ABSTRACT

Financing Sustainable Agriculture in the United States: Observations and Innovations

Brandt Bergeron

Director: Michael Stegemoller, Ph.D.

Agriculture in the United States is on the whole an industrial enterprise, as reflected by institutional treatment and established practice. Drawing upon the work of agrarian author Wendell Berry, this paper contends that the status quo of an industrial and scientific approach to agriculture is leading to disastrous long-term effects for farming communities, land quality, and end consumers. This trend has been worsened by the loss of local and regional agricultural marketplaces and a lack of external, non-governmental investment in sustainable farms. Moreover, there is substantial evidence which indicates that farms lack appropriate sources of capital because of a persistent information gap created by farmers' lack of fluency in institutional finance, the inapplicability of traditional financial models to small farming, and the hesitancy of financial institutions to underwrite agricultural investments. Rather than searching for answers in agricultural innovation, this paper examines potential financial innovations to address the issue. This paper advocates for various structural improvements within agricultural finance, using a case study of a berry farm in Hillsboro, Oregon to inductively discuss such solutions. A primary conclusion of this paper is that if appropriately-structured equity capital and technical assistance were made available to small farmers who espouse sustainable farming practices, substantial gains could be achieved in the health and long-term stability of small farming operations and local farming economies.

APPROVED BY DIRECTOR OF HONORS THESIS:

_____

Dr. Michael Stegemoller, Department of Finance

APPROVED BY THE HONORS PROGRAM

_____

Dr. Elizabeth Corey, Director

DATE: _____

FINANCING SUSTAINABLE AGRICULTURE IN THE UNITED STATES: OBSERVATIONS AND INNOVATIONS

A Thesis Submitted to the Faculty of

Baylor University

In Partial Fulfillment of the Requirements for the

Honors Program

By

Brandt Bergeron

Waco, Texas

April 2020

TABLE OF CONTENTS

ACKNOWLEDGMENTS

I would like to express my sincere gratitude to Dr. Michael Stegemoller for his help with this project. His patient support, professional expertise, and care for farm life offered continual encouragement along the way. Many thanks to Sam Boden for his help researching West Union Gardens and for his thoughts on social capital. He is a great teacher and friend. Though I have never met him, I would like give thanks to Mr. Wendell Berry. I am grateful for this man who made big claims and actually set about living by them. His work forms the basis for my justification of the sustainable farm. Though I am aware that my arguments in this paper may put some of our ways of thinking at odds, I hope that he might forgive me. Thank you to my mother for sharing her love of things that grow and for our conversations in the infancy of this project. Lastly, thanks to my wife Kendall for her unwavering love, discerning thoughts, and patience during many long nights in the library.

EPIGRAPH

"Provision is the sum of our ways of securing from the earth our food, clothing, and shelter — and of taking proper care of the sources of these things in nature and in human culture. It rests upon no guarantees, and it does not pretend to know the future."

– Wendell Berry, *Leaving the Future Behind: A Letter to a Scientific Friend*

"Late August, given heavy rain and sun
For a full week, the blackberries would ripen.
At first, just one, a glossy purple clot
Among others, red, green, hard as a knot.
You ate that first one and its flesh was sweet
Like thickened wine: summer's blood was in it
Leaving stains upon the tongue and lust for
Picking. …"

– Seamus Heaney, "Blackberry Picking"

CHAPTER ONE

Sustainable Agriculture in the United States: Background & Definitions

Introduction

Going by the traditional definition of economics, there should be few better economists than the local farmer. On the farm, allocation of scarce resources is a constant and daily endeavor. Thus, it might seem to follow that we should be able to understand local farms in terms of their economic performance, and that we could describe farming through the practical application of economics in financial modeling — synthesizing projects into traditional frameworks with measures like net present value, unlevered internal rate of return, and return on equity. But the use of financial models and economic ways of thinking has long evaded or hindered the progress of many American farmers. Financial analysis has been used by many researchers and practitioners in recent years — primarily for farms with large-scale operations better suited to these types of analyses. Unfortunately, the principles of finance as applied to large-scale farming have caused severe damage within American agriculture. While large scale agricultural production, with uniform crop selection and mechanized production processes, is more measurable within financial models, it is accompanied by a host of negative externalities that are not captured by a financial model, calling the integrity of such models into question. On the other hand, the financial decisions faced by small, diversified farms can be even more difficult to capture within a model, since they face an array of specific challenges that can make such traditional financial modeling unhelpful or irrelevant.

Small farms also create positive social and environmental externalities that are underappreciated by financial measures of performance.

Understanding the role of finance within the setting of small-scale, sustainable agricultural ventures requires that some traditional measures of finance be recast to adjust to the aims of the farmer. While bridging the gap between financial analysis and small farming operations is inherently challenging, I believe that it is a worthy undertaking. For farmers seeking access to capital, especially desirable forms of institutional capital, knowing how to explain their farm's needs and performance in financial terms significantly increases the likelihood accessing the most productive forms of capital. Many small farmers would benefit from some of the insights of modern finance, in decisions including land acquisition, farm capital structure, crop selection, and capital budgeting. Additionally, a more complete understanding of finance will help small farmers and policy-makers to potentially avoid toxic forms of financing created by investors in "agribusiness." Finally, better forms of financing at the small-farm level could benefit local regional economies — a key toward improving the long-run sustainability and success of U.S. agriculture.

Context: Agribusiness and U.S. Farming

American agriculture has lost its way. For one thing, it is lacking leadership. The first stated goal of the United States Department of Agriculture, the branch of the government devoted to agricultural policy with a 2020 budget of $119 million, is the following: "To provide economic opportunity through innovation" (*opba.usda, usda.gov*). In a 2014 document entitled "Measuring Success: New and Beginning Farmers and Ranchers," the USDA identified "increased investment," "targeted outreach," and

"technical assistance" as its key strategies to solving the crisis of young people leaving the farming community and the corresponding increase in the average age of American farmers (1). This proceeds from the governmental organization whose work directly affects the use of American farmland and the kinds of produce we can obtain for our tables. Meanwhile, Apple, Inc., the creator of the Mac computer and the iPhone, is guided by a mission statement to "Improve the lives of people" and "Empower the public," and has a vision is to create innovation, integrate partners and excellence, and achieve market specialization ("Apple"). On a surface reading, it appears that there is little to differentiate the mission of U.S. agriculture from that of a trillion-dollar technology firm.

In the private sector of the agricultural economy, a centralized, industrial-scientific-innovation approach has become the default. Farming sector analysts estimate that industry leader Bayer AG, the pharmaceutical and agribusiness giant which recently acquired former rival Monsanto, Corp., accounts for ~25% of global seed production, and alongside its competitor DowDupont, controls 75-80% of global corn and soybean production — by far the most valuable products in the seed category (Greenberg). Bayer also runs an insurance business, selling 21% of global crop protection (Greenberg). Bayer's mission is to provide "Science for a better life," and defines itself as a "world-class innovation company" with the goal of "achieving and sustaining leadership positions in our markets" (Bayer). Bayer's corporate managers have outlined very similar objectives to the public policy makers of the United States — objectives focused on scientific innovation that drive performance in the market and create economic wealth. They have already accomplished much to this end, building a business that will provide everything

required to grow the food consumers need (seeds, chemical fertilizers, and crop insurance).

While it runs the risk of gross oversimplification to analyze these governmental and corporate agribusiness organizations by their vague mission statements or statistical impact on farm development, it is telling that both policy-makers and farm-suppliers approach farming as an exercise in scientific innovation with financial engineering to boost economic profitability. This approach might work for a tech startup in Silicon Valley, but it falls woefully short as a measure of success for American farmers.

Redefining Farm Success and Sustainability

I would like to redefine farm success for the purposes of this paper. Rather than measuring scientific innovations on the farm, global economic outcomes, or profitability based on the sale of farm assets, I believe that we should understand farm success as inherently tied to the health of the land and the *local* economy. Among other things, farm success must include caring for the land that is used for agriculture, the ability to market and sell products at a fair price, financial compensation for farm labor, and established connection of local and regional consumers with the land to realign economic and social incentives.

Adequately defining farm success requires a new understanding of sustainability. While the majority of government initiatives, agribusiness corporations, and investors provide lip-service to sustainable agricultural practices, their actions have often incentivized harmful practices in the past, and seem to offer dim prospects for substantive change moving forward. Many of the negative effects of industrial agriculture have been observed empirically, yet practical solutions are often discarded in favor of vague

commitments to environmental health. For instance, in speaking of the greenhouse gas emissions of farming caused by use of chemical fertilizers, politicians generally jump to predictions of catastrophic climate change and propose any number of scientific and political solutions, without once suggesting that we change the system that demands nitrous fertilizers for food production. Wendell Berry suggests that this is a flawed way to quantify the problem. Speaking of this issue of climate change as "the most famous and influential future-fear at present," he explains that the process of turning an impending danger into a "movement" impedes meaningful solutions by harping on panicked predictions:

> The problem with prediction, no matter how scientifically respectable it may be, is its power to bring on first a fear and then a movement that can be popularized into a fad. But of all bad motives none may be worse or more hopeless than fear. Nobody, I think, has ever done good work because of fear. Good work is done by knowing how and by love. (*The Art of Loading Brush* 69-71)

Instead of fear-mongering and hoping for grand scientific solutions, Berry demands that his readers grapple with issues of sustainability beginning at the local level. He advocates for "good work," changes in farming practices and a return to small-scale farming that adapts to the land (71). Alongside Berry, I believe that we must be able to envision sustainable farms before attempting to envision a sustainable global food system or a reversal to climate change.

When combined with the writings of Wendell Berry, the work of Wes Jackson forms a part of the theoretical foundation that I hope to apply to issues of farm finance. Wes Jackson is the president emeritus of The Land Institute, an organization focused on implementing sustainable farming practices that improve land quality. He outlines many key considerations in defining farm success that have been overlooked by the big-ag agenda in his speech "Becoming Native to This Place." One of Jackson's fundamental

arguments centers on the importance of recognizing the potential uses of agricultural land according to its inherent qualities. Casting aside the "checklist of environmental social problems" facing American farmers, he argues that

> We need to recognize the reality of the ecological mosaic across the country and to realize that there are some places…where the *land* determines and other places where human beings can actually make useful and appropriate changes in a favorable environment. (Jackson)

While this approach does not at all preclude the application of scientific knowledge to agriculture practices, it asks several questions related to the nature of the land before beginning to assess how the laws of nature may be bent to serve man's needs. This holds numerous implications for what constitutes good farming, including crop selection, seed purchasing, methods of planting and harvesting, etc. In this paper, I will seek to focus less on particular farming practices, and more on forms of financing that may enable farmers to consider and implement more sustainable forms of agriculture.

In addition to helping redefine the objectives of "sustainable farming," Wendell Berry has elaborated on his many convictions about farm economy that are antithetical to agrarian economics in the status quo. Stemming from his experience with the tobacco economy as a farmer in Kentucky, he advocates for a much more robust consideration of the damages of industrial farming that are not directly paid for by producers or consumers — what economists call externalities. In his essay "The Problem of Tobacco," Berry develops a fulsome view of the regional crop of tobacco, accounting for its costs and benefits to the farmers and land that grew it, and analyzing the impact of federal regulations that functioned to control production and prices. As a "cornerstone" crop of the Kentucky economy, Berry notes that tobacco had several advantages, and that with the right protections in place, it provided consistent profitability for the community. It

was a "sociable crop" that brought various farmers together to share the work during the most labor-intensive periods, and it "permitted significant income to be realized from small acreages, thereby sparing us the inevitable damage of extensive plowing" (*Sex, Economy, Freedom and Community* Ch. 5). At the same time, Berry accounts for the hazards of tobacco production, noting that while it was less damaging to the land than some crops (he mentions corn), it still resulted in soil erosion. He also takes significant time to address existing concerns about the detrimental health effects of tobacco consumption. It is this sort of complete account that must be given when evaluating farm outcomes at the local and regional level: first addressing impact to the land and the local community, then examining the concerns of society at large. It is a computation that does not exclude the externalities of "land loss, soil erosion, forest degradation, toxic contamination of soil and water, bad health, etc." (*Loading Brush* 77-78). In his essay on tobacco, Berry advocates for a public policy solution — the continuance of federal production controls to ensure fair pricing to farmers without the need for subsidies. I believe that this type of holistic approach should similarly be adopted in examining private-sector agricultural investments.

Social Capital: Definitions and Applications

In order to bridge the gap between this new vision for farm sustainability and the sources of capital needed to accomplish this vision, it is helpful to define and understand the term "social capital." This term is found across much of the academic work that has been done on agricultural finance, particularly on the small-farm level. It is consistently introduced as both a measurable variable and predictor of success. In the section that

follows, it is discussed in its various applications and defined for the purposes of this paper.

One use of the term applies to the integration of academic, scientific, agribusiness, and global economic policy at the macro level. In a 2014 paper titled "Social capital and investment in agriculture: Three global networks converge with implications for research assimilation," Fairley-Grenot and Carberry identify social capital as "a glue and an oil that can link research and finance systems together" to potentially slow the damage of ecological degradation in the context of Australian agriculture. They define social capital as "networks together with shared norms, values and understandings that facilitate cooperation," thinking of this at a very institutional level (343). Essentially, they seek to identify the benefits of cross-linking trade, capacity building, and environmental goals via research to identify future paths forward. They examine potential impacts of increased levels of social capital on issues including public policy, allocation of funds for future research, and global financial incentives, noting that research and banking systems have "diversified around new forms of industrial development" since World War II (349). In practice, this cross-network view of social capital in agriculture could be applied as it was in the University of Technology Sydney's 2019 Report "Water Scarcity Risk for Australian Farms & the Implications for the Financial Sector." This report combines an academic review of drought risk in the Australian agribusiness sector, semi-structured interviews with farmers and agribusiness bankers, and a risk-framework model to provide recommendations to bankers seeking to optimize loan-making decisions to the Australian farming sector (5). The interdisciplinary acquisition of "social capital" created insights such as the following: during their interview process, researchers found that "bankers reported that lack of access to sufficient water was a considerable risk factor for farms"

but that "formal on-farm water risk assessments are rarely carried out in practice," which is critical to establishing the true risk of multi-year loans in Australia's drought-prone environment (30). Alongside the conversations with bankers, talking with farmers revealed the difficulty in quantifying the fiscal value of water, and the need for more clarity on the subject in the loan-making process (35). The literary review and interview work then allowed researchers to develop a better model for long-term water risk assessment, adjusted for short, medium and long-term factors (37). They were able to develop the concept of "water value at risk," where potential rainfall deficits must be offset by water purchases. Adjusting for farm-level needs, researchers were able to create a multifactor model that better reflects true risk-levels for Australian farmers (49). Tapping into the social capital in the Australian agroeconomic sector by integrating research with the knowledge of experienced practitioners helped identify and quantify the impact of water shortages. These insights were applicable in addressing the pressing demands of Australian water shortages.

On the regional (micro) level, there is more to be said about the meaning of social capital. A dearth of information exists about the role of social capital in agriculture within developing countries. For many years, the World Bank has used the idea of social capital in creating its developmental programs. The authors of a 2006 tome on social capital's role at the World Bank have noted that the term "has been praised and damned for its capacity to embrace a broad range of issues" (Bebbington et al. 4). They identify social capital either as resources that flow through a network or the extent of the network structure itself, and combines these understandings to reflect "assets of groups that reside within their relationships" (4). Anthony Bebbington has written numerous papers about the role of social capital in developing South American agrarian economies. He examines

the regional impact of economic policy in countries such as Ecuador, Peru, Chile, and Bolivia, finding that the primary predictors of "peasant viability" were correlated with farmers' ability to access natural resources and social capital resources (2031). These regional insights from developing countries might be more helpful to understanding the needs of small U.S. farmers if they were not rather dismissive of agricultural practices themselves: Bebbington states that "institutional and human investments largely unrelated to agriculture and often outside rural areas" are a "more appropriate response to agricultural stagnation than yet one more erosion control or seed improvement project" (2032). Bebbington divorces investments in "natural resources" from investments in "social capital," and views social capital as access to government resources, financial aid, and non-agricultural activities that reduce ties to the land in developing countries. Thus, in the context of agrarian economies in developing countries, the term is often used to denote a community's access to baseline resources rather than the integration of advanced research, policy, and financial networks.

Social capital is also discussed in the context of small business analysis as a predictor of innovative potential. Thomas Lyons has researched the impact of social capital in the context of rural business development in the U.S. as a way to combat rural poverty. Lyons surveyed two business incubators in rural areas and a regional economic development program, concluding that social capital is both necessary and hard to come by in rural areas, and that to build social capital, the "component parts" of regional economic systems must be "linked" via formal and informal relationships to their proper place in the national and global marketplace (215). Significantly, Lyons also noted that "access to affordable capital and skill-building resources" was "limited in all three regions," and that all three service providers were reliant on "nontraditional capital

sources" (214). A more recent study by Laursen et al. in 2012 examines the "importance of regional social capital for firms' innovative capabilities" (178). Using an econometric model and the variables of "social capital — social interaction," "R&D intensity," and "external R&D acquisition", the researchers found that throughout twenty-one Italian regions analyzed, "firms located in regions characterized by a high level of structural social capital in terms of social interaction display a higher propensity to innovate," particularly for companies with a medium-propensity to innovate (189).

These attempts to define and analyze social capital represent only a tiny fraction of the academic efforts that have been devoted to the topic. To simplify the wide-ranging and often contextual definitions of social capital, I will use the following definition in assessing its role in small-farm agrarian finance — social capital is an intangible asset obtained by building relationships in the regional agrarian economy, which creates positive network effects that can contribute to beneficial resource-sharing, operational superiority, and access to desirable end markets for farm products. On the one hand, this understanding of the term appreciates the importance of networks for business success. However, it crucially seeks to avoid defining social capital as access to technical advances that will drive innovation on the farm, or access to resources that will enable farmers to leave agrarian life, as in Bebbington's research. This revised understanding strives to preserve the centrality of the farm economy to this discussion of farm financing, following Berry's manifesto: "No fact of technological innovation need ever associate with the facts of community or ecological life" (*Loading Brush* 93). Since this paper is attempting to entirely associate finance with community and ecological well-being, I have chosen to exclude the technological view of social capital.

In terms of applicability to this paper, social capital can be seen as one of many important factors for farm success and financial well-being. It is difficult to quantify, carries with it potentially-confusing business connotations, and is often a catch-all term used out of convenience rather than as a function of diligent insight. While I do not believe that social capital is the primary determinant of farm success, I do believe that farms high in social capital can expect to see sustained improvement in good farming practices through shared knowledge within the farming community. Furthermore, the idea of social capital is integral to the discussion of farm finance, as it highlights the foundational value of key relationships outside the farming community.

CHAPTER TWO

Finance at the Farm Level: West Union Gardens

In the midst of daily operations, the small farmer constantly faces capital allocation decisions. Farmers must have access to a variety of monetary and nonmonetary resources to ensure their ability to manage the farm effectively. This chapter focuses on the capital requirements faced by West Union Gardens, a berry farm located in Hillsboro, Oregon. West Union engages in small scale production agriculture in a sustainable fashion; the farm is not organic certified, but grows food that in many ways exceeds the USDA's technical requirements of "organic" produce. Their goals since taking over the farm in 1987 have included "improving the land, providing fair employment, and producing clean, quality produce" (*westuniongardens.com*). This case study, which examines West Union's current and historical capital requirements, will focus on four primary types of capital requirements: real assets used in the everyday operations of the farm, financing for land acquisition, cash flow needs for seasonal income supplementation, and required resources for crop selection, marketing, and distribution.

Examining the case of West Union Gardens showcases the challenge of sourcing and allocating capital that meets the farm's operational needs in any given year. West Union Gardens is a ~170-acre farm located in Hillsboro, Oregon, just outside the Portland metro area. Situated in the rich soil of the Willamette Valley, it is owned by Jeff and Cheryl Boden, who have operated it for over 30 years. Their son Sam manages much of their local berry distribution and served as a primary source of information during research. Berries are the farm's primary crop: it grows many varieties including

blackberries, raspberries, and marionberries. Additionally, the farm raises a variety of vegetables and flowers that are mainly sold in its on-site farm stand. Many of West Union's berries are distributed to local grocery stores for sale.

Capital Expenditures

As with all farming operations, West Union Gardens requires a variety of fixed assets and equipment in order to carry out its core functions. It uses two tractors, to which a plow can be fixed for tilling. Additionally, West Union uses a variety of vehicles for transportation of produce and workers around the farm, primarily Volkswagen buses and all-terrain vehicles. It employs movable pipes and sprinkler systems that supply irrigation to the fields. West Union also has a large barn that is used for storage of equipment and supplies. It also maintains a small outbuilding that serves as a storefront for customers visiting the farm and contains a refrigeration unit that houses produce between harvest and distribution. In the fields, West Union utilizes "high-houses," a type of outdoor greenhouse setup. Most equipment is purchased on an as-needed basis, though more planning and budgeting is generally used for larger capital investments. For example, West Union recently purchased a new tractor and 4-bottom plow as opposed to the old 3-bottom setup that they had used for many years, a transaction that provides some insight into the farm's capital budgeting process. Jeff Boden viewed the decision to purchase the 4-bottom plow as a time-saving measure, one that would allow for more efficient tilling which would help West Union expand its cultivated land area or spend time elsewhere on the farm. Jeff ran a basic breakeven analysis of the cost of the new tractor against the benefits of added capacity and time-savings. Additionally, he considered the fact that the old tractor's dependability was deteriorating and it would likely incur increased

maintenance costs if made to bear the primary workload. In the end, he estimated that it would take five to six years to recover his investment, and made the purchase. This level of analysis is perhaps somewhat atypical of Northwest farmers. In Sam Boden's words, most of West Union's peers "respond to pressing and urgent needs when purchasing equipment." Certainly, there is an added level of professionality and foresight that plays into West Union's equipment decisions compared to those of its peers, but it like any other farming operation must respond to unexpected demands at times. Since equipment breaks and requires immediate attention at the risk of losing valuable time and critical windows for crop development, capital budgeting is a very imprecise science.

Land Acquisition

West Union Gardens acquired land in stages. At the outset, the Bodens purchased a 40-acre plot of real estate that formed the original farm, paying ~$180,000 in total, or $4500/acre. They used the Farm Credit System to finance the loan. At the time, the move to purchase 40 acres required a substantial measure of bravery and appetite for risk, and the $180,000 loan felt to Jeff and Cheryl like an enormous sum. Since then, West Union has purchased an additional 90-100 acres for $1,000,000 (~ $10,000/acre). By comparison, this second loan required the assumption of less risk and uncertainty for West Union than the first, even though it represented over twice the amount of land and five times the amount of debt. This loan was made with many years of experience already in place and in the context of a robust real estate market in the Hillsboro area, a trend that has continued to the present.

Rounding out its real estate portfolio, West Union also leases 27 additional acres from a neighboring farmer. They wish to purchase the land if possible, and have been

prevented from doing so only by their neighbor's unwillingness to sell. All told, West Union holds high quality, contiguous plots of acreage that are closely-managed, productive, and represent the bulk of farm assets. The land value is not only stable, but has appreciated considerably over time.

Seasonal Income Needs

In addition to long-term loans for real estate, West Union Gardens has historically acquired short-term loans to provide cash flow during the low-income winter months, using this money to continue farm operations and offset personal living expenses. Despite holding a growing portfolio of high-quality, producing assets, West Union needed seasonal injections of liquidity for many years to ensure its continuation. Thus, in 2005, it certainly marked a new era for the farm when it no longer required the additional capital of a seasonal loan during the winter months. Though West Union has continued to draw on lines of credit or seasonal loans on an as-needed basis, this moment signaled a new level of stability and a reduction in financial risk.

Crop Selection, Marketing and Distribution

While questions of crop selection, marketing, and distribution might seem like separate issues, they often factor simultaneously in West Union Gardens' decision-making process. Together, they also demonstrate the convergence of the roles of monetary and social capital in agriculture. West Union considers crop selection, an agricultural decision, to be integrally related to the business decisions of marketing and distribution, because of the need to consider a product's path to market before it is grown. Typically, West Union considers three questions when selecting crops. First, does the product grow well? Second, how much trouble is the product? Third, how profitable is the product (net profit/acre)?

The first two criteria are agricultural, related to considerations about a crop's suitability for the Pacific Northwest climate, comparative advantages of different berry varieties, availability of various plots of land, ease of planting and harvesting, access to irrigation, potential use of a "high-house," demands on the soil, etc. And while these agricultural factors largely determine the cost portion of the profitability calculation of question #3, the only way to calculate projected revenue is by understanding the market for that particular product. West Union must consider whether there is an existing market for the product and whether they could tap into that market.

Often over the years, West Union has sought to grow unique crops with no traditional path to market, and find a way to sell them. Their rhubarb business is a fine example. While growing the crop has required little out of the ordinary, the acquisition of end customers has been unexpected and innovative. The crop is well-suited to the Northwest and relatively straightforward to grow, but it is not traditionally regarded as a widely marketable commodity. Yet despite setting out with little more than a low-quality website for marketing, West Union has built connections and relationships over time that have fostered a prosperous business selling rhubarb crowns. In addition to selling in their local Portland market, West Union now sends out a large truckload of crowns every year for delivery across the United States and Canada.

While West Union's unique rhubarb business came about nontraditionally, West Union's berry business has been their mainstay over the last several decades, and has flourished in correlation with West Union's careful accumulation of social capital over that span. Social capital in the form of relationships with local grocery stores and distributors of produce has a direct impact on the profitability and stability of West Union's business, as it provides a steady source of demand for its agricultural production.

For example, in their earlier years West Union participated in local farmers' markets to market and sell their berries, requiring a substantial commitment of time and effort in exchange for the opportunity to sell their produce. This was not only time-intensive, but represented a marketplace where sales were uncertain. Nevertheless, these interactions in the local marketplace, combined with many years of consistent product quality, helped build up a supply of relationships and access to distribution channels that have grown the business by leaps and bounds. Today, Sam Boden, in his role managing West Union's distribution relationships, reports that they experience about two times more demand for their berries than they could ever supply. West Union no longer travels to farmers' markets on a regular basis, and spends very little if anything on marketing (the farm maintains a website and social media page with updates on which crops are in season). Sam describes West Union as "wealthy in relationships with distributors, wholesalers" and identifies the development of many "long-standing relationships with local grocery chains" as a key foundation to their current success. While not every customer offers the same price for West Union's product — a cannery for instance pays substantially less than a grocery store — it is evident that West Union holds the enviable position of working with the customers they choose to supply based on the quantity and quality of berries available. This not only allows them to strengthen and monitor the quality of the customer base, but it provides the stability to make better assumptions and predictions regarding future investments, crop selection, etc.

West Union has also acquired social capital in the form of relationships with other Pacific Northwest farmers who are willing to share information about their work. For instance, in considering whether or not to plant a new crop for the first time, West Union might consult with farmers in their local area to ascertain their prospects to grow the crop

successfully and profitably. Over time, they have seen the importance of diversification play out among the Northwest farming community, watching neighboring farmers struggle or even fail by overconcentrating their production of certain crops with no end market. Recently, West Union consulted a neighboring farmer about his lucrative foray into hemp planting — a consideration that while successful for him, has been disastrous for some other farmers in the Northwest because of the crop's sensitivity to moisture and susceptibility to root rot. These relationships with local farmers not only bring more efficiency and success to the Bodens' farm, but in turn provide valuable information and insight to other farmers, strengthening a shared knowledge base. Conversations rooted in agricultural knowledge, friendship, and community thus result in decisions that strengthen the farm's physical and financial resources.

West Union Today: Financial Challenges and Opportunities

Today, West Union Gardens is in a unique position relative to most small U.S. farms. It is well-established within the Hillsboro community, well-connected to end markets for its produce, financially stable, expanding its portfolio of valuable assets, growing excellent crops, and making measurable progress in improving the quality of its land through sustainable farming practices. Yet the Bodens still face challenging capital allocation questions, and see room to improve in their role as employers and community members. One goal that they would like to achieve is to decrease their reliance on seasonal laborers in their farming operations and increasing their full-time workforce. During the growing season, the farm relies on the help of many farmhands to aid in planting, cultivating, and harvesting their produce. During the off months, however, the farm does not have the financial resources to retain some employees on payroll. Knowing

the difficulties for employees created by the loss in winter income, West Union would like to reach the point that they could keep more employees on in full-time roles, but would currently assume too much financial burden and risk in doing so now.

West Union also sees opportunity for further investment in alternative revenue streams for the business. While Jeff Boden continues to apply his creative powers to finding end markets for unique produce, his sons have a vision to invest in projects that might encourage more of Hillsboro's non-farming community to visit the farm. They see the opportunity to add a seasonal drink shop to the current farm-stand setup or offer other opportunities in the fall that would grow West Union's community engagement level and add diversity to its revenue base. These potential projects certainly have the opportunity to succeed, but pose many questions that will require time and business planning along with trial-and-error to supply meaningful answers.

A Financial Model of West Union Gardens: Purpose and Design

At the conclusion of the research process, an illustrative operating model was created for West Union Gardens. Portions of the model are shown for reference in the Appendix. Rather that utilizing West Union's actual financial information, the author generated fictitious data, with rude approximations serving for fixed inputs. The purpose of the model was to create an innovative depiction of West Union's operations that would be understandable by financial institutions for valuation purposes and financial statement analysis, while also providing a tool that could be potentially helpful to farms like West Union in financial decision-making. The model was reviewed both by a faculty advisor in the finance department and West Union Gardens, with West Union's comments forming part of the discussion that follows. Through the process of creating and discussing the

contents of the model, an additional objective was to identify the shortcomings of the model, and more generally the shortcomings of any model of this type, particularly identifying the ways that it could hurt as well as help farmers and providers of agricultural capital.

The model is constructed beginning with field-level profit and loss calculations, which flow into a standard three-statement model with an income statement, balance sheet, and statement of cash flows. The guiding principle behind such a layout was to create some separation of the farming operations tabs from the aggregated financial statements that would appear in the more standardized format outlined by U.S. Generally Accepted Accounting Principles (GAAP). The field-level operations tabs were divided into three main sections: "Planting/Cultivation", "Yield Projections", and "Harvest/Sale". This design was meant to mimic the pattern of a growing season, during which costs incurred in the several months of planting and cultivation are offset by harvest returns later in the season. The "Planting/Cultivation" section included cost categories such as fertilizer costs, water costs, seed costs, land prep costs, and required labor hours for cultivation each week. The "Yield Projections" category was calculated using either hardcoded projections for the upcoming year (low/base case/high) or the average of historical crop yields for the given type of berry. Finally, the "Harvest/Sale" section primarily worked to divide the harvest into end markets: wholesale, farm stand, and cannery. Estimated percentages of the harvest were allocated to these three distribution channels, and multiplied by projected sale prices for each corresponding category to calculate total projected revenue. Given that berry harvesting is a very labor-intensive operation, some labor costs were included in the "Harvest/Sale" section as well. The final output in the field-level tabs was a "Gross Profit/Acre" calculation.

In the aggregate full-farm section of the model, the data from the field-level operations was consolidated into total projected financials for the current fiscal year alongside historical financials. Key metrics calculated included Earnings Before Interest and Taxes ("EBIT"), Net Plant, Property, and Equipment ("Net PP&E"), and Cash Flows from Operations. While nearly all of the data in the full-farm section links directly to the field-level tabs, the Balance Sheet is also linked to a tab containing loan amortization schedules for West Union's long-term notes for land and equipment. The data in both the field-level tabs and the farm-level tab could be used for financial analysis, with the field-level data likely being more helpful for calculating farming-relevant key performance indicators, and the three-statement data being more helpful in calculating financial return outputs, understanding earnings trends and projections, and asset analysis.

Feedback and Analysis of the West Union Model

Upon receiving the model, West Union Gardens was able to analyze and comment constructively on the model's design. Overall, they responded positively to the model, but with several reservations. First, they emphasized that the flexibility of their systems does not align with the relative rigidity of the model, and thus the model has limited applications for farm-level use (Boden). This result is unsurprising, given the complexity of small farming operations like West Union, which grows dozens of crops in a given year, constantly rotates fields and machinery, and does not rely upon synthetic inputs to ensure the survival and marketability of its crops.

Furthermore, West Union clarified some of the field-level measures they use that differed from those employed in the model. The following discrepancies were noted: while the model projected water cost and water usage, West Union emphasized that

water usage was the relevant input, and also that correctly determining water usage is much more complex than the model suggests. While water use was simply estimated on a gallons/week and a cost/gallon basis with no assumed constraints, West Union clarified that water consumption, while essentially free, is limited to a set quantity each hour and each day based on city agricultural regulations. The challenge is not how much water to use, but how to efficiently allocate water across fields as needed. Another area that differed substantially from the model was the "Yield Projections" section of the field-level model. West Union emphasized a wide, almost unknowable variation in the "yield, quality, and consistency of a given crop," thus making percentage allocations of sales to wholesale, farm stand, and cannery an issue of substantial conjecture (Boden). Given that factors like uneven ripening, scarcity, and sun damage all impact the yield and suitable end market for each crop of berries, and the fact that these factors are practically impossible to project each year, revenue forecasting is an extremely difficult prospect to tackle. West Union made the historical observation that when a crop has been sold to canneries, it usually results in a breakeven (zero net profit) for that field. This could be used to make a simplifying assumption within the model to alleviate the projection difficulty.

A final discrepancy between the model and West Union's experience is the calculation of labor costs. In the model, a flat-rate average hourly labor cost multiplied by labor hours required for cultivation and harvesting drives total labor costs. However, for West Union, the average cost of hourly labor is not readily calculable, making this measure a rough guess. With large weekly variations in labor hours, the use of seasonal work crews and family labor, and varying pay rates, this cost calculation is in fact much more complex than was shown in the model.

Overall, the feedback received from West Union was very constructive, both in understanding where more complexity and flexibility could be introduced into the model, and in describing some simplifying assumptions that should be made to avoid irrelevant outputs and excess complexity. Developing models, even to the level of this illustrative project, is somewhat costly. Adding in the extra complexity of constraints like water rights would take more time, and may not be particularly helpful if the current system is already working well. It is also worth noting that if a model of this nature utilized real data and were to be shown to external investors, it would likely require audits and other compliance costs that could be prohibitively high.

There is a tradeoff between complexity and usefulness in describing problems of this nature. Greater complexity within a model could well be the enemy of usefulness; it would be impossible and impractical to try and capture all of the natural processes and variables that go into growing berries on a farm like West Union. Significantly, this model was designed to describe the farming process of West Union, and while certain decisions may be improved based on insights within the model it must be understood that relying on the model to prescribe appropriate farming practices would be disastrous. It is important that West Union not abandon good practices whose benefits may not captured in a gross profit calculation, something that the model could never emphasize. Creating the model served again as a reminder that the benefits and costs of externalities associated with farming are very difficult to quantify.

Despite its dangers and shortcomings, a model is able to show some of the inner workings of the farm's core operations, particularly to someone with financial expertise. The model also pointed out areas where West Union could work to develop better estimates of certain measurable categories, such as labor costs. Problems such as

optimizing water usage could perhaps be helpfully worked out in a model. Further improvements to capital budgeting decisions, such as when to purchase equipment and how to finance it, may enhance West Union's proactive approach to such decisions. It is possible that further analysis of this type, combined with real farm data, could be helpful for day-to-day operations and boost profitability by implementing various non-invasive changes.

The dialogue with West Union was informative with respect to the risk characteristics of berry farming. On the one hand, West Union's cashflows are uncertain and highly variable. However, the ability to sell inferior berries to canneries and achieve near breakeven profits even on poor harvests does help create a floor to preserve the business' capital and operational ability. It can be generally known that in any given growing season, not all crops will perform equally well, but the staggered timeframe of the various types of berries grown increases the likelihood that at least some crops will grow and ripen well enough to sell via wholesale or directly to customers. Downside risk is also limited by the quality of West Union's relationships with wholesale distributors — West Union experiences steady demand for their products in the Portland metro market. Almost all the berries they can produce will be sold, it is only a question of the quantity and quality of berries West Union can grow.

On the whole, the creation of a model was a useful exercise that allowed for improved discussion and delineation of the financial challenges facing a small to midsize farm with diversified operations. The model failed to accurately capture the full decision-making process within the farm, but was deemed by West Union to be understandable and a good effort on the whole. With more work, the model could better capture certain key inputs, such as variable labor costs, profitability by end market type, and the costs of

water limitations during warm periods. The model cannot account for innumerable variations of growing conditions that accompany each new season. The timeframe of each crop grown, availability and cost of labor, and uncertainty of yields alone are enough to make a model of this scale look rigid or irrelevant. Nevertheless, models of this type could still serve more than an illustrative purpose, either for addressing particular questions or challenges on the farm, or for financial institutions seeking to gain an understanding of the farm's performance. With the accrual of sufficient historical yield data, decision-making about overall crop allocations could potentially be improved. Appropriate diversification strategies of crops could be better quantified and understood, and particular issues of capital budgeting may be addressed better than with the reactive approach typical to small farmers. More generally, a model of this type could be informative to farmers who are looking to grow a new crop for the first time, or to new farmers beginning to budget their allocation of labor, capital, and other resources. Lastly, while the primary purpose of creating this model was to correctly model farming operations over the course of a growing season, further iterations of the model could also be reviewed by financial institutions to judge its usefulness and applicability as a relevant tool in financial and operational analysis. Later versions of the model could also examine issues of financing for future expansion.

CHAPTER THREE

The State of Agricultural Financing: Farm Debt

When it comes to the financing of agricultural production in the United States, it is nearly a foregone conclusion that if any form of outside capital is used, it will be debt. The trend has become more prevalent over time, to the point where the average debt-to-equity-ratio for a U.S. farm was 15.3 in 2018, having steadily risen over the past decade and with projected debt levels continuing to rise going forward (USDA ERS). The use of debt financing is consistent regardless of whether the capital is used to acquire land, equipment, or expand operations. There are two primary institutions that farmers can turn to for debt financing: commercial banks or the U.S. government. The government has long been an active leader in the agricultural lending space, operating a federal agency — the Farm Credit Administration — to manage its role in farm lending.

Even as levels of farm debt have risen over time, the underwriting institutions of farm loans have become increasingly distant from the farms themselves. This chapter describes the shifts in the agricultural debt markets over the past several decades that have brought about this distancing effect and the reality of farmers' current ability to access debt financing. In doing so, this chapter primarily examines agricultural banks (defined as commercial banks with a higher than average proportion of agricultural loans) and the Farm Credit System, which together underwrite well over 80% of farm debt (USDA ERS).

Commercial Agricultural Banks

While the market for farm debt has continued to grow in the commercial banking sector over time, the number of banks issuing that debt has declined substantially, a trend that has accelerated as many community banks and local branches of commercial banks have closed or consolidated. In 1985, commercial banks held approximately $39 billion in loans used to finance agricultural production, an amount that grew to $77 billion in 2019, representing an increase of 96% (FRED "All Commercial Banks"). However, the amount of farm debt held by the top 100 commercial banks as ranked by total assets grew over that same timespan by 165%, from $6.6 billion in 1985 to $17.5 billion in 2019 (FRED "Top 100"). This outpaced growth has increasingly concentrated agricultural loans into the hands of large institutional lenders, and is largely attributable to consolidation and agricultural bank failures. There were a large number of agricultural bank failures in the 1980s related to adverse changes in the farm economy such as decreasing farmland prices, low commodity prices, and increasing input costs (Gilbert and Kliesen). It is possible that many of these failures in the 1980s were related to a lack of portfolio diversification — in other words, a result of agricultural banks being too exposed to performance of the farm sector itself. Gilbert and Kliesen note that the smallest banks were particularly vulnerable, as they were generally more exposed to risk in the agricultural sector, faced higher loan delivery costs than their larger peers, and lacked affiliations with large banking organizations that can provide protection during downturns.

More recently, agricultural banks have again undergone a period of bank unprofitability, failures, and consolidations, this time as a result of the increased regulatory burden of the Dodd-Frank legislation imposed in the wake of the financial

crisis. A 2018 article from Julie Stackhouse, Executive Vice President at the Federal Reserve Bank of St. Louis, notes that while the current trend of net bank branch closures began in 2009, it had long been preceded by a decline in the number of active bank charters and bank headquarters (Stackhouse). Among other things, Stackhouse attributes these trends to the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, industry consolidation after the financial crisis, and changing consumer preferences (Stackhouse). This last point is a significant addition: the introduction of Dodd-Frank has coincided with a shift away from a community banking model where depositors keep their savings at local banks and toward a more centralized, platform-based system of banking.

Although agricultural banks have suffered from crises in the farming sector, the banks themselves tend to operate more efficiently than their non-farm peers. In a 2012 paper analyzing recent bank failures during the financial crisis, researchers from the University of Georgia (Li, Xiaofei et al.) find that from a technical efficiency standpoint, "agricultural banks have been operating more efficiently than surviving nonagricultural banks" ("Technical Efficiency" 18). They define technical efficiency as the measure of "the ability of a firm to obtain optimal outputs from a given set of inputs"; in basic terms, agricultural banks do more with less (11). Additionally, the quality of the underlying loans in agricultural banks is substantially higher than those held by commercial banks (18). In another paper by the same authors, it is shown that agricultural loans demonstrated substantially lower delinquency rates during the financial crisis than nonfarm loans, with overall delinquency rates over 7% while farm loan delinquencies barely topped 3% ("Agricultural Lending" 121). Furthermore, the authors empirically demonstrate that credit exposure to the farm sector does not increase the risk of bank failure, as has been

posited by some, "confirming that agricultural lenders are in relatively stronger financial health" (119). Yet for many community agricultural banks, this increased efficiency relative to non-farm banks has still not proved to be enough to allow them to stay open. Industry-wide pressures, increased regulatory costs, and changing consumer preferences have swallowed hundreds of agricultural banks, leaving farmers increasingly far away from accessible forms of debt capital.

In their paper "The differential impact of the Dodd-Frank Act on niche non-metro lenders," McKee and Kagan examine the financial performance of non-metro credit unions and agricultural credit associations. They find that since the passage of the Dodd-Frank reforms in 2010, which imposed substantial costs on institutions offering real estate loans in non-metropolitan areas, the burden of these costs resulted in decreased bank efficiency and lower non-interest income, with the authors concluding that:

> An asymmetric impact of compliance costs, combined with the importance of cooperative institutions in providing real estate products in some markets, suggests that an indirect [effect] of the Dodd–Frank Act is to promote the decline in the number of credit unions and ACAs. (299-300)

Additionally, the reforms handed down by Dodd-Frank push banks toward increased standardization of loan contracts, reducing the value that a local bank can provide to a farmer by tailoring a deal to their specific needs. Tanya Marsh notes how this negates some of community banks' prior competitive advantages, in addition to chipping away at their profitability:

> The focus on standardization of consumer financial products…fails to recognize the value to consumers of the community-banking model, which emphasizes relationship banking, personal underwriting, and customization of financial products. (230)

This severely limits community banks' ability to lend to customers who do not have the "deep credit history necessary for the model-based lending used by large financial

institutions" (230). This not only pushes banks out, but leaves farmers without access to debt capital and wondering how they might possibly adapt their strategies to obtain a loan. Not surprisingly, this limitation disproportionately affects small farmers without financial expertise.

This subject is examined in Carraher and Van Auken's 2010 paper, "An Analysis of Funding Decisions for Niche Agricultural Products," where they study funding flows from providers of capital to small farmers. They polled providers of capital in Iowa, ranging from the Farm Credit System to Community Development Financial Institutions to Revolving Loan Funds, in an attempt to identify the leading causes of funding request rejections and other obstacles impeding small farmers' access to funding. Among the many types of institutions polled, the primary reasons identified for rejections were "insufficient collateral" (50.9%) and "weak/no business plan" (49.1%), while the leading recommendation from those same financial institutions was that small farmers obtain "technical assistance" (financial advice) — ostensibly to create a business plan or find some collateral (7). The authors note that while "technical assistance" is a primary recommendation of capital-providers, few of those capital-providers actually provide such assistance (8). Thus, it seems clear that there is a knowledge gap, which if filled could open doors for smaller farmers to provide the needed information for financial institutions to underwrite financial distributions, and likewise increase the number of viable counterparties for agricultural capital placements. However, given the increasing separation of farmers from the people who can provide loans or the technical assistance needed to apply for a loan, the prospects for many small farmers may be grim.

The Farm Credit System

The second source of debt financing that farmers can pursue is the Farm Credit System. Both the Farm Credit System and Farm Credit Administration, its regulating and supervising agency, were created under Franklin Roosevelt's administration in 1933 by executive order (*fca.gov*) The stated aim of the Farm Credit System is to "provide maximum service to the US agricultural sector at minimum cost subject to maintaining long-run viability" (Dang 39). The FCS seeks to provide loans to farmers at competitive rates, along with insurance and other related products (Song 2). It is comprised of a network of 4 banks and 68 member associations of banks. (*fca.gov*). The 4 banks raise institutional investment dollars in domestic and international debt markets and make loans directly to other entities, including the 68 affiliated FCS associations (Dang 38-39). As with the number of agricultural banks, the number of FCS associations has fallen rapidly over time, from approximately 150 in 2000, to 80 in 2011, to the 68 currently in existence (50). This decrease in number has corresponded to an increase in average association size (50). FCS banks and associations are government-sponsored but member owned, with each farmer who borrows through the FCS obtaining a share of ownership in the system (Song 2). FCS loans are more frequently backed by real estate, with the FCS handling a comparatively smaller 33% of the market for non-real estate debt (USDA ERS). All told, the banks and associations of the Farm Credit System hold 41.4% of farm business debt, with another 4.4% of farm debt held by Farmer Mac and the Farm Service Agency ("FCA 2018 Annual Report" 19). The government thus oversees over 45% of U.S. farm debt, with most of the remainder held by commercial banks and individuals (19).

To evaluate the Farm Credit System's effectiveness, Dang and his coauthors employ a definition of technical efficiency very similar to that used by Li et al. to measure agricultural bank efficiency. They find that the Farm Credit System's efficiency has been improving over time, a function of greater market share in the U.S. agricultural debt market (FCS institutions held only 27% of farm debt in 2000), increased farm income, and the substantial consolidation of member associations (47, 49). They also find that increased farm profits have been substantially influenced by the (government-subsidized) biofuel boom and rising crop prices (49). Additionally, they note that FCS banks are more efficient than FCS associations, and that the largest associations in the FCS are generally more efficient than small ones, making it unsurprising that overall FCS efficiency has increased as the number of member associations has dwindled (50). Dang and his colleagues recommend more consolidation to boost efficiency (50).

Agricultural Banks and the FCS: Comparisons and Conclusions

When compared in pure efficiency terms, agricultural banks and the FCS look similar, with Farm Credit coming out slightly ahead. Minrong Song and his coauthors performed a comparison between the technical efficiency of the FCS and that of commercial agricultural banks. The bulk of their study mirrors the technical input and output criteria discussed above; they find that FCS institutions are 5 percentage points more efficient in the ordinal technical efficiency scale their commercial bank counterparts (15-16). Whether or not these two types of institutions can even be measured by the same standards is debatable. For example, it is unstated how the effects of government farming subsidies impact the efficiency of either group. Does a biofuel boom bias efficiency

calculations as much for agricultural banks as it does for the government-backed Farm Credit System?

Technical efficiency aside, Song et al. allude to the fundamental differences that separate the two types of lenders. "Their operating styles and structures are inherently different," they write, noting that compared to the more centralized format of the FCS, "[commercial] banks tend to be more geographically dispersed across the country" (17, 19). Significantly, they find that to combat the increasing difficulty of agricultural lending, "the operating decisions of smaller lenders notably mirror those made by FCS lenders" (21). In other words, we can expect over time that any remaining commercial agricultural banks will increasingly operate like their government counterparts.

While financial institutions, both private and governmental, can and should be applauded for their gains in efficiency, the trend of industry-wide consolidation in order to achieve it comes at a cost. It seems that the choices available to small farmers in the debt markets, which in many cases is their sole source of financing, are becoming increasingly homogenous. The requirements of farm lenders are likewise being standardized. In light of this type of extreme financial consolidation, the caution of Wendell Berry seems nearly as applicable as it is to large-scale farming practices:

> Bigness is a most amorphous and unstable category. As a social or economic goal it is totalitarian; it establishes an inevitable tendency toward the tyrannical *one* that will be the biggest of all. ("The Culture of Agriculture")

Functionally, agricultural banks and the Farm Credit System appear to be operating well enough, based on their technical efficiency and the quality of the loan portfolios they hold. However, it seems evident that for farmers, particularly small farmers, these gains in efficiency have had little benefit. For farms not as fortunate as West Union Gardens, helpful forms of debt financing may never arrive. What role the Farm Credit System and

agricultural banks could play in fixing this problem is unclear, but both face clear obstacles. The centralized FCS is tied to the same government that drives the USDA's focus on technological agribusiness, while the agricultural banking industry is operating as an increasingly consolidated and distant conglomerate. This analysis leaves many unanswered questions, but it undoubtedly demonstrates that there is room for improvement in small-scale farm finance.

CHAPTER FOUR

The Case for Equity Investments in Sustainable Agriculture

A key objective of this paper is to determine the financing needs of small and sustainable farming operations and to discuss the best potential sources of capital to fulfill such requirements. I believe that a key to promoting a resurgence in sustainable agricultural practices in the United States will include establishing the appropriate criteria and creating a market for strategic equity investments. Equity capital is of a very different nature than debt. Within a farm's capital structure, debt has the senior claim on all the financial returns of the farm. Interest expense regularly accrues and must be paid on the outstanding principal balance, and the debt must be refinanced, gradually amortized, or repaid by a certain maturity date. Often, there are a series of restrictive covenants that impose various limits on a farmer's use of capital to ensure repayment, and in case of financial distress or bankruptcy, debt holders receive priority claim to the assets secured against their debt. The holder of an equity investment, on the other hand, is a residual claimant to the financial returns of the farm. Equity holders participate in farm ownership and share proportionally in increases and decreases to overall farm value. Equity contracts can be structured more flexibly to compensate the investor. The investor may for instance receive regular dividend disbursements as a share of firm profits, a set annual payment proportional to their share in ownership, or be compensated only when their stake is sold or liquidated.

There are several reasons why equity capital could be especially helpful going forward. First of all, whereas the industrial agricultural farm is designed to carry debt on

its balance sheet, with crops, equipment, and fertilizers in place to consistently manufacture food and produce stable cashflows, the small farmer faces a large degree of risk and uncertainty that makes debt financing less ideal, especially in a farm's early years. Furthermore, sustainable models of farming are generally less capital-intensive, meaning that asset-backed loans are less of an option for many small farmers. Additionally, having access to too much debt financing — even cheap debt financing — can be detrimental to the farming process. Wendell Berry explained this anecdotally in his 1974 address at Gonzaga University:

> Some of these overcapitalized hill farms in my part of the country are going to damage the soil more than any agriculture that's ever existed. You get two or three hundred thousand dollars in debt on 500 acres of steep land and put it all in Holstein cows — great big heavy beasts that all congregate and walk the same paths twice a day to be milked…people are failing in those places too. ("The Culture of Agriculture.")

This type of mismanaged cattle operation exemplifies how access to the wrong type or too much capital can incentivize the wrong behavior, especially if accompanied by a farmer's greed or ignorance.

Wang et al. posit in their 2002 paper "External Equity in Agriculture" that properly structured equity investments under a principle-agent model may serve to align investors' and farmers' interests by compensating the farmer's effort level with appropriate income-sharing while avoiding the costs of financial distress and mitigating the liquidity constraints associated with the use of leverage (13). Their model is somewhat unapproachable by those with no taste for advanced mathematics but could show providers of capital a potential way forward in the structuring of equity contracts. In an earlier paper, Crane and Leatham point out that historically, highly-leveraged farms have struggled more than their less leveraged counterparts during periods of volatile interest

rates and lower return on assets (223). This evidence points to historical and theoretical reasons for the use of equity in farm finance, but there are other, more specific arguments which make the case for strategic equity investments.

Over the coming decades, a huge proportion of farmland will be subject to changing ownership, with each change in ownership implying recapitalization and a potential change in land use. Recent research conducted at the Centre for Sustainable Food Systems at the University of British Columbia traces a "historical decline in post-colonial North American farming populations, with farmers as an economic class comprising less than 2% of the total population in both the USA and Canada" (303). With the aging farming population, a shrinking number of agricultural participants, and a lack of succession planning, Wittman and her co-authors estimate that "up to 70% of farmland in North America is likely to transfer hands in the next two decades" (303). This research suggests that agricultural cooperatives or community farming may provide a path forward. Under the cooperative ownership structure, there could feasibly be multiple equity partners with both financial and operational responsibilities in the cooperative. In the financing of such farm cooperatives, Pokharel et al. indicate in their 2018 paper that leverage is a primary contributor toward financial stress and low returns in agricultural cooperatives, making equity financing a desirable alternative. For the financially stressed cooperatives they studied, "the leverage problem accounted for 66.5 percent…of the financial stress" (278). Furthermore, "the composition of the debt problem" has changed over time, with "the proportion of the financial stress attributable to leverage" for all 583 cooperatives studied increasing substantially over time to 38 percent — 14 percentage points higher than when similar research was conducted by Moller et al. in 1996 (278). The increased use of leverage has been fueled by a higher demand for short-term seasonal

loans following the financial market crash of 2008, and could also be correlated to the 2012 drought in the United States (278-279). If agricultural cooperatives are to succeed financially, the limited use of leverage and a pivot toward equity financing seems to be a primary factor.

In the case of privately-held farms like West Union Gardens, equity financing could be used to solve persistent challenges in purchasing and transitioning land to sustainable agricultural uses. Ponsio and Ehrlich address this issue in their 2016 paper "Diversification, Yield and a New Agricultural Revolution." Examining the transitional period for farmers seeking to pivot land use from industrial agriculture to organic or conservation farming, the authors show that financing is a critical factor in determining whether transition is viable. Just as short-term debt has caused increased financial distress for cooperatives, reliance on short-term leasing agreements can create disincentive for private operators to transition to more sustainable farming practices. They explain that "Uncertainty in yields and transition costs likely make converting land for organic production unfeasible for farmers with short-term leases" (7). While these costs and yield uncertainties are generally well worth the difficulty of transitioning in the long-term, farmers may be too constrained by the lack of stable financing to make the transition. The authors cite a 2016 study by Calo and de Master covering California's Central Coast region, an area where most farmers have short-term leases. One farmer they interviewed hoped to grow berries, but was unable to make the investments required to plant the crop without knowing the long-term viability of his leasing agreement.

> If I were an owner I would put in some raspberry. That takes three years to grow and then six years of harvest, but how am I going to invest in something over 10 years from now if the owner can kick me off in three years? I can't leave half my investment, that's for sure. (120)

The inability of farmers to negotiate more stable financing arrangements through the purchase of land leaves them unable to plant the crops they desire, use sustainable (but temporarily more uncertain) agricultural techniques, and often eliminates hope of ever owning and operating a farm independently. Paradoxically, if a farmer were able to give up some percentage of ownership in the form of an external equity investment, they may be enabled to actually own a farm, rather than being relegated to permanent tenant status as a result of never-ending short-term lease agreements.

Ponsio and Ehrlich further explain that farmland being transitioned to organic or sustainable uses is frequently held by largescale industrial farmers seeking a premium for "organic produce" with little interest in implementing the necessary diversification to achieve truly sustainable farming practices.

> These newly organic farms…often chose to substitute inorganic chemical inputs with their organic counterparts to gain certifications without incorporating diversification practices to limit the need for such inputs. These farms are thus not truly transitioning from industrial agriculture. (7)

Again, this underscores the hazards of turning to industrialized agriculture to solve the crisis of agricultural land use and reinforces the need for long-term financing arrangements for small farmers to avoid being squeezed out by this type of rent-seeking behavior. In the words of Wendell Berry, the land does not acknowledge the "determinism of 'market forces'" and the demand to "Get big or get out" (*Loading Brush* 77). Berry explains: "For the corporate purchasers the low price attendant upon overproduction is the greatest benefit…for farmers it is the single cruelty of the current agricultural economy" (40). While a contractual arrangement to enable the marketing of "organic" produce may serve to drive investor profits, it takes away the opportunity for

small-scale famers to connect with and care for the land. This precludes progress toward the agricultural changes that are needed in the United States.

Equity investments not only provide a way to reduce the financial strain associated with leverage, they provide a path to ownership, and enable small farmers to make long-term investments in themselves and the land they work. Equity infusions also provide greater potential for the addition of a critical component discussed at the outset of this paper: social capital. Given the higher risk often associated with equity investments and the principle of shared ownership, potential equity partners will have a greater vested interest in providing the type of technical assistance that small farmers may need to make the appropriate investment and capital management decisions. Equity partners may also help by providing insight on questions of crop selection, pointing farmers to educational resources, and facilitating engagement with other local farmers and distributors. An equity investment could likewise open the door to competitive debt financing options, given that "technical assistance" is the primary obstacle to obtaining debt financing as seen in Carraher and Van Auken. The existence of an equity partner who can provide targeted advice, check in on a farm's financial performance, contribute to the formulation of a business plan, and help a farmer find suitable end markets for their produce could be invaluable in boosting a small farm's financial health and continuity.

Challenges Associated with Equity Investments

While equity investments offer many compelling benefits in the context of local, sustainable farming, there are a variety of challenges to making such investments. Crane and Leatham state that the primary obstacles that stand in the way of providing equity

capital to farmers are the "structural characteristics of agriculture" (223). The authors explain further:

> These barriers stem primarily from the organization structure of production agriculture with the correspondingly high transactions costs: the search and information, underwriting, and monitoring costs associated with sole proprietorships and small partnerships contracting for external equity (223).

Again, the lack of information flow and business expertise seems to be the greatest barrier to equity investment. The same lack of technical training as discussed in Chapter 3 that plagued farmers seeking to access debt markets likewise applies to equity opportunities. Here, however, the problem seems to be most acutely concentrated in the lack of market-making intermediaries and willing financial partners who understand and care about farm operations. Either there is an absence of such individuals and institutions, or there is effectively an absence as neither the farmer nor the investor is willing to bear the costs of market-making and investment monitoring. This would suggest that a larger, collectivized business organization — in other words, an agricultural cooperative — may function as a more investable structure for external equity capital while also being able to serve the needs of the land through sustainable, small-scale farming.

Crane and Leatham suggest a proposed market structure called a "profit and loss sharing equity market, a structure by which financial intermediaries (banks) would participate as market-makers for equity investments by holding both federally insured interest-bearing deposits and uninsured noninterest bearing investment deposits (225). Banks would then be enabled to draw up contracts and provide equity investments to farmers. The authors note that while any investment institution could hypothetically fulfill this role, they believe that the Farm Credit System "would be at an advantage over other investment institutions" given its national scale and ability to diversify its holdings in

agricultural equity to "protect against regional losses" (232). They believe that the FCS would be able to attract additional capital from investment banks seeking exposure to agriculture.

I believe that this proposed market structure has several compelling elements, but that it fails by seeking to accommodate itself to the status quo of agricultural operations and finance. The authors advocate the profit and loss model for adoption by "general production agriculture" — in other words, agribusiness. They envision the FCS as the likely candidate to effect this task, and while making improvements to the FCS should be a priority, it seems impossible that a national, government-sponsored financial institution can practically and profitably effect provide customized equity financing of the type envisioned in this paper. Drawing up equity contracts for production agriculture and handing this role to the FCS is plausible but not ideal. It may well be another way for the government to lose money and for small farmers to lose sight of the best ways of farming. We cannot circumvent the fact that finance must adapt to the individual farm and farmer if we are to make progress, and based on the literature reviewed in Chapter 3 concerning the composition trends of the associations belonging to the FCS, it does not seem likely that the FCS will be able to accomplish this adaptation.

For finance to adapt to more sustainable methods of agriculture, for high-quality equity investments to be made in the sustainable agriculture sector, and for the sustainable system of agriculture to become the production system of agriculture, the market for equity investments needs to be local and regional rather than centralized. Just as there is no single repository of knowledge where a farmer can go to learn how to farm, there should be no Wall St. of sustainable agriculture where a farmer goes to obtain financing — especially when that financing is in the form of equity capital. Rather,

information must be gathered and investment decisions must be made at the local level. To the extent that farmers cannot fully finance their own operations, there must be limits set on the distance between the farmer growing a crop and the investor financing the growing of that crop. That is not to say that investors should ignore the principles of diversification and risk-sharing, but suggests that they should attempt to invest in farms where the practices of diversification are actually embedded in the crops grown. Given that the yields of sustainable farms are substantially more resilient to common environmental risk factors experienced by all farmers as discussed in Ponsio and Ehrlich, this type of farm-level diversification may be doubly good for external investors.

The following section will discuss how this regionalized equity market might function. Before doing so, a final barrier to the creation and sustenance of such a market should be considered — the return profile that these investments would offer to investors. The returns to an equity investment in sustainable farming, either at the whole farm or project level, are difficult to project and rationalize in terms of risk and return as understood in finance. Agricultural investments, particularly on the smaller scale, have a substantially different return profile from the broader financial market. For instance, the growth of an equity investment in sustainable agriculture cannot be modeled according to the same assumptions of perpetual growth that underlie assumptions in the broader economy. It is unhelpful to try and use the Capital Asset Pricing Model (CAPM) to establish appropriate discount rates. The CAPM projects equity returns based on overall market risk (market risk premium) and an asset's historical correlation to the market (beta). Farming risks are of a very different nature. They are often uncorrelated to the financial markets and very idiosyncratic. A two-week spell of dry weather in the summer

wouldn't be noticed in most sectors within the financial markets, but could cut a berry farmer's profits in half.

Furthermore, it is doubtful that an agricultural equity investment in a small farming operation would compete in absolute terms to the expected return of alternative equity investments — for instance, a broad market index — over the near term. However, we might use different standards and models to evaluate prospective equity investments in agriculture. When evaluated on a historical, risk-adjusted basis and compared against other financial investments, agricultural equity investments may indeed offer compelling return characteristics. What is additionally clear is that for such investments to correctly compensate investors, the structure and terms of the investment must be closely tailored to the individual farm or project being invested in. In the following section, examples of such investments and the market-making intermediaries needed to underwrite them are explored, along with potential holistic solutions that address the financial needs of sustainable farming in the United States.

A New Chapter in Agricultural Investing: Progress and Possibilities

As shown throughout the course of this paper, there are a host of actions that might be taken within agricultural investing and institutional finance to support the effort toward a more sustainable and localized form of farming. There are several examples of financial institutions that do much of what is advocated in this paper. Harvest Returns, an agricultural fund based in Fort Worth, Texas, raises capital, primarily equity capital, for small famers across a diverse agricultural spectrum. Harvest Returns obtains capital from limited partners, usually accredited investors, and deploys it in the United States and abroad in categories including hydroponic produce, cocoa plantations, hemp labs, and

tax-advantaged investments in Qualified Opportunity Zones (Harvest Returns). While several elements of Harvest Returns approximate a traditional, closed-end private equity fund, Harvest Returns maintains a higher degree of transparency by offering investments in individual projects, much as co-investments would work within the private equity model. Their stated mission is "To facilitate capital raises for small to medium-sized farmers & ranchers while providing investors streamlined access to attractive, low-risk, private placement opportunities in production farming" (Harvest Returns.) While the investments made are in production agriculture, Harvest Returns generally funds farmers who are operating at a smaller level, prioritize sustainability, and promote environmental well-being. Harvest Returns investment sizes range from around $200,000 to multi-million-dollar projects for their Qualified Opportunity funds. Harvest Returns invests in farms looking to expand production capacity, reap particular tax benefits, and integrate new agricultural technologies. These characteristics are popular selling points, not only for Harvest Returns' own limited partners, but for future buyers of their equity stakes. This marketability is critical since Harvest Returns realizes much of their total return by exiting their investments through an eventual sale of their equity stake.

The Fair Food Fund also makes equity investments in sustainable agricultural opportunities, but operates at various levels along the spectrum of the local food supply chain. The Fair Food Fund is a primary operation of the Fair Food Network, which is headquartered in Ann Arbor, Michigan and works to connect underprivileged people to food sourced directly from local farms and boost local economic health (Fair Food). As an impact fund, the Fair Food Fund seeks to measure its efficacy in dollar terms primarily on total community impact rather than enterprise profitability. They claim that each dollar invested by the Fund returns nearly $9 in "community benefits," which are categorized as

"value of jobs created plus value of local farm purchasing, divided by the value of financing and business assistance deployed" (Fair Food Impact Report). Working from an impact investing standpoint rather than a financial return-driven model, the Fair Food Fund makes use of a variety of financing options, including equity, convertible notes, and debt, but focuses more on the return to the supply chain and community rather than the investor. While the Fair Food Fund provides capital itself, it also seeks to empower entrepreneurs and farmers to raise additional funding — the businesses they support raise an average of 7x more capital than the Fair Food Fund initially provides (Impact Report). In total, the Fair Food Fund seems to accomplish many outcomes that this paper advocates for — local community development, investments in small farmers, and the provision of technical assistance along with financing — in an impact investing format.

Whereas Harvest Returns and the Fair Food Fund are financial institutions seeking to provide better financing solutions to small farmers, there are additional non-financial institutions that play a key role in this area. Consider The Berry Center — Wendell Berry's namesake organization that seeks to put teeth into the precepts and practices espoused by Mr. Berry. The organization operates in Henry County, Kentucky, and as a part of its stated vision seeks to answer the question "What will it take for farmers to be able to afford to farm well?" (*berrycenter.org*). The Berry Center functions in a variety of ways, primarily through training programs and disseminating information to local farmers. The Berry Farming Program, an education program for farmers, has been in operation since 2012. The program currently functions in collaboration with Vermont's Sterling College by hosting courses onsite in Henry County aimed to equip college students with agricultural techniques and business expertise through a series of interdisciplinary courses. Program entrants must have at least 60 credit hours of college

coursework complete, and preference is given to those with hands-on farming experience (Sterling College). It is particularly designed to be contrary to "the dominant industrial approach to agricultural education" (*berrycenter.org*). Courses in the program include agroecology, forestry, draft animal power systems, U.S. farm and food policy, and small business management (Sterling College). The Berry Center also oversees the "Our Home Place Meat" initiative, which functions as a cooperative for Henry County livestock producers to bring their meat to market. The purpose of the initiative is to "address fundamental challenges of creating local food economies" by "producing local food, establishing fair compensation for farmers, managing supply and demand, accessing markets, and responding to consumer values" (*berrycenter.org*). The various roles of the Berry Center to educate farmers and create local marketplaces for their products provides an example of how a nonfinancial institution can play a critical role in bringing about the financial betterment of small, sustainable farming operations.

These three institutions — Harvest Returns, the Fair Food Fund, and The Berry Center — are individually making tremendous strides toward a more sustainable and financially secure farming community. The institutions go about this very differently, and each offers important insights into ways that the objectives set forth in this paper might be put into practice. Each respective program has particular strengths that offer foundational insights to potential investors in farm equity. Harvest Returns has done an excellent job raising meaningful amounts of investor capital for equity investment in production agriculture. The fund managers clearly conduct extensive diligence on investment opportunities, provide good transparency as to the use of their investment capital, and seem to offer compelling returns to qualified institutional investors. The Fair Food Fund offers substantive technical assistance in addition to customized financing packages that

add value to the entrepreneurs they work with. They have a clear focus on impacting the whole food supply chain and building the local economy, and they seek to create value in the local community and ensure access to food for the most needy. The Berry Center functions to equip the next generation of farmers with the resources they need to actually work the ground in a sustainable and profitable manner and to learn how to bring their products to market. It seeks to develop the men and women who will actually do the work of farming in generations to come. Together, these organizations demonstrate solid strides forward.

However, they individually and collectively still fall short of the aims of this paper. Perhaps it is because the scope of this paper is too broad, and asks too much of any one institution, even if it regionally focused. In terms of direct investment in agriculture, Harvest Returns is heavily focused on niche row crops (predominantly hemp) and hydroponic farming, which no doubt have their place but fall short of the type of diversification around staple crops that is so needed for agricultural renewal. Most of Harvest's capital is deployed into tax-advantaged land in Opportunity Zones. Holding such lands could actually contribute to already existing agricultural land shortages. Wendell Berry posited even in 1974 that there is "plenty of land and agricultural potential now in the hands of the people that are playing tax games with it. That ought to be stopped" ("The Culture of Agriculture"). The Fair Food Fund appears to operate upon better principles for the sustainability of the farming economies it supports, but its scope is very small and it seems to lack the appropriate robustness in farming information and investment risk/return analysis to effect long-term solutions that are valuable to farmers and profitable to investors. That said, the Fair Food Fund does provide excellent technical assistance and has a track record of securing follow-on financing, which does

something to allay this concern. The Berry Center, meanwhile, is performing the central function of equipping farmers to care for the land through a robust agricultural education. Nevertheless, it too seems to lack the financial firepower to accomplish its stated goal helping farmers afford to farm well. It does offer a basic business education to those interested in the Berry Farming Program, but does not itself act as an intermediary between outside investors and farmers in need of capital. It rightfully places emphasis upon the economy of the farm and the local community, but I would contend that in order to effect broader measures of change and to perpetuate the type of practices the Berry Center espouses outside of Henry County, bridges to more institutional forms of investment capital must be formed.

The type of institution here envisioned would operate as a financial institution designed to equally serve the interests of the farmer alongside the interests of investors. It would seek to generate community impact in line with the efforts of the Fair Food Fund, but would be tethered to more tangible financial return targets to attract outside investors. Like Harvest Returns, it would seek to engage investors and justify investments in sustainable agriculture as a part of an investor's portfolio. However, in order to truly serve the farmer, it must provide its farmers and investors access to a repository of agricultural resources that would empower farmers to make the right choices to effect long-run sustainability and success. Importantly, it would seek to provide substantive amounts of social capital by putting farmers in contact with local markets where they might distribute their produce and connecting them with other farmers who might be willing to share knowledge and other resources. Before making an investment, it would collaborate with farms to create a model similar to the illustrative model shown in this paper, working with the individual farm to determine the appropriate type of financing.

The investment institution could then issue financing or outsource the securitization to another institution. Rather than determining the maximum amount of leverage that a farmer could obtain, it would focus on helping farmers create a path to outright ownership and minimize risk associated with debt — farmers face enough risks without financing risk. It would seek to add as much social capital as possible and as little monetary capital as required. It would make small investments and plan for stable returns and sustainable growth.

This type of organization must be regional in nature, and those regions should not be arbitrarily drawn, but rather bounded according to the climate, growing conditions, and produce of each region, as in the vision of Wes Jackson. With the type of underwriting this institution would accomplish, it would be foolish to think that one office would sufficiently serve the berry farm in Oregon as well as it serves the cattle ranch in Texas. (This is not to say to say that the institution I am proposing would only hold the agricultural investments of its local region — I think that the principles of diversification are still advisable, especially if providers of capital are to withstand inevitable regional downturns.)

Further research is needed on the advantages of equity and debt financing for early stage farmers in the United States, or for farmers seeking to transition to more sustainable methods of agriculture. The model developed for this paper could be refined to be more insightful and user-friendly through design changes, further feedback from the farming community, and adaption to particular crops and regions.

Those seeking to accomplish this work may well include the university to develop the type of regional repositories of knowledge and financial acumen that could support small farmers. Much as the Berry Center has partnered with Sterling College, more

fruitful partnerships could be made in this sector. Partnerships with regional cooperatives and organizations should be explored. There is a possibility for further intersectional research to be done in collaboration with those who have studied microfinance and economic development in the rural areas of developing nations. In summary, if this effort is to succeed, it is dependent upon the continued dedication of academics and practitioners within the agrarian and the financial sectors.

Conclusion

In his vision of what he calls a "reasonably self-sufficient and self-determining local economy," Wendell Berry says:

> A local economy, if pretty fully realized, would be solid and lasting. It would be an economy truly economic, not like the present industrial economy enriching the rich by consuming and making goods from anywhere, but living by the mutual thriving of neighbors and taking proper care of all the goods that are its own. It would make itself lasting by valuing its sources and making them last.
> *(Loading Brush* 84)

In an attempt to bring about this vision of a resurgent local economy "pretty fully realized," this paper has sought out ways that farmers might cease operating according to the financial norms of the industrial economy, and in fact make use of financial tools to create counter-industrial agrarian thriving as the basis of the local and regional economy. To bring about this vision today, we must find ways for farmers to access external capital; this paper has shown how forms of equity capital may provide the best type of funding and technical assistance when sourced from the appropriate financial intermediary. This paper seeks to serve as a preliminary step in that direction, empowering farmers to make "solid and lasting" improvements toward a sustainable future for American agriculture.

APPENDIX

WUG Operating Model - By Field **2/23/20**

Field Name: Field A
Crop: Marionberry

Stage 1 - Planting/Cultivation		
Inputs	**Amount**	**Units**
Field A size	30	(net acres)
Active cultivation period	110	(days)
Seed cost	$250.00	($/acre)
Hourly labor cost	$15.00	($/hr)
Land prep costs		
Clearing/plowing	10	*(hrs/acre)*
Mulch	$5.00	*($/acre)*
Water usage	160	(gal/week)
Water cost	$0.10	($/gal)
Cultivation	5	(hrs/acre/week)
High-house?	Yes	(Yes/No)
High-house costs	15	(hrs)
Fertilizer needed?	No	(Yes/No)
Fertilizer cost	$400	($/acre)

Yield Projections		
Inputs	**Amount**	**Units**
Field A size	30	(net acres)
Historical Marionberry Yield	No	(Yes/No)
Case	**Base**	
Low	3500	*(lbs/acre)*
Base	5000	*(lbs/acre)*
High	6500	*(lbs/acre)*
Historical yield	4750	(lbs/acre)

Stage 2 - Harvest/Sale		
Inputs	**Amount**	**Units**
Field A size	30	(net acres)
Proj. Harvests	4	(#/season)
Harvesting labor	12	(hrs/acre)
Proj. Sale Prices		
Wholesale	$2.25	*($/lb)*
Farmstand	$1.80	*($/lb)*
Cannery	$1.35	*($/lb)*
Proj. Sales %		
Wholesale	*50%*	*(% of total)*
Farmstand	*30%*	*(% of total)*
Cannery	*20%*	*(% of total)*

Stage 1 - Financials		
	2019A	**2020E**
Land prep costs		($4,500)
Seeding costs		($7,500)
Cultivation costs		($35,357)
Water costs		($251)
High-house		($225)
Fertilizer cost		$0
Total planting/cultivation costs		**($47,834)**

Yield Data		
	2019A	**2020E**
Total Yield (lbs)	**142,500**	**150,000**

Stage 2 - Financials		
	2019A	**2020E**
Sales		
Avg. selling price		$1.935
Total yield		150,000
Total sales		**$290,250**
Harvesting costs		($21,600)
Net harvest revenue		$268,650
Net harvest revenue		$268,650
Total planting/cultivation		($47,834)
Gross Profit		**$220,816**
Gross Profit/acre		*$7,361*

Figure 1 – Illustrative Operating Model, Field-Level

REVENUE

Cultivated acreage	45	
Total berry revenue	**$439,200**	*% Total*
Wholesale	*$189,810*	*43%*
Farmstand	*$131,760*	*30%*
Cannery	*$117,630*	*27%*
Total vegetable revenue	$45,000	
Rhubarb contract revenue	$15,000	
Total Revenue	**$499,200**	

VARIABLE COSTS

	2020E	*% Total VC*
Land prep costs	($7,875)	*10.3%*
Seeding costs	($9,600)	*12.6%*
Water costs	($609)	*0.8%*
Cultivation costs	($51,429)	*67.2%*
High-house costs	($225)	*0.3%*
Fertilizer costs	($6,750)	*8.8%*
Total Variable Costs	**($76,487)**	

FIXED COSTS

	2020E	*% Total FC*	*COGS Alloc. %*
Depreciation	($35,000)	*12.1%*	*50%*
Loan Payments	($64,200)	*22.3%*	*80%*
Salary - Jeff/Cheryl	($125,000)	*43.4%*	*0%*
Farmstand cost	($24,000)	*8.3%*	*0%*
Distribution costs	($40,000)	*13.9%*	*0%*
Total Fixed Costs	**($288,200)**		

Projected CAPEX - 2020

Equipment - New Tractor	$90,000
Buildings - New Shed	$50,000
Total	**$140,000**

Figure 2 – Illustrative Full-Farm Financials

West Union Gardens Income Statement

For the year ended December 31, 2020

	2019A	2020E
Sales		$499,200
COGS		($145,347)
Gross Profit		*$353,853*
SG&A		($301,040)
Depreciation		($35,000)
EBIT		$17,813
Taxes (21%)		($3,741)
Net Income		**$14,072**

West Union Gardens Balance Sheet

For the year ended December 31, 2020

	2019	2020
ASSETS		
Cash	$10,000	$7,700
Accounts Receivable	$1,900	$1,750
Inventory	$5,500	$8,000
Total Current Assets	$17,400	$17,450
PP&E	$240,000	$380,000
Less: Acc. Deprec.	($42,000)	($51,000)
Net PP&E	$198,000	$329,000
Land	$1,200,000	$1,200,000
Total Assets	**$1,415,400**	**$1,546,450**
LIABILITIES		
Accounts Payable	$1,200	$1,000
Notes Payable	$5,500	$6,000
Other Current Liabilities	$1,500	$2,600
Total Current Liabilities	$8,200	$9,600
Long-Term Debt	$928,931	$907,243
Total Liabilities	**$937,131**	**$916,843**
STOCKHOLDER'S EQUITY		
Retained Earnings	**$478,269**	**$629,607**
Total Stockholder's Equity	**$478,269**	**$629,607**

Figure 3 – Illustrative Consolidated Income Statement and Balance Sheet

West Union Gardens Statement of Cash Flows
For the year ended December 31, 2020

CASH FROM OPERATIONS	2019	2020
Net Income		$14,072
Depreciation		$9,000
Accounts Recievable		$150
Inventory		($2,500)
Accounts Payable		($200)
Notes Payable		$500
Total		**$21,022**
CASH FROM INVESTING		
Capital Expenditures		($140,000)
Land Acquisitions		$0
Total		**($140,000)**
CASH FROM FINANCING		
Increase (Decrease) in Debt		($21,688)
Total		**($21,688)**

Figure 4 – Illustrative Consolidated Statement of Cash Flows

BIBLIOGRAPHY

"About the U.S. Department of Agriculture." Accessed 28 October 2019. Web. https://www.usda.gov/our-agency/about-usda

"About West Union Gardens." Accessed 17 April 2020. Web. http://westuniongardens.com/aboutus.php

"Apple Mission and Vision Statement Analysis." Mission Statement Academy. Web. Accessed 28 October 2019. http://mission-statement.com/apple/

"Bayer: Science for a Better Life." Bayer website. Accessed 28 October 2019. Web. https://www.bayer.us/en/about-bayer/mission-values/

Bebbington, Anthony. "Capitals and Capabilities: A Framework for Analyzing Peasant Viability, Rural Livelihoods and Poverty." *World Development*, Vol. 27, No 12, 1999, pp. 2021-2044.

The Berry Center Website. 2017. Accessed 3 April 2020. www.berrycenter.org

Berry, Wendell. "The Culture of Agriculture." Agriculture for a Small Planet Symposium. Jul 1, 1974. Gonzaga University, Spokane, WA. http://tilthproducers.org/about-us/history/the-culture-of-agriculture/

Berry, Wendell. *Sex, Economy, Freedom, & Community.* E-book, Counterpoint. 1992.

Berry, Wendell. *The Art of Loading Brush: New Agrarian Writings.* Counterpoint, 2017.

Boden, Sam. Personal interview. 15 October 2019.

Boden, Sam. "Re: Thesis – West Union Model." Received by Brandt Bergeron, 3 Mar. 2020.

Calo, Adam and Kathryn Teigen De Master. "After the incubator: Factors impeding land access along the path from farmworker to proprietor." *Journal of Agriculture, Food Systems, and Community Development, 6*(2), pp. 111-127.

Carraher, Shawn and Howard Van Auken. "An Analysis of Funding Decisions for Niche Agricultural Products." *Journal of Developmental Entrepreneurship*, Vol. 17, No. 2 2012, pp. 1-15.

Crane, Laurence and David Leatham. "External Equity Financing in Agriculture Via Profit and Loss Sharing Contracts: A Proposed Financial Innovation." *Agribusiness*, Vol. 11, No. 3, 1995. pp. 223-233.

Dang, Trang et al. "Measuring the efficiency of the Farm Credit System." *Agricultural Finance Review,* Vol. 74 No. 1, 2014, pp. 38-54.

Fair Food Network Website. www.fairfoodnetwork.org. 2020. Accessed 3 April 2020.

"Fair Food Fund Five-Year Impact Report." 2018. Accessed 3 April 2020. https://fairfoodnetwork.org/wp-content/uploads/2019/06/FFF_5-Year-Impact-Report_Digital-Small.pdf

Fairley-Grenot, Katrina and Peter S Carberry. "Social capital and investment in agriculture: Three global networks converge with implications for research assimilation." *Innovation: Management, policy & practice,* Vol. 16, Iss. 3, 2014, pp. 343-353.

Farm Credit Administration. "2018 Annual Report of the Farm Credit Administration: Regulator of the Farm Credit System." Accessed 17 April 2020. https://www.fca.gov/template-fca/about/2018AnnualReport.pdf

Farm Credit Administration Website. www.fca.gov. Accessed 17 April 2020.

"Loans to Finance Agricultural Production, All Commercial Banks." Federal Reserve Bank of St. Louis Economic Data (FRED). 18 Feb 2020. Accessed 17 April 2020. https://fred.stlouisfed.org/series/ALFAPGACB

"Loans to Finance Agricultural Production, Top 100 Banks Ranked by Assets." Federal Reserve Bank of St. Louis Economic Data (FRED). 18 Feb 2020. Accessed 17 April 2020. https://fred.stlouisfed.org/series/ALFAPGT100

Greenberg, John. "Warren: U.S. rubber-stamped deal; Bayer-Monsanto now controls 25% market share." PolitiFact. 14 Feb 2019. Web. Accessed 28 October 2019. https://www.politifact.com/truth-o-meter/statements/2019/feb/14/elizabeth-warren/warren-bayer-monsanto-controls-25-seed-pesticide-m/

Harvest Returns Website. www.harvestreturns.com. Accessed 1 April 2020.

Heaney, Seamus. "Blackberry Picking." 1999. Poetry Foundation. Accessed 17 Apr 2020. https://www.poetryfoundation.org/poems/50981/blackberry-picking

Jackson, Wes. "Becoming Native to this Place." Thirteenth Annual E. F. Schumacher Lectures. Schumacher Center for a New Economics. 1993.

Kelly, S., R. Cunningham, R., Plant, Maras K., "Water Scarcity Risk for Australian Farms and the Implications for the Financial Sector," UTS. 2019. *www.uts.edu.au*

Kliesen, Kevin and R. Alton Gilbert. "Are some agricultural banks too agricultural?" *Federal Reserve Bank of St. Louis Review,* Vol. 78, No. 1. Jan-Feb 1996.

Laursen, Keld et al. Organizational Science, Vol. 23, No 1. pp. 177-193. "Regions Matter: How Localized Social Capital Affects Innovations and External Knowledge Acquisition." 2012.

Li, Xiaofei et al. "Agricultural lending and early warning models of bank failures for the late 2000s Great Recession." *Agricultural Finance Review,* Vol. 73 No. 1, 2013. pp. 119-135.

Li, Xiaofei et al. "Technical Efficiency and the Probability of Bank Failure among Agricultural and Non-Agricultural Banks." Agricultural & Applied Economics Association's 2012 AAEA Annual Meeting, Seattle, WA, 2012.

Lyons, Thomas. Journal of Developmental Entrepreneurship, Vol. 7, No. 2. "Building Social Capital for Rural Enterprise Development: Three Case Studies in the United States." 2002.

Marsh, Tanya. "Reforming the Regulation of Community Banks After Dodd-Frank." *Indiana Law Journal,* Vol. 90, No. 179, 2015. pp. 179-235.

McKee, Gregory and Albert Kagan. "The differential impact of the Dodd-Frank Act on niche non-metro lenders." *Journal of Banking Regulation* 20, 2019, pp. 291-301.

"Measuring Success: New and Beginning Farmers and Ranchers (BFR)" USDA. Accessed 28 October 2019. Web. https://www.usda.gov/sites/default/files/documents/measuring-success.pdf

Pokharel, Krishna, et al. "Examining the financial performance of agricultural cooperatives in the USA." *Agricultural Finance Review,* Vol. 27 No. 2, 2019, pp. 271-282.

Ponsio, Lauren and Paul Ehrlich. "Diversification, Yield and a New Agricultural Revolution: Problems and Prospects." *Sustainability,* Vol. 8 No. 11, 1118. 2016.

The Search for Empowerment: Social Capital as Idea and Practice at the World Bank. Ed. by Bebbington, Anthony et al. Bloomfield, CT: Kumarian Press. 2006. Print.

Song, Minrong et al. "A Comparative Analysis of Technical Efficiency and Input Allocation Decisions of Farm Lenders in the Commercial Banking Industry and the Farm Credit System during the Late 2000s Recession." Southern Agricultural Economics Association 2015 Annual Meeting, Atlanta, GA. https://ageconsearch.umn.edu/record/196696/

Stackhouse, Julie. "Why Are Banks Shuttering Branches?" Federal Reserve Bank of St. Louis. Feb 2018. Accessed 14 April 2020. https://www.stlouisfed.org/on-the-economy/2018/february/why-banks-shuttering-branches

United State Department of Agriculture Economic Research Service. "U.S. farm sector financial indicators, 2013-20F." 5 Feb 2020. Accessed 17 Apr 2020. https://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics/

"United States Department of Agriculture: FY 2020 Budget Summary." USDA. Accessed 28 October 2019. Web. https://www.obpa.usda.gov/budsum/fy2020budsum.pdf

Wang, Aijun et al. "External Equity in Agriculture: Risk Sharing and Incentives in a Principal-Agent Relationship." *Agricultural Finance Review*, Spring 2002, pp. 13-24.

"Wendell Berry Farming Program." Sterling College. 2020. Accessed 3 April 2020. www.sterlingcollege.edu/wendellberry

Whitman, Hannah et al. "Beyond the market? New agrarianism and cooperative farmland access in North America." *Journal of Rural Studies* No. 53, 2017 pp. 303-316.