "impossible" (Tucker 1920, 5). Space was at a premium for small grocers, and culinary custom made it unthinkable that anyone would buy almonds once Christmas and New Years had passed. The American Nut Journal concluded that to keep up with production, the place of almonds in the American diet must be shifted to "year-round consumption as food" ("The Year's Opportunity" 1920). An early catalogue advertisement implored readers to "think of them not as an appetizer merely, or some rare delicacy to be enjoyed at Christmas and then disappear, but rather as an article of food to be kept always in the house" (Cobb Bates & Yerba Co. 1910). Almonds were so tightly linked to the holiday season as to be considered more of a treat, a social activity or a finishing touch than as a source of nourishment.

A spatial fix to overcome the seasonality of almond consumption and expand materially into the spaces of retailers' shelves required marketers to fundamentally shift the meanings of almonds. Coordinated advertising was a semiotic tool for enacting a temporary fix to the economic strain of overproduction. Harvey's theorization of the spatial fix underscores how capitalism's tendency towards overproduction requires expansion and material reorganization to compensate for falling rates of profit, yet he stops short of linking these processes to the meanings embedded in objects as they are experienced in people's everyday lives. The semiotic infrastructure laid down by the California Almond Growers Exchange in the early

20th century was just as essential as the warehouses and railroads that transported almonds to market and similarly would shape the semiotic possibilities of the industry's future. In retrospect, it is striking that while today almonds are popularly touted as a *superfood*, just a century ago it was novel for Americans to even consider them in the same category as food.

2.2 Becoming an "Essential Food"

It would not be until the 1960s, after 40 years of relentless marketing by the industry, that the seasonal pattern of almond purchasing would transition to year-round buying (Allen 2000, 128). Consumers are not passive recipients of the gastronomic ideals proffered in advertising; culinary conversion takes work. In the meantime, a successful lobbying effort in the 1920s to raise tariffs on shelled almonds from Europe opened up the ingredient sector to California growers. With a new competitive edge, almond growers expanded their confectionary customer base while continuing to demonstrate that almonds were suitable for year-round home consumption as food.

During the Great Depression, when economic collapse drove many to hunger amidst food surpluses, the emerging field of nutrition science took on increasing political import. Under the USDA's expanding role, policy makers sought to educate homemakers in stretching meager budgets through economically efficient nutrition (Atwater 1895). A mechanical view of the body as engine-like simplified food into energetic inputs and outputs, advocating rational calculation over personal

satisfaction or cultural significance (Mudry 2009). Eager to be viewed favorably under the influential nutritionist paradigm, the California Almond Growers Exchange contracted with a private firm, the California Foods Research Institute, to perform state-of-the-art analyses of the nutritive values of almonds. This institute "worked closely with the exchange's advertising agency, … developed recipes for distribution to news media" and "got the nutrition story to newspapers, radio stations, magazines, cooking schools and scientific publications" as well as to nutrition teachers in rural areas, "dietitians of private and government hospitals, and quartermasters of the Army, Navy and Marines" (Allen 2000, 91). The Institute appeared to be laboratory, advertising consultant and public relations firm all-in-one and was, unsurprisingly, hired by other California commodity groups of the time.

The second world war transformed the California almond industry. The US government feared that insufficient nutrition would mean "a slowing down of industrial production [and] a danger to military strength" (Mudry 2009, 61). Armed with quantified nutrition data emphasizing caloric density and energy-building fats, the California Almond Grower's Exchange successfully lobbied to have almonds designated an "essential food" by the War Manpower Commission (Allen 2000, 93). This meant almond growers received preferential access to gasoline, equipment, and Mexican labor contracted through the Bracero program[11] while other industries were constrained by rations. As military dollars poured into the chocolate industry for

[11] The Bracero Program, operating from 1942 – 1964, was a set of legal and diplomatic arrangements facilitating temporary work permits for Mexicans in the United States to fill low-wage, primarily agricultural, jobs. For an extensive analysis see Mitchell (2012).

soldiers' supplies, demand for almonds as a confectionary ingredient rose in tandem. For almond production to materially expand into military rations and the national food supply it had to successfully morph meanings.

The spatial fix to overproduction during wartime would not have been possible without enrolling scientific authority to literally redefine almonds as "essential" in the eyes of policy-makers. At each moment of impending crisis, historical specificities influence the semiotic strategies of the spatial fix. Wartime shifted the audience of the industry's efforts from homemakers and retailers to government institutions, and the mechanism for forging new meanings shifted accordingly from calls in popular magazines for a change in culinary culture to the mobilization of scientific authority and mechanistic rationale. The nutritional profile of an almond is itself a material-semiotic object, a characterization of molecules inseparable from their implications for human health. The materiality of the almond could be deployed as political leverage only when investments were made in the semiotic practices of science to inscribe the nut with a new type of significance for national defense. As with each iteration of the almond industry's spatial fix, the semiotic track laid by nutrition science enabled expansion while simultaneously fixing specific configurations of meaning in place.

2.3 Scrambling to Sell

In the post-war era, anxiety over surpluses reemerged as almond production exceeded domestic consumption before the war. In 1945 President Truman reversed a

slew of tariffs which had buoyed American farmers since 1930 and had made California almond growers competitive in the shelled-almond market for confectionary. Producers feared imports from regions with lower labor costs would flood the market. The industry responded with product differentiation, creating canned and flavored nuts as well as new forms of chopped and slivered nuts to top sweet treats. They secured a purchasing agreement with the USDA school lunch program to buy 5 million pounds of almonds each year. Most significantly, after 3 years of lobbying in Washington DC, California growers succeeded in amending the Agricultural Adjustment Act to include almonds and filberts. This meant growers could elect to form a Federal Marketing Order. While originally intended to manage surpluses by restricting sales during bumper crop years and formalizing quality standards, the Marketing Order would eventually become an unprecedented advertising and nutrition research powerhouse.

As a Federal Marketing Order, the Almond Control Board legally required all almond producers to abide by its standards and to pay a fee per pound for the functioning of the organization. To keep prices from falling, the Board could set aside stockpiles of almonds, amounting to as much as 25 percent of the total crop in 1951. The Board also created a two-tier pricing structure, selling almonds abroad at half the price of domestic almonds in order to open new markets and off-load the surplus (GAO 1985). But they could not stop growers from planting. Mechanization, increased use of petrochemicals, and technical support from the land grant universities boosted production per acre as almond acreage continued to expand.

Average yields climbed 64% between 1949 and 1961. In 1959 the industry faced a crop four times the size of the year prior and launched the "Colossal Almond Crop" promotional campaign. Unlike the war era focus on nutritional substance, mid-century advertising emphasized almonds as a versatile ingredient for home-makers and in the expanding market of consumer packaged goods. The Exchange produced a film titled *Elegance is an Almond*, featured almond recipes in women's magazines, made almonds the standard airline in-flight snack, and deployed almonds to dress up frozen dinners. The success of these efforts attracted even more farmers to convert their land to almonds. In 1966 the almond industry and then Governor of California Pat Brown considered acreage limits or removal of immature fruits to reign in surpluses, but citing enforcement challenges, determined new markets were the most feasible option (Allen 2000).

Sales from the Exchange doubled between 1960 and 1970. In 1972, almond growers and other commodity groups drowning in surpluses successfully lobbied Congress to amend the marketing order program and allow funds to be used for advertising and market research (GAO 1985). These expenditures had been expressly forbidden under prior legislation. The change was nothing short of revolutionary. By 1981, the Board spent 97% of its total budget on advertising, promotion and research and development. Marketing has dominated spending ever since.

The Board also incentivized handlers, like the Exchange (officially renamed Blue Diamond Growers in 1980), to advertise independently by giving them a credit towards their dues for money spent promoting their own brand. "The incentive is to

spend more than you would have had you just given it to the Board" a senior marketer for Blue Diamond described. Another marketer underscored the importance of the outsized advertising spree. "Blue Diamond spent…because it was kind of free. Because we were getting it back from the Almond Board. So what that did is, you had 20 years of advertising that the size of the business didn't warrant." Government mandated payments, and incentives for brands to spend, created a flood of promotion. The humble, local co-operative began hiring seasoned marketers from New York City with experience at Nestle and Unilever, the largest food companies in the world.

Just as the first million-dollar advertising campaign went public, American purchasing power declined due to oil embargoes and high interest rates. Both Blue Diamond and the Almond Control Board went to work abroad to boost sales, with matching funds from the USDA Foreign Market Development Program. After another decade of making miracles for growers, the Blue Diamond President lamented in 1979 "virtually every significant potential market in the world is now open to our product…there are no longer the many opportunities for new development that existed some years ago" (Allen 2000, 155). Further compounding growers' woes were Reagan Era economic policies which strengthened the dollar and made almonds more expensive abroad. To maintain and expand markets, almond exporters received government funding through the Targeted Export Incentive Program which allowed almonds to be sold abroad at below market rates. Over the course of the 1970s almond acreage doubled again, with "a substantial portion of

recent plantings … traced to investment syndicates, large corporations, other handlers and speculators" (Allen 2000,148).

Given limited international interest, and lower profit margins for products sold abroad, almond growers focused on boosting per capita consumption in the US. The CAGE President underscored the stark situation, "One doesn't normally ask someone to increase the consumption of a product by more than 40 percent in a single year…but that, in a sense, is what we are being asked to do" (Allen 2000, 158). The cooperative launched an atypically frank television advertisement exemplifying the surplus crisis. Almond growers buried up to their elbows in almonds pleaded with shoppers*: a can a week is all we ask*.

The candid and humorous tone of the ads gave almond growers an unexpected fifteen minutes of fame as many were invited on popular talk shows and radio programs. The 1980s US Farm Crisis—in which surplus production drove down prices, farmer debt soared, and government leaders famously advised growers to "get big or get out"—was becoming legible to broader publics at the time through events like the celebrity sponsored Farm Aid concert of 1985. Almond marketers leveraged the idea of supporting farmers as a civic duty and pursued a fix to their crisis of overproduction by framing consistent almond purchases as an act of solidarity. As with previous fixes, the semiotic strategies employed reflect historical geographic specificities. The "Can a Week" message aligned with media coverage of America's farm crisis and placed almond growers within a larger narrative of rural struggle amidst surplus. The catch phrase was broadcast extensively in part because the state,

through the Federal Marketing Order, incentivized a modestly sized cooperative to overspend on advertising. Thus somewhat ironically, the fleeting material-semiotic fix of the late 1980s was buoyed by the state while resonating with a farm crisis message reflecting the state's failure to adequately support farmers' long-term economic viability.

2.4 Harnessing the Health Halo

The word "healthy" had begun popping up in almond advertisements in the 1970s as marketers caught on to emerging trends in "natural" or "whole" foods (Belasco 2007). But it wasn't until the 1990s that the almond industry would begin funding a veritable onslaught of nutrition research to back promotional claims. The motivation was twofold. First, the FDA had become increasingly restrictive about health claims made by food advertisers and required scientifically-backed justification. Second, a small group of almond handlers unhappy with the requirement to pay for collective advertising by the Almond Board sued, claiming the obligation infringed upon their freedom of speech. They were successful, and in 1994 brought advertising spending to a screeching halt. The Almond Board, with an estimated $11.14 million budget in 1995,[12] decided that while waiting for an appeal they would shift part of their formidable advertising budget into nutrition research. The first order

[12] $11.14 million (1995 crop of 557.1 million lbs at 0.2/lb), of which at least 60% was likely intended for advertising.

of business was to challenge the low-fat diet craze by showing that almonds contained "good" fats.

"When I first arrived at Almond Board of California in 1999, only two almond nutrition research papers had been published" the Board's current Chief Scientific Officer Dr. Karen Lapsley described in 2018. "To date we have 158 nutrition research peer-reviewed published papers" (Almond Board of California 2018b). She estimated in our interview that roughly 75% of existing worldwide knowledge about almonds, possibly more, has been supported in some way by the Almond Board.[13]

Advertisers were particularly keen on finding a recognized icon that would validate their health message. The American Heart Association's "heart-check" food certification program provided just such an opportunity, but the AHA held to a strict limit on the fat content of its approved products. Almonds were ineligible. The FDA similarly rejected a proposed statement that nuts reduce the risk of heart disease. After substantial industry efforts, FDA approved a qualified health claim stating, "scientific evidence suggests but does not prove that eating 1.5 ounces per day of most nuts, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease." The almond industry continued arguing their case to the AHA and eventually succeed in obtaining the heart-check stamp of approval. But it was not

[13] It may be even higher, considering after substantial searching I failed to find a single academic paper exclusively dedicated to almond nutrition produced without ABC involvement.

easy, and almost certainly never would have happened without ABC's hefty investment.

Health messaging transformed the almond market. The current Marketing Director of the Almond Board elucidated how the "health halo" effect has allowed products with almonds as an ingredient to be viewed as healthy by association. "If you think of almonds as healthy and almonds as a great snack, then having an almond as an ingredient in a bar, there's a positive halo that goes to that bar… [it] makes you feel a little better even about eating chocolate, because you're balancing things out." The health halo means any product appears healthier to consumers because it contains an ingredient recognized as healthy. Enthusiasm for the marketing power of the "health halo" is fitting though slightly ironic. The "halo" description was originally a critique of diet foods made by health professionals worried about the tendency for such labels to give consumers permission to binge eat (Chernev 2011; Provencher, Polivy, and Herman 2009). Among marketers the "halo" has lost all hint of disapproval. For driving volume, it's a god-send.

At the Almond Board, the Nutrition Research subcommittee originally reported directly to the Marketing Committee. While the team explored a wide range of topics "the whole point is to sell more almonds" a senior marketer and longtime Marketing Committee member reported.

> It wasn't so direct as the marketing people say 'I want you to work on this, this and that.' There was a dialogue. 'Well what are you working on that shows some promise for application?' And they'd tell us. And some wise guy like me would say, 'Well #1 and #2 actually have commercial application but

> #3, 4, 5 just stop. It's a waste of time. Just don't do it.' I mean, there always has to be a certain amount of pure research because you never know what you might learn. I don't want to make it too black and white, but it was marketing driven. Getting back to the mandate of the marketing order itself. It's all about enhancing the value of almonds, expanding markets and basically driving up the price and selling to more people around the world.

As the almond industry set their sights on new international markets, they partnered with nutrition researchers in target countries to root their health claims on foreign soil. They contracted with private nutrition research firms and enticed junior faculty and doctoral students with funding for research investigating almonds' health effects. Almond Board staff are co-authors on some publications, meaning they have a direct role in study design and analyses of results. For most studies the Board is careful to distance itself from the research process, however, the selection of projects is by-design oriented towards perceived sales opportunities. Likewise, researchers prepare proposals to suit the anticipated desires of the Almond Board.

Unsurprisingly, studies that show little advantage of almonds over other foods drift into relative obscurity while those validating health claims receive top billing in the Almond Board's nutrition research reports. As veteran food marketers explained, for large consumer packaged goods companies, almonds are too small a portion of their budget to justify a nutrition research investment. More specialized companies lack the funds to pursue such research and are less motivated because the benefits would be spread across the industry.

As a material-semiotic spatial fix, health messaging expanded markets by imploring consumers to rethink the role of almonds in their lives. No longer merely a

source of sustenance or aid to family farms, almonds now served as a shield against rising rates of heart disease and Type 2 diabetes, the so-called "diseases of affluence." The heart logo and its connotation of medical expertise became a powerful semiotic tool in the quest to have almonds redefined as a protective food. This health message spoke to historically situated concerns over the consequences of an American diet high in animal products and processed sugar, themselves commodities suffering chronic overproduction for which the body has been the site of a spatial fix. Through the Almond Board's capacity to tax growers for labeling advocacy and to fund research which individual companies were unlikely to pursue, state facilitation was fundamental to this nutri-centric turn. Without the political tool of the marketing order, and the constant threat of oversupply that it simultaneously alleviates and exacerbates, almonds would likely never have been crowned with a "health halo" at all.

2.5 Securing Superfood Status

Industry leaders credit the health message with a spectacular growth in domestic consumption. In the 1990s annual US almond consumption remained relatively stable, averaging 0.63 pounds (0.29 kilos) per capita. By 2017 it reached 2.36 pounds, a rise of 375% in less than two decades (USDA 2018). Trends toward high protein diets (Luscombe-Marsh 2015), increased snacking (Piernas and Popkin 2009) and alternative milks[14] (Sethi, Tyagi, and Anurag 2016) undoubtedly aided the

[14] Almond milk, like most beverages, contains a relatively low quantity of almonds per unit weight and thus its popularity is unlikely to be the primary driver of increased almond consumption. Due to

popularity of the nut. Tree nuts sales overall are on the rise, yet almond sales have experienced far more growth than any other nut (USDA 2019). This is likely a testament to the almond industry's unmatched marketing efforts[15] and the use of health messaging emphasizing protein and fiber to give almonds a competitive advantage over potential substitutes.[16]

In the early 2000s, phenomenal sales in the US and abroad, in combination with intensified farming practices, boosted profits for growers. Value per acre averaged $1644 in the 1990s; by 2011 it topped $5000 per acre and peaked in 2014 at an unheard-of $8600 per acre. Lured by attractive returns, California growers converted row crops like cotton and tomatoes to almonds and investors rushed to join the boom. Bearing acreage surged from an average 430,000 acres in the 1990s to over 1,000,000 acres in 2016. An intensifying drought beginning in 2012 drove prices even higher as buyers feared reduced irrigation would produce a short crop. By 2016, the Almond Board anticipated a 30% increase in production within 4 years. Fearing an oversupply, the Board successfully petitioned growers and the USDA to raise the per-pound fee by 33% for 3 years in order to fund additional marketing efforts (7 CFR § 981 2016).

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its relatively low almond composition, suitability for low-grade almonds and high resale value however, almond milk has substantially contributed to industry profitability.

[15] Because Marketing Order budgets are determined by a fee per unit weight, the relatively large size of the almond industry is reflected in its sizable marketing funds relative to other US grown nuts.

[16] Particularly when courting food industry customers, almond marketers routinely compare the nutrition profile almonds to other nuts in order to legitimate their distinctive healthfulness.

At roughly the same moment, the Board shifted its nutrition research program from "health conditions" such as heart disease and diabetes towards "wellness and vitality" (Dreher 2017).[17] A member of the marketing committee explained:

> There's a study that was done not by us, by somebody else, that basically shows health practitioners and nutritionists, their rating of the nutritional value of different foods. And then it's compared to what consumers rate as being nutritionally good for you. And almonds rank up in the in the very top righthand quadrant, #2 on the list. So that information told us that this health message was resonating with the consumers and being reinforced by the nutritionists out there, and we really didn't feel a compelling reason to continue to emphasize it.... They're all on board, now it's the next chapter, and what do we say about the product without losing touch with what got us there.

Successful advertising, this interviewee reminded me, is about the cumulative effect of a consist message over time. Building on existing health messages would have a greater impact than starting from scratch. His explanation of the pivot from disease prevention towards vitality reveals three key dynamics. First, the industry had reached saturation with existing health messages at the same moment when surpluses loomed, requiring a new strategy for driving consumption. Second, investment in nutrition research and messaging created a sense of path-dependency as consistent messages are more cost effective. This resonates with Harvey's theorization of fixity where in prior investments limit mobility by rooting an industry to a certain space, in this case a semiotic space. Third, through decades of sustained nutrition research, the almond industry had successfully shifted a critical portion of its advertising message

[17] The Chairman of the Nutrition Research Committee cited here, Mark Dreher, is a nutrition science consultant who has developed strategic research plans for food industry multi-nationals such as Nabisco and Frito-Lay.

over to health professionals and nutritionists who would likely continue working to their benefit at very little expense.

Consumers do not uncritically adopt the health messages offered by nutrition research and industry, yet health has been such a successful advertising platform that the Almond Board now uses receptivity to health messages, as well as snacking behavior, as the primary criteria for selecting which new countries their marketing campaigns will enter. Importantly this carries a gender and class dimension. According to marketers I interviewed, women and those with higher incomes and education are correlated with health message receptivity. To continue growing consumption in the US, however, almonds had to do more than sustain health or prevent disease; they needed to surpass the status quo. Under the new wellness and vitality mandate, the committee began funding research on cognitive performance, "skin health" (more accurately, wrinkle prevention), and optimizing gut function. Meanwhile the marketing committee and its contracted advertising firm had been gradually shifting the advertising message from healthy lifestyles to something more ambitious.

Advertisers increasingly positioned almonds as the source of endless energy required for a non-stop action-packed lifestyle. The advertising team "determined our primary target to be productive to the extreme, driven by their desire to accomplish a seemingly endless number of tasks in a day" (Sterling-Rice Group 2018). In an interview the Marketing Director told me "for some people that life would feel very frenzied and out of whack, but for this consumer they love it." Presenting a less

optimistic take, marketers presenting at the annual industry conference described "one major force shaping snacking habits are the stress levels of younger generations," with an accompanying bar graph showing progressively greater stress ratings between generations X, Y, and Z. They quoted focus group participants describing a "hectic lifestyle" and wishing there were more hours in the day. Almond advertisers want these potential customers to "think of [almonds] as not just the best snack choice but the snack that would give them the energy to keep powering through" (Sterling-Rice Group 2018).

The Almond Board website identifies 10 unique almond snacking occasions as moments of self-regulation amidst a white-collar working woman's demanding day: the recovery, the morning prep, the crunch-time rush, the mid-morning battle, the salad plus-up, the chip switch, the afternoon lull, the on-the-goer, the trail mixer, and the late-nighter (Almond Board of California 2018a). The accompanying narrative describes almonds as the snack solution for a life of vigorous early morning exercise, constant errands, shuttling children to-and-fro, eating at a desk or while walking, moderating meals and curbing cravings. While the Almond Board has chosen not to use the term superfood in advertisements, fearing it might connote a fad, they support the widespread acclaim almonds have received as a nutrition "powerhouse." In 2018, Blue Diamond embraced the superfood attribution by adopting the slogan "Don't deny your cravings. Eat them. All the flavors you crave… in a superfood." At the annual conference marketers explained it would be most efficient and effective to shift the group of "medium [almond] users" into the

category of "heavy users" than to find messages that would attract brand new almond eaters. While preventative-health framing of almonds emphasized restraint and acquiescence to expertise, the superfood era encourages health-conscious consumers to subtly challenge dietary recommendations and see themselves as potentially unlimited.

Shifts in the advertising strategy accompanying the almond industry's transition from "health" to "vitality" paint a vivid portrait of how the superfood concept reshapes expectations of wellness from disease prevention to hyper productivity. In 2017, advertisers shifted from positioning almonds as an ingredient in a healthy lifestyle to a means for maximizing output. The "Carpe PM" marketing campaign satirized afternoon fatigue as a dire medical condition instantaneously alleviated by the first taste of an almond. While intended to be humorous, the campaign medicalized even the slightest fluctuations in energy, responsibilized workers for fatigue, and encouraged consumers to see eating almonds as a source of renewed potential. The 2018 "Own Your Everyday" campaign featured the power of almonds to not only alleviate, but enchant the most minute frustrations of a privileged life, such as helping one's husband find the TV remote or changing the office printer's toner cartridge with a swivel of the hips. In each vignette of the series an "Almond Snacker" introduces a surreal moment of productivity-enhancing enlightenment, infusing trivial decisions with the potential for grandeur. The superfood framing of almonds instructs eaters that if they make the right eating

choices, they can not only meet but exceed expectations while making magic of the mundane.

As a spatial fix, the pivot from preventative health to productivity required semiotic strategies both suited to the historical context –the gendered neoliberal subjectivity of early 21st century US culture—and consonant with existing configurations of meaning fixed through hefty investments in nutrition science and health advertising. Almond producers could not expand their real estate within the stomach of American consumers without simultaneously expanding the territory of almonds within the landscape of food meanings, now presenting almonds as an aid for every possible domestic and professional task.

3. SUPERFOOD AS SPATIAL FIX

As almond production surges, the industry must constantly work to shift the way consumers see almonds, from seasonal specialty to superfood, and the way they see themselves, from sophisticated to superhuman. At each narrowly averted crisis of overproduction a new type of imagined subject emerges. In the early twentieth century it was a woman seeking to become more modern by letting go of traditional seasonal eating patterns. Throughout the mid-century, almond marketers envisioned a government official or homemaker eager to apply scientific rationale to strengthen the national body. In the 1980s almond ads evoked a sense of rural nostalgia and civic duty to support American farmers through regular purchasing habits. During the turn of the twenty-first century, almond marketers envisioned consumers eager to avoid

diet-related diseases through informed food choices. Now, as this market for preventative health offers little room for expansion, they envision women striving to maximize productivity in each minute moment with boundless energy. At each stage the subjectivity of the eater is reimagined to suit the needs of a spatial fix to chronic agricultural surplus.

Understanding the spatial fix as material-semiotic illuminates the importance of meaning-making practices to political economic patterns. Harvey theorized the spatial fix as a temporary solution that functions much like the fleeting fix of addiction. While he treats space as a material configuration, a parallel pattern is evident in the shifting configuration of meanings. Just as markets can be saturated, meanings can be saturated. They are inseparable. Harvey highlights the tension between capital's need for mobility and the fixidness of necessary material infrastructures in a specific location. Likewise, the almond case reveals this tension occurring through meanings. Expanding markets requires new meanings, and yet to be effective advertisers cannot stray far from existing investments in historically cultivated meanings and the semiotic infrastructure of scientifically legitimated nutrition claims. While consumers maintain skepticism, reflexive resistance and complex social behaviors surrounding food choice, they increasingly rely on experts (Dixon and Banwell 2004). Marketers find it more efficient to increase the quantity consumed by existing almond eaters rather than to recruit new customers because the hard-won semiotic foundation has already been laid.

It is well known that the state enables spatial fixes to agrarian capitalism. Export subsidies, public university research to intensify production, and infrastructures of commodity circulation all facilitate a material reordering of agriculture that can temporarily alleviate overproduction. Far less recognized is the state's role in enabling the accompanying semiotic shifts. As the almond case demonstrates, state-mandated payments to the Almond Board have been essential to the industry's ability to execute sophisticated advertising campaigns, fund nutrition research, and advocate for recognized health labels. While early cooperation prior to the federal marketing order propelled the industry's profitability, mandated payments enabled an explosion of marketing activity.

This case study has periodized a series of material-semiotic spatial fixes in the United States, the California almond industry's largest market, but such spatial fixes are geographically specific. Export growth is another a key strategy pursued by marketers. While in the US almond meanings have been built out through the discourse of nutrition, in Korea the industry is constructing its semiotic infrastructure through the discourse of beauty. Just as an expanding industry must adapt to new material conditions like climate, so too must it reorient its semiotic strategy to suit new cultures of food and the body.

Advertisers often describe themselves as simply identifying existing needs and positioning their product as fulfilling these needs. The historical shifts in almond advertising undoubtedly reflect far-reaching and well-documented social phenomena: the promotion of modernity, the expanded authority of science in domestic activities,

growing concern over heart disease and obesity, and the physical and psychological strain of mounting expectations for working women. Yet advertising is not just any mirror to societal change. It is a funhouse mirror, warped along multiple axes to magnify desire. Advertising presents consumption as an assertion of identity, and in doing so makes powerful claims about what characteristics of identity should be desired.

In the case of almonds, superfood status extends beyond touting the health-promoting chemical composition of a food. It fosters a consumer culture in which food is a coping mechanism for life in overdrive. This resonates with analyses of the neoliberal entrepreneurial self as governed by ambition, calculation, autonomy, and an unrelenting expectation of self-improvement (Brown 2003; Rose 1992; Scharff 2016). Superfood eaters are encouraged to see food as fuel, and themselves as engines of productivity with perpetually unmet potential. While preventative health messaging advocated self-management, it lacked the entrepreneurial emphasis on maximizing output. Even the language of cravings and constant snacking amplifies a vision of the self as simultaneously self-regulating and insatiable.

The recent turn towards a superfood framing does not rewrite the many existing meanings ascribed to almonds by consumers: it is merely the semiotic frontier. People may seek out almond products as a substitute for animal protein motivated by environmental or health concerns, or because they are a staple of family recipes, or for other complex motivations an in-depth consumer study might reveal. Marketers do not expect all almond eaters to adopt the hyper-productive subjectivities

of superfood eaters, but they do see this vitality message as the growth edge of the industry. Superfood status for the almond industry is a spatial fix, an ever-incomplete process of prolonging agrarian capitalism despite repeated crises of overproduction. As this case demonstrates, the food meanings forged at such frontiers of accumulation carry lasting cultural implications and yet are always destined to be refashioned.

Analyzing a single commodity carries obvious limits, and this work would be greatly enhanced by similar analyses of domestic foods gaining superfood acclaim. Tracing a single commodity historically, however, reveals how intimately agrarian political economy and food culture are knitted together through time. Chronic overproduction, coupled with state-facilitated cooperation and marketing, have pursued spatial fixes which reshape flows of food materials and meanings alike. As the array of superfoods expands in the coming years, it is worth asking for whom superfoods are ultimately so "super."

CHAPTER 3:

Plants, Pathogens and the Politics of Care:

Xylella fastidiosa and the intra-active breakdown of Mallorca's almond ecology

ABSTRACT

Almonds were once "the gold of Mallorca," a source of modest wealth and pillar of diversified farming systems for small holders on the largest of Spain's Balearic Islands. Now researchers believe nearly every almond tree on the island will be dead within five years. The introduced bacteria Xylella fastidiosa, enabled by its spittle-bug vector, and emboldened by climate change, has flooded the xylem of these rainfed trees, impeding the flow of fluid and nutrients until the tree can no longer survive. This paper enrolls feminist theorizations of care, material-semiotics, and agential realism to deepen the ethical implications of a plant epidemic. I argue that by attending to the care relations underlying pathogenicity we can shift from narratives of landscape purification toward a more-than-human politics of care.

1. INTRODUCTION

Almonds were once "the gold of Mallorca," a source of modest wealth and pillar of diversified farming systems for small holders on the largest of Spain's Balearic Islands. Today researchers believe nearly every almond tree on the island will be dead within five years. An introduced bacteria, Xylella fastidiosa, enabled by

its spittle-bug vector, and emboldened by climate change, has flooded the xylem of these rainfed trees, impeding the flow of fluid and nutrients until the tree can no longer survive. As a localized island issue, the plant epidemic was a contained tragedy. Once it was detected in mainland Spain, it became a rural crisis. As almond farmers, farm advisors, government officials, and scientists grappled with this new reality, often with sharp disagreement and blame, their words were threaded together by a common fundamental concern: care, or "cuidado."

What does it mean for farmers to care for trees? For a government to care for farmers? For trees to care for a diverse agroecological landscape? What does it mean to fail to care in these contexts? Or to be careless?

This paper elaborates a distinctly feminist account of Spain's faltering almond assemblages, using two tools: Maria Puig de la Bellacasa's theorization of care and Karen Barad's notion of "intra-activity". Puig de la Bellacasa offers a theorization of care which does not entirely correspond to its vernacular usage. Rather than benevolent concern, care is a form of maintenance work. Research on care follows in the feminist tradition of drawing attention to unrecognized labors, such as Silvia Lopez Gil's description of care as largely unseen work "without which life does not function" (2007). It is embedded in everyday practice (Barnes 2012), so seamless a process it lacks a clear beginning and end. Consonant with new materialist approaches, care for Puig dela Bellacasa includes not only human acts, but the activities of an assemblage that promote ongoingness, irrespective of scale, aliveness, or species.

As Anne-Marie Mol elaborates, “articulating ‘good care’ is an intervention rather than factual assessment” (Mol 2008, 84). Care is non-innocent. For some farmers, pesticide applications can be read as care. Care can be paternalistic. Many Spanish farmers resented life under Franco, the fascist dictator in power from the Spanish Civil War (1936-1939) until his death in 1975, yet felt his investments in agricultural extension were a form of care. Care is, to quote Puig de la Bellacasa “a thick, impure involvement in a world where the question of how to care is posed” (2017). She suggests as researchers we look for where this question is not easily answered.

Care, as an ethic, embraces interdependence and mutual obligation. Karen Barad’s theory of agential realism provides an ontological foundation for such an approach. She insists that entities do not preexist their relatings. Where as the common usage of “interaction” implies a prior state of independence between two distinct actors, her term “intra-action” maintains their ongoing mutual co-constitution. She rejects the subject-object distinction of causal explanations, showing that boundaries or “agential cuts” emerge from within. This quickly becomes palpable in the circling blame game of a plant epidemic where causal mechanisms are multiple and uncertain, simultaneously external and internal. Where a pillar of rural life vanishes, and landscapes and lives are transformed.

To examine the intricacies of landscape care, I build on multi-species ethnographic approaches (Kirksey and Helmreich 2010; Ogden, Hall, and Tanita 2013) and more-than-human geographic thought (Whatmore 2006; Robbins and

Marks 2010; Panelli 2010; Braun 2006), articulating the dynamic assemblage of people, bacteria, insect vectors, trees and climate that collectively produce the Xylella epidemic. This paper derives insights from interviews with farmers, managers of almond grower cooperatives, government officials and scientists in Mallorca (Balearic Islands Province) and Alicante (Valencia Province), participant observation at farmer organizing meetings to discuss the epidemic, and analysis of archival records and secondary sources relevant to Spain's almond ecology.

I did not begin this research seeking to examine care, nor did I anticipate encountering an epidemic of such dramatic proportions. It was the voices of my interlocutors repeatedly deploying the word "*cuidado*" and detailing the decline in rural maintenance work inherent to the Xylella outbreak which drew my attention to care as fundamental to the pathogen's proliferation. I had been exposed to feminist theorizations of care prior to this research, but my fieldwork drove me to revisit and deepen my engagement with care in order to make sense of an unexpected phenomenon. While emic use of "cuidado" and the etic theoretical concept of care are not perfectly equivalent, their resonance was too strong to be ignored. Both evoke interdependency, responsibility, caution and a compilation of actions neither unidirectional nor discrete nor exclusively human that hold a life-world together.

Environmental anthropology has long attended to the intimacy of interspecies linkages in agrarian lifeways (Evans-Pritchard 1940; Conklin 1957; Netting 1974). Recent work highlights the interacting agencies of organisms across scales, from microbes (Paxson 2008) to forests (Tsing 2015; Kohn 2013). Yet despite the

significance of plant pathogens to empire making (Crosby 2004) and their suspected amplification by climate change, these life-world altering diseases have received little attention (Seshia Galvin 2018). Plant disease famously provoked mass migration during the Irish Potato Famine (Yoshida et al. 2013), forever changed the ecology of North America during the Chestnut blight (Biermann 2016), and nearly eliminated European wine cultivation (Campbell 2004). As global transportation networks become increasingly fluid (Chapman et al. 2017), resistance to agrochemicals becomes more common (Gould, Brown, and Kuzma 2018), socioeconomic change refashions landscapes (Meentemeyer et al. 2008) and climate change alters the ranges and populations of organisms (Jones 2016; Trębicki et al. 2017), plant disease is expected to be more frequent and possibly more destructive.

Accounts of plant disease tend to reify boundaries, positioning pathogens as an outside threats or invasion. Proposed solutions thus emphasize securing borders or developing a protective shield for the organism at risk. While these tactics are pragmatic and potentially useful, I want to draw attention to how pathogens, no matter their origin, are produced from within. Pathogenicity describes "the relational ways in which infectious diseases are made" (Hinchliffe et al. 2017). Understanding pathogenicity is not only timely, but theoretically rich terrain for understanding mutuality, biopolitics and care amidst precarity. In this paper I detail how Spain's Xylella epidemic is produced not only by bacteria, but also by the conditions of possibility created by tourism, unstable land tenure, histories of marginalization, and retreat of government from farm advising. My analysis shows that theorizing a plant

epidemic as intra-active allows us to understand the material-semiotics of pathogenicity and shift from landscape purification toward a politics of more-than-human care.

2. PATHOGENICITY AS RELATION

2.1 El Oro De Mallorca

Xylella fastidiosa is a bacterium named for its habitat, the xylem of plants, and for its fastidiousness. It is notoriously difficult to culture (Purcell 2013). While scientific convention calls for referring to the bacterium as X. fastidiosa, I will use the name "Xylella" as it circulated among my interlocutors. While Xylella dislikes laboratories, it finds a plethora of comfortable homes within the xylem of vascular plants; it has 359 known plant hosts from 75 different plant families (Baldi and La Porta 2017). Like most bacterial pathogens it is asymptomatic in its place of origin, the tropics of Costa Rica, where it has co-evolved as an amiable endophyte which inhabits but does not kill its host. This makes sense as tropical plants benefit from abundant water and a bit of bacteria is unlikely to restrict their flow. Killing the host is generally bad for business. Once introduced to a new environment, Xylella rather easily finds a xylem-feeding insect whose mouth and foregut it can colonize, thus hitching a ride to the next juicy xylem the insect seeks out.

Almond trees are unlike the plants of Xylella's tropical origin. They are a desert tree, with wild relatives native to the region stretching from Central Asia westward to the Levant (Ladizinsky 1999). For the past few millennia almonds have

accompanied farmers throughout the Mediterranean basin, as they are particularly well suited to the long hot dry summers characteristic of the region. While almonds have long been present in Mallorca, the largest of Spain's Balearic Islands, they did not gain a prominent place in the landscape until the turn of the 20th century. At that time a global grain glut and new industrial substitutes for olive oil made agriculture less profitable for aristocratic landlords (Tello et al. 2018). Political changes over the prior century had already eroded the power of noble estates. To save themselves from bankruptcy landlords began selling off parcels, and an emerging class of merchant capitalists bought the land at bargain prices before subdividing and reselling it to peasants through long-term annuities (Ferrer Guasp 2000). Wine grapes were initially the preferred cash crop of this emerging class of diversified peasant farmers, as the global shortage produced by the phylloxera blight in continental Europe promised spectacular profits. The boom was quickly followed by a bust. A surplus of grapes drove a steep decline in prices and phylloxera eventually made its way to Mallorca. Many chose to replace vineyards with almonds. The land peasant farmers had been sold was often at the agricultural margins, much of it formerly forested and on steep slopes, and wage work was an important compliment to subsistence production (Molina de Dios 2012). Almonds were an ideal choice; a resilient tree able to thrive in dry, rocky, low-nutrient soils, and requiring little maintenance while they engaged in wage labor elsewhere. Almonds, I was told, were the crop of the poor.

In 1930, the Balearic Islands, commanded more area in almonds than any other Spanish province, despite its relatively small size.[18] Almond trees served as pillars within a sophisticated diversified rainfed farming system. A typical farm would include a mix of trees (including almonds, olives, carob, and figs) pruned at chest height to allow sheep grazing in the understory which was seeded with a rotation of winter grains, legumes and fodder crops. Limited agrochemical inputs due to embargoes placed on the Francoist regime maintained a largely organic agroecological system (Murray et al. 2019). Almond plantings grew increasingly popular. By 1975s, according to government records, 15% of the Balearic Islands' total surface area was planted to almonds, with an additional 206, 365 individual trees scattered across the landscape along field edges, roads, or hillsides (Instituto Nacional de Estadística 1977). While other regions of Spain's Mediterranean coast grew almonds, nowhere were they quite as economically significant as the Balearic Islands, where they earned the title "el Oro de Mallorca," the gold of Mallorca. While grains, olive oil and meat provided sustenance for small farmers, almonds were primarily sold for export. As one farmer explained, almond harvest was the time of year for buying new clothes and gifts. It was the crop that put money in their pockets.

When commercial airline travel brought an influx of tourism to Mallorca beginning in the 1960s, the landscape of almonds in bloom served as a stunning visual spectacle attracting visitors (Bardolet 1980). Most tourists came for the

[18] Balearic Islands are ranked 44th in size out of 52 Spanish provinces.

beaches, however, not the almonds. Fueled by substantial German investments, tourism has come to dominate the island's economy. An estimated 10 million tourists visit Mallorca annually (Balearic Islands Tourism Board 2017), whose resident population remains less than 1 million. Mallorcans I spoke with often repeated a striking statistic: in summertime an airplane leaves or takes off from the island every minute. Today almond farmers I spoke with feel the landscapes they tend are valued as photo fodder while they themselves are forgotten. "Xylella didn't kill the almonds" one man told me, "tourism did."

2.2 Almendros mal cuidados

When I arrived in Mallorca in January of 2018, Xylella had been *officially* detected only 15 months prior. Once it had been identified, the Consejería de Agricultura, Pesca y Alimentación (Ministry of Agriculture, Fishing and Food) studied the issue internally while trying to calm concerned farmers. According to the European Union's protocol (Directive 2000/29/EC), all trees within a 100 meter radius of the infected site were to be removed. Researchers soon found that infected trees spanned the entire island. While almonds suffered most visibly, the bacteria was found in wild and cultivated olives, wine grapes, oaks, pines and several shrubs. To follow protocol would be to denude the island. Naturally quarantined by the surrounding waters, the Mallorcan government pleaded their case to the EU Commission and received an exception.

Xylella was first confirmed present in a cherry tree in a plant nursery, and many believed the international nursery trade was its means of arrival. Most farmers suspected that it arrived from California, their almond-growing rival, in the 1990s when government officials had traveled to learn about improved almond varietals and intensive growing techniques. A Ministry official denied ever bringing plant material from overseas. A long-time farm advisor remembered returning with a small sample of the Texas varietal from California in the 1990s, but nothing since. Another agronomist described pocketing a few almonds on research visits and propagating them back home as a matter of course inherent to scientific curiosity. Regardless of whether such research trips were to blame, the rumor resonated with farmer's perception of the Ministry as careless and naïve. Further complicating matters, plant pathologists identified three distinct subspecies of the bacteria, suggesting multiple independent introductions (Olmo et al. 2018).

The first thing I encountered when I entered the Ministry's office was a large vertical banner illustrating the symptoms of Xylella. Plant quarantine notices for airports and the cruise ship and ferry docks had been quickly circulated. I was shown boxes of freshly printed color pocket guides detailing the disease awaiting distribution. The booklets illustrated best practices, recommending farmers plow their fields or use herbicides to remove any understory vegetation which might harbor the insect vector. The ministry was in a flurry of activity to address this *new* disease, but farmers scoffed at the claim that this was anything new.

Almond farmers told me they had noticed abnormalities for over 15 years but lacked resources to address the issue. Since the 1980s there has been no agricultural extension service providing agronomic advice. No one at the island's only university was actively studying almond diseases. In fact, an enthusiastic plant pathologist working at the airport did a great deal of the early investigation into Xylella *pro bono* in his spare time. Despite his PhD, a lack of official research employment at a university or government institution limited his credibility, potentially delaying action on the issue. When consulting the Ministry, farmers were either told incorrectly that the problem was a fungus (the consulting agronomist happened to specialize in fungi) or that they had not properly cared for their trees. According to many at the Ministry, the problem was *falta de cuidado*, a lack of care.

This accusation of lack of care felt deeply unjust to many. "The administration comes back saying '*son almendros mal cuidados* (they are poorly cared for almond trees).' Obviously when your trees are dying and people have told you there's no solution, you stop taking care of them. Why would you invest?" The assertion seemed out of touch, as farmers were quick to note that the man who first identified the seriousness of the problem with almonds was himself a trained agronomist praised for his carefully tended land. It also put a heavy burden on individuals who had been swimming against the current of the tourism-driven economy. Even the most meticulously cared for orchard could be surrounded by farms that have been abandoned because economic opportunity was elsewhere, or turned into vacation rentals prioritizing aesthetics over tree health. How could more pruning, weeding, or

pest treatments possibly compete with "strangulation" by neighboring fields, they asked.

> We have a 33 hectare planting, rainfed, old, traditional, organic, that I'm wondering… this year should I pull it all out?... For the last two years I don't know whether to prune, not to prune, what to do, because no one gives you anything, no breaks… Now they're saying off the cuff that what you should do is tear everything out because if you hadn't had that single weed, because if you hadn't had that single insect, because whatever. Right. But in Mallorca you can have a half hectare of perfectly cared for almonds, without a single weed, but the neighbor's farm left you with it abandoned. You'll be in the same situation. That's what we told the Ministry.

Almond farmers fumed at the notion that they had not cared for their trees because it seemed to negate the systemic disruptions of rural life. Farmers had found their economic base gradually dissolving as hotels multiplied. Their regional government had long touted tourism as the saving grace of an island once known for its antiquated agrarian ways. Their children had chosen more comfortable urban lives. Their neighbors had abandoned the land, leaving trees that were indeed uncared for and giving passersby the impression that rural lifeways had already disappeared into the history books. Agriculture, which had been cared for by a community not so long before, found itself excluded from the cares of most Mallorcans.

"The image of those almonds, many of them already dead, or those trunks, the big ones on the side of the highway, farms, some abandoned, all the dry wood that's dying. For me this is the graphic image of our agricultural society, of rural society, or what's left of it."

2.3 People Would Care If It Affected Tourism

Almond production went from being the island's agricultural jewel to the husk of its former splendor in just 25-30 years, an almond cooperative manager reflected. In that time tourism had transformed every corner of the island's economy. Three distinct phases mark Mallorca's transition from agriculture to tourism: the mid-century boom (1953-1972), the early neoliberal boom (1979-1987), and the financialization boom (1993-2008) (Murray 2012). Each period has been followed by years of global economic crisis and restructuring. 1953 ended an era of virtual economic isolation for Spain. Allied governments after World War II had maintained embargoes against fascist-controlled Spain until the United States, seeking allies in the fight against communism, signed a series of pacts with Franco. The warming of diplomatic relations, abundance of capital and paid holidays in nearby industrial economies, comparatively cheap cost of labor, and triad of sun-sand-and-sea made Mallorca an attractive destination for an emerging class of leisure consumers. After the 1970s recession and Spain's 1986 integration in the European Union, tourism picked up its pace, with consolidated resort chains benefiting under deregulatory regimes. A map of tourist accommodations in 1996 shows a dense concentration of hotels along the beaches and large coastal cities with very few locations in the island's agricultural interior. By 2010 tourist lodgings permeate the island. During this most recent construction boom, new policies prioritized rural lodges and five-star rated hotels, a move advocated by established hoteliers protecting themselves against competition (Pons, Rullán Salamanca, and Murray 2014). Farmers had long felt the economic pull of tourism, but now it was an inescapable.

Farmers I spoke with felt that agriculture had become an after-thought for public officials.

> You can't compete with the quantity of money generated by an activity as powerful as tourism, which requires investments in infrastructure, airports, sea ports, highways, hotels, streets, sidewalks, [compared] with an agricultural sector where people are aging, where there's no relief, where there's not much interest in change.

A few farmers I met had begun incorporating agritourism into their activities, enticing visitors with the authenticity of rustic lodgings or a freshly prepared lamb. They had always juggled multiple roles, often selling their labor as a tractor driver or in a factory to make ends meet. "You have to be polyvalent here. You can't live from one thing," one man explained. Most farmers felt the wealth generated by tourism remained highly concentrated. "For all this tourism it seems like we should be the wealthiest place in Europe. But only 3 or 4 people are really earning… the hotel owners. We work very hard now in the summers [in the tourism industry] and we're still just as poor."

I met a doctoral student who had begun carefully cataloguing over 200 Mallorcan almond varieties 5 years earlier and suddenly found himself documenting a dying race. "There's a wealth that will be lost forever," he said, but "*no pasa nada*". People would care if it affected tourism. Instead he saw the almonds decaying in silence.

2.4 No one left to consult

Despite their frustration with how the Xylella epidemic was being handled, most farmers did not actively display their discontent or make demands upon the government. Franco's dictatorship, which was particularly harsh for Catalan-speaking regions like Mallorca, had instilled a sense of resignation towards administrative absurdities. Despite 40 years of democratic governance since, fascism was in farmers' living memory and had a particularly potent effect on those who spent their formative years under Franco. The regime had cared for farmers, providing extension services farmers now missed, but as a retired farm advisor explained, this was a paternalistic kind of care expecting obedience. Care is non-innocent.

The Servicio de Extensión Agraria (SEA), or Agricultural Extension Service, was established during the late 1950s as part of the United States' aid to Franco's regime. Spanish officials traveled to the US and returned with an agenda to replicate the American model of farm advising. The program aspired to a Green Revolution for Spain, prioritizing economic efficiency through mechanization, intensification and irrigation. The SEA's creator, Rafael Cavestany, explained that his first task was to convince farmers to forget the idea that farming was way of life and to instead see it as an economic activity, under the motto "fewer farmers, better farming" (Cavestany y de Anduaga 1955). In-line with Franco's technocratic model, farmers were expected to be passive recipients of wisdom delivered by technical experts (Díaz Geada et al. 2012). Yet due to its decentralized model the institution had significant autonomy. Its workers lived alongside farmers and they gradually adapted their activities to meet community needs, developing a suite of rural social services which

evolved to recognize rural populations as the engines of their own development (Benito and Pulgar 2007). Care provided by the extension service was complex, navigating a tension between its paternalistic mission and a more democratic manifestation.

During the transition to democracy, between Franco's death in 1975 and the approval of the Spanish constitution in 1978, political power was decentralized from the central government to 17 Autonomous Communities (Comunidades Autónomas) leaving the SEA in limbo. When Spain entered the European Union in 1986, SEA agents became responsible for administering benefits through the Common Agricultural Policy, transforming agricultural advisors into bureaucrats.

Mallorcan farmers recalled the SEA with nostalgic praise. Nearly everyone I spoke with remembered the enthusiastic fam advisor who had dedicated his career to supporting almond growers, even though it was not his original assignment. Unlike the Ministry's representatives hidden away in offices shuffling stacks of paper, this man was out in the fields, running trials of new techniques and answering their questions. Many felt that the money flowing in from the EU fundamentally changed public perceptions of farming, from a livelihood to a paper chase. They wondered how the detection and response to Xylella might have gone differently if SEA were still active. When I asked farmers where they go when they need advice, they often responded with a dry laugh. Occasionally they might consult someone at the cooperative, but these advisors had often spent far less time in the field and their priorities lay elsewhere.

Agricultural cooperatives were yet another institution farmers felt had ultimately failed them despite the best of intentions. In order for farmers to receive benefits from the EU, they were required to organize into agricultural cooperatives. Cooperatives were intended to allow farmers greater economic power through bulk purchases of inputs at lower prices and collective sales of their product at higher prices. Almonds require processing equipment to remove the hull and shell, and a cooperative would allow farmers to own the expensive processing equipment themselves, capturing a greater share of the sales value. While farmers appreciated these gains in the short term, many felt that they had been tricked in the long term. The cooperatives were not run by farmers concerned with preserving the land, but by businessmen concerned with satisfying their customers. As evidence, farmers explained that when California almonds became cheaper, many cooperatives began importing and processing large quantities of them for sale, arguing it was to everyone's economic benefit. The orders were filled, and the cooperatives profits were shared by its farmer members, but ultimately imports forced Mallorcan growers to accept lower prices. The retired farm advisor said at the time he had proposed forming a cooperative composed only of farmers, but the administration rejected them, saying that they could not feasibly market their product.

The decline of institutional support through the SEA, and the lack of full alignment between farmers and cooperative employees, left farmers with fewer people to consult when they encountered something strange in their almonds. When they did call on the Ministry or their cooperative, a degree of distance, distraction or

distrust seemed to limit the connection. Institutional networks of care for farmers themselves require regular care to maintain.

2.5 Little reason to invest

"The farms aren't actually mine," one farmer mentioned as an aside after our lengthy conversation discussing the rhythms of his days and years pasturing sheep among the almond groves. It was an afterthought to explain because the situation is so common. The small parcels farmers in the early 20th century could afford to buy were not big enough to earn a living from the land. Most full-time farmers were effectively sharecroppers splitting the harvest fifty-fifty with various landlords under informal agreements. As profits from agriculture declined, those who continued working the land stayed afloat by cultivating a dozen or more parcels of various owners. Lack of stable land tenure made it difficult to justify investments in almond trees. Wheat gives an annual harvest so fertilizer costs are easily recuperated at the end of the season. Almond trees take five to eight years to begin producing under rainfed conditions, reaching their full productive capacity around fifteen years. Long-term arrangements with landowners are difficult to come by. With tourism rapidly raising property values, farmers never know when they might not have their agreement renewed.

A manager at a small almond cooperative told me he had suspected a new disease in 2010, but it was difficult to distinguish between drought, aging trees and lack of care. People were not renewing their orchards but merely keeping older, weaker, trees from a previous generation, he explained. Many urban-dwelling

families have inherited land from their parents but have little knowledge of how to maintain the landscape. According to almond growers and their advisors, this younger generation comes back just to harvest the nuts, without knowledge of how to care for and renew the orchard. As the graduate student of almond diversity explained, "There's no generational renewal. Xylella will just make all this happen faster."

As in many parts of the world, the agrarian workforce was aging. Some suspected almonds had suffered neglect because pruning trees is more physically demanding than other farm tasks. Others noted that farmers in their seventies and eighties were unlikely to plant trees because they might not live to see them bear fruit. They felt less invested in organizing to combat the Xylella epidemic because they saw no one who would take care of the land when they passed. "We haven't put up much of a fuss because there's no social weight forcing us to do things otherwise… after me there's no one else.'"

The island's young farmers association has just 4 members. The member I met expressed a sense of obligation to care for the land, while acknowledging that such care takes more than just the work of farmers. "We understand that maintaining the environment is our responsibility, that it benefits everyone, and we want to do it. What happens is that alone, alone it´s impossible." Others echoed the significance of almond trees as essential to the Mallorcan landscape and valued for "more than just production." Landscape care was a task that demanded more than the actions of increasingly scarce farmers. But the question of how to care was not easily answered.

2.5 Irrigated Hopes

In 2018, irrigation was emerging as a new form of almond tree care, an act which was once considered unthinkable for such a drought resistant species. Because Xylella affects the fluid artery of the tree, the xylem, its effects are much less severe when trees are irrigated.

After I interviewed the man handling the Xylella case at the Ministry of Agriculture he offered to take me on a tour of recently planted orchards. “I want to show you the best” he said, “not the stuff by the road side.” He took me to visit a new irrigated modern planting owned by a wealthy doctor and assured me the trees received abundant fertilizer, interpreted as a sign of care. At the next stop, we marveled at a large orchard owned by a hotelier. My guide felt responsible for performing progress, explaining that Xylella is not the real problem. For him it was old trees and lack of care. As we drove along he pointed out the window to trees with lichen growing on almond branches as evidence. While lichens are not harmful to trees he found them unsightly. Not enough pruning or treatment with copper fungicide, he explained. Farmers hadn’t taken care of their trees.

The largest cooperative on the island was also planting an irrigated orchard. The beneficiaries would be the farmer-members the cooperative manager explained, but it was not celebrated by all growers. “There is not enough water for everyone” many stated frankly, including those who had planted the new irrigated orchard. Mallorca also has no permanent rivers, and threats of water shortage are constant.

Tourism puts serious strain on water supplies, particularly as the government has incentivized higher-end resorts with golf courses and extensive landscaping (Kent, Newnham, and Essex 2002). Overexploitation of aquifers has produced salt-water intrusion, a terrifying prospect for an island depending on groundwater for 75-95% of its supply. And then there is the omnipresence of climate change. Hydrologists predict reduced water supplies. Higher winter temperatures and intense heat episodes are also suspected to boost the virulence of Xylella. Many believe the record temperatures of recent summers are what triggered Xylella to rapidly multiply and kill its almond host.

> Now they are doing irrigation, but in my opinion they are going to end up without water, because it doesn't rain. Every year we surpass record summer temperatures. Every year we set records. It doesn't rain. Every day more people, more human pressure, more tourists, more pools, more needs and we are going to end up without water. I don't know if they are going to be able to irrigate, though they say they will use recycled water.

Another cooperative manager described hopes for a mixed system. Some intensive irrigated orchards could generate enough almonds to keep production facilities moving and allow farmers to revitalize rainfed almond landscapes, "for the environment more than anything." For those with access to water, capital and land to secure their investment, irrigation presented a modernist fix that could keep the almond industry afloat and possibly avert land abandonment in the near future. Strangely, many agronomists expected the polyculture of rainfed almond production to be saved from disease (at least temporarily) by the monoculture of irrigated, fertilized, and pesticide-controlled plantations. For rainfed farmers and others anxious

about Mallorca's water future, betting the future of almond cultivation on irrigation seemed careless.

2.6 An Island Tragedy Becomes a Mainland Crisis

While Mallorca mourned its losses, infected almonds were detected on the Iberian Peninsula in Alicante Province. Here too farmers were accused of lack of care, but unlike Mallorca, spared by its geography, EU protocols mandated mass tree removals to stem Xylella's spread. "If they tear out the trees, they will tear out the last of rural life" one farmer told me. In a region fighting wave after wave of rural depopulation, these almond trees were rooting people to a sense of place, not to mention rosemary, myrtle and the many native shrub hosts potentially slated for removal. While these polyvalent farmers did not rely primarily on almonds for their income, losing vegetation meant losing a landscape whose maintenance was crucial to their identities. "The work of my father, my grandfathers, I can't see it torn out because some guy thinks it's the right idea," one man shared.

A small group of farmers organized, protested in the streets, and lobbied their case with every political party that would listen. They argued that eradication of Xylella was impossible given the range of hosts. Mass tree removal might also hurt the economic lifeline of the community: tourism. According to EU guidelines, once trees were removed land owners would be restricted from planting anything for 5 years. They would receive 19 Euros per tree for their loss. An already aging farming population might not replant, many feared, accelerating rural abandonment. The

weeds that regrow on untended land might also raise the risk of fires, another anticipated consequence of rural depopulation and a warming climate.

When I met the group, united under the title *Plataforma de afectados por la Xylella Fastidiosa de la provincia de Alicante* (AXFA, Platform for those affected by Xylella fastidiosa in Alicante Province), the sixth distinct focus of Xylella infection had been recently discovered by researchers who had in the months prior fanned out over the province to conduct microbial analyses of trees at risk. Much like Mallorca, farmers in Alicante told me they had noticed symptoms for many years and that the disease was nothing new. The woman who first detected Xylella in her orchard had been sending samples to a laboratory for 4 years. Given the pathogen's historic absence in Europe, it took extended, persistent efforts to identify the culprit as Xylella, renown among bacteriologists for its resistance to lab culture. Now facing the proposed uprooting of her surroundings, she regretted the care she had taken to send in so many samples.

Landscape purification was simply a futile bureaucratic performance, farmers claimed, advocating for a shift from attempts at eradication to containment. They cited scientific reports detailing the growing list of known plant hosts and insect vectors, the years that the disease had likely spread undetected, and the lack of successful eradication anywhere in the world. Farmers felt that the administration's decisions were based more on the budget than the biology. The European Union provided funding for eradication measures but not containment. Tree removal was also a business, which some suspected might have financial or political benefits for

those in office. Administrators dismissed rainfed almonds for being unprofitable, failing to see the trees as integral to the rural landscape. Unlike the powerful capital-intensive agro-industries of the region, citrus and olives, small-scale rainfed almond growers felt they were treated as disposable. “The administration only cares about productivity. The smell of almonds turns to pine and they say oh well.”

Farmer advocated for “living-with” (*convivir con*) Xylella, even though no one knew what that would mean. The difference, for them, was the care it would take. Learning to live with Xylella and contain its impacts would require long-term engagements with farmers and other landowners. It would require research and iterative, locally-situated, decision-making processes. It would require more thorough planning and continuous involvement. Pulling trees, by contrast, was seen as a means for the administration to act quickly and then walk away.

While I empathized with the affected farmers, I also empathized with administrators acting under extreme uncertainty. Swift action to stem an epidemic might be the most effective tactic for sparing the region and the entire European continent from widespread harm. Failing to act quickly presented greater risks. Yet ultimately farmers were seeking not just to save their trees, but to find a collaborative path forward to long-term landscape care.

3. CONCLUSION

3.1 The Intra-Action Of Pathogenicity

Plant epidemics, like Xylella, often produce cycles of blame, resentment, and deepened community divides. This may stem in part from treating the phenomenon (1) as an in*ter*action between separate biological and social actors – the pathogen is the enemy and the people respond well or poorly – and (2) as a unidirectional causal chain – a single event introduces a pathogen which wipes out a species. If the pathogen were the clear enemy, then its eradication would be simpler to manage. But like heat, awakening the bacteria within a tree, the pathogen's virulence is provoked by a broad assemblage of facilitating conditions. Xylella is not inherently antagonistic toward plants. Plant pathologists describe disease as the product of a pathogen-vector-host-environment complex. Xylella – spittle bugs – almond trees – climate, none of these is entirely non-human. Their conditions of possibility coproduce one another, constantly in dynamic relation with more-than-human assemblages. Various groups of human beings to varying degrees have helped Xylella travel across oceans, built stone walls and cultivated grain fields where spittle bugs thrive, anchored their agriculture with almond trees, and produced a warming world. Tourism, unstable land tenure, histories of marginalization, retreat of government from farm advising, these are all conditions of possibility for the Xylella epidemic too. None of these is a purely human affair. Each is encoded in the almond growing landscape itself: as untended farms, as older trees, as marginal soils, as Xylella spreading without being seen.

To admit the more-than-human and intra-active quality of pathogenicity is to relinquish a managerial logic. Containing the pest is only part of the picture. Such an

admission requires an ethical reckoning that goes beyond government funding for tree replacements. It broadens the scope of dialogue to reflect long-term commitments to the land. Understanding care as non-innocent avoids a good-bad dichotomy, asking difficult questions about *how* to care.

The vector of time in epidemiology encourages us to see disease spread as a series of discrete events. Yet in the eruption of an epidemic, past wounds, present transformations, and future fantasies or fears permeate one another. To embrace a pathogen as intra-active, emerging from within, is to exchange the causal chain inherent to blame for collective responsibility.

3.2 Toward a More-Than-Human Politics of Care

Care is perhaps most perceptible in its absence. Farmers felt a lack of care by government and a tourism-oriented culture. Bureaucrats interpreted trees with minimal management as lacking care. When the prospect that almond trees might disappear from the landscape is raised, either gradually by disease or suddenly by bulldozers, the agroecological maintenance work – a form of care – they provided becomes clear. The trees do not only produce almonds, they root more-than-human lives in place and across time.

Just as Latour argues we cannot abandon our monstrous technologies (2011), we cannot abandon our plant epidemics as mere unintended consequences or strictly biological phenomena to be contained and controlled. A more-than-human politics of care requires us to pay attention to the entanglements that allow such a phenomenon

to exist, to respond to each relation accordingly, and despite uncertainties, to collectively articulate futures of landscape care.

There is no saving Mallorca's almonds, at least not in the form they once took. What rural landscapes "living with" Xylella on the Iberian Peninsula might look like is an open question, potentially requiring dramatic reconfigurations of rural life. The Xylella epidemic was always about more than almonds. A more-than-human politics of care is not a call for protecting, preserving or proliferating any particular beings – plant, animal or otherwise. It is a call to see the web of *relations* among plants, farmers, insects, aquifers, bacteria, governments, petrochemicals, scientists, soils, and matter of all kinds as the site of politics where the ongoingness of specific configurations of existence is negotiated. It is a call to question the focus on an individual actor—be it a bacterium or a bureaucracy—as uniquely blameworthy, for the solutions thus proposed are likely far too narrow. A more-than-human politics of care demands we examine the slow processes at work in transforming landscapes—like tourism, land tenure and climate change—as well as the sudden discrete shocks. Care as politics does not presuppose any normative qualities: forms of maintenance and relation-building are multiple and will always create differentiated effects. Care redirects our thinking from linear causal chains and subject-object grammars to the mutual becoming of intra-actions. Pathogenic conditions are not anomalous, they are endemic to late capitalist life. To confront them we must not only take swift bold actions, but also to do the subtle, gradual maintenance work of understanding and transforming inherited relationships, broadening imagined constituencies,

acknowledging bonds of mutual responsibility, and in doing so weave new fabrics of more-than-human care.

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Chapter 1

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