

Spring 2020

"You Can't Milk an Almond": America's Consumption of Milk and "Milk's" Consumption of America

Miranda Cahill Sanborn
Bard College, ms3547@bard.edu

Follow this and additional works at: https://digitalcommons.bard.edu/senproj_s2020

 Part of the [Environmental Studies Commons](#)



This work is licensed under a [Creative Commons Attribution-NonCommercial-No Derivative Works 4.0 License](#).

Recommended Citation

Sanborn, Miranda Cahill, "'You Can't Milk an Almond': America's Consumption of Milk and 'Milk's' Consumption of America" (2020). *Senior Projects Spring 2020*. 177.
https://digitalcommons.bard.edu/senproj_s2020/177

This Open Access work is protected by copyright and/or related rights. It has been provided to you by Bard College's Stevenson Library with permission from the rights-holder(s). You are free to use this work in any way that is permitted by the copyright and related rights. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/or on the work itself. For more information, please contact digitalcommons@bard.edu.

“You Can’t Milk an Almond”:
America’s Consumption of Milk
and “Milk’s” Consumption of America

Senior Project Submitted to
The Division of Social Studies
of Bard College

by
Miranda Cahill Sanborn

Annandale-on-Hudson, New York

May 2020

Acknowledgements

Thank you to my advisor, Michèle Dominy, for supporting me throughout this whole process and through these past four years. Meeting with you always somehow brought me calm and motivation at the same time. Thank you for offering me tea and a stuffed monkey when I was overwhelmed, and for talking with me every week about milk. This project truly could not have come together without you.

To my mom and dad, thank you for raising me with such a deep appreciation for food and the earth, this project clearly stemmed from somewhere and I wouldn't have wanted it any other way. Thank you for encouraging me, no matter what I'm doing. Mom, thank you for being ready to help with any crisis or editing needs that I called you with these past few days. I actually don't think I could have gotten this done without you.

To my friends, thank you for always making me feel so loved and supported. To those at Bard, thank you for making our time here so wonderful and fulfilling. I love you all so much and I'm so proud of us.

Thank you to my teachers and to everyone at Bard College!

Table of Contents

Introduction	3
Chapter One: History and Rise of Milk Consumption	10
The Bankruptcies of Dean Foods and Borden Dairy Co.	
A (Very) Brief History of Milk in the United States	
Changes in Milk Production	
Mark Hyman and <i>Food: What the Heck Should I Eat?</i>	
Some More on Milk’s Healthfulness	
Environmental Impact of Milk	
Chapter Two: Almond and Oat Milk as Alternatives	32
Part I: Almond Milk	35
America’s Favorite Milk Alternative	
The Marketing of Almond Breeze	
Health Costs and Benefits of Almonds and Almond Milk	
Environmental Impact of Almonds and Almond Milk	
Part II: Oat Milk	48
New York City’s New Favorite Milk	
The Marketing of Oatly	
Health Costs and Benefits of Oats and Oat Milk	
Environmental Impact of Oats and Oat Milk	
Chapter Three: The New Milk Alternative	62
The Marketing of Hudson Valley Fresh	
A Closer Look into Small-Scale Dairy	
Conclusion	77
Bibliography	80

Introduction

Open your fridge. I'll bet you ten dollars that there is a carton of milk in there. If not, okay, then it's on your list to pick up from the store. If not, okay, maybe I owe you ten dollars. But what do I mean by "milk"? I would owe a lot more people money if I just meant cow's milk.

I came to want to write this project out of my own personal interest as a consumer of milk. Being from California, which grows the majority of the world's almonds, and hearing that it takes 1.1 gallons of water to grow one almond, I was avoiding almond milk out of loyalty and "environmental consciousness." This, thankfully, was not too much of a hardship, as I don't really think almond milk compares with the creaminess that milk gives my coffee. I wanted to know, however, if I should in fact be avoiding almond milk or if it was just the unfortunate scapegoat of California's water crisis.

Then I heard about oat milk: the hot new alt milk that all the cool coffee shops were suddenly offering, that my peers were claiming made their lattes creamier than they had ever been before. Was this the non-dairy milk that was going to taste the closest to the milk we had come to know so well?

The whole time though I was thinking, is there really that much wrong with dairy milk? I do not personally feel that I experience symptoms of lactose-intolerance, and I'm still buying and drinking dairy, so why am I also purchasing milk alternatives and paying more for them when I want a treat in my coffee? And furthermore, what are everyone else's reasons for doing it? I used coconut milk for a while, but I only bought a brand (So Delicious) that made their coconut milk thicker and creamier than others so it would resemble cow's milk more closely. I looked past the fact that the way they do this is by adding a lot of extra artificial ingredients.

This is all to say that I wanted to find out for myself what milk I should be drinking, but also why and how exactly this came to be such a critical decision.

Milk, after over a century of promotion as a nutritional necessity for both children and adults, is now a central part of the typical American diet. It is displayed in commercials as part of a “balanced breakfast,” been endorsed by celebrities with “milk mustaches” in one of the most successful ad campaigns in history, and has found its role in the minds of people all over the world as a nutritious and essential beverage to promote strong bones and childhood growth. However, what would you say if you found out that decades of this assurance and comfort were in fact a part of a massive campaign by the dairy industry to promote its product? Or that modern dairy production has resulted in very different milk than was produced when our grandparents were getting it dropped off in glass bottles on their doorsteps? At the same time, what would you say if you found out that, although you may still buy milk every week at the grocery store, milk consumption has been steadily declining since the 1970s? Or if you knew how many dairies had to close their doors because they were no longer making a profit from their product?

The title of this project, “You can’t milk an almond,” is a quote from US Representative Sean Duffy of Wausau, Wisconsin, as he was urging the FDA to ban the labeling of plant-based beverages as “milk.” Dr. Scott Gottlieb, the commissioner of the FDA, also commented on this issue, stating that “an almond doesn’t lactate” (Bowles 2018).

The first section of this paper will describe the history and politics behind dairy milk, its rise to becoming America’s favorite drink, and the challenges it faces today. In the past five months (as of May 2020), two of the largest milk corporations, Dean Foods and Borden Dairy Co., filed for bankruptcy, marking a shift in power in the food world away from dairy. The

reasons behind this are many, including something as seemingly unrelated as reduced cereal consumption, which results in lower milk consumption. However the trend also represents a change in the psyche of the consumer. The vast majority of Americans no longer drink three glasses of milk per day as the FDA advises them to. Instead, they put a splash in their coffee, half a cup to accompany their cereal, or use a couple tablespoons for their cake. Many Americans also are unable to drink milk because of its lactose or because they are otherwise sensitive to it. Many also avoid it because of animal rights, environmental, and health concerns. Many young people now even find the idea of drinking a whole glass of milk from a cow's udder a little gross. Many, however, still want some sort of milk-like liquid to replace it with. So they look for alternatives.

During the early 2000s when I was growing up, if a friend was lactose intolerant, they drank soy milk. I remember very clearly the cartons of Silk Soy Milk that lived in my friends' fridges. That, for all I knew, was the only option if, for whatever reason, someone did not drink cow's milk. Then came almond milk, becoming popular in the early 2000s and especially taking off in the early 2010s (while soy milk had been widely used since around the 1990s). While soy, almond, and other non-dairy milks have been around for centuries in other parts of the world, they have only recently made a huge splash in the United States.

This paper will explore the shifting of American ideals and trends, first to milk and then towards milk alternatives. It will then aim to provide information regarding the comparative costs and benefits of milk, almond milk, and oat milk, namely the environmental impact and health findings, as well as strategies for promoting and marketing each product. In order to

investigate how each milk's traits are relayed to the consumer, I focused on three brands, one for each milk: Almond Breeze, Oatly, and Hudson Valley Fresh.

If dairy milk represents an American identity and belief system that we have come to cherish, then almond milk and oat milk represent different stages in the present and future. Although almond milk developed into one of the most popular milk alternatives on the market, consumers have become increasingly aware of its flaws in terms of its environmental impact. One of the major criticisms is that almonds use large amounts of water, a resource that is relatively scarce in California's Central Valley, where the nut is primarily grown. Another criticism is that almonds are harmful to bee populations that are used to pollinate almond orchards each year. Because of this increased awareness, while almond milk represents the most popular alternative milk today, we are at a possible transition point towards more environmentally conscious purchasing.

Oat milk is beginning to stand out as an increasingly popular non-dairy option, and recently surpassed almond milk as the fastest growing milk alternative (*The Guardian*). With its rapid growth in popularity, oat milk affords a glimpse into what might be the future of milk choices: a broader range of options for consumers to choose based on their own personal priorities.

Although cow's milk may be slowly on the decline, every dairy alternative or non-dairy option is, in its very name, a comparison to milk. We have come to know cow's milk as essentially a neutral, baseline, control. Any milk that we drink, even if we do not actually like the taste of dairy milk, leads us to compare the two.

In order to find out what consumers are looking for in the milk they drink, I conducted interviews with moderated Bard College Environmental and Urban Studies (EUS) majors with an Interest in Food and Agriculture.¹ I conducted a total of six interviews over the course of March and April of 2020, both in person and over video. In order to keep their identities anonymous, I have given each of them a pseudonymous name based on their milk or milks of choice. I chose these students in order to zero in on a specific population of informed consumers, as they all have gained knowledge and experience through their field of studies. They are also all young, pursuing a higher education, and attending a private liberal arts college in New York, all of which make them fit the profile of having at least tried alternative milks and favoring priorities that would influence their purchasing habits. Although they did all have ethical, environmental, and health concerns about milk, and many do purchase non-dairy milks instead of cow's milk, there were other factors that came first for them. Factors such as taste, price, and shelf life all had a significant impact on the students' milk choices, as did the sheer comfort and nostalgic quality that dairy provides for many people. The profiles of my informants are below.

¹ One of the students that I interviewed was not an EUS major, but took a class called Planetary Consequences of Food Production with Gidon Eshel in the Fall of 2019, which gave them a lot of information on the topic. They also have a deep interest in Food and Agriculture.

Name: C.L. (Cream Line)
Year: Senior
Major: Environmental & Urban Studies
Home State: New York
Milk of Choice: Whole Milk
Brand: Ronnybrook
Priorities: Taste

Name: A.M. (Almond Milk)
Year: Senior
Major: Environmental & Urban Studies
Home State:
Milk of Choice: Almond, Oat
Brand: Almond Breeze
Priorities: Taste, Availability, Price
Relevant Classes Taken: Gidon Eshel, Farm Practicum with Katrina Light

Name: A.O. (Almond Oat)
Year: Senior
Major: Environmental & Urban Studies
Home State: California
Milk of Choice: Almond, Oat
Milk of Choice at a Coffee Shop(?): whole milk, unless it doesn't cost more to get almond or another alternative
Brand: Almond Breeze
Priorities: Longevity, Taste, Price
Relevant Classes Taken or Teachers: class on Food Systems with Kris Feder
Literature that has informed decisions: *Death by Food Pyramid: How Shoddy Science, Sketchy Politics and Shady Special Interests Have Ruined Our Health* by Denise Minger

Name: L.M. (Local Milk)
Year: Senior
Major: Environmental & Urban Studies
Home State: California
Milk of Choice: Half & Half, Dairy Milk
Brand:
Priorities: Local, Longevity, Taste, Ethics, consideration of Environment and Health
Relevant Classes Taken: Reimagined Farms Practicum with Katrina Light, Gidon Eshel's classes, including Planetary Consequences of Food Production, classes with Peter Klein

Name: N.D. (Non Dairy)
Year: Junior
Major: Environmental & Urban Studies
Milk of Choice: Oat
Priorities: Cost, Longevity

Name: O.M. (Oat Milk)
Year: Senior
Major: American Studies
Home State: Connecticut
Milk of Choice: oat milk, local cow's milk
Brand: Planet Oat, Oat Yeah!
Priorities: Taste, (Health)
Uses: cereal, baked goods, oatmeal
Relevant Classes Taken: Planetary Consequences of Food Production with Gidon Eshel, other?

Chapter One

HISTORY AND RISE OF MILK CONSUMPTION

Overview

This chapter introduces how milk evolved to become the central American beverage that it is today. From its use as a substitute for breast milk, to being advertised as indispensable nutrition that every person in the country must consume for its health benefits, to its decline in consumption, milk has been integral to the modern history of the United States, and reflects our changing values amid the rise of industry and automation, shifts in community and family life, and expanded environmental and social awareness.

The Bankruptcies of Dean Foods and Borden Dairy Co.

On November 12, 2019, Dean Foods, the largest milk company in the United States, filed for bankruptcy protection. The company had reported five consecutive quarters of losses, closed some of its plants, and laid off hundreds of employees. Two months later on January 6, 2020, Borden Dairy Co., another of the largest and oldest dairy companies in the US, also filed for bankruptcy. These two bankruptcy filings signify a radical shift in the role of dairy in the United States, a shift that has left the dairy industry struggling. Consumers who still drink cow's milk are gravitating more and more towards milk from smaller, local, often organic dairy farms. There has even been a movement to support raw milk instead of the pasteurized milk which has been the standard in this country for generations. In addition, many Americans are phasing out cow's milk and replacing it with alternatives made from nuts, soybeans, seeds, and oats. For a variety of reasons, consumer habits are changing and many companies are working hard to adapt.

Unfortunately for Dean Foods and Borden, the shift does not favor America's more traditional version of milk.

Founded by Samuel E. Dean Sr. in 1925, Dean Foods was created when milk in the US was a commodity in demand. The company witnessed the steep rise in milk consumption during the 20th century, and is now experiencing the effects of milk's decline. Dean Foods, which became a conglomerate of many well-known names in dairy, owns brands such as Dairy Pure and TruMoo, as well as makers of tea and juice such as Orchard Pure and Meadow Leaf. Interestingly, the company also used to be involved with organic milk and milk alternatives, owning a company called WhiteWave, which oversees brands such as Horizon Organic, Silk, and So Delicious. Dean Foods parted with these brands, however, in 2013, spinning off WhiteWave in 2013. WhiteWave was eventually bought by the French company Danone in 2016, creating DanoneWave, now called Danone of North America. One of WhiteWave's brands, Horizon Organic, is a major producer of organic cow's milk, labeling themselves "the brand that succeeded in bringing organic milk to the masses" (whitewave.com). Silk, which began with just soy milk, now makes an array of milk alternatives, including almond, cashew, coconut, and a brand of oat milk called Oat Yeah! So Delicious also makes coconut milk, coconut milk yogurt, and vegan ice creams and desserts.

In hindsight, after Dean Foods' bankruptcy filing, their jettisoning of some of the major alternative dairy brands seems like a "strategic error," as David Yaffe-Bellany points out in his New York Times article "A Milk Giant Goes Broke as Americans Reject Old Staples" (2019, New York Times). Yaffe-Bellany attributes the financial problems that have crippled Dean Foods in part to this growing market, saying the company "has found itself unable to compete as

plant-based and lactose-free dairy alternatives rise in popularity.” Dean Foods has also taken on a significant amount of debt, which means they have much less leeway to make strategic decisions, such as a return to the milk alternative industry or a complete rebranding. Quoting Matt Gould, a dairy industry analyst, Yaffe-Bellany writes that debt ““constrains your ability to try radically different things”” (2019, New York Times). Dean Foods clearly misread the trend towards alternative plant-based milk, and missed the opportunity to capitalize on the increasing popularity of its adjunct brands such as So Delicious and Silk. In choosing to focus exclusively on its conventional production of cow’s milk, it drove itself to the brink of bankruptcy.

Yaffe-Bellany also cites the development of private-label brands as competition from companies that were formerly customers of Dean Foods. Walmart, for example, used to be one of Dean Foods’ biggest customers, but in 2018 the superstore opened its own milk-processing plant. This simultaneously deprived Dean Foods of a major source of business, and created competition for the company. Walmart customers suddenly had a cheaper option, as a store’s private brand is typically sold at a noticeably lower price than are other brands.

Borden Dairy is another prime example of a major milk company with roots far back in American history which recently declared bankruptcy. Gail Borden, the company’s founder, supplied condensed milk to the Union Army during the Civil War, after developing the first successful commercial method of condensing milk, making it much more transportable and less perishable. This was the beginning of Borden Dairy, although the name was not formalized until 1919. Gail Borden and his partner opened a plant in upstate New York in 1861, and by 1930 had bought 200 other dairy companies in the US and had become the nation’s largest fluid milk distributor.

Elsie the Cow, named one of the top 10 advertising icons of the 20th century by AdAge in 2000, became Borden's mascot in 1936. Her smile still graces every Borden product, even their orange juice, which of course does not come from a cow, and her face is scattered all over the Borden website. The iconic cartoon of Elsie, who is indeed modeled after a real cow, appears pretty, friendly, and maternal. She presents a happy smile, has long black eyelashes, a yellow daisy chain around her neck, and poses in front of a big yellow flower- or sun-like shape. With these characteristics, Elsie not only appeals to cartoon-loving children and projects the idea that Borden milk is healthy for kids, but also attracts moms. Elsie is both a cow and a mother figure, with traditionally feminine features like long eyelashes, a flower necklace, and a perpetually sunny demeanor, and in cartoons which show her below the head, she wears a frilly apron. Elsie became the perfect mascot for Borden because mothers could identify with her as they bought milk for their families, and Elsie's benign image also implied that cows were always happy, even enthusiastic, to provide their milk.

Elsie has stayed central to Borden's branding for decades, and with her image Borden continued to expand, venturing into other businesses (including chemicals), and buying companies (Borden acquired 23 companies in 1987 for \$442.6 million). It experienced overall success until the early 1990s, and was eventually bought by a private equity firm, Kohlberg Kravis Roberts & Co., and sold off many of its other businesses, returning to being majority dairy.

Like most big dairy companies, Borden has been struggling with recent changes in milk prices and sales. In an article for CNN titled "One of America's Oldest and Largest Milk Producers Files for Bankruptcy," Chris Isidore quotes Borden's CEO Tony Sarsam speaking

about one of the company's major issues during the bankruptcy filing: "Despite our numerous achievements during the past 18 months," Sarsam shared, "the company continues to be impacted by the rising cost of raw milk and market challenges facing the dairy industry" (Isidore 2020). As Sarsam notes, the number of dairy farms in the country is shrinking (Sarsam states that more than 2,700 family dairy farms went out of business in 2019), meaning there are fewer suppliers of milk, which has driven wholesale milk prices up. At the same time, lower consumption of milk has caused retail prices to fall, causing a series of conditions that makes it challenging for milk processors like Borden to see the same level of profits they are used to.

Dean Foods and Borden are not the only major food or beverage companies that have been facing challenges recently, but the dairy industry represents a particularly stark example of the struggles these brands face.²

A (Very) Brief History of Milk in the United States

Milk was not always the mass produced staple beverage that it is now. Today, most Americans assume that milk has been consumed for as long as they can imagine. If there were cows, there was milk, and if there was milk, people must have been drinking it. Surprisingly though, regular consumption of fluid milk in the United States only began around 1840, and even then the majority of milk's consumer base was infants, when it was used as a substitute for breastmilk. Before then, cow's milk was a very minor part of the human diet. While many families and towns, especially in the Northeast of the US, had "family cows," the volume of milk produced was quite limited and most of that milk went to the production of butter and cheese,

² Others include Kraft Heinz, who's two brands, Kraft and Heinz, have been staples of the American table for decades/the last century. Only recently have they begun to notice drops in sales, as consumers have shifted more towards less processed foods.

which were central to the American diet. Sociologist and policy analyst, E. Melanie Dupuis from University of California, Santa Cruz, discusses this in her book *Nature's Perfect Food: How Milk Became America's Drink*, published in 2002 by New York University Press. The consumption of fluid milk by adults was “an afterthought,” Dupuis says, and it was often fermented or a by-product of butter production, typically used in cooking or fed to hogs. “In other words,” Dupuis writes, “from colonial times to the mid-nineteenth century, fresh milk was not a major American beverage” (Dupuis 2002, 5). So, how did it come to be perceived as a staple of every household, a daily necessity that every American had to have in the fridge at all times?

Back in the early and mid-nineteenth century, alternative baby feeding methods were becoming increasingly popular, with wet nurses and artificial feeding being two of the main methods. At this time, artificial feeding consisted primarily of cow's milk, as infant formula was not invented until the 1860s and not heavily advertised to mothers until the 1880s. Dupuis notes there were also social concerns that gave rise to these alternative methods. She mentions that husbands would sometimes discourage their wives against breastfeeding because of “cultural mores proscribing sex during the period of nursing” and “a desire to maintain their wives' fertility” (Dupuis 2002, 52). Nursing also required women to stay home, keeping them from “social and civic activities crucial to the attainment and maintenance of social status in urban society at the time” (Dupuis 2002, 52). By the mid-nineteenth century, cow's milk became a more popular alternative than a wet nurse, likely in part because it was much cheaper. Over time, the method by which one fed one's baby became a sign of class or status, since working-class

and poor mothers generally could not afford cow's milk or a wet nurse, so the majority of them still breast fed.³

In the late 19th and early 20th century, bad milk was targeted by New York City health officials and reformers in the movement to combat infant mortality in the city. At the time, babies were dying at an alarming rate. The infant mortality rate in New York City from 1898-1900 was about 137 per 1,000 births (NYC Department of Health). Many of them were dying of measles, scarlet fever, and gastrointestinal issues. This was likely due to poor sanitation, a lack of safety education among parents, and other factors, many of which were consequences of living in cramped, unclean spaces. Many of these babies were the children of immigrants living in tenement housing, which were notorious for their crowded and unsanitary conditions. Whether or not unsafe milk was the driving factor in the steep infant mortality rate, educating mothers and providing them with clean milk seemed to have been an important remedy and saved a lot of children. Around 1910, the New York City Department of Health's Bureau of Child Hygiene began setting up milk stations around the city that gave safe milk to mothers. There were also doctors stationed at these spots to answer questions any mothers might want to ask about taking care of babies. These safety measures, along with programs to empower and educate mothers as well as outreach to new mothers, greatly decreased infant mortality in New York City. As Dupuis explains, milk was a concrete and comparatively simple issue to focus on, and clean milk (eventually in the form of pasteurized milk) came to be perceived as a key element in saving babies in the early 20th century. In its role as an infant food for babies without available breast milk, cow's milk was viewed as a necessary food in American life. It had to be

³ Interestingly, very poor mothers and upper-class mothers may have had low or lack of milk production in common: the poor mothers often could not get sufficient intake of food, while the very upper-class women were subject to a standard of "dainty eating," in which they also likely did not get enough calories (Dupuis 2002, 52).

produced every day for these infants and, if breast milk was unavailable, there was no alternative (before the invention of formula). It provided necessary nutrients that babies could not get anywhere else and that meant that if the price of milk rose, people accepted the cost and still had to buy it. The widespread perception of milk as essential for babies set the stage for milk to be considered a beneficial necessity for older children and adults.

Dupuis, in *Nature's Perfect Food*, describes the framing of milk as, unsurprisingly based on her title, nature's perfect food. Using the concept of perfection to describe the narrative that was created around milk, she describes how this story was supported and perpetuated by early reformers of the milk system, nutrition experts, the US Department of Agriculture, and, of course, the milk industry. Milk came to be perceived as a pure, naturally occurring, downright perfect form of sustenance. Ironically, however, this natural food in its fresh, fluid form was not able to be consumed year-round, especially in hot cities where it could go sour within hours. Until the development of transport and refrigeration, milk was only drunk when the cows were producing milk, which was typically in the spring and summer, when there was lots of pasture for them to graze. It was only with the rise of cities and the development of an industrial food system that milk really began being consumed daily, year-round, and in large quantities (Dupuis 2002, 30).

This rise of popularity and consumption was largely due to an increased level of quality and safety, made possible by new developments in the food system. These included the glass bottle, developed in 1886, medical milk commissions who set a standard for "certified" milk, and tank cars, tank trucks, and railroads, which transported milk to cities (Dupuis 2002, 39). There were also strong efforts by milk reformers at the turn of the century to push milk pasteurization,

which was a huge turning point once it started being implemented. Pasteurization is a process invented by French microbiologist Louis Pasteur in the 1860s in which food is heated in order to sanitize it, eliminate pathogens, and keep it from spoiling as quickly. It first began to be used to sanitize milk in the 1890s by Sheffield Farms Dairy in New Jersey, which led to many other large dairy companies pasteurizing their milk (Dupuis 2002, 77). The public health debate over whether or not milk should be required to be pasteurized went on for many years. Around 1910, New York City made milk pasteurization law. Michigan became the first state to require state-wide pasteurization, with other states following shortly after (CDC “Raw Milk”).⁴

Changes in Milk Production

Over the next few decades leading up to around World War II, dairy production began to change. Although the number of farms in the country was declining, cows were bred to produce more milk, so overall production increased. According to a study for the American Society of Animal Science entitled “The environmental impact of dairy production: 1944 compared with 2007,” the average milk yield per cow rose from 2,074 kg of milk per year in 1944 to a whopping 9,193 kg per year in 2007 (Capper, et al. 2009). While annual milk yield per cow more than quadrupled, the number of cows shrank. In 1944, the US dairy system consisted of 25.6 million cows. In 2007 this population had fallen to 9.2 million. It is not surprising, considering

⁴ Today, most milk that you will find in the grocery store will be pasteurized. In 1987, the FDA issued a regulation prohibiting the sale of raw (unpasteurized) milk between states, but raw milk can still be bought in many states. As of 2016, according to the National Conference of State Legislatures, which is the raw milk legal information linked on the CDC website, consumers can buy raw milk in retail stores in 12 states. In 31 states, including New York, raw milk can be purchased only directly, for example from the farm, at a farmers’ market, or through a “cow share” program. Raw milk sales are prohibited for human consumption in the remaining 19 states, although it can be purchased for animal consumption in most (NCSL “State Milk Laws”).

general trends to raise efficiency and needs for increased agricultural production in the US, that when these two changes are calculated together, they result in an increase in total milk production. In 1944, those 25.6 billion cows produced a total of 53.0 billion kg of milk each year. In 2007, the 9.2 million cows that comprised the US dairy population annually produced 84.2 billion kg of milk.

This increase was made possible by agricultural technology created after World War II that allowed for specialized and greatly intensified production systems. According to Capper et al., production in the 1940s was pasture-based, with mostly “home-grown forages” (Capper et al., 2009). Whereas today, dairy cows eat mostly concentrates, typically made from crops such as corn and soy, with some of their diet including processed roughage and pasture. Milk yield, specifically, was able to be increased also by changing the breed of cows used, from Jersey and Guernsey, which have a higher fat content in their milk, to Holstein, which produce much more milk. In 2007, Holstein cows comprised 90% of the US dairy herd (Capper et al., 2009). Developments in genetic evaluation, which can identify cows that are most genetically ideal for milk production, artificial intelligence, and general technological improvements have all contributed to this massive rise in production. Milk yield also increased because of the use of more protein-rich foods for the cows, such as alfalfa and corn-based feed. Between 1900 and 1927, the area of alfalfa planted in the US rose from 6,000 to 11,401,000. By 1960, alfalfa covered 27,654,000 acres of the country (Dupuis 2002, 139).

This production and efficiency has continued to grow since 2007. According to the USDA National Agricultural Statistics Service, the database that was used in this study, annual

milk production per cow rose to about 10,609.9 kg in 2019, totalling 99,056,408,945.3 kg of milk produced in 2019 (USDA 2020, “Quarterly Milk Production”)⁵. As these numbers were recorded in pounds and then converted to kilograms, they are approximate.

The purpose of this study was to compare modern milk production systems with those of the 1940s, in order to examine the perception that the “pasture-based, low-input dairy systems” in use during the 1940s were more environmentally resourceful. The researchers wanted to compare the environmental impact of modern US dairy practices with those of historical systems.

According to the USDA, in 1975 the average person drank around 29 gallons of milk a year. In 2018, that number had dropped to about 17 gallons (USDA 2019, “Dairy Per Capita Consumption”). The decline has been relatively steady since the 1970s, with Americans drinking on average 26 gallons each in 1985, 24 gallons in 1995, 22 in 2005, and 18 gallons in 2015. Articles such as “America’s Milk Industry is Struggling. Don’t Blame Oat Milk” (Wiener-Bronner 2019) and “Got Milk? Might Not Be Doing You Much Good,” (Carroll 2014) offer various possible reasons for the decline. One of the main factors is that people are simply replacing milk with other beverages. These are not necessarily direct replacements for milk, such as non-dairy milks, which have taken off since the 1990s. Replacements also include water and juice, since Americans reason that they can get their nutrients elsewhere (Carroll 2020).

This downward trend in milk consumption continues, despite the fact that the USDA still recommends that American adults drink two to three glasses of milk every day in order to

⁵ <https://www.ers.usda.gov/data-products/dairy-data/>

maintain their health (USDA 2020, “MyPlate”).⁶ Contrary to these current recommendations, in 1977 when the 1977 Dietary Goals for the United States was released, the federal government gave no special attention to milk or dairy products, did not encourage Americans to eat or drink more of them, and did not even include milk in its final recommendations. In response, the dairy industry lobbied Congress to give dairy more attention and to recommend it to the American people, pushing Congress to create a dairy promotion board and “checkoff” program. This lobby created a powerful campaign that went on to fund, and still funds, milk ads and many dairy-related research studies. As Marion Nestle states in her *Food Politics: How the Food Industry Influences Nutrition and Health* (2013), a large part of this push and investment in advertisements for milk was “aimed at reversing a 30-year decline in milk consumption” (Nestle 2013, 80). One very successful example of these ads was Got Milk?, released in 1993 and funded by the California Milk Processor Board. By getting beloved celebrities to pose with “milk mustaches,” Got Milk? became one of the only ad campaigns to span generations and become ingrained in the minds of the country. By 1992 when the first food pyramid came out, the USDA was recommending two glasses of milk per day for adults. In 2011, when MyPlate replaced the pyramid, the daily recommendation had been raised to three glasses a day, where it remains today. Hyman attributes this major shift in favor of dairy to lobbying and increased spending in Washington by the dairy industry, stating that “today, the \$47-billion-a-year dairy industry is one of the most influential food lobbies on Capitol Hill” (Hyman 2018, 81). He also notes that, according to the Center for Responsive Politics, the dairy industry gave nearly \$46 million to influential politicians between 1990 and 2016.

⁶ <https://www.choosemyplate.gov/eathealthy/dairy> . Accessed: May 2, 2020

Mark Hyman and *Food: What the Heck Should I Eat?*

It is important to explore the sources from which consumers are getting their information about milk as something they should or should not drink. Dr. Hyman is a #1 New York Times Bestselling author, and this book is currently one of the more popular health advice books published by a licensed doctor. Of course, this is just one book and it reflects the particular opinion of Dr. Hyman, but it has had a tremendous influence on consumers.

Dr. Mark Hyman, M.D. is a leading speaker and writer in the field of Functional Medicine, as well as a practicing family physician. He is a strong advocate for the power of the choices we make when we eat, and the importance of making informed and educated choices about food and nutrition, both as a consumer and in terms of health. He points out the huge role that food corporations and industries play in manipulating consumers' eating habits, often leading to obesity, diabetes, and other health issues. Hyman has testified before the Senate Working Group on Health Care Reform on Functional Medicine, participated in the 2009 White House Forum on Prevention and Wellness, was nominated for the President's Advisory Group on Prevention, Health Promotion, and Integrative and Public Health, and is a New York Times bestselling author (Mark Hyman website "About").⁷

In his 2018 book *Food: What the Heck Should I Eat?* Hyman devotes individual chapters to various food groups, breaking them down into how they affect and are affected by the economy, politics, and the environment, and what they mean for our health. Hyman devotes a whole chapter to "Milk and Dairy," laying out the political, environmental, and nutritional history of milk, and ultimately advising his readers to limit their dairy intake and, if they do

⁷ drhyman.com/about/

choose to eat dairy occasionally, stressing that it should be grass-fed, full-fat, additive-free, and ethically and sustainably raised. This is assuming the consumer is not lactose intolerant, allergic, or sensitive to dairy. If this is the case Hyman advises to avoid dairy at all costs. Hyman bases his advice mainly on health concerns, citing studies that the calcium we have come to value in milk does not prevent bone fractures (both in adults, young adults, and children), and therefore does not mean stronger bones (exercise is what makes bones stronger), and warning that dairy can cause a multitude of health problems. He also points to “Big Dairy” as the origin of the government guidelines and ad campaigns that coerced Americans into believing milk was essential. Hyman’s other concerns include the industrialization of dairy and its environmental impact.

In regards to health, Hyman claims that milk may potentially do more harm than good (and he doubts that it does much good anyway). He cites a 2013 study published in *JAMA Pediatrics* by Harvard’s David Ludwig and Walter Willett, two of the leading nutrition scientists in the nation, that indicates that hormones in milk are potentially carcinogenic.⁸ Hyman explains that the purpose of cow’s milk is to help a calf grow and “bulk up fast” (Hyman 2018, 84). When cows are milked while pregnant, as they are in modern industrial practices in order to get the most out of each animal, their milk is “brimming with hormones” because they are getting ready to feed a newborn (Hyman 2018, 84). As these hormones are meant for calves, they are anabolic hormones, meaning they stimulate muscle tissue growth, which, Hyman says, may promote cancer in humans, in that they may cause increased cancer cell growth. Hyman cites IGF-1 as the most troubling hormone in milk.

⁸ The study is: Ludwig DS, Willett WC. Three daily servings of reduced-fat milk: an evidence-based recommendation? *JAMA Pediatr.* 2013; 167(9):788-89.

The USDA's dietary guidelines are one of the first places a consumer might go to find out what is "healthy," both for themselves and for their family. If the government recommends it, why would it be untrue or misguided? The pyramid and the plate are both accessible and easy to read tools designed for the average American to use. It is disillusioning to realize that the food pyramid and MyPlate are not based strictly on nutritional guidelines, but are influenced by lobbying and political maneuvering. But the truth is that if tens of millions of dollars are funneled into efforts to sway these guidelines to favor a certain food group (which was only made into a "food group" after the initial push from the dairy industry in the '70s and '80s), the recommendation will almost certainly fall in favor of that group.

While some consumers may look to the government's MyPlate for guidance, others will turn to scientific studies for their nutritional information. In this case, Hyman points out that as of 2015, out of a committee of scientific experts that develop dietary guidelines in the US, two of them had financial ties to Big Dairy: one was a paid scientific consultant to the national Milk Processor Education Program, and the other was a member of the Dannon Institute Scientific Council (Hyman, 82). Hyman also refers to analysis in *PLOS Medicine* which concluded that studies on nutrition funded by the dairy industry were eight times more likely to find health benefits associated with drinking milk than studies that received no funding from dairy. This reveals a direct bias of studies backed by dairy.

Some More on Milk's Healthfulness

Milk contains calcium, phosphorus, vitamin A, vitamin D, B vitamins, and protein, all of which the human body needs. It is required in the United States for cow's milk to be fortified

with Vitamin D. The USDA also recommends that Americans drink lowfat or nonfat milk, even though many of the nutrients in milk are fat soluble, meaning in order to absorb them, the body needs fat. Because of this, many nutrition experts and doctors (such as Hyman), argue that if a person is going to drink milk, they should drink whole milk in order to make sure they are actually getting all the good nutrients they want out of it.

While Hyman urges his readers to limit their dairy intake because of health and ethical concerns, the opinions of experts in regards to dairy milk's healthfulness span a wide range and the topic is still in dispute. While the government recommends that Americans drink two or three cups of low- or non-fat milk every day, some scientists, such as Ludwig and Willett, warn it could cause negative health implications. Others, still, say that it does not matter all that much either way, telling readers to drink milk if they want and are not sensitive to it, but that it will not give them much nutrition that they are not able to get somewhere else. The media also varies in their advice to consumers, who are met with a barrage of competing pro-milk, anti-milk, and milk-neutral articles, making the decision even more challenging.

In September of 2019, Healthy Eating Research (HER) at Duke University organized a panel of experts in health and nutrition to establish recommendations (or revise current recommendations) on beverages for children. The project was funded by the Robert Wood Johnson Foundation, a nonpartisan foundation. The group consisted of representatives from The Academy of Nutrition and Dietetics, the American Academy of Pediatric Dentistry, the American Academy of Pediatrics, and the American Heart Association, and a scientific advisory committee. The panel came to the consensus recommendation is very similar to the USDA's Dietary Guidelines for Americans, which is 2 cups per day for children ages 2 to 3 years and 2.5

cups per day for children ages 4 to 8 years. In regards to infants, the panel recommends that children under 12 months “avoid consuming milk due to risks for intestinal bleeding in their developing gastrointestinal tracts and because it is not well suited for meeting infants’ nutritional requirements. Children younger than 12 months often get the nutrients found in dairy products through formula, breast milk, and complementary foods (for infants ages approximately 6 to 12 months), such as yogurt or cheese” (Healthy Beverage Consumption in Early Childhood, 2019, 14).

It makes sense that milk would be recommended to young children, especially under the age of two, since it has nutrients that infants need, fat that is believed to aid in brain development, and is produced to nourish newborn mammals. However, after recommendations for young childhood, there is a rampant disagreement among experts. If most humans’ production of lactase, the enzyme that digests dairy, begins to decrease around the age of two, and we have a much broader diet with so many other nutritious foods in it, is milk still so necessary? In a 2020 *New York Times* article referencing the Healthy Eating Research project entitled “Milk and Juice Are Not as Needed as You Might Think,” Aaron E. Carroll states that “there’s very little high-quality evidence, and no comparable mammalian example, to argue for the specialness of cow’s milk after this period.” Arguments that it is healthy because of protein and vitamins “could be made about many, many other foods,” Carroll says, “but those foods don’t receive such official recommendations of support” (Carroll, 2020). This seems to be a popular conclusion, especially among mainstream news sites, that there is a dearth of evidence that milk provides unmatched benefit to an adult balanced diet. Mark Hyman even lists in his

book fourteen other foods, such as sardines, collard greens, and even almonds, that contain just as much if not more calcium as milk (Hyman 2018, 83-84).

Environmental Impact of Milk

Milk is often questioned and criticized for the large impact it has on the planet. Water and land are both used to feed the cows, who need to eat a lot, and water is also used for things such as cleaning and drainage on the farm. Producing feed also contributes to greenhouse gas emissions, and cows, as they are ruminants, produce methane. Because of this it is important to examine various environmental factors through which milk production contributes to resource use, pollution, and climate change.

When considering the environmental impact of milk, a distinction must be made between milk and beef. Although the two come from the same animal, dairy production uses less resources than beef does. In the 2014 study “Land, Irrigation Water, Greenhouse Gas, and Reactive Nitrogen Burdens of Meat, Eggs, and Dairy Production in the United States,” Eshel et al. compare the impact of various types of animal-based protein, including beef and dairy. They state that “the environmental costs per consumed calorie of dairy, poultry, pork, and eggs are mutually comparable... but strikingly lower than the impacts of beef” (Eshel, et al. 2014, 1).

A modern dairy cow typically gets pregnant about three or four times in her life, and each time she gets pregnant, she produces milk. On the other hand, once a beef cow is slaughtered, there is a limited supply of beef that can be obtained from that cow. Lactation, or the time that a cow makes milk after giving birth, lasts about one year, and the cow is dry for only about eight weeks of that period. According to the USDA National Agricultural Statistics Service (NASS),

in 2019, the average annual milk production per cow in the US was about 10,726 kg (or 23,646 lbs). This would presumably mean that each time a cow gets pregnant she produces about this much milk. This section will lay out water use, land use, and emissions of typical industrial dairy production today.⁹

The 2019 BBC article by Clara Guibourg and Helen Briggs “Climate Change: Which Vegan Milk is Best?” is an example of information which a typical milk consumer who is interested in environmental issues would easily find with a quick internet search. This article lays out the environmental impact, based on water use (L), land use (sq m), and emissions (kg), of dairy milk, almond milk, oat milk, soy milk, and rice milk.

Water Use

A 2010 study by M.M. Mekonnen and A.Y. Hoekstra entitled “The Green, Blue and Grey Water Footprint of Farm Animals and Animal Products” found that the total global average water footprint of milk was 1,020 L/kg, accounting for 19% of the total global animal production water footprint. Milk comprised the second largest percentage, after beef cattle, which accounted for one third of the total footprint (Mekonnen et al. 2010, 29). In Mekonnen et al., 2010, the “footprint” covers both direct and indirect water usage, spanning the whole supply chain of the product. This includes feed crop cultivation, livestock farming, processing, and shipping to the retailer and the consumer. Throughout the whole dairy manufacturing process, from the production of milk to selling it to the consumer, the largest water use comes from the very first step: growing the cows’ food.

⁹ Other factors such as reactive nitrogen, which affects soil health, are also very important but are not included in this section.

The amount of water used is determined by how much food the cows are eating and what their food consists of. Feed conversion efficiency is the amount of feed it takes to produce a given amount of a substance, in this case, milk. Because cows move around more in grazing systems, they require more food. This means that feed conversion efficiency increases as production moves from industrial, to mixed, to grazing. The composition of this food is a big factor in water use however, since different kinds of feed require varying amounts of water to produce. Feed concentrates, which typically consist of crops such as corn and soy, and are used in industrial systems, tend to create a relatively large water footprint compared to roughages such as grass, crop residues, and fodder crops, which have a much smaller water footprint (Hoekstra 2012, 5).¹⁰ In this case then, as one moves from industrial to grazing techniques, the water footprint of feed for cattle decreases.

Hoekstra, in his 2012 study “The hidden water resource use behind meat and dairy,” also emphasizes the importance of investigating where the food is being produced. One reason is to determine whether the land being used for grazing could be otherwise converted to cropland. “The social and ecological impacts of water use at a certain location depend on the scarcity and alternative uses of water at that location,” he states (Hoekstra 2012, 6). As with all other aspects of agriculture, water use can be a major consideration depending on the location of production. High water use in the drought-ridden Central Valley of California is very different from high water use in upstate New York, which gets plenty of rain.¹¹

¹⁰ Cows, like other livestock, are often fed a variety of feedstuffs from various locations that are hard to trace, so it is difficult to say exactly how much water or other resources these feedstuffs actually used.

¹¹ California’s Central Valley is one of the major sources of the country’s food, but has also experienced major droughts and water scarcity. This is discussed in more detail in Chapter Two.

In their 2014 study, Eshel et al. found that 2,977 liters of water were used per kilogram of protein in dairy production. This study however, is taking into account all dairy, not just milk as the Hoekstra study is.

Land Use

The large majority of land use in large-scale dairy goes towards the production of food for the animals. A typical dairy cow's diet usually consists mainly of a mix of forage and grass from grazing in pasture, alfalfa, hay, silage, and concentrates. They are also often fed vitamins and minerals, especially after giving birth. Concentrates are things such as corn, soy, oats, barley, and byproducts from food production, and provide extra carbohydrates, protein, fat, and nutrients to the cows. Brewer's grain (or spent grain), which is the solid product left over from beer or malt beverage production, is an example of a byproduct and is often bought by farms from breweries and fed to livestock.

According to the 2014 study conducted by Eshel, et al., a typical dairy cow's diet consisted of about 11.7% pasture, 28.3% processed roughage, and 60% concentrates. This of course differs based on the farm, location, farming style, and other factors. Eshel et al. found that dairy uses 152m^2 land/kg protein.

Emissions

Greenhouse gas emissions are another aspect of dairy that consumers often raise concern over, as cows produce the gas methane naturally and a lot of energy often goes into producing cows' feed. In the 2019 BBC article on dairy and non-dairy milks' climate impact, authors

Guibourg and Briggs cite Poore and Nemecek, 2018 to provide data regarding emissions from each kind of milk. They state that dairy milk accounts for about 3.14 kg CO₂e per liter of milk. Guibourg and Briggs explain that this means that if you drank one glass of milk per day (a glass is quantified in this article as 200ml), over the course of one year your milk drinking would account for about 229kg of emissions.¹²

Capper et al., 2009, points out that the emissions of a modern dairy cow are much greater than that of a dairy cow in 1944. However, due to the increase in milk yield per cow and decrease in the number of dairy cows in the US, the total emissions levels per kg of milk have fallen, as have water use, land use, and the amount of other resources used.

¹² One US cup measurement is 8 fl oz, which equals 240 mL, so this measurement is slightly less than one 1 US cup.

Chapter Two

ALMOND AND OAT MILK AS ALTERNATIVES

Overview

If milk is defined by the Food and Drug Administration as “the lacteal secretion... obtained by the complete milking of one or more healthy cows,” then alternative milks are not in fact milks (FDA.gov).¹³ Alternative milks, milk alternatives, non-dairy milks, plant-based milks, vegan milks, mylk, insert-plant-based-substance-here-drink, whatever you call them, are milk-like liquids derived from a plant. These plants can be nuts, coconuts, soy beans, oats, rice, hemp, flax, or anything else from which you can extract milky liquid. Alternative milks are typically made by blending the main ingredient with water, sometimes after soaking it, and then optionally adding things like salt, sugar, flavors, and, if commercially produced, preservatives and stabilizers. Because of these methods, not all plant-based milks carry the same nutritional value, environmental impact, texture, or flavor as others. Without additives such as xanthan gum, guar gum, and carrageenan, for example, you might wonder why your almond milk is so thin. These are often used to make plant-based milks pass as more similar to dairy milk, as its thick, creamy texture is the norm that consumers are typically accustomed to and sometimes crave. Many now also come fortified with nutrients such as calcium and B12, again to make them more comparable, this time nutritionally, to cow’s milk.

Alternative milks, however, are nothing new. The first recorded non-dairy milk was almond milk, documented in 1226 in the *Kitab al-Tabikh*, a Baghdadi cookbook (Franklin-Wallis 2019, Shurtleff, et al. 2013). Soy milk, made from soybeans, was first mentioned in writing

¹³ <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?fr=133.3>

slightly later, in the 14th century in a Chinese document. Almond and other non-dairy milks have also been found in medieval recipes, presented as alternatives to cow's milk (Franklin-Wallis 2019).

Flash forward to the 20th century, when plant-based milks were just beginning to reach the West. In 1956, the Plantmilk Society was established in London by Leslie Cross, who was then the vice-president of the British Vegan Society, and the group set out to find an alternative to cow's milk on the basis of their objection to "the cruelty of the dairy industry" (Franklin-Wallis 2019). They eventually settled on soy because of its protein content. Soy milk was further developed and sold by Philippe Vandemoortele, who went on to create the very successful Belgian non-dairy food and beverage brand Alpro, and soy milk took off in the late 1990s. The brand Silk launched its soy milk in 1996, and soon discovered that if they put their product in the refrigerated section next to dairy milk their sales would increase dramatically. Providing consumers with a lactose-free, vegan, "animal-friendly" alternative, soy milk quickly grew to become the most consumed alternative milk in the United States. Soy milk has a similar amount of protein, less fat, and less sugar, than milk and often has added calcium, vitamin A, and vitamin D, giving it a comparable amount of these nutrients which make it a very attractive alternative. It was often marketed as a healthier choice than dairy. Not long after soy milk's rise in popularity, however, people began to criticize its taste and raise possible health concerns. This was likely a large reason why soy milk started to see a decline around the early 2000s, with consumers worried about the phytoestrogens in soy, which have led to concerns of soy contributing to breast cancer and other health issues, especially in women. Whether these concerns are valid is still under dispute, but they have made many customers wary of soy milk.

One Bard student that I interviewed stated “soy milk and its health concerns have deterred me from it, otherwise I think it’s great” (A.M. April 2020).

Soy milk was still the most popular milk alternative for years, having been surpassed in popularity by almond milk only in 2013. By 2018, while soy milk still accounted for \$230,341,283 in yearly sales, almond milk had long surpassed it at \$1,208,102,467 (Nielsen 2018). Almond milk, which many regard as safer than soy milk, now stands as the favorite alternative milk in the United States.

Over the past four or five decades, Americans’ tastes have been changing. Overall, consumers, especially those who are more liberal and affluent, are turning away from the processed junk food that crowds the shelves of supermarkets and have been gravitating towards products labeled “organic,” “natural,” and “grass-fed,” and those that contain whole foods and fewer ingredients. More people than ever are identifying as gluten-free, plant-based, vegetarian, vegan, and dairy-free, and both a cause and an effect of this is a sweeping trend of plant-based alternatives. The plant-based beverage industry is currently a \$9.8 billion market (Wertheim 2018). This trend has generated a lot of conversation about the costs, including health, environmental, and economic costs, of animal-based products, which include milk. Even if you have never read anything about milk’s effect on your health, chances are you’ve heard someone remark that milk might be bad for you, how we’re the only animals who drink milk after early childhood, or even just how they realized that “milk is so weird if you think about it.” These negative messages about dairy milk are especially interesting because they are in direct conflict with what Americans heard for decades: that milk is not only good for you but essential for a strong body and a healthy life.

With this shift in perception has come the rise in alternatives so that people can still have the comfort and habit of drinking milk or putting it in their coffee and tea, but without the lactose or other issues they have with cow's milk. Milk alternatives also taste different than cow's milk, which is perceived as both a good and a bad thing, depending on how people feel about the taste of cow's milk.

A very large producer of alternative milks is Silk, owned by WhiteWave, which was previously owned by Dean Foods. Silk makes a range of alternative milks, such as almond, cashew, and, arguably its most classic, soy. Almond Breeze, Califia, and So Delicious are just some other top plant-based milk brands.

The dairy industry has not been happy with this growing trend, and in 2019 responded with the DAIRY PRIDE Act, or the Defending Against Imitations and Replacements of Yogurt, Milk, and Cheese To Promote Regular Intake of Dairy Everyday Act. This Act argues that the FDA should not let non-dairy beverages use the label "milk."

Part I: Almond Milk

America's Favorite Milk Alternative

If you have heard of alternative milk, you have heard of almond milk. Almond milk is typically made by soaking almonds and then grinding or blending them with the addition of water. Commercially produced almond milk is then often pasteurized to make it more shelf stable, and homogenized.

Until the early 2000s, almond milk remained popular only among small and specific groups, such as lactose intolerant individuals averse to soy, early health food fans, and vegans. It

only came to surpass soy milk because of the health concerns people started having regarding soy. As the 2019 *Guardian* article “White Gold: The Unstoppable Rise of Alternative Milks” states, “The Blue Diamond Growers,” makers of the now incredibly popular Almond Breeze, “sensed an opportunity” in 2008 and ran with it (Franklin-Wallis 2019). As author Oliver Franklin-Wallis writes in this article, the executives at Almond Breeze knew that the only way they were going to truly compete with Silk soy milk, which was the leading soy milk brand at the time (as it is now), was by getting their product into the refrigerated milks section.

Franklin-Wallis refers to these refrigerated cases as “high-traffic” and “fiercely competitive,” as supermarkets closely regulate and charge for shelf space. At the time, Silk was owned by Dean Foods, one of the largest dairies in the country, and Dean had “leveraged its industry clout” to get Silk put next to dairy milk. Following this strategy, Blue Diamond “established a partnership with the second largest dairy in the country,” writes Franklin-Wallis, quoting Al Greenlee, Blue Diamond’s director of marketing. Blue Diamond also targeted neighborhoods in Florida with large Hispanic populations, who have a higher genetic rate of lactose intolerance. At the same time, the California almond industry began a huge campaign to get the word out about the health benefits of almonds, funding research, publicizing findings, and putting substantial funds into almond marketing. The campaign was a success, and word spread quickly and almonds were declared a superfood. By 2015 almond milk accounted for \$894,650,036 in sales and about 5% of the total milk market (dairy and non-dairy milk) (Nielsen 2016).

The increase of almond consumption is not expected to decline, according to Richard Waycott, president and CEO of the Almond Board of California: “We don’t see a cap on growth at this point” (McGivney 2020). With the total value of almonds also increasing in the US, from

\$666,487,000 in 2000 to \$5,468,040,000 in 2018, this makes perfect sense (USDA 2020, “Tree Nuts Yearbook”). This market is also beginning to be dominated not by small farmers, but by huge companies that have the money to sit on a new orchard for a few years before they start to see returns.

The Marketing of Almond Breeze

Almond Breeze, the name of the almond milk produced Blue Diamond, is currently one of the most popular almond milk brands in the US. Blue Diamond, based in California, is also one of the world’s leading almond suppliers. The Almond Breeze website opens onto a page dominated by blue and white backgrounds and graphics.¹⁴ At the top of the page, the blue, orange, and white Blue Diamond Almonds logo sits right in the center. Upon entering the site, the Bard students I interviewed had the most negative reactions to the Almond Breeze website out of the three brand sites, saying “this one is clearly corporate” (C.L.) and “I don’t trust them already” (A.M.). The whole website is full of blue and white, evoking light, breezy (Almond Breezy?), slightly clouded skies, making visitors feel as though they are outside in one of the almond orchards featured many times on their homepage, among the white almond flowers pictured on each of their products’ packaging. The whole site evokes purity and cleanliness, and follows a palette referring to sky, clouds, almond flowers, and almonds.

The “Products” section includes all of Blue Diamond’s products: Snack Almonds, Almond Breeze, Nut Thins, and Baking Ingredients (Almond Flour). The “Company” tab also features a dropdown menu with many different tabs, highlighting the importance of quality, their history, and how they focus exclusively on almonds. The menu gives special attention to these

¹⁴ Almond Breeze website. Blue Diamond. <https://www.bluediamond.com/brand/almond-breeze>

three things with sections that read “Blue Diamond Story: Quality is Our Legacy,” “Our History: Perfected Over Generations,” and “Our Craft: Almonds Are All We Do.” Almond Breeze uses words like “legacy” and “generations,” which both evoke a sense of family and, in this case, a farm being passed down from parent to child for generations. The company also refers to their business as “Our Craft,” implying a sense of artistry, passion, and community. They also emphasize that they are focused only on almonds, conveying to the consumer that they are dedicated and satisfied with what they do. In this way they communicate that they are confident enough with the almond business that they do not feel the need to expand to other non-almond products.

Below the tabs the visitor is greeted with a large image that features an array of all the different flavors of almond milk cartons (Vanilla, Original, Chocolate, unsweetened varieties, and creamers). At the top of the image, “Almond Breeze” is written in curved, casual but clean letters. White with a dark blue outline, the words stand out but also blend with the varying shades of blue that make up the background of the image. Under the Almond Breeze logo reads “NEW PACKAGING SAME DELICIOUS ALMONDMILK.” Almond milk is spelled as one word on the Almond Breeze website and the packaging, followed by a ® symbol. This suggests that the drink is a special product unique to Almond Breeze. Rather than “almond milk,” as in the “milk” of almonds, the company markets it as “almondmilk,” a new and intriguing word that is its own individual product. Many other brands do this as well, such as Silk and Califia Farms.

On the “Blue Diamond Story” page, the site visitor is greeted with “Almond Quality is Our Legacy” written in large white letters over an image of a man tending to or harvesting almonds from a tree full of beautiful white blossoms. Underneath, sandwiched between more

copy about quality, innovation, and “commitment to a craft,” is an image of what looks like two almond farmers in front of a long row of light pink blossoms and one of the top of a white barn against a clear blue sky. Like much of the Almond Breeze website, this page is quite image-heavy, with only short, one- or two-line chunks of text and punchy phrases such as “Quality doesn’t happen by chance” and “We are The Almond People.” The most informative section of this page is Almond Breeze’s explanation that it is a co-op of “more than 3,000 growers with one guiding goal, to bring the benefits of almonds to the world.” They add “we’ve been pioneering how almonds are enjoyed for over 100 years.” Here, Almond Breeze introduces the concept of being almond “pioneers,” which is prevalent throughout the website, and also describes itself as a co-op, but fails to offer many specifics about either of these concepts.

The “Our History” section opens with an image of what we can assume is three generations of almond growers: a man in a Blue Diamond Growers hat, one in a Heinrich Farms hat, and a young child. Below is a timeline that lays out Blue Diamond’s history, describing how the company went from simple “California pioneers” in 1850, to founding The California Almond Growers Exchange in 1910, to becoming Blue Diamond and, today, “bringing the benefits of almonds to the world.” Again, Blue Diamond uses this word “pioneers” to describe its roots, creating this narrative of its founders as courageous, brave, willing to push past boundaries and endure hardships in order to make better lives for themselves. Simply the word “pioneers” paints a picture in the reader’s mind of innovation and leadership in tapping into a market, which seems to be foundational to Blue Diamond’s brand message. The use of the word also appeals to American ideals, since we associate the word “pioneers” with the creation of the United States and with the fulfilment of the American Dream, and we admire pioneering spirit.

The page goes on to say how in 1910, The California Almond Growers Exchange “[led] development of California’s almond industry from a minor domestic specialty crop to the world leader in almond production and marketing.” This reinforces the message of the American Dream, that a small determined group of workers followed their passion for almonds and persevered to become one of the largest almond producers in the world. The company seems to take a lot of pride in this and uses it to its advantage, featuring many old photographs of factory buildings with their old company name, young women working and happily sorting almonds, and a man with a microscope next to big burlap sacks filled with millions of pounds of almonds ready to be inspected. The page then moves into the 1940s through 1980s, with color images of vintage ads, highlighting their “A Can A Week” ad campaign which featured real almond growers. These ads, along with the images of the workers, not only depict Blue Diamond as a fun, lighthearted company but also humanize it. Just as they did with the “A Can A Week” campaign, the company wants its consumers to see Blue Diamond as a small, personable company, one that they can trust.

The page then skips to 2010, highlighting the enormous growth of the company with an image of a mechanized almond picker driving through a row of trees and noting the “record-breaking global demand.” They also mention their expansion in 2013, opening a new plant in California to double capacity and the Blue Diamond Almond Innovation Center, “the world’s first and only research center dedicated to almond product innovation.” Alongside the copy is an image of two people working at the new plant and one of two very happy looking young women “innovating” in white chef coats, with sun streaming into the white room from behind them. While the image of the two plant workers looks pretty real and candid, this image

of the women in the “Almond Innovation Center” looks completely staged and seems almost as if they are in heaven or some perfect idealized world. This same image is used on the Our Craft page, blending into the white, light, breezy aesthetic of their site and emphasizing the narrative of Blue Diamond as an effortlessly innovative, pioneering group of individuals.

“Our Craft,” the third page of the highlighted sections explaining the qualities of the company, begins with “Almonds Are All We Do.” It continues to “The Blue Diamond Way,” which lays out the three main points that they are trying to drive home: 3,000 Growers Strong, Advanced Manufacturing, and Rigorous Quality Assessments. Under 3,000 Growers Strong, they reiterate that they are a cooperative, who “carefully grow and harvest the freshest California almonds, as generations did before them,” strengthening the idea of Blue Diamond as a humble collective, formed over generations. With Advanced Manufacturing, they highlight the use of “state-of-the-art technology” which they have “pioneered and improved for generations.” Again, Blue Diamond reinforces the image of the company as pioneers, and highlights its improvement over the course of several generations. The word “generations” is immediately connected with family, leading the viewer to assume that Blue Diamond farms are family farms, which are often associated with being wholesome and trustworthy. Not that this is a false narrative for Blue Diamond farms, since one family has in fact managed much of the company for several generations. The “Meet Our Growers” section of the site opens with “Family is the Blue Diamond Way” (mentioning again that they are “a co-op of more than 3,000 growers” and below says “A Family Operation,” highlighting three families who grow for Blue Diamond, each accompanied by a video. In these short videos, family members talk about their parents and grandparents who started their farm, emphasize how perfect California is for growing almonds,

and praise Blue Diamond for being such an excellent company that makes sure their products are “nutritious and healthy” and that “they’re going to taste different because the quality is there.” These videos introduce you to the farmers, their hard work, and their passion for almonds, which humanizes Almond Breeze as a company. They talk about their parents, raising their children on the farm, and even the financial support that Blue Diamond has assured them: “Blue Diamond is the shining star of co-ops” and “I’m so happy with Blue Diamond.” These videos are definitely advantageous for Blue Diamond, making the company much more appealing and proving to the viewer that behind their almonds are individual families. However, there is way to know if these farmers are representative of the thousands that grow for Blue Diamond, since these are the only ones featured on their site. Many Bard Environmental and Urban Studies students I interviewed talked about how they wished there was more mention of the workers on the Blue Diamond website (as they did about other sites as well), remarking that there was no mention of the people actually picking the almonds. While one grower mentioned in their video that he has no employees, that he and his sister do all the work, there is no way to know if this is true for the thousands of other growers that make up Almond Breeze.

Above these videos featuring individual farms, Almond Breeze has created a longer video featuring short clips from the individual farmers’ videos. This choice makes it seem either as if Almond Breeze really wants to drive in the points that their growers make, or does not think their customers are going to watch all the videos and therefore will not notice. Throughout its website, Blue Diamond reinforces particular images and words, just as it recycles parts of these farmers’ videos. Perhaps relying on the viewers’ short attention spans, the company repeats

words and phrases such as “pioneer,” “generations,” and “co-op of 3,000 growers” so that these will be the main takeaways from their website.

Health Costs and Benefits of Almonds and Almond Milk

Packed with healthy fats, protein, and vitamins and minerals, almonds are known to be one of the healthiest nuts, and even foods, available. A simple internet search tells us that almonds are packed with calcium, protein, monounsaturated fats, vitamin E, fiber, antioxidant phytochemicals, and arginine (2016 New York Times; 2014 The Atlantic). They have also been associated with aiding in the prevention of diabetes, arthritis, cancer-cell growth, and Alzheimer’s disease.

Nuts in general are very beneficial. A 2013 Harvard study published in *The New England Journal of Medicine* examined the relationship between nut consumption and mortality. The study followed 76,262 women over a period of 30 years and 42,498 men over 24 years, measuring through questionnaires every two to four years how often participants consumed nuts.¹⁵ Participants indicated their nut intake on a variety of levels: never or almost never, one to three times a month, once a week, two to four times a week, five or six times a week, once a day, two or three times a day, four to six times a day, or more than six times a day. Researchers kept track of deaths and causes of death, and adjusted their calculations for age and variables such as diet and lifestyle. The results showed “a significant inverse association between frequency of nut consumption and total mortality among both women and men” (Bao, et al. 2013). The study

¹⁵ Female participants were part of the Nurses’ Health Study (NHS), a prospective cohort study of 121,700 female nurses from 11 US states, established in 1976. Male participants were part of the Health Professionals Follow-up Study (HPFS), a prospective cohort study of 51,529 male health professionals from all 50 states, beginning in 1986. Some participants were excluded from this nut study due to a history of cancer, heart disease, or stroke, or a lack of information provided.

found that, in comparison to eating no nuts, eating nuts seven or more times per week decreased death rate by 20%.

Another study published in *The British Journal of Nutrition* in 2014 investigated the fatty acid composition of almonds and how almond consumption affected an overall estimated 10-year risk of congenital heart disease. The authors found that almond consumption increased both oleic acid (an omega-9 fatty acid) and monounsaturated fatty acid content, which are inversely associated with congenital heart disease risk factors and an overall estimated ten-year congenital heart disease risk, meaning almond consumption was found to decrease the risk of heart disease (Nishi, et al. 2014). In fact, the study found that every ounce of almonds eaten per day was associated with a 3.5% decrease in heart disease risk ten years later.

The journal *Mother Jones*, is a progressive magazine, and a source that people looking up this topic would likely find and read. As Tom Philpott says in a 2014 article for *Mother Jones*, although almonds are really good for you, putting them in milk form is actually a very inefficient way of getting all these benefits (Philpott 2014). However, based on the interviews that I conducted with Bard students, it doesn't seem like people are necessarily drinking almond milk for the health benefits. Although many probably are, and especially if they are comparing the healthful nut to cow's milk if they've heard bad things about cow's milk's effect on health. Instead, these educated consumers that drink almond milk seem to be drinking it for reasons such as its low cost compared to other alternative milks, its long shelf life, and the simple abundance and trendiness of it. Still, Almond Breeze highlights the nutritional benefits of almonds on their website, implying that these are maintained when almonds are turned into milk.

Environmental Impact of Almonds and Almond Milk

With the rise of almond milk as an alternative to cow's milk has also come an increase in criticism of the extremely popular nut, namely regarding its environmental impact. Around 80% of the world's almond supply is grown in California's Central Valley (McGivney 2020).¹⁶ Unfortunately, the Central Valley has been experiencing a drought for almost a decade (the state is just now emerging from one of the worst and longest droughts it has experienced), and it takes about 1.1 gallons of water to grow one almond (Saner 2015). This has led to almonds and their "milk" coming under fire even as they have become increasingly popular.

Many Californians, hyper-conscious of the drought, hear, as I have, that one little almond accounts for a whole gallon of water and never look at almond milk the same way again. When asked about almond milk, one Bard Environmental and Urban Studies major stated, "I'm pretty anti-almonds because my dad lives in California," (C.L.) showing a loyalty to the area's resources even though the student lives elsewhere. While other crops also use plenty of water, almonds have become a symbol for excessive agricultural water use in California. The news about how much water they use has resulted in a slew of news articles with headlines such as "Your Almond Habit Is Sucking California Dry" (Philpott 2014) and "The Dark Side of Almond Use" (Hamblin 2014), leading many environmentally conscious consumers to back away from almonds and almond milk. Despite this backlash, however, the almond industry is far from struggling and the number of almond orchards in the Central Valley only continues to grow. According to the USDA, the expanse of almond orchards in California has gone from 510,000 acres in 2000 to 1,090,000 acres in 2018. With yield per acre also increasing, production of the

¹⁶ While different articles cite slightly different amounts, between 80-82% seems to be the general consensus, with some even saying 85%.

nut in California has increased from 703 million pounds in 2000 to 2,280 million pounds in 2018.

The fact that most of the world's almonds are grown in California is really the main issue. Anywhere in the world, 1.1 gallons of water per almond is a lot, but if almonds were being grown in a region with plentiful rainfall, such as the Northeast of the US, the environmental impact would not be as severe. In the Central Valley, however, more orchards means that more water and resources must be diverted to growing almonds, and in California, this can mean diverting water away from other crops and animals. Alastair Bland, in an *NPR* article written in 2014, when the drought was especially bad, pointed to the decline of the king salmon, also known as Chinook salmon, in the Klamath River in northern California (Bland 2014)¹⁷. Because so much valuable water was being diverted from the river to almond orchards, these endangered salmon were experiencing low water levels, which also made the water warmer, putting them at risk of a disease called gill rot that killed tens of thousands of the fish back in 2002.

It is not just water, however, that has been cause for alarm surrounding almond production. There is another worry: the decreasing bee population. Honeybees are crucial to the production of almonds because they pollinate the trees, and with the massive increase in demand for almonds around the world, the demand for bees has followed.

Unfortunately, beekeepers in the US who bring their bees to California have been witnessing a widespread dying off of bees in recent years, with some losing over a hundred hives in one season. According to a 2020 article in *The Guardian* titled “‘Like Sending Bees to War’: The Deadly Truth Behind your Almond Milk Obsession,” more than one-third of commercial

¹⁷[npr.org/sections/thesalt/2014/08/21/342167846/california-drought-has-wild-salmon-competing-with-almonds-for-water](https://www.npr.org/sections/thesalt/2014/08/21/342167846/california-drought-has-wild-salmon-competing-with-almonds-for-water)

bee colonies in the United States were wiped out during the winter of 2018-2019, a total of 50 billion bees (McGivney 2020).

This large-scale bee death is often linked to exposure to pesticides used in the Central Valley, and to parasites and diseases that have been infecting bees in greater numbers in recent years. McGivney also points out that bee deaths result from the industrial and intensive methods used in almond, and general agricultural, production. One example of this intensive production specific to almonds is that, unlike many other crops which can be left fallow some years, almonds have to be maintained every season.¹⁸ Consequently, even during a drought, almond trees must be watered intensively or the trees will die. This means that almonds are a monocrop, creating a monoculture. Unfortunately, bees thrive in biodiverse environments, so by sending them to almond orchards every year, they are being imported into an environment that they are not suited for and also continuously worked extremely hard.

Still, it takes about half as much water to produce almond milk as it does to produce cow's milk (Bull 2020), making almond milk, although one of the worse non-dairy milks for the environment, still not as resource-intensive as cow's milk.

¹⁸ When land is fallow it means the land has intentionally been left unsown so that crops will not grow during a certain season. This may be to avoid surplus production or to restore nutrients to the soil, either leaving it or planting a rotation crop such as oats.

Part II: Oat Milk

New York City's New Favorite Milk

In July of 2018, in a *New Yorker* article entitled “Hey, Where’s My Oat Milk?” author Antonia Hitchens laid out the “tragedy” that was the oat milk shortage of 2018, when New York ran out of oat milk (Hitchens 2018). Hitchens describes how oat milk brand Oatly, which the article refers to as “the small and unabashedly quirky Swedish company that invented oat milk,” brought oat milk to the United States. Then, during the summer of 2018, New Yorkers who had grown to happily anticipate their oat milk latte in the morning were told all of a sudden that their milk of choice was not available. The demand for Oatly had become so great that production could no longer keep up.

Oatly was started in 1994 by Lund University food scientist Rickard Öste, who, according to Hitchens, developed oat milk “based on research on lactose intolerance and food systems” (Hitchens 2018). Oat milk can be made simply by blending oats with water (and salt, sweetener, and flavor if desired) and then straining out the pulp. Oatly, however, uses enzymes to liquefy raw oat kernels, says Mike Messersmith, Oatly’s general manager (Hitchens 2018).

In the same way that Oatly is incredibly strategic with their branding and image, as is evident from their quirky website and eye-catching advertisements, they were also quite clever in the way that they brought their oat milk to the US. Oatly arrived in the United States in the fall of 2016, starting with Intelligentsia Coffee, a coffee shop in New York City.

The first consumer base in the US that Oatly targeted was one that could serve as liaisons to even more consumers: baristas, particularly, the baristas of New York City. Oatly chose popular coffee shops where the baristas were specifically extra enthusiastic about coffee. The

company also staffed its ground team with people involved in coffee and well-connected in the coffee scene. This was important to get a leg in. As one barista interviewed in the *New York Times* 2018 article “The Humble Ascent of Oat Milk” stated, “We’re all buds... the industry’s pretty tightknit,” meaning connections in this community were crucial spreading the oat milk word (Wertheim 2018). Oatly also has a special Barista Blend, which is meant to froth like dairy milk does, which really appealed to baristas. With these practices, Oatly convinced baristas that their customers knew and respected to introduce this new, foreign product to the US, making it more likely that it would be taken seriously and well-received. By beginning with New York City coffee shops, Oatly strategically went right to the source of modern milk usage—coffee—and infiltrated the industry from the ground level. Rather than immediately selling their product to big companies, they sold to smaller businesses and their employees and got them hooked, who in turn got their customers hooked. Then, when the market and demand had developed, Oatly widened its supply and began to expand production.¹⁹

The general manager of Oatly, Mike Messersmith, even asserted that periodic shortages allowed “the humanness of the company to come through,” adding to the image of Oatly as a small brand that is simply trying to provide oat milk to as many people as possible.

Since the introduction of oat milk to the US by Oatly in 2016, many other brands have capitalized on the trend, including Silk (calling their’s Oat Yeah!), Quaker, Califia Farms, Planet Oat, Pacific Foods, and Elmhurst 1925. At Bard College, when interviewing educated consumers, many of them said that while they used to drink almond milk, they are now starting

¹⁹ Oatly makes their US products in New Jersey, Minnesota, and Quebec, Canada (Oatly website “FAQs”).

to explore or have already switched to oat milk. This seems to echo a larger national trend as well.

The Marketing of Oatly

Oatly is a Swedish brand founded in the 1990s with the mission of creating a nutritious, sustainable alternative to cow's milk. Popular in Sweden, the United Kingdom, and much of the rest of Europe, the oat milk brand was introduced to the United States in 2016 in New York City coffee shops, and afterwards transitioned into other cafés and select stores around the country. With natural, pleasing colors, bold graphics, and a relaxed, humorous tone, Oatly seems to market itself especially to young people as an approachable, friendly brand.

Oatly's United States website opens with a slider that greets its visitors: "Hello future oatmilk drinker," in calm, aesthetically pleasing grey-blue and black block letters. Next to the greeting are three cartons of Oatly, each a different variety that they sell. Under this graphic, the text reads "We didn't write that headline because we have a special ability to see into the future. We just know that even though there are a lot of plant-based options out there to add to your coffee or cereal, the combo of oatsome deliciousness and what our products can do for you is pretty challenging to find elsewhere." This is followed by a link to view all the oatmilk products they offer, which in the US are Barista Edition, Full-Fat, Low-Fat, and Chocolate Oatmilk, along with a variety of flavors of Frozen Desserts.

This confidence is the first thing a consumer experiences when entering Oatly's website. With a casual tone and a calming palette of neutral colors, they suggest that they are the superior

brand and get the reader wondering what exactly Oatly “can do” for them (and what “oatsome deliciousness” means).

The next slider reads “A Swedish Original” in bubble letters that appear to have grey-blue colored snow sitting on them. Little dots that look like snow surround the letters, a carton of oatmilk, and a little graphic of a polar bear. These images emphasize the Swedish roots of the company. On the Swedish and United Kingdom versions of the site, there is no mention of the fact that the company is Swedish on their home pages. The snowy graphics and polar bear add a cute element to the brand, while also emphasizing that it is unique, as many other oat milk-producing brands are from the United States. This is followed by a short paragraph that begins to discuss Oatly’s history. In this paragraph, the invention of Oatly is proclaimed to be “the invention of the world’s first oatmilk.”

The third slider showcases three of the types of oatmilk that Oatly sells: Low Fat, Chocolate, and regular Oatmilk. The cartons show a consistent brand appearance but each have different spreads on the sides of the cartons and each variety has a distinct color. This slider serves to direct the visitor to Oatly’s “Computerized oatmilk locator,” into which one can plug in a city or zip code and find where Oatly products are sold and served in cafés in their area.

As the paragraph goes on, Oatly continues to project its confidence in its product, claiming how lucky you would be if there happened to be Oatly in their area, or unlucky if there is not. Their “computerized oatmilk locator” is “incredible” and “pretty modern and exciting.” Even the name “computerized oatmilk locator” is easy to relate to, as it becomes a friendly and simple tool (with a comical name) for the consumer’s convenience, rather than a complicated, coded, abstract piece of technology. Oatly instructs the visitor to “Tell it what you want,”

continuing the idea that it exists simply for the consumer's convenience, even though its purpose is to help Oatly sell its products. The oatmilk locator dismantles the conception that Oatly is unavailable or hard to acquire because it reveals that it is sold at readily accessible places that most people go to already, such as Target. Even in the Hudson Valley, there are Targets and ShopRites and health food stores at which Oatly is sold.

The fourth and final slider on the Oatly homepage reads "WE LOVE FEEDBACK" in big bubblegum-pink bubble letters, linking to the site's Contact page. Here, customers can fill out a short form and are encouraged to write "anything that you think could make Oatly better or the world better for that matter."

Throughout all these sliders, and in much of the website, Oatly speaks directly to the consumer by using the second person. This makes the visitor feel as if they are being individually recognized and that Oatly really cares about them. Oatly's brand is more personal than institutional, with their approachable and humorous writing and their minimalistic layout. Their copy is easy to read, they only do oatmilk, and therefore they do not have an overwhelming/confusing number of products.

The next section features big letters that read "Introducing the most amazing fiber in the drinkable world." Below reads "If you want to send an email or stream a movie then optical fiber is way more amazing, but if you just want to get some fiber in your body so your body can get some nutritional justification, then a glass or two of our liquid oats is a pretty good start." Here Oatly continues to use a lighthearted tone to communicate with its customers. As this web page is being read within the context of nutrition, it can be assumed that the reader already knows what type of fiber Oatly is talking about. However, Oatly chooses to specify that it is the type of

fiber a person consumes rather than “optical fiber,” adding a trendy little joke into its informative text and tapping into a modern, current tech-savvy consumer. They do not say all that much about the actual fiber in the oat milk, besides that it is “amazing” and will provide “nutritional justification.” However, they have persuaded the reader that there is fiber in Oatly’s oat milk and that it will help fuel their body, and have reinforced the notion of Oatly as a trustworthy and user-friendly company.

The next section’s heading reads “THE OATLY WAY” and features what are presumably oat plants growing from the O, and the Y turning into an arrow and pointing into a glass. This section describes some of the history of Oatly and how people thought they were “totally crazy” for turning oats into oat milk. The first thing they say is that “the original idea behind Oatly was to find a way to make a nutritious liquid product for people who just didn’t like cow’s milk or were unwilling to use it for personal reasons.” With this statement, Oatly conveys that it was invented for the benefit of its customers. Many of the people reading this statement will likely identify with it, for the many reasons which may have led them to click on the Oatly website. Perhaps they do not like the taste of cow’s milk, or they believe it is not good for their health. Maybe they are lactose intolerant, or maybe they are thinking of the impact of the dairy industry on the environment. Whatever the consumer’s reason may be, Oatly does not go into too much detail. They are not using this space to persuade their readers to drink oat milk over cow’s milk, but are simply acknowledging the fact that many people do not drink cow’s milk and should have an alternative option. Because of this lack of specificity, a large number of readers can relate to the statement and therefore indirectly feel as though the creators of Oatly had them in mind when forming the company.

The section then goes on to imply that Oatly was one of the first to produce oat milk while it was still a radical idea:

Today, the concept of producing a drink directly from oats instead of first feeding oats to a cow and letting the cow process them into milk is an option but back when we started in the 1990s most people thought we were totally crazy. That's okay, we are happy to be right where we are now making quality liquid oat products for you to enjoy.

Oatly could have simply begun the first sentence here with something along the lines of “Today, making milk from oats is an option...” However, they chose to sneak in a selling point which they mention a few times throughout their site and on their packaging. This point is essentially to say that oat milk is less processed than cow's milk. This is specifically in terms of how the oats are treated and processed, but since Oatly's focus is oats, the specificity appears valid. Even though the oats going into Oatly are still processed in order to turn them into milk, just as they are inside the cow, Oatly makes their process seem simpler and more direct. They describe the oatmilk making process as “producing a drink directly from oats” and the cow's milk process as “first feeding oats to a cow and letting the cow process them into milk.” To describe their own process, Oatly uses words such as “producing” and “directly,” while they have the reader picture a cow “process” oats into milk. Although the cow's process itself in fact may seem more of a natural one than oat milk production, Oatly makes it sound more industrial and manufactured. Even the sentence itself describing the cow's milk production is longer than the one conveying oat milk production. “First feeding oats to a cow and letting the cow process them into milk” is just a little more convoluted than “producing a drink directly from oats.” Although still easy to understand, it requires just a little more effort from the reader, and therefore is perceived as more complicated and less desirable than the other.

Even in their description of their production methods, Oatly uses simple and aesthetic graphics to illustrate each step of the process. This reinforces their efforts to show the consumer that producing oat milk is simple, and their product is minimally processed, and therefore good for the consumer and good for the planet. Although they say these things other places as well, the repetition of this message subliminally drives these points into the consumer's mind.

The next section begins with a somewhat homemade-looking graphic reading "SWEDISH AND INDEPENDENT." A crown dots the I, and the letters resemble a hand drawn art project. The first couple of sentences grab the reader's attention: "We know how it sounds. Tall, blond, beautiful, hard to get, extremely liberal with no sense of attachment or responsibility whatsoever." Oatly manages to poke fun at the stereotypes of Swedes as tall, blond, and beautiful. The text goes on, reading "Sorry to disappoint you, that's just not us. We are the other Swede—somewhat boring, super practical, painfully honest, notoriously hardworking and independent not because we don't want to be social but merely because we want to have the right to say what we think and do what we think is right." This description conveys that Oatly is reliable and dependable and also imaginative, evoking images of Swedes as great architects and designers.

Contrary to what seems to be the norm for many dairy milk companies around the Hudson Valley, Oatly is more outwardly focused on the environment than on the people that grow their oats. The Hudson Valley Fresh website features photographs of parents and children smiling and playing on their dairy farms and advertises how local and fresh their milk is. Oatly on the other hand does not feature any images of their growers or farms, and one has to search a little to find the source of the ingredients. This is probably because Oatly is such an international

company, so their ingredients come from different places around the world. On the page of each of their individual products is a “Where does it come from?” button, under which customers can find the particular company from which each ingredient comes. This adds to Oatly’s image of being transparent and honest. Young and socially conscious consumers would likely love this feature, as they are able to know the exact sources of their products, in the same way they would want detailed information about the dairy milk they may be buying.

The Oatly 2018 Sustainability Report begins with a bubblegum pink page with Sustainability Report 2018 written in big white clean bubble letters. It describes in detail the brand’s sustainability practices, along with large graphics and photographs that sometimes take up the whole page. It is full of color and clearly honest about their shortcomings, an endearing way to explain why they may not have met all of their goals from past years, while also communicating their low environmental impact compared to cow’s milk.

Health Costs and Benefits of Oats and Oat Milk

Oats are not necessarily the nutritional powerhouse that almonds are. They are, however, rich in soluble fiber and B vitamins, and are known to lower cholesterol. Oat milk compares pretty well in terms of total sugars with other milk alternatives. In comparison, though, it is higher in carbohydrates and calories than most, as oats are a cereal grain. All of this, however, depends on the brand of oat milk, as many will add extra sugars or flavoring, which change its nutrient profile. Although oats are naturally gluten free, they often end up being cross-contaminated in the field, as they are typically grown near wheat or barley, which contain gluten and can get mixed in with the oats during harvesting, transport, or processing. This makes

it very difficult for people with gluten intolerances or allergies, such as those with Celiac disease, to be sure that their oat products are indeed gluten free. Because of this frequent cross-contamination, if a company wants their oats to be gluten free, they must either sort and process them to remove the gluten, or buy them from a grower that keeps them separate or processes them before selling the oats. Either way, this process is not cheap and requires a lot of additional work.

All of Oatly's US products are certified gluten-free by the Gluten-Free Certification Organization (GFCO). For their US products, they source their oats from Grain Millers which is based in Canada and has their own "proprietary process to produce the most pure oat products possible" (Grain Millers website "Organic Gluten-Free").²⁰ According to their website, they not only met the FDA's gluten limits of 20ppm, but they wanted to see "just how darn clean we could get our oats" and got it down to 10ppm.

Just as with all other alternative milks, parts of the plant, in this case of the oat, are lost when made into milk. Typically, the process of making oat milk results in leftover pulp that contains many of the beneficial nutrients that would typically be taken up if they were consumed in their original form, simply as oats. Oatly, however, uses a unique manufacturing process that maintains the loose oat fibers, or beta-glucans, so they end up in the product rather than being discarded. They also use enzymes between milling and separation to break the oat starch down into smaller parts, mainly maltose, or malt sugar, which naturally sweetens their products (Oatly International website "The Oatly Process").²¹

²⁰ <https://www.grainmillers.com/services/organic-gluten-free/>

²¹ <https://www.oatly.com/int/our-process>

A carton of Oatly Full Fat Oatmilk contains, per cup, 160 calories, 9g of fat, 3g of protein, 15g of carbohydrates, 1g of soluble fiber, 2g of dietary fiber, and 7g of total sugars. One cup also contains 350mg of calcium, 3.6mcg of vitamin D, 160mcg of vitamin A, 0.6mg of riboflavin, 1.2mcg of vitamin B12, and 390mg of potassium (Oatly US website, Full Fat Oatmilk Chilled^{22 23}). Their Oatmilk is fortified with calcium, potassium, and vitamins A, D, B12, and riboflavin. On Oatly's website, they proudly point out the fact that oats are quite high in soluble fiber, as noted in the section above when they declare that their product has "the most amazing fiber in the drinkable world." The fact that their "milk" has fiber, which can help regulate blood sugar and appetite and lower cholesterol, seems to be one of Oatly major nutritional selling points. While one cup of Oatly Oatmilk has 1g of soluble fiber and 2g of dietary fiber, one cup of Hudson Valley Fresh Whole Milk has 0g, giving Oatly the leg up in that regard.

Although this may attract many customers who are in search of more fiber in their diet, it is almost definitely not the main reason that people buy oat milk. Oatly pushes other factors even more, advertising to vegans, lactose-intolerant customers, and people who want a milk with a lower environmental impact than cow's milk. This seems to be what consumers want as well. The students that I interviewed were less concerned about the nutritional content of their milk and much more about taste, ethics, and resource use and emissions.

²² <https://us.oatly.com/collections/products/products/full-fat-oatmilk-chilled>

²³ One cup of Hudson Valley Fresh Whole Milk contains 160 calories, 10g of fat, 9g of protein, 11g of carbohydrates, 0g of dietary fiber, and 11g of total sugars. One cup also contains 290mg of calcium, 3mcg of vitamin D, and 368mg of potassium. They do not have vitamin A content of their Whole Milk listed, but there are 181mcg in their Reduced Fat 2% Milk. (Hudson Valley Fresh "Our Products") (<https://hudsonvalleyfresh.com/our-products/milk/>)

Environmental Impact of Oats and Oat Milk

Oatly makes a point of telling its customers why they should choose oat milk over cow's milk, and one of its major reasons is the welfare of the environment. While they make it clear that Oatly tastes good and offers health benefits of its own, such as lots of fiber, the company does not really try to argue or prove that Oatly is better than dairy milk in these ways. This may be because they cannot compete with the taste of dairy milk, for people who love the taste, or the natural nutrients in it, for people who drink milk for nutritional value. Oatly does, however, go to great lengths to make sure consumers know how much better oat milk is for the environment than cow's milk.

On its website, sometimes linked in a homepage slider but now more difficult to find²⁴ Oatly dedicates a whole page to touting the low greenhouse gas emissions of its product, citing studies and comparing oat milk's environmental footprint with cow's milk.²⁵ This page, which reads at the top in big letters "New! Oat Drink With Carbon Dioxide Equivalents," starts by explaining the bigger picture of how food production affects the planet. It then goes on to share how the company thought it would be beneficial for consumers to "see and compare the climate impact of different products" to make their buying decision easier. They explain that "we didn't just think it in a 'It might be fun for us, as one small oat company, to stick climate impact numbers on our product,' but instead that 'consumer empowerment should be law,' just like nutrition labels are required under law. Here, Oatly implies that their actions are for the benefit

²⁴ In May 2020, sliders on topics such as carbon emissions have been replaced with information about how things have changed during the time of coronavirus (without actually saying COVID-19). They have created a page called The Oatly Department of Distraction Services, and remind Oatly buyers that "buying every single last carton of oatmilk that you find at your local shop or online retailer is not the coolest of moves," and assure them that their "top priority right now is to ensure that no matter what happens, the oatmilk keeps flowing" (oatly.com).

²⁵ oatly.com/uk/climate-footprint

of the consumer, driving “consumer empowerment” and referring to themselves as “one small oat company.” With this language, Oatly seems to not only be interested in selling its product, but also seems motivated to educate the reader, who can then go on to make independent choices. However it also shows the company’s confidence in the environmental superiority of its product: they would not share this information if it failed to put oat milk above cow’s milk. Later on, before sharing the numbers, they call for other food companies to divulge their figures and put them on their products, and even call on the consumer, saying “feel free to contact the food producers you’d like to compare us with and politely demand that they show us their numbers. You can blame this pushy piece of copy, if that helps.” Here Oatly is not only expressing its beliefs, but also working to take a leading role in consumer knowledge and consumer advocacy. From this it is easy to see which step or steps result in the most emissions (this is usually the farm step). By conveying this much confidence, being willing to be compared with any other food, the reader kind of gets the idea before they even see the numbers.

The data on this page was collected by CarbonCloud, which provides climate impact research on different foods in order to help people make “climate-smart choices.”²⁶ The company uses a model based on over twenty years of research and has been used by the Swedish Environmental Protection Agency, The Potsdam Institute for Climate Impact Research (PIK), and Princeton University. CarbonCloud makes its calculations based on a “cradle-to-gate” assessment, which means that they look at the emissions of a product from the production of its agricultural inputs to the grocery store shelf. In this assessment, they found that oat milk

²⁶ carboncloud.io

generated 0.44 CO₂e per liter of product. The largest portion came from the farm, which accounted for 0.17 CO₂e per liter (Oatly UK “Carbon Dioxide Equivalents”).²⁷

In their 2018 Sustainability Report, Oatly notes that in a life cycle assessment of their products conducted in 2018 by the Research Institute of Sweden AB (RISE), which found that the company uses approximately 6.4 liters of water per liter of oat milk. About 80% is used in the factory during production, with 15% going directly into the product as an ingredient, and 65% being used for things such as cleaning and dishwashing. The remaining 20% is used during all other steps, such as milling, transport, and packaging (Oatly 2018 Sustainability Report, 32).

Oatly also takes measures to ensure that their oats are free of glyphosate (also known as Roundup), which is a widely used herbicide that has come into question about potentially being carcinogenic. Glyphosate was found by the Environmental Working Group (EWG) in many oat products in 2015.

As with almond milk, people do not necessarily drink oat milk because they think it’s especially good for them. Instead, based on interviews I conducted and how Oatly markets their product, consumers are drinking it more for ethical and environmental reasons.

²⁷ oatly.com/uk/climate-footprint

Chapter Three

A NEW MILK ALTERNATIVE

Overview

When I was interviewing Bard Environmental & Urban Studies (EUS) majors at Bard as my informed consumer population, I expected many of them to tell me that they drank non-dairy milks. As young, generally liberal, environmentally and socially conscious individuals pursuing a higher education, they fit my anticipated profile of non-dairy milk drinkers. I was expecting them to be conscientious consumers, making educated choices about the milk they drink. I didn't necessarily expect all of them would drink only non-dairy milk, and I was not surprised to find that many of them have not stopped, or have any desire to stop, buying cow's milk. What I did not anticipate was the overwhelming popularity of what I came to realize was a sort of new alternative: small-scale, locally produced milk.

Out of the six students that I interviewed, three of them, C.L., L.M., and O.M., said that they frequently buy milk local to the Hudson Valley. One of them typically buys oat milk, but "think[s] of [dairy] milk as a treat," (O.M.) noting that it "has more fat and calories than oat milk." She continued that "the only context I'll buy cow's milk is from local [farms]," and that she has been buying more milk from local farms recently with her housemates. Another, A.O., said that although she usually buys almond milk, "I'll feel guilty if I go and buy... industrial milk. So if I do buy milk I'll try to buy from Hudson Valley Fresh or... Stonybrook."²⁸ She says that she can't ignore "the reality of the dairy industry," much of which she learned about through her environmental studies classes. While not referring to anything specific about the dairy

²⁸ "Stonybrook," a term used by multiple people that I interviewed, seems to be a surprisingly common combination of Stonyfield Organic milk and Ronnybrook, a Hudson Valley favorite sold primarily in glass bottles.

industry directly in their comments, students expressed concern with many aspects of dairy production, from water and land use and emissions, to working conditions, to how the cows are treated, to simply being averse to the industrial quality of it.

There is definitely also something about living in an area where milk is widely produced that makes consumers more enthusiastic about buying it from local sources, whether it is local pride, the ability to know where your milk comes from, or the sheer physical visibility of it. As O.M. pointed out, “with local cow’s milk, you can go to the farm and see the cows,” citing it as superior not only to industrially produced dairy, but also to alternative milks, which are often even less accessible and produced in multiple locations. Because of these factors, non-dairy milks may seem even more industrial and remote, being split up between indistinct stretches of land and processing plants. If you see a field of oats, you probably don’t immediately think “that’s where the oat milk in my local store is coming from!” There is no pride or easy connection to be made there, and consumers have to make an effort to research where their product is being grown. Many students also said that they only started buying local milk when they came to college in the Hudson Valley, and that local milk was not a big consideration when they were at home. One stated “since I’ve been drinking milk up here [in the Hudson Valley] I drink less milk when I’m home because it’s Horizon [Organic], and I feel sustainably guilty,” even though they admitted that they do not necessarily have evidence that local Hudson Valley milk is environmentally better than a brand such as Horizon Organic.

C.L., who works in the food industry and says she is “known as an avid dairy person among [her] friends,” only buys whole milk, typically the creamline milk from Ronnybrook or Adam’s, a grocery store in Kingston. When asked if she felt like moving to the Hudson Valley

for college affected her purchasing choices, she answered “Yes, absolutely.” “I don’t want to admit to it but there is some of that locavore, Hudson Valley [ideal],” she said, referring to the locavore movement, popular among foodies, which stresses locally grown foods. Citing ethics as a top priority along with taste and price, she said that she would prefer organic milk and that if raw milk was more easily available, that is what she would be drinking. Upon learning that Ronnybrook was in Pine Plains, only about half an hour away from Bard, she remarked “It’s in Pine Plains?! Well I mean, if someone wants local milk, that’s [it]... I had no idea... So I guess I’m happy that I’m drinking Ronnybrook milk.”

L.M., who enjoys alternatives, but always finds herself going back to dairy, says they try to buy local milk brands for a number of reasons, including environmental considerations and simply the feeling that they understand that local, small-scale milk is ethically better. They also work at a farm near Bard that produces milk, and they sometimes get raw milk from there. “Raw milk tastes really good,” they say, “and has all sorts of other things attached to it that are so tempting to want like microbio[ti]c and probiotic things.” Instead of going to product websites or reading scientific papers, this student, like many others, said that they were much more likely to read a brief article online, something like “The 8 Best Milks for the Environment,” or get their information from their friends or teachers. Many Bard EUS students, like L.M., also work at farms during their time at Bard, many for their EUS Internship graduation requirement, and gain experience that makes them more attached to and knowledgeable about local milk.²⁹ L.M. also

²⁹ I did my EUS Internship at Toluma Farms, a sheep and goat dairy farm in Northern California, and it was really valuable for me to see and participate in the milking process, even if it was not with cows. Doing this and talking with those who work there gave me a much deeper appreciation for milk and a different perspective than if I hadn’t gotten that experience and information. They also have a creamery on site where they use cow’s milk from nearby, so I also learned a lot about the difference between small- and large-scale milk, something that I expect other students who have worked at similar places have also experienced and this has influenced their milk habits.

shared that they “fall prey pretty easily to a ‘local is better’ argument, even though I know that in certain circumstances that’s not the case.” They continued “but I feel like it’s easier to just push everything aside when I’m buying Hudson Valley Fresh or Ronnybrook, and it’s probably more fine than buying Hannaford’s brand or something.”

The Marketing of Hudson Valley Fresh

Hudson Valley Fresh Dairy is a company local to the New York Hudson River Valley, founded in 2004 by Sam Simon.³⁰ The company works with ten dairy farms throughout Columbia, Dutchess, Ulster, and Rensselaer Counties and has a processing plant in Kingston, New York. The company is popular in the Hudson Valley, so much so that the milk is served at Kline Commons, Bard College’s main dining hall, as well as their smaller dining hall and café.

A visitor to The Hudson Valley Fresh website sees first a video documenting the lifecycle of milk.³¹ It begins with a group of cows in a lush, green pasture. It then moves to young children playing beside more cows, calves eating close to the camera, milk being bottled with Hudson Valley Fresh labels, and finally a barista making a milky latte. The video is sunny and full of familiar and happy scenes, and communicates a message of valuing family-run farms and content, well-treated cows. The two stories on the home page read “Premium Fresh Local Dairy,” “Why Is This Milk So Good,” and “Meet Our Farmers.” The Premium Fresh Local Dairy section of the page acts as a way to promote the company’s products in a few different ways. Half of it is taken up by a graphic for “Creamy Whole Milk Yogurt,” which advertises the health benefits of their yogurt, specifically calcium, vitamin D, protein, and omega 3s. Beside the text is

³⁰ “Plankenhorn Farm.” *Hudson Valley Fresh Dairy*, hudsonvalleyfresh.com/farms/plankenhorn-farm/.

³¹ Hudson Valley Fresh website. <http://hudsonvalleyfresh.com/#cont-wrap>

an image of the Hudson Valley Fresh yogurt and below, “Learn More About Our Products,” which links to their yogurt product page. Although most of the Hudson Valley Fresh website is simple, clean, and limited to a few colors (white, black, the green used in their logo, and a light blue used mostly for details and links), this yogurt graphic stands out. The same font and their green, white, and blue are used, but the background is a gradient of orange and yellow, popping against the clean white background of the homepage, and making it look almost like an advertisement. The graphic catches the site visitor’s attention and offers a different style and feeling that is more poppy and excited than much of the rest of the website, which is calm and not as boldly eye-catching.

To the right of the yogurt piece are two additional features that advertise Hudson Valley Fresh products specifically. The first, “Why Is This Milk So Good?,” links to their “How Fresh?” page. Behind the text “Why Is This Milk So Good?” is a photograph of a glass of milk, a plate of cookies, and a carton of Hudson Valley Fresh whole milk. The items sit on top of a wood table, which dominates the foreground. In the background, a cat peacefully sleeps on a wicker chair, and an open door allows sunlight to flow into the bright room. The image evokes a feeling of a happy family home, with a napping pet and nice glass dishes to serve homemade cookies. It implies that Hudson Valley Fresh is a milk that is consumed in idyllic American Northeast homes and pairs well with classic comfort foods enjoyed by everyone. At the bottom of the image is a graphic of a cow’s face, an arrow pointing to “3 DAYS,” and then an arrow pointing to a house, representing the journey of Hudson Valley Fresh milk from cow to home in three days. This graphic discreetly shows the customer how fresh the company’s milk is, answering the question “Why is this milk so good?” before the customer even clicks to the How Fresh page.

Below this image is a tool where visitors can enter their zip code and land on a page with all the nearby locations at which they can find Hudson Valley Fresh products.

Much of the rest of the website is dedicated to communicating various aspects of the character of Hudson Valley Fresh, their farmers, and their values. On the homepage however, they immediately advertise the quality and health benefits of their products. The only thing before this is the video of happy cows and children and lattes, and the only thing after is a feature highlighting the company's farmers. The product-highlighting section is sandwiched between smiling family farmers, lush green pastures, and grazing cows, all of which emphasize Hudson Valley Fresh as a nature-oriented, family-oriented, cow-oriented company. Their homepage says very little about the health impact of their milk and says nothing about their sustainability practices. However, the little that they do say about their health impact is very specific, both in amount (percentage of daily value) and product (yogurt). On their website, Hudson Valley Fresh shows that they are focused on communicating their values and a little about their health benefits, rather than their environmental impact.

The Meet Our Farmers section below the products features highlights various Hudson Valley farmers, specifying the number of milking cows they have, how many generations they've been farming for, how many acres they manage, and the breeds of cows they own. Each farm has a pleasant photo representing the farm: some are of happy farm owners, some of the whole family, and others are of grazing cows. This, along with the inclusion of how many generations the farm has been run by, add to the feeling that Hudson Valley Fresh values its farmers, cows, and land. This is one of the more graphically unique and likely more complicated elements in terms of coding included on their homepage, suggesting that a lot of time and

thought was put into this section. With this page, the company features their farmers and lets their customers get to know them in an interactive and personal way, highlighting this as one of the company's main values that they put forward.

Our Values

The Our Values section, which comes just after Our Products, features many short sections with titles such as “Udderly good!,” “Locally processed!,” and “Hay, hay, hay!” These pun and exclamation point-filled phrases lighten the mood as the reader looks over the company's values. The values focus on the cows' health, the quality of the milk, its health benefits, its localness, and the certifications and standards it meets. There is little mention of sustainability, except for the phrases “sustainable agriculture” and “environmentally responsible agricultural products.”

The first few lines of the page list the company's mission and priorities:

Hudson Valley Fresh Dairy LLC is dedicated to preserving the agricultural heritage of the Hudson River Valley while producing fresh, premium-quality dairy products. We believe in supporting sustainable agriculture and are currently preserving 7000 acres of open land in Columbia, Dutchess, and Ulster Counties. Our mission is to secure living wages for our farmers and their families, who are the owners of Hudson Valley Fresh.

Hudson Valley Fresh wants to communicate their connection to the long legacy of farming in the Hudson Valley, their loyalty to the region and support of its community, and their embrace of traditional American values. It is notable that while they mention here their support of “sustainable agriculture,” there is no section on the site focused specifically on their sustainability practices. Their emphasis on fair treatment of their farmers and their families, however, is featured often throughout the site as a form of cultural sustainability.

Each section heading ends with an exclamation point, and these are scattered throughout the text as well, conveying excitement and eliciting enthusiasm about each detail. There are some scientific explanations mixed in, but they are brief and often followed by phrases such as “cow comfort” and “taking care of the cows,” returning to the company’s core values.

How Do We Compare?

One of the options that drops down under the Our Values tab at the top of the site is a section titled *How Do We Compare?* This page serves to promote milk and its health benefits, while stressing its superiority to non-dairy milk alternatives. The first heading on the page, “The Dairy Case Conundrum,” is followed by the declaration “Our Hudson Valley Fresh families are just like yours. Just like you, they work hard and live busy lives and at the end of the day want to provide safe, nutritious, high quality food for their families. With an ever-changing world and an abundance of marketing campaigns and labels upon labels, this can be a confusing and difficult task.” With this appeal to the reader, Hudson Valley Fresh identifies with the customer’s desire for easy choices: they know milk, they grew up with milk, they may find the “ever-changing world” and “abundance of marketing campaigns” (a subtle dig at milk alternatives) in the dairy case overwhelming, so Hudson Valley Fresh is the only smart choice. Through clever marketing methods, Hudson Valley Fresh strengthens its message of family values, while also positioning themselves on the same level as their customers.

A little further down on the page, they continue to speak directly to the reader, emphasizing the care they have for their customers and their families:

We wanted to create this page as a resource for you — who cares about safely feeding your family wholesome, nutritious foods — to dive into the true differences between the extensive options of the dairy aisle, to bust some myths

you may have heard about dairy, and to share links to other resources that might help answer your questions and better equip you to make the right decision for you and your family.

The language here is chosen to reassure their customers: by giving them “a resource,” they imply transparency and education, so that the customer can make “the right decision” to choose “wholesome, nutritious foods.” This paragraph also promises to “bust some myths” about dairy and “dive into the true differences” between the various options in the dairy section. Hudson Valley Fresh is perhaps implying that the recent bias against cow’s milk is misconceived. On this page, they attempt to combat these biases by discussing the nutritional benefits of milk, while they do not mention anything about environmental consequences of milk or any other comparisons between milk and dairy alternatives.

As the page goes on, the nine essential nutrients found in milk (protein, phosphorus, calcium, Vitamins E, A, B₂, B₃, B₅, B₁₂) and their importance, especially for childrens’ diets, are detailed. Further down is a graphic titled “is there any comparison?” that presents Hudson Valley Fresh whole milk in comparison to oat, almond, soy, coconut, and rice milks. The chart provides data on the protein, added sugar, total sugar, and ingredients in each beverage. Underneath the title reads “take a look at the difference between fresh, local, REAL DAIRY and the non-dairy alternatives.” The chart is clearly meant to display cow’s milk as superior to all non-dairy milks. The whole milk has the most protein, 0 grams of added sugar (only oat milk also has 0 grams), and only two ingredients (Milk and Vitamin A), while all the other options have eight or more. Although they cite Hudson Valley Fresh whole milk specifically here, this chart does not specify for any other product which brand’s nutrition facts are being used, even though the information likely varies across brands. The “How Do We Compare?” page of the

Hudson Valley Fresh website is a solid representation of the company's explicitly presented values of family and of the nutritional benefits of milk. Hudson Valley Fresh, in comparison with Almond Breeze, also uses much more long blocks of text, making it seem like they really want their reader to hear what they have to say and like they have a lot to share.

A Closer Look into Small-Scale Dairy

Across the country, in Northern California, small-scale milk has also become a beloved and increasingly appreciated commodity. Daily Driver is a bagel shop and cafe in San Francisco that was created as an offshoot of Tomales Farmstead Creamery, a cheese creamery located on the sheep and goat dairy farm Toluma Farms in Tomales, California. Along with sheep and goat milk, Tomales Farmstead Creamery also uses cow's milk in their cheese, and Daily Driver uses it for their cheese, butter, and cream cheese for their bagels. They also have it available to put in their coffee. They get their cow's milk from Silva Family Dairy, a cow dairy in Tomales with about 110 Jersey cows and around 1,200 acres of Marin Agricultural Land Trust (MALT) protected land, meaning it will stay agricultural land and cannot be developed. Silva is certified organic and only provides milk for Daily Driver and Strauss Family Creamery.³² Marissa Silva, who runs the farm with her husband Lewis, is a sixth generation dairy farmer of the same property that they operate on now, and Lewis is also a sixth generation dairy farmer. They have one employee who, as Hadley Kreitz, cheesemaker and co-owner of Daily Driver, attests, "is treated incredibly well and loves the cows, and has a passion for what he's doing." I spoke with Kreitz about Silva's milk and her experience working closely with the farm. Kreitz often picks

³² Strauss is an organic dairy company in Marin County that is well loved for the work they do to help small farms, their glass bottle return system, and their milk's taste and quality.

up milk from Silva for the Creamery and Daily Driver, pumping it from the tank connected to the milking parlor into a portable one on the back of a trailer. Over the years they have been working together, she has gotten to know the few people there and see each aspect of the process.

One thing that Hadley emphasized as one of the most differentiating factors between the milk that Daily Driver uses and industrially produced milk is what the Silva cows eat and how they graze. Like many dairy farms, Silva uses rotational grazing, a grazing system in which the cows are rotated between paddocks, or sections of pasture, as needed. At Silva Dairy, they do a specific type of rotational grazing called strip rotation, which means cows are milked in the morning and then afterwards go out onto an area of fresh pasture that is sectioned off using movable fencing. “It’s pretty small” says Kreitz, referring to the size of each paddock, “maybe the size of half a football field for the [slightly over] 100 cows.” The cows are there until they’re milked in the evening, and then while they are being milked, Lewis will go out and move the fencing around to create a new paddock, where the cows then go for the night. “So pretty much every twelve hours they’re on new pasture,” Kreitz explains. This process provides the cows with fresh grass, but also maintains the land in the long run. The process not only spreads the manure over the grass, but the cows’ hooves also kind of till the manure into the land, before the cows are then moved to the next pasture so that previously grazed on pasture can rest, grow, resurface, and regenerate. The manure provides the soil with nitrogen, phosphorus, and other nutrients, promotes growth and organic matter levels, and can balance pH levels, all of which help improve soil health, prevent runoff, and aid in pasture growth (NCBA 2015). As Kreitz explains it, “the cows are basically the fertilizer. They fertilize it, they use the weight of their

bodies and their feet to kind of till it all in, and then they probably rest the pastures for about a month or so before [the cows] are back on it.”

Right now, the cows at Silva Dairy are 100% grass fed, and only get a small amount of grain in the parlour, which mostly just provides them with a boost of protein. “The winter-spring is kind of our time when cows are on grass all the time,” says Kreitz, adding that it is generally the opposite of grazing schedules on the East Coast due to California’s much milder winters. During the summer when the climate is drier in California, the cows are fed outside instead, usually getting organic hay or alfalfa.

This uses a very different process from most larger dairies. Many of the more industrial dairies will keep their cows in something called a tie-stall barn, where they are inside and immobilized all day. This is largely because of the amount of labor required to take the cows out to pasture, feed them there if needed, and bring them back in, especially if milking happens twice a day, as it does at most dairies; the work expands as the number of cows increases. This industrial system, however, leads to large amounts of manure buildup indoors. Typically there is a trench that transports all the manure out to one particular spot, forming what is called a manure lagoon. These lagoons, since they are full of manure, give off loads of methane, contributing to the high emissions levels for which dairies are notorious. This manure is sometimes used as fertilizer or for other uses, but is not being put directly back into the soil, and therefore is less efficient. Some dairies, on the other hand, do allow their cows to graze outdoors but are not doing rotational grazing. This method, although it does naturally spread the manure, can be very hard on the land and depletes many of the benefits that come from letting everything rest and re-grow, and as a result the land can become overgrazed.

Large, industrial dairies can also be harsh places to work, with demanding hours, many cows to milk simultaneously, and an overwhelming buildup of manure, urine, and other odors indoors. Working conditions of course vary from farm to farm, and it is hard to make generalizations about them based solely on the system in place, but in general dairies put extreme demands on their workers. The industrial dairy system can also be very hard on the cows, since they are often cooped up without much exercise, being pregnant and producing milk indoors, and worked to excessive productivity. “I think that’s why a lot of people kind of protest against dairy,” says Kreitz.

Jersey cows, which is the breed at Silva Dairy, produce much less milk than Holsteins, which are high producers and are the cows populating most large dairies. The benefit, however, of Jersey cows is the quality of their milk. “All milk has vitamins K, A, D, and B,” Kreitz explains, “but those are fat-soluble vitamins, and since the Jersey cows have so much fat in their milk, we actually have much more of those vitamins in our milk.” Jersey milk is also A2, meaning it only contains the casein protein A2, as opposed to “normal milk,” which has both A1 and A2. The A2 protein is easier for humans to digest and A2 milk only comes from certain breeds, one of them being Jersey. The nutritional richness of the milk also depends on how it is pasteurized. A lot of big industrial dairies or creameries will use a method called HTST, which stands for “high temp, short time” pasteurization, which essentially shocks the milk at a very high heat. This is done in order to kill dangerous bacteria in the milk, but it also gets rid of a lot of the beneficial bacteria and nutrients. At Daily Driver and Tomales Farmstead Creamery, they use a milder process often referred to as “vat pasteurization” (because it is done in a vat rather than a pasteurizer). This method is performed at a lower temperature, takes much more time, and

is more labor intensive, but the benefit is that it “keeps the milk alive,” as Kreitz says, “which is super important especially when you’re making something like cultured butter that needs those kinds of natural flora.” Kreitz also claims that you can almost taste where the cows are coming from. “You can actually taste the grassiness, but if you had done something like a high temp short time pasteurization all of that would be kind of shocked out of it,” she says. There seems to be an awareness among Bard EUS students about these nutritional differences, even if they are relatively broad: “I think that not all milk is created equal,” said one (A.M.).

Not only is the nutritional content and taste different, but so is the appearance. “The most alarming difference that our customers see is that the color of our butter is yellow,” says Kreitz, explaining that with most yellow butter, the color is actually artificial, but at a place like Daily Driver, it is because they use the milk of Jersey cows and those cows mainly eat lush green grass, which gives it its vivid yellow color. This distinctive appearance, the first thing that the customer sees, acts as a starting talking point to begin a conversation about why it looks that way and where it comes from, one of Daily Driver’s main objectives. Designed by Hadley’s husband as a kind of “factory or maker-space turned inside out,” as she explains, the space is arranged in a sort of mezzanine style with windows into the creamery, so visitors can see first hand the cheese making, bagel forming, and butter paddling. The goal is “full disclosure of everything that you’re eating, full food transparency,” and also “to spark a conversation of where your food come[s] from, who’s making your food.”

This full disclosure and transparency seems to be a trait that is growing in popularity among consumers. Once the conversation is started about where customers’ milk comes from and why it is important, Kreitz says she has seen a surge of people coming to the shop who really

get engaged. This is definitely a particular type of consumer, one who wants to know the origins of what they are eating and drinking, and is often concerned with the environmental and ethical impacts of the product. Daily Driver is in San Francisco, which has a high cost of living and is the home to many major corporations and tech companies. Its mainly liberal residents are value environmental and ethical awareness as well as brand transparency. Since San Francisco residents would also likely drink alternative milks, its population is relatively similar to that of Bard which tends towards both alternative milks and small-scale, local cow's milk. The interest in brand openness also came up in the interviews I conducted, with many participants commenting on Oatly saying "They're being extremely transparent... or at least trying to be transparent," and on Almond Breeze saying "They don't have the transparency that [Hudson Valley Fresh] does" (C.L.).

Although non-dairy milks are on the rise, Kreitz is confident that cow's milk is not going anywhere any time soon. The type of milk, however, is up for more debate. "I don't think people are going to stop wanting dairy anytime soon, but I think people are going to stop wanting dairy that's having a huge impact on the world," she says. "I'm trying to be an advocate for small-scale dairy and dairy that's conscious of the land around them, the people around them, the animals." Her passion comes through as she says "I can taste so much of a difference in our product, just because these cows are outside and they're happy, healthy, beautiful animals that are getting this incredible forage and you can tell that the land is super healthy."

Conclusion

From the interviews I conducted, I came to realize the extent to which people considered local, small-scale dairy and industrial, large-scale dairy as two totally separate entities. None of my participants shared whether they were lactose-intolerant or sensitive to dairy, but if they had, I would have imagined they would be more inclined to view all dairy milk as the same. Since they did not, however, and did not reveal whether they were vegan or completely avoiding dairy altogether for any other reason, they were influenced by other considerations -- preference for organic farming, environmental concerns, taste, nutritional value, and so on -- than in the choice between dairy or non-dairy. In addition to this distinction, every person that I interviewed said that they use or have used non-dairy milks, whether it be only occasionally or every day. Many of them used non-dairy milks in the past and recently switched to local milk, or have been purchasing it more frequently. They are making a conscious choice to not only avoid milk from bigger brands, but also to purchase cow's milk from small local farms instead of buying alternative milks. As a result, these consumers are essentially treating local milk as a new alternative milk.

If I were to go further or deeper into the environmental impact of each milk, I think it would be important to look more into variables such as emissions, reactive nitrogen levels, and pesticide use. I did not talk all that much about reactive nitrogen in this paper, but it has a significant impact on soil health, which is a critical aspect of agriculture's effect on the earth. I also did not talk too much about pesticides, but I know this is a major concern for consumers, and I would have liked to do more research into pesticide use in oat milk, for example.

I would have liked to investigate more about the workers at each company, for each type of milk I looked at, and what the conditions at each company are typically like. This would pose some challenges, because each farm will be different and treat their workers differently. The websites, as many of the students that I interviewed pointed out, made little to no mention of the companies' workers. As consumers and advocates, we sometimes focus more on the conditions of the animals than those of the human workers, while both issues should get ample attention. As many of the EUS students I interviewed were concerned about workers' conditions, it is clearly something that many consumers care about, and if I had more time I would have focused more attention on this issue. I think that at Bard we learn to question and critique the food system, which is very important. It is easy, however, for the line between the corporation and the farmer to be blurred, and it is important to make that distinction.

Writing this project has taught me about the complexity of making decisions around food. Many of the students that I interviewed expressed the importance of taste when it comes to milk, and in particular the comfort and nostalgia that they associate with it. Because of these considerations, almond and oat milk do not completely fill the place of cow's milk for many people. They do, however, offer options for people that are sensitive or intolerant to lactose or are avoiding dairy for personal reasons. Almond milk may be your milk of choice if you want less fat or love the nutty flavor. Many simply choose it because they do not particularly love dairy milk and they like the taste of almond (as students O.M. and A.M. did). If you are more concerned about the environmental impact of your milk choice, or prefer something with a texture similar to cow's milk, oat milk may be what you should go for (especially Oatly if taste and texture are your priorities, or if you are gluten-free). If you still want milk, but do not want

the hormones or high heat pasteurization that comes with many large-scale dairy brands, you may want to try getting milk from a smaller independent company, or even a nearby organic farm. These milks, of course, are often more expensive and less accessible, and therefore commercial dairy is still a very important option to have available. Still, not all these dairies are the same and it is therefore valuable to look into the brand you buy from. As consumers, we are forced to weigh all of our various priorities every time we stand in front of the milk cases in the grocery store, and since those priorities can include health considerations, the environment, human and animal rights, locality, taste, price, and many other factors, the choice can be overwhelming.

Bibliography

- “A Showdown in the U.S. Milk Aisle Continued at the End of July.” Accessed May 4, 2020. <https://www.nielsen.com/us/en/insights/article/2018/a-showdown-in-the-us-milk-aisle-continued-at-the-end-of-july>.
- “Association of Nut Consumption with Total and Cause-Specific Mortality | NEJM.” Accessed May 4, 2020. <https://www.nejm.org/doi/full/10.1056/NEJMoa1307352>.
- Bao, Ying, Jiali Han, Frank B. Hu, Edward L. Giovannucci, Meir J. Stampfer, Walter C. Willett, and Charles S. Fuchs. “Association of Nut Consumption with Total and Cause-Specific Mortality.” *New England Journal of Medicine* 369, no. 21 (November 21, 2013): 2001–11. <https://doi.org/10.1056/NEJMoa1307352>.
- Bull, Marian. 2020. “The Milk Situation.” *The New York Times*, March 14. <https://www.nytimes.com/2020/03/14/style/milk-dairy-marketing.html?searchResultPosition=1>.
- “Beneficial Uses of Manure FINAL Aug2015.Pdf.” Accessed May 4, 2020. <https://www.ncba.org/CMDocs/BeefUSA/Media/Beneficial%20Uses%20of%20Manure%20FINAL%20Aug2015.pdf>.
- “California Drought Has Wild Salmon Competing With Almonds For Water.” *NPR*. Accessed May 4, 2020. <https://www.npr.org/sections/thesalt/2014/08/21/342167846/california-drought-has-wild-salmon-competing-with-almonds-for-water>.
- Capper, J.L., et al. 2009. “The environmental impact of dairy production: 1944 compared with 2007.” *Journal of Animal Science* 87: 2160-2167.
- Chalupa-Krebsdak, Sebastian, et al. 2018. “Nutrient density and nutritional value of milk and plant-based milk alternatives.” *International Dairy Journal* 87: 84-92.
- “Dairy: long-term contribution trends.” Center for Responsive Politics. December 22, 2016. <https://www.opensecrets.org/industries/totals.php>.
- “Dairy Per Capita Consumption” 2019. United States Department of Agriculture. <https://www.ers.usda.gov/data-products/dairy-data/>.
- Dupuis, E. Melanie. 2002. *Nature’s Perfect Food: How Milk Became America’s Drink*. New York, NY: New York University Press.

- “Effect of Almond Consumption on the Serum Fatty Acid Profile: A Dose–Response Study | British Journal of Nutrition | Cambridge Core.” Accessed May 4, 2020.
<https://www.cambridge.org/core/journals/british-journal-of-nutrition/article/effect-of-almond-consumption-on-the-serum-fatty-acid-profile-a-doseresponse-study/8E5CA27A4A1B282BED2384839925E642#cjotab>.
- Eshel, Gidon, Alon Shepon, Tamar Makov, and Ron Milo. 2014. “Land, Irrigation Water, Greenhouse Gas, and Reactive Nitrogen Burdens of Meat, Eggs, and Dairy Production in the United States.” *Proceedings of the National Academy Of Sciences* 111(33).
- “Feed Grains: Yearbook Tables.” 2020. United States Department of Agriculture.
<https://www.ers.usda.gov/data-products/feed-grains-database/feed-grains-yearbook-tables.aspx>.
- Franklin-Wallis, Oliver. “White Gold: The Unstoppable Rise of Alternative Milks.” *The Guardian*, January 29, 2019, sec. Food.
<https://www.theguardian.com/news/2019/jan/29/white-gold-the-unstoppable-rise-of-alternative-milks-oat-soy-rice-coconut-plant>.
- fulcrum.org. “Heb33910.0001.001.Epub.” Accessed May 4, 2020.
<https://hdl.handle.net/2027/fulcrum.ww72bc141>.
- Fulton, Julian, et al. 2019. “Water-indexed benefits and impacts of California almonds” *Ecological Indicators* 96 (1) 711-717.
<https://www.sciencedirect.com/science/article/pii/S1470160X17308592#b0170>
- Good K. 2016. “Milk life? How about milk destruction: the shocking truth about the dairy industry and the environment.” *One Green Planet* website, April 22.
- Guibourg, Clara, and Helen Briggs. 2019. “Climate change: which vegan milk is the best?” *BBC* website, February 22. <https://www.bbc.com/news/science-environment-46654042>
- Hamblin, James. 2014. “The Dark Side of Almond Use.” *The Atlantic* website, August 28.
<https://www.theatlantic.com/health/archive/2014/08/almonds-demon-nuts/379244/>
- “Healthy Beverage Consumption in Early Childhood: Recommendations from Key National Health and Nutritional Organizations.” 2019. Technical Scientific Report. Healthy Eating Research, Duke University.
<https://healthydrinkshealthykids.org/app/uploads/2019/09/HER-HealthyBeverageTechnicalReport.pdf>
- Hedenus, Fredrik, et al. 2014. “The importance of reduced meat and dairy consumption for meeting stringent climate change targets.” *Climatic Change* 124: 79-91.

- Hitchens, Antonia. 2018. "Hey, Where's My Oat Milk?" *The New Yorker*, August.
<https://www.newyorker.com/magazine/2018/08/06/hey-where-s-my-oat-milk>.
- Hoekstra, Arjen Y. 2012. "The hidden water resource use behind meat and dairy." *Animal Frontiers*. 2 (2): 3-8.
- Hoekstra, Arjen Y. 2013. *The Water Footprint of Modern Consumer Society*. London: Routledge.
- Hyman, Mark. 2018. *Food: What the Heck Should I Eat?* New York, NY: Little, Brown and Company.
- Institute for Water Education "The Green, Blue and Grey Water Footprint of Crops and Crop Derived Products":
<https://waterfootprint.org/media/downloads/Report47-WaterFootprintCrops-Vol2.pdf>
- Isidore, Chris. 2020. "One of America's Oldest and Largest Milk Producers Files for Bankruptcy." *CNN* website, January 6.
<https://www.cnn.com/2020/01/06/business/borden-dairy-bankruptcy/index.html>
- Ludwig DS, Willett WC. 2013. "Three daily servings of reduced-fat milk: an evidence-based recommendation?" *JAMA Pediatr*. 167 (9): 788-89.
- McGivney, Annette. "Almonds Are out. Dairy Is a Disaster. So What Milk Should We Drink?" *The Guardian*, January 29, 2020, sec. Environment.
<https://www.theguardian.com/environment/2020/jan/28/what-plant-milk-should-i-drink-almond-killing-bees-aoe>.
- "Milk Life? How About Milk Destruction: The Shocking Truth About the Dairy Industry and the Environment - One Green Planet." *One Green Planet*. Accessed May 4, 2020.
<https://www.onegreenplanet.org/animalsandnature/the-dairy-industry-and-the-environment/>.
- Minger, Denise. *Death by Food Pyramid: How Shoddy Science, Sketchy Politics and Shady Special Interests Have Ruined Our Health ...* Malibu, Calif: Primal Blueprint Publ, 2013.
- Nestle, Marion. 2013. *Food Politics*. Berkeley, CA: University of California Press.
- Nestle, Marion. 2006. *What to Eat*. New York, NY: North Point Press.
- "NYCdata: Population Characteristics: Births, Marriages, Deaths and Infant Mortality." Accessed May 4, 2020.
<https://www.baruch.cuny.edu/nycdata/population-geography/pop-characteristics.htm>.

- Philpott, Tom, and Julia Lurie. 2015. "Here's the Real Problem With Almonds." *Mother Jones* website, April 15.
<https://www.motherjones.com/environment/2015/04/real-problem-almonds/>
- Philpott, Tom. 2014. "Your Almond Habit Is Sucking California Dry." *Mother Jones* website, July 14.
<https://www.motherjones.com/food/2014/07/your-almond-habit-sucking-california-dry/>
- Poore, J, and T. Nemecek. 2018. "Reducing food's environmental impact through producers and consumers." *Science* 360 (6392): 987-992.
- Roos, Elin, et al. 2017. "Greedy or needy? Land use and climate impacts of food in 2050 under different livestock futures." *Global Environmental Change* 47: 1-12.
- Saner, Emine. 2015. "Almond milk: quite good for you – very bad for the planet." *The Guardian* website, October 21.
<https://www.theguardian.com/lifeandstyle/shortcuts/2015/oct/21/almond-milk-quite-good-for-you-very-bad-for-the-planet>
- Shurtleff, William, and Akiko Aoyagi. *History of Soymilk and Other Non-Dairy Milks (1226 to 2013): Extensively Annotated Bibliography and Sourcebook*. Lafayette, CA: Soyinfo Center, 2013.
http://books.google.com/books?id=MyJPwd72zhgC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false.
- "Sustainability Report 2017." *Oatly* website, 2017. Accessed November, 2019.
www.oatly.com/uploads/attachments/cjp9gpb709c3mnqr8idyecwy-sustainability-report-2017-eng.pdf.
- "Sustainability Report 2018." *Oatly* website, 2018. Accessed November 2, 2019.
<https://www.oatly.com/uploads/attachments/cjwvr38ex0n2eiqragq2tv1v-oatly-sustainability-report-web-2019-eng.pdf>.
- "Tree Nuts: Bearing Acreage, Yield per Acre, Gross Returns per Acre, Production and Value, Price, and Supply and Utilization." 2019. United States Department of Agriculture.
<https://www.ers.usda.gov/data-products/fruit-and-tree-nut-data/fruit-and-tree-nut-yearbook-tables/#Tree%20Nuts>.
- "U.S. Dairy Situation at a Glance." 2020. United States Department of Agriculture.
<https://www.ers.usda.gov/data-products/dairy-data/>.
- Valenze, Deborah M. *Milk: A Local and Global History*. New Haven: Yale University Press, 2011.

Wertheim, Bonnie. 2018. "The Humble Ascent of Oat Milk" *New York Times*, , Jan. 19. <https://www.nytimes.com/2018/01/19/style/oat-milk-coffee-oatly.html>

"Which Plant-Based Milk is Best for the Environment?:
<https://foodprint.org/blog/which-plant-based-milk-is-best-for-the-environment/>

Willett, Walter C. 2001. *Eat, Drink, and Be Healthy*. New York, NY: Free Press.

Yaffe-Bellany, David. 2019. "A Milk Giant Goes Broke as Americans Reject Old Staples." *New York Times* website, November 13. <https://www.nytimes.com/2019/11/13/business/dean-foods-bankruptcy.html>.

Websites:

Dr. Mark Hyman. "About." Accessed May 4, 2020. <https://drhyman.com/about/>.

"Almond Breeze | Non Dairy Milk | Blue Diamond." Accessed December 9, 2019. <https://www.bluediamond.com/brand/almond-breeze>.

"CDC | Public Health Law Anthologies: Raw Milk," July 26, 2019. <https://www.cdc.gov/phlp/publications/topic/anthologies/anthologies-rawmilk.html>.

"Dairy Farms, Stories & Benefits | U.S. Dairy." Accessed May 4, 2020. <https://www.usdairy.com/>.

"DFA - Family-Owned Dairy Farms | Dairy Farmers of America." Accessed May 4, 2020. <https://www.dfamilk.com/>.

Nutrition, Center for Food Safety and Applied. "Raw Milk Questions & Answers." *FDA*, April 28, 2020. <https://www.fda.gov/food/buy-store-serve-safe-food/raw-milk-questions-answers>.

OATLY! "Oatly USA." Accessed December 9, 2019. <https://us.oatly.com/>.

"Premium Fresh Local Dairy." Accessed December 9, 2019 <http://hudsonvalleyfresh.com/>.

Solodev. "American Dairy Association North East," April 23, 2020. <https://www.americandairy.com/>.

"State Milk Laws." Accessed May 4, 2020. <https://www.ncsl.org/research/agriculture-and-rural-development/raw-milk-2012.aspx>.

"WhiteWave Foods." Accessed May 4, 2020. <https://www.whitewave.com/>.