

Geoff Desa
Xiangping Jia *Editors*

Social Innovation and Sustainability Transition

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Editors

Geoff Desa
Lam Family College of Business
San Francisco State University
San Francisco, CA, USA

Xiangping Jia
Chinese Academy of Agricultural Sciences
Beijing, China

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Acting like an algorithm: digital farming platforms and the trajectories they (need not) lock-in

Michael Carolan¹

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Abstract

This paper contributes to our understanding of farm data value chains with assistance from 54 semi-structured interviews and field notes from participant observations. Methodologically, it includes individuals, such as farmers, who hold well-known positionalities within digital agriculture spaces—platforms that include precision farming techniques, farm equipment built on machine learning architecture and algorithms, and robotics—while also including less visible elements and practices. The actors interviewed and materialities and performances observed thus came from spaces and places inhabited by, for example, farmers, crop scientists, statisticians, programmers, and senior leadership in firms located in the U.S. and Canada. The stability of “the” artifacts followed for this project proved challenging, which led to me rethinking how to approach the subject conceptually. The paper is animated by a posthumanist commitment, drawing heavily from assemblage thinking and critical data scholarship coming out of Science and Technology Studies. The argument’s understanding of “chains” therefore lies on an alternative conceptual plane relative to most commodity chain scholarship. To speak of a data value *chain* is to foreground an orchestrating set of relations among humans, non-humans, products, spaces, places, and practices. The paper’s principle contribution involves interrogating lock-in tendencies at different “points” along the digital farm platform assemblage while pushing for a varied understanding of governance depending on the roles of the actors and actants involved.

Keywords Digital agriculture · Precision agriculture · Big data · Dependency · Algorithms · Knowledge · Data cleaning

Abbreviations

AI	Artificial Intelligence
GNSS	Global Navigation Satellite Systems
IoT	Internet of Things
LiDAR	Light Detection and Ranging
STS	Science and Technologies Studies
USDA	United States Department of Agriculture

Introduction

Smart farming—also known as digital agriculture, e-agriculture, precision agriculture, agriculture 4.0, etc.—is an umbrella term referencing data- and software-intensive platforms widely said to be transforming agriculture (DeClercq et al. 2018; Walter et al. 2017). Farm managers, ranchers, and producers, in conjunction with industry and government

actors, are leveraging the capabilities of the Internet of Things (IoT), from sensors to GNSS (Global Navigation Satellite Systems), cloud computing, weather and climate modeling, high-speed internet, historical yield data, and LiDAR (Light Detection and Ranging) systems to usher in what has been described as a digital revolution in agriculture (e.g., Claver 2018; DeBoar 2015). This disruption has been met with a mix of optimism and anxiety: the former, as producers are enticed with promises of increased profits and efficiencies with the adoption of these platforms; the latter, as farmers, peasants, and food justice activists worry about the uncertainties, dependences, and digital divides that these innovations have been known to create.

Most of the academic literature on smart farming focuses on improving economic and technological efficiencies while grappling with the question of how to better incentivize adoption (for a review of this scholarship, see Finger et al. 2019). Consequently, there remains a lot we do not know about these artifacts, especially in terms of their impacts—social, political and otherwise. Fortunately, the available critical social science scholarship on the subject is growing. This literature ranges from qualitative studies examining the

✉ Michael Carolan
Michael.Caranol@colostate.edu

¹ Department of Sociology, Colorado State University, B241 Clark, Fort Collins, CO 80523, USA

ways that smart farming platforms are accommodated within (and alter) the everyday lives, practices, social networks, and identities of farmers (e.g., Carolan 2017a, 2017b, 2018a, 2020b; Higgins et al. 2017; Jakku et al. 2018; Jayashankar et al. 2019) to surveys on farmer attitudes toward “smart” technologies and the organizations that promote and manufacture them (e.g., Gardezi and Bronson 2019; Wiseman et al. 2019). There is also a suite of studies examining actors linked to digital farming innovation, design, and investment (Bronson 2019; Fielke et al. 2019; Carolan 2020a, 2018a, b) and other “key governance actors” (Regan 2019).

This paper contributes to the literature by looking *at* as well as *beyond* actors already known for their positionality within the digital agriculture space. Rather than study pre-determined groups, which to date has tended to focus overwhelmingly on those generating data and using platform outputs (i.e., farmers), or to a lesser extent on those identified as playing a major role in the design phase (i.e., investors), I attempted to cast a wider methodological net. This net was defined less by what I thought I knew about data values chains and oriented more toward discovery. This put me into contact with who I was expecting: farmers, senior leadership of tech firms, and the like. But it also led me to actors engaged in important acts of tinkering; activities that might not rise to the celebratory status of “investor” and/or “inventor” (i.e., the Elon Musk’s of the digital agriculture world), as observed, for instance, among those experimenting with self-learning machines and algorithms.

This brings me to what I am calling farm data value chains. While inspired by earlier agrifood scholarship directed at following the commodity (e.g., Friedland et al. 1981; Wells 1996), the paper diverges from this framework in a number of important ways. My use of the term “chain” differs from how it might otherwise be used when talking about food and agriculture, such as when those in business logistics talk about supply chains (e.g., Bosona and Gebresenbet 2013; Nicholson et al. 2011) or when political economists interrogate global commodity chains (e.g., Challies 2008; Selwyn 2012). This argument draws from the likes of Bruno Latour and the field of Science and Technology Studies (STS) broadly. Latour (1999), for instance, advances the concept “chain of translation.” This speaks to an orchestrating set of relations among humans, non-humans, products, spaces, places, practices, and times producing assemblages as opposed to hierarchies or linearly-defined chains.

The analysis draws from 54 semi-structured interviews with actors identified as having a role in farm data value chains in North America. This sample was derived from a hybrid methodological approach, combining snowball sampling inspired by a follow-the-commodity (e.g., de Sousa and Busch 1998; Friedland et al. 1981; Wells 1996) spirit alluded to earlier. Giving respondents’ space to direct me to other potential participants helped draw me to less visible

elements of smart farming assemblages, including those yet to be fully analyzed by agrifood scholars—like practices linked to the creation and use of algorithms in agriculture.

The paper’s principle finding is that these platforms are linked to types of lock-in—a term used to describe when seemingly small alterations produce immensely consequential pathways that become calcified and resistant to change. These tendencies are identified as taking shape in the design phase as well as among farmers, though how they become expressed across chains is shown to differ. The paper concludes situating these findings within a discussion of governance. In rejecting essentialism, the paper’s posthuman lens leaves space to talk about how lock-in tendencies are not destiny. How we *do* governance, I argue, ought to reflect the types of lock-in confronted and the ways in which actors and actants are involved.

Smart farming landscapes

The digital agriculture sector has changed radically in the last decade. Monsanto (now owned by Bayer) invested early and aggressively in this space. In 2012, the company spent US\$210 million to acquire Precision Planting, which at the time was one of the largest precision planting equipment manufacturers in the U.S. In 2013, the firm invested close to US\$1 billion to buy Climate Corporation, the world’s largest digital agriculture platform. Estimates from 2014 reported the platform was used on as much as one-third of all U.S. farmland (McDonnell 2014). In 2014, Monsanto purchased the soil analysis division of Solum, and, in a separate deal, 640 Labs, a mobile technology and cloud-computing firm specializing in smart farming applications. In 2016, the company acquired the European farm management software company VitalFields, while 2017 they added to their portfolio the irrigation-specific data analytics firm Hydrobio (for further details about these acquisitions see, e.g., Bassetti et al. 2017; McDonnell 2014; Pletz 2014).

John Deere has also made significant investments in this space, especially since 2017 with the purchase of the artificial intelligence startup Blue River Technology (Kolodny 2017). Weeds cost farmers an estimated \$11 billion a year. Blue River was one of the first to innovate into the “See & Spray” space, creating a weed control cotton machine capable of scanning the ground and distinguishing between crops and the weeds, down to a level of millimeters. It is designed to target weeds with herbicides and kill them (Gagliordi 2018).

Smart farming platforms are not only interested in planting and growing periods. Diagnostic tools have also been designed for harvest. Yield monitors keep detailed records of within-field yield variability. In addition to crop quantity, quality can also be monitored. In cereals, traits like protein and moisture content are measured in combines equipped

with near-infrared spectroscopy. Yield quality monitoring is of particular relevance for high-value horticultural crops (Finger et al. 2019).

Case IH and New Holland introduced their autonomous tractors at the 2016 Farm Progress Show. The former can be controlled from a PC, tablet, or smart phone. The French company Naio Technologies engineered a tractor that uses laser and camera guidance to navigate between rows of fruits and vegetables while its sensors scan individual plants as it hunts for weeds.

Automation has also made inroads in dairy farming with automated milking parlors. Though less than 5% of U.S. dairy farms utilize robots, the figure is expected to increase by 20 to 30% annually “for the foreseeable future” (Mulvany 2018). Robotics in dairy farming is already a US\$1.6 billion global industry (Mulvany 2018). A related suite of technologies draws from the facial recognition. Dairy and other livestock operations are now using repurposed facial recognition algorithms to detect lameness or variability in animals. Estimates place these A.I.-assisted detections as occurring a full two days prior to when a trained technician can see problems (Griffiths 2020).

The agricultural drone market is likewise experiencing exponential growth, with analysts expecting its valuation to hit US\$2 billion by 2026 due to the technology’s versatility regardless of a farm’s size (Ag Daily 2018). A 2016 report calculated the value of drone-powered solutions in all applicable industries to be more than US\$127 billion, noting that the most promising applications are likely to take place in agriculture (Mazur and Wisniewski 2016). Drones are part of digitization trends in agriculture not only because they assist in data collection but when coupled with machine-learning platforms they become an important part of a larger sensing assemblage. Drones are used for applications ranging from crop assessment, where they generate spectral data and reveal crops that have been injured by the drifting pesticide dicamba and can spot herbicide-resistant weeds growing between rows. Other uses include counting livestock, monitoring for disease, monitoring water (e.g., checking irrigation channels), and even pollination—a New York-based start-up has developed pollinating drones for almond, cherry and apple orchards (Ehrenberg 2018).

Much of this technology is rooted in processes captured by such terms as “machine learning,” “Artificial Intelligence” (AI), “deep learning,” and “algorithms,” which essentially speak to the idea that computers can be taught without explicit programming. Specific examples of these techniques and practices are discussed in the findings. Providing a few definitions at this point in the paper might help better situate those empirics.

Machine learning involves drawing conclusions from large datasets. In an agricultural context, it “can take a decade of field data—insights about how crops have performed

in various climates and inherited certain characteristics—and use this data to develop a probability model” (Kharkovyna 2019). The description continues,

With all this information, far more than any single human can grasp, machine learning can predict which genes will most likely contribute a beneficial trait to a plant. Of the millions of combinations, advanced software greatly narrows the search (Kharkovyna 2019).

Meanwhile, an algorithm, to quote directly from Wikipedia (n.d.), “is a finite sequence of well-defined, computer-implementable instructions, typically to solve a class of problems or to perform a computation.” The term therefore refers to, drawing now from critical data studies scholars, any “abstract, formalized description of a computational procedure” (Dourish 2016, p. 3). This procedure, in turn, “autonomously makes decisions based on statistical models or decision rules without explicit human intervention” (Lee 2018, p. 3). While imaginations tend to go immediately to Google, Netflix’s recommender, or predictive policing systems when hearing the term, algorithms can carry out both “simple calculations or highly complex reasoning tasks” (Janssen and Kuk 2016, p. 372), realizing that an algorithm like bubble sort can be described in a sentence (Seaver 2017).

“Chains” and “lock-in”: situating the argument conceptually

In *Pandora’s Hope*, Latour (1999) recounts his time with French and Brazilian scientists in the Amazon as they studied the boundary between forest and savannah; an activity that included collecting soil samples. Latour used the experience to follow the samples of soil from the rainforest to peer-reviewed academic journals—the “passage from a clump of earth to a sign” or scientific fact (Latour 1999, p. 79). Bruno Latour used the term “chain of translation” to talk about this process, where material objects, judgments, and practices produce ontological multiplicity in the context of representational coherence—e.g., *peer-reviewed facts* about soil is not ontologically equivalent to *Amazon soil* but each eventually comes to represent the other. I also want to introduce Latour’s (Latour 1999, p. 40) concept “circulating reference,” as it introduces ways of thinking that lend themselves well to the empirics of this paper. The term speaks to the idea that while processes “along” the chain are heterogeneous and multiple they are not entirely unconnected. Each sequence always, to some degree, refers “back” to prior objects and activities, though Latour’s thick description made it clear that countless judgements are always made along the way.

Others have appropriated Latour’s understanding of a “chain” to understand issues central to data studies scholarship, such as Marieke de Goede’s (2018, p. 1) application to

interrogate “illicit” financial transactions, “whereby commercial transactions are collected, stored, transferred, and analysed in order to arrive at security facts (including for example frozen assets, closed accounts, and court convictions).” As she writes,

If we liken a transaction to the soil sample in the Latourian schema, we can render visible the practices that transform—for example—a financial record from simple bank registration, to suspicious transaction to (in some cases) court evidence. As in Latour’s chain of soil analysis, translation is key to the movement and sequencing of transactions data across the security chain. When transactions are reported from one professional domain to another, they are not simply moved but also modified: they acquire new meanings, new combinations with other data, and new capabilities (de Goede 2018, p. 6).

These modifications take any number of forms within farm data value chains, such as when machine-sensing platforms convert observations into 1s and 0s or when software engineers undertake the process of “cleaning” data.

Data chains are therefore presented below as neither discrete nor linear; the same also pertains to the material (e.g., data, code, algorithms) said to be moving through them. Rather, the chains discussed are recursive, multiple, contested, and heterogeneous. *Folds* supplant *flows* for the verb of choice in this approach as phenomenon like “commodity,” “infrastructure,” and “actors” are shown to be distributed throughout the network as opposed to representing parts within it (Lee et al. 2019). This also has implications for how we think about issues of governance, realizing that “governing the world on the basis of the politics of modernity (top-down, cause-and-effect understandings) is dangerous, false and hubristic” (Chandler 2015, p. 850).

The term “lock-in,” traditionally defined, speaks to how even relatively small changes in institutional arrangements can become self-reinforcing and result in very different paths than if those changes had not been implemented (Arthur 1989; Bui et al. 2019; David 1985; Frank 2007). North (1990), for example, famously used this reasoning to help explain cross-national income disparities. The phenomenon of lock-in helps explain how practices and ideas become entrenched even though they produce lower social utility than the alternatives. Some examples in the literature include high-levels of red meat consumption (Frank 2007), the standard keyboard arrangement (David 1985), and the carbon economy (Unruh 2002).

The automobile’s rise as the dominant form of transportation provides a well-observed example of technological and institutional lock-in. Its “effectiveness” as a form of personal mobility cannot be separated from the co-emergence of numerous supporting technologies and industries and

the core competencies these activities require, involving, for instance, the production and distribution of petroleum, glass, rubber, concrete, asphalt, and steel. In addition, we cannot ignore the role played by investments in an extensive road network, the building of service stations and motels, the development of car-based disciplines (e.g., automotive engineering), “free” parking, and the like. In assemblage language, it is impossible to separate what an automobile is from this heterogenous network. When needing to get from Point A to B, what form of transportation typically comes to mind? What future mobilities are we more likely to envision? (*Personal* transportation, think X-wings and landspeeders, often crowds out *public* forms of transportation in most futuristic depictions.) Societal answers to these questions are shaped deeply by the fact that we, too, are part of the automobile-assemblage. We are locked-in to this architecture—this car-chitecture.¹

The term lock-in might be perceived by some as ill-suited for a posthuman approach, especially among those reading the concept as embracing a nondynamic and linear—deterministic, even—understanding of history. This would explain attempts to propose complimentary concepts, like path generation (Djelic and Quack 2007), in an effort to provide balance. I see the term, rather, as offering a way to talk about assemblages while moving beyond a purely flat ontology, where agency is distributed equally among actors and actants. It is worth pointing out that Deleuze and Guattari (1988), and scholars inspired by their thinking (e.g., Adkins 2015), routinely deploy the noun “calcified” and the verb “calcification” to talk about when phenomenon, from political forms to language, harden and become resistant to change, which I would argue is “lock-in” by another name.

Lock-in, fundamentally, recognizes that power is situated across heterogenous networks. Power is not “held” according to this concept and linearity is abandoned. A “path” supported by lock-in is not destiny, just as it is not a path in the sense that we tend to think of the term, unless what comes to mind is something that folds onto itself, veers, and multiplies. This also speaks to what I like about an STS-inspired reading of lock-in, as it rejects dichotomist (i.e., either/or) outlooks. This is to say: assemblages can both/and—they can both harden and multiply.

¹ “Yellow No. 2” field corn is a USDA (United States Department of Agriculture) grade designation with a minimum test weight of 54 lb per bushel at 15.5 percent moisture. It has a maximum limit of percent broken kernels and foreign material and cannot exceed 5 percent total damaged kernels (Extension 2009). It is also often used to speak generally of conventional corn seed.

Table 1 Categorizing respondents (n=54) by job titles (capital letters designate code identifiers)

Job title	n
Programmer (P)	2
Engineer (E)	6
Firm Leadership (FL): E.g., CEO/Vice President/Director	7
Crop Specialist (CS)	5
Agronomist (A)	6
Computational Biologist (CB)	2
Statistician (S)	1
Farmer ^a (F)	
Annual gross revenue: less than US\$350,000	15
Annual gross revenue: US\$350,000 or greater	10

^aAccording to the United States Department of Agriculture (USDA), “small” farms as those with an annual gross revenue below US\$350,000

Methods

Rather than fixate on pre-identified groups (e.g., software engineers with Company X) and/or roles (e.g., farmers), I entered the field inspired by a sense of exploration. My goal was to cast a broad methodological net and not be hemmed in by preconceived notions about who and what are part of data value chains. Some of this inspiration came from a well-traveled path within agrifood scholarship, known generally as the “follow the commodity” approach (e.g., de Sousa and Busch 1998; Friedland et al. 1981; Wells 1996). Initially, the idea was to follow big agricultural data; to start by talking with farmers, who both produce and consume 1s and 0s, and work my way “out.” The approach quickly broke down, however, as I learned there was no-*thing* to follow, only heterogeneous assemblages. Regardless, the approach helped expand my awareness of the actors and actants involved in the making of these messy networks.

Fifty-four face-to-face semi-structured interviews were conducted between July 2017 and October 2019. Respondents consisted of individuals from across North America who were involved in various ways with farm data value chains, including programmers, software engineers, computational biologists, crop specialists, and farmers. Farmers came from the U.S. states of Iowa (n=12), Kansas (n=10), Nebraska (n=8), Illinois (n=5) and the Canadian province of Saskatchewan (n=10). See Table 1 for a breakdown of respondents’ roles and identities as they were related to agricultural data. Smart farming platform-types reported among farmers interviewed, and their adoption frequencies, are listed on Table 2. Thirty-nine respondents resided in the U.S. The other fifteen participants lived in Canada.

Participants were also followed and observed engaging in situ with the “chain.” Some observations took the better part of a day (like when a farmer brought me along to

Table 2 Digital agriculture platform-types reported among farmers and adoption frequencies

Platform-type	Frequency
Mobile devices for (often) real-time monitoring	25
Global Navigation Satellite Systems	20
Variable rate seeding	0
Variable-rate fertilizer/nitrogen modeling/etc	20
Aerial vehicle technology (drones)	13
Robotics/automation	5
Remote sensing	5
Precision irrigation	3

plant corn); others were folded into the interview itself, like when some participants (e.g., engineers) were asked to explain “their” algorithms. Extensive field notes were taken during these observations. All interviews were recorded, transcribed, and ultimately coded. A research assistant and I independently coded the same three randomly selected transcripts and any inconsistencies in coding were reviewed until consensus was reached. I then coded the remaining transcripts, using those initial codes as a guide. Only adults were interviewed. Pseudonyms are used to protect the anonymity of respondents.

A convenience sample was sought as it can be difficult to convince actors in these sectors to agree to an interview. Personal connections were used to enroll respondents. A snowball sampling method took shape by starting with those known to myself. In the spirit of following the commodity, respondents guided me to actors/roles who they thought I could learn from to better understand the data valorization process. Names were obtained in most instances by asking respondents about “who I should talk to in order to better understand how these platforms get created.” This was especially useful for an outsider—disciplinarily- and organizationally-speaking—such as myself as it helped identify actors and practices. For instance, in eleven cases I was directed outside of the corporate world to independent consultants, which included a few university professors; individuals who would have been missed had the focus been on, say, a particular firm or firms. As I learned, the expertise and know-how related to these platforms is highly distributed and therefore hard to pinpoint by means other than, for lack of a better phrase, following the commodity.

The fact that my study was multinational in scope—it included actors within the U.S. and Canada—reflects the extent to which I tried to stay true to that “following” ethos. The geographic scope of this study reflects both intent, of wanting to follow as best I could, and material realities; after all, following costs money. While I would have welcomed the opportunity to fly wherever and talk to and observe

whomever, qualitative research is an exercise in what is, among other things, financially feasible.

Seaver (2017) makes some important methodological points about studying objects like algorithms, which are ontologically opaque in part because of access issues. Those involved with these artifacts worry about revealing trade secrets and breeching intellectual property protections. These barriers often encourage approaches to data collection that can appear highly “undisciplined” (Seaver 2017, p. 6) and that look to be “a departure from the idealized image of a fieldworker embedded long-term in a bounded society” (Seaver 2017, p. 6). In these instances, Seaver encourages becoming a methodological “scavenger.” As he argues:

Ethnographers have always gleaned information from diverse sources, even when our objects of study appear publicly accessible. Moreover, the scavenger replicates the partiality of ordinary conditions of knowing—everyone is figuring out their world by piecing together heterogeneous clues—but expands on them by tracing cultural practices across multiple locations (Marcus 1995) and through loosely connected networks (Burrell 2009).

“Scavenging” nicely captures what I was attempting to accomplish with the above-methods. I was turned down for interviews and access to some spaces alluded me, like the data/server farm I tried to visit. Methods sections for qualitative research tend to read as success stories, in the sense of mentioning only those efforts that resulted in an interview. They also rarely admit to the role played by money in the research design—as admitted earlier, I would have welcomed flying to interview and observe more people if my budget had allowed for it. Such shortcomings associated with this research are fully recognized. But I also realize that qualitative research is ultimately, to quote Hannerz (2003, p. 213), “an art of the possible.” The below represents my best attempt to do what I could with what I had and with whom I had access to.

Findings: lock-ins along the assemblage

The methodological technique of “following” meant I also followed those interviewed as they engaged with data and code. For farmers, this involved being given demonstrations of what their smart platforms did. Those responsible for creating these platforms, alternatively, showed me why they did what they did, explanations that gave me an inside look to see, as one engineer described it, “how the algorithm-sausage is made” (E2). During these encounters, I was especially interested in how farm-level data were aggregated and turned into something deemed valuable.

I was told repeatedly about the importance of making “dirty” farm data useful by way of a “cleaned” process. Cass was a software engineer. She described how part of her job was to get data, in her words, “talking the same language” (E6). She used a wood analogy to describe the cleaning process.

Take a pile of wood, which in itself doesn’t have much if any value, and turn it into a bunch of interchangeable pieces that connect up and make something beautiful and functional. That’s basically what I do with data.

I was immediately struck by this analogy. To liken what she does to the craft of woodworking and to allude to aesthetics, by describing her job as involving the creation of “something beautiful,” is a radical departure from the position described in conventional scientific chains of translations—as described in Latour (1999), for example. I asked Cass about this, wanting to hear more about why she chose to talk about what she did in those terms.

“Could you say more about this,” I asked. “The way you describe it,” I continued, “makes what you do sound as much like an art as a science, which isn’t how it’s promoted and sold to the public.”

Cass smiled at the question and did not immediately respond. She breathed deeply before hissed softly through her teeth, as if contemplating just how much to say. She went on to admit that “data cleaning does involve judgement calls,” though, echoing language from my question, she pointed out that “just because I make artistic judgments those judgments are heavily informed by facts.”

Data were deemed “dirty” by a number of respondents by nature of not sharing the same format or structure. Numerous reasons given for this. Data could have been collected by different tractors from any variety of companies using their own propriety software and systems. Or perhaps the data were from one company’s tractors but from different models. I learned that even the same tractor model can generate different data depending on the version of the operating system used. Sometimes the problem lied in user-error, as when data are coded improperly even prior to being collected. One programmer mentioned how she “routinely comes across 200 bushel per acre soybean fields” (P1)—signifying a combine that had not been reset after being put to work in a corn field.

Data cleaning has received surprisingly little attention, either among STS scholars or the larger scientific community, even though it involves making changes to data (it is sometimes referred to as data editing) (Leahy 2008). Another way to refer to the process is to talk about creating conforming data, which does a better job of calling out the practice’s normative nature. To clean data is really to create data that conform to a particular, predetermined moral architecture that specifies what *is* and what *ought* to be. When

thought of in these terms, cleaning can be viewed as a prime example of the chain of translation at work if value is to be generated from the (dirty) data coming from farm implements and other sources.

I interviewed an engineer, Hadi, who told me he specialized in “cyber-agriculture.” For one project, he created algorithms designed to help spot disease in fields. In his words:

Diagnosing for plant disease is all about pattern recognition. Usually, we—humans—spot disease after it is too late. [...] Imagine feeding millions of imagines into a computer and have it do pattern recognition, down to the cellular level even, before it becomes visible to the naked eye. [...] *It*—the computer—learns these patterns and finds them for us. [...] Now you can take a drone, fly it over a field, and have it look at the cellular structure of every plant and see disease when it is still easily treatable. (E3)

Or take the following quote from Faye, a computational biologist, taken in the context of discussing machine learning as applied to plant breeding:

You take a couple decades of field data and develop a probability model that predicts the genes most likely to contribute a beneficial trait to a plant. [...] You train the program to look for patterns [in the genes] to see if there are any interactional effects; this is stuff that even a hundred years of field trail data wouldn’t tell us. [...] Basically, the program learns to understand why certain traits get expressed. [...] We exploit that knowledge and create new varieties. (CB1).

Both Hadi and Faye talked as if the data inputted into these self-learning systems were of the God’s Eye variety. For example, Faye’s reference to taking “a couple decades of field data” glossed over the fact that she was talking about decades of field data from *very specific fields*—namely, those of the monocrop, industrial-scaled variety. Respondents involved in the making of algorithms were continuously making judgments about what data ought to be included when instructing these self-learning machines; judgements driven by assumptions concerning what patterns were worthy of recognition.

Mark was a V.P. of a division of a smart farming firm. At one point in the interview he talked about how his company was trying to perfect the sensor accuracy on combines and drones for detecting water and protein content of corn.

We feed the algorithm endless pictures. [...] I can input images of kernels from any farm. But then if I went one farm over the kernels might look different, even if the same variety. The difference could be due to soil type or because that field recorded different weather events for the year. [...] The algorithm gets

better every year we collect more and more field data. (FL6)

“But your algorithms are only seeing Yellow No. 2,” I pointed out, adding, “which means they are only learning to be valuable to a very distinct subset of farmers, right?”²

Hearing this produced a blank look on his face, as if my question were somehow unfair or that its answer obvious.

Yes, but that’s what Iowa corn farmers grow. This [technology] is what farmers want. They don’t grow broomcorn, or Mexican blue corn, or sweet corn. If they did, we’d develop predictive analytics for those crops. [...] We’re in the business of improving the efficiencies of large-scale corn growers.

The above speaks to one form of lock-in, which resembles the technological and institutional lock-in described in prior scholarship (e.g., Cowan 1990; Unruh 2002). Not surprisingly, because these platforms are taught to only “see” certain variations across monocultures within monocultures—e.g., a corn field containing genetically identical corn—their value proposition lies, first, in encouraging producers to transform their operations in order to have them conform to the “needs” of these platforms. This form of lock-in is a continuation of what has been happening in agriculture since at least the advent of agricultural mechanization. Kloppenburg (2005), for instance, details how corn hybridization was a response to the invention of the mechanical corn picker, which introduced new “needs” into the assemblage, such as ears of uniform height and stalks that remained standing at harvest.

I was able to observe this movement-toward-increased-conformity firsthand. Take Josh’s experience, a farmer in Illinois who a few years prior grew soybeans, field corn, and sweetcorn, the latter for markets in and around Chicago. He spoke positively when asked whether he found value in adopting smart farming technologies.

I honestly don’t know how I lived without them [smart farming technologies]. In addition to plant counts, I use drone mapping to assess stand establishment; to tell me if there’s any place [in the field] that needs replanting. [...] I’ve saved hundreds of hours not having to manually count plants. [...] I probably make tens of thousands of dollars more every growing season because I’m now putting in the best crop possible. (F5)

Yet Josh was also clear about how those smart platforms are variety specific. He noted a strong incentive to focus on growing field corn and soybeans, even though at one point

² I cannot take credit for this neologism, as I heard it from Michael Bell some twenty years ago.

he contemplated “further diversification”—more varieties of sweetcorn “so I could sell it over the span of a month or so” to generate additional household income.

“You’d think corn is corn, but no. The results aren’t as reliable,” he answered when asked if he was able to use the drone and field corn assessment software on his sweetcorn. Later he confessed to having “shrunk my acreage in sweetcorn after adopting the [aforementioned] technology” in order to “take full advantage” of the technology.

Also observed were a number of examples of *knowledge lock-in*, which was most acutely observed among farmers. Prior scholarship notes, on the one hand, how technology increases farmer knowledge as they learn to use and accommodate new technology into daily routines (Arthur 1989). On the other hand, knowledge-gained has also been shown to come at the expense of knowledge-lost, creating another type of lock-in as technologies risk eroding local analogue knowledge thereby further encouraging even more intensive use of a given platform (e.g., Stone and Flachs 2018).

All the farmers interviewed believed they were more technologically savvy than prior generations; sentiments that, if true, speak to knowledge gained among farmers. Yet a number of farmers also talked about knowing their farms and fields differently than their parents on account of these platforms—e.g., “I don’t think it’s a matter of one generating knowing more or less than another generation but knowing *differently*” (F11). Digging further to understand what precisely this meant revealed “knowing differently” to be a euphemism for “knowing less” about certain elements, namely, those elements dealing with local analogue knowledge.

Analogue knowledge and the digital knowledge generated by so-called smart, precision platforms are both local. The latter are in fact marketed on that very basis, pledging to generate highly local (if applying a Euclidean, geospatial understanding of the term) knowledge. The distinction rests heavily on digital knowledge’s promotion of seeing like an algorithm, where what is knowable and actionable are dictated by an exogenous sensing infrastructure (Lee 2020) created by individuals acting at a distance with their own assumptions and value judgments and animated by a you-can’t-manage-what-you-can’t-measure ethos. Conversely, what I am calling local analogue knowledge does not travel as well in large part because of its representational exuberance—it cannot be “contained” by a number or dashboard.

James’ case is representative of this group. James farmed approximately 2,000 acres and has come to rely, in his words, “heavily on these digital platforms for knowing what’s going on in my fields” (F8). He was quick to show me on his phone a variety of different dashboards and interfaces that told me almost anything a conventional farmer would ever want to know about their fields, from predictive weather software to plant counts, end-of-season

yield estimates, and satellite soil maps. With a few taps of his screen he could bring up soil composition, crop residue levels from prior years, etc. The farm had been in his family for multiple generations. I therefore asked how previous generations knew the land, without the aid of satellites, predictive analytics, drones, and broadband internet.

“My dad knew his ground like the back of his hand,” James explained, later adding that “while he didn’t have the detailed knowledge that I have—it’s called ‘precision agriculture’ for a reason—he learned to read the land better than I ever could.” When asked to say more about how his knowing of the farm differed from how his parents knew the land, he explained:

I read screens and dashboards. That’s where I get my info from. My parents read fields. They made judgments by the look of the plants. I even remember dad when he used to smell and taste the soil.

I do not have data to support the thesis that smart platforms were directly responsible for the loss of local analogue knowledge among adopters—knowledge associated with, for instance, how rich, organic soil ought to *taste* and *smell* and how healthy plants ought to *look*. A number of farmers interviewed did, however, acknowledge that prior generations were better at, as James put it, reading their fields, whereas smart farmers’ expertise today rested in reading screens, charts, and maps.

Lyle, a farmer from Kansas, explained the difference between what he knows and what, in his words, “old timers” know this way, pointing specifically to his neighbor as someone illustrative of the latter category.

I’ve got a neighbor like that. That’s not to say he’s a bad farmer. He’s a damn good one, thanks in part to having been on his ground for the entire 80 years of his life. [...] His is old school precision agriculture. He knows every inch of that property because he’s walked it hundreds of time. [...] God bless him. I’ll never get to know my land that well; not *that* way at least. I’m [my farm’s] too big. But I know it as well as anyone can at this scale thanks to these technologies. (F17)

Lyle’s comment brings up another theme common among farmers interviewed: the importance of smart platforms for knowing large expanses of land “as well as anyone can at this scale.” A lot has been written about how farmers have lost important local knowledge of their land and livestock thanks to intensification and scale-expansion (e.g., Flora 1992; Nazarea et al. 2013; Shiva 2016). Smart farming promises to correct this knowledge deficit, allowing farmers the ability to make management decisions down to the square-inch of their fields (Nebraska Corn Board 2019). At one level, then, techniques like precision agriculture make

adopters as knowledgeable about their land as Lyle's neighbor, with all his intimate local knowledge.

Yet at another level this knowledge is different; a difference that induces dependencies on these platforms once farmers lose the ability to read fields and animals in that way that Lyle's neighbor does and James' parents did. Learning to "see like an algorithm" is also predicated on the fact that those making algorithms are enacting futures in the image of their assumptions, thus further constraining what (future) farmers see and thus know. (The optic language is intentional as digital interfaces in smart farming tend to be visual in nature.) So: when actors like Mark, the earlier-introduce V.P., decide farmers do not what platforms knowing anything about "broomcorn, or Mexican blue corn, or sweet corn," to use his own examples, he was making a decision about how knowledgeable farmers ought to be in their quest to practice "smart farming."

Governance: "going under" and "staying above" an algorithm's hood

To stimulate meta-reflection, Lee and Björklund Larsen (2019, p. 2) "draw playfully on the metaphor of the engine hood" when they "ask what positions, other than 'going under the hood' to uncover the hidden normativities of the algorithm, are there?" In addition to this position, where "the politics, effects, and normativities that are designed into algorithms become foregrounded" (Lee and Björklund Larsen 2019, p. 2), they talk about "staying above" the hood.

Here, on the other side of our constructed spectrum of ideal types, we could place ethnomethodological analyses of the achievement of social order. In this analytical position, algorithms would emerge as 'contingent upshot of practices, rather than [as] a bedrock reality' (Woolgar and Lezaun 2013, p. 326). (Lee and Björklund Larsen 2019, p. 2–3)

Finally, Lee and Björklund Larsen (2019, p. 3) introduce "a middle road between going under the hood and staying above it"—an "ideal type that approaches algorithms, and technology, through an analysis of nonhuman agency and relationality."

This meta-reflection helps me analytically categorize the above findings. I went under the hood when interrogating the politics and normativities of digital farming platforms. At other moments I was above it, such as when emphasizing how such technologies cannot be abstracted from their larger assemblages. And I was operating somewhere in the middle when talking about knowledge lock-in and the enfolding of values, materialities, and practices as engendering novel ways of knowing, anticipating, and doing foodscapes while potentially closing off other pathways.

These analytic categories also help link the above findings with Campbell-Verduyn et al.'s (2017) paper where they distinguish between governance *with*, *through*, and *by* algorithms in order to speak to how big data-related innovations "have important but varied implications for accountability, effectiveness and power" (p. 230). To talk about governance *through* algorithms is to place impacted humans in the driver's seat. Governance *by* algorithms, conversely, speaks to scenarios where human agency is greatly reduced. Finally, to talk of governing *with* algorithms represents a mixed form of governance, which lies at some point between the prior extremes.

To go under the hood and point out the normativities of these platforms is not to critique that fact that these technologies are value-laden—no socio-technical assemblage exists without having politics (Winner 1980). Those who critique smart farming platforms on the basis that they are biased are engaging in the practice of tail chasing—you cannot avoid creating these platforms absent of value judgments. The act of pointing out normativities is more about interrogating the *types* of values at work and the *processes of design* that afford access to some voices but not others (Bronson 2019). To talk about governance *through* algorithms is to target "points" along assemblages where humans do have a say in what the platforms look like, and what they look at (e.g., monocultures within monocultures versus, say, polycultures), so as to ensure those politics are truly participatory.

Alternatively, agency, as conventionally conceived, is highly debatable when situated with an algorithmic context. As Mau (2019, p. 3–4) argues,

If everything we do and every step we take in life are tracked, registered and fed into evaluation systems, then we lose the freedom to act independently of the behavioural and performance expectations embodied in those systems.

The ability to affect or influence someone else's social and psychological characteristics is a capability had regardless of the physical or mental architecture (digital, mechanical, or biological) in question (Schwitzgebel and Garza 2015; Vladeck 2014). Instances of governance *by* algorithms therefore needs to be addressed through additional governance *of* algorithms—this is where the state can play a role. Such is especially important in light of the distinctly private character of algorithmic governance regimes, where shareholders represent the entirety of the *démos* (Kalpokas 2019). To not include in our suite of options governance *of* algorithms is to abdicate even greater influence to those assemblages assisted by the affordances of capital.

Governance *with* algorithms, finally, pushes conventional understandings of what it means to govern given the human and non-human heterogeneity involved. How does one approach the subject of governance if not through

a humanist lens? What does a participatory politics look like that includes “representatives” from the heterogeneous assemblage that is digital agriculture? Questions like this often assume governance depends entirely on just, inclusive processes.

Yet political theorists have not reached a consensus on this point. What if we were to reconsider whether political process is the be-all and end-all solution to what it means to engage in good governance? Rothstein (2009, p. 311), for instance, argues that “electoral democracy is highly overrated when it comes to creating legitimacy,” adding that “even in the successful and stable Nordic democracies, there is scant evidence that legitimacy is created on the input side of the political system.” Muirhead and Rosenblum (2019, p. 33) believe it important to distinguish between philosophic and sociological legitimacy when talking about political systems of governance: the former “asks what kind of regime, in principle, would be worthy of support,” while the latter focuses on “whether citizens in fact view their political order as worthy of their support” (see also Kalpokas 2019, p. 103).

I am not suggesting we abandon the rich scholarship arguing on behalf of democratizing socio-technical transitions (e.g., Brunori et al. 2011) and design (e.g., Koskinen and Norros 2018) in agriculture. This is not about creating competing frameworks. The aim here is to think about complimenting what we already know about governing *through* algorithms. The following brief example may prove generative for such ends.

Plantix is a free mobile app that was launched in 2016. By 2017, the app had been downloaded more than a million times in over 155 countries. By late-2019, total downloads exceeded 10 million in 16 languages (Willmer 2019). Farmers from around the world upload an average of 50,000 images daily, using the app. to identify plant (and weed) type, possible disease, and pest or nutrient deficiency. With more than 15 million images on file, the platform represents the world’s largest plant database (Martyn-Hemphill 2019). This real-time data stream means the platform can give users alerts about the spread and direction of diseases and pests. To quote Monti, a university-employed crop specialist, while describing Plantix and other platforms like it:

The tool is learning every day, not based on what some investors or engineers want it to know but based on what farmers of any scale want it to know. [...] People are even starting to teach the app. about houseplants. [...] This isn’t about making money. It’s about making a tool for and by the people. (CS1)

The penetration of smartphones into the rural areas of India, countries throughout Africa, and Pakistan has helped give millions access to this database. This, in turn, has given the self-learning system access to images and data that it otherwise would not have “known”—a type of

double-movement democratization, mutually benefiting and informing actors (e.g., pheasant farmers) as well as actants (e.g., Plantix algorithms).

Two farmers interviewed reported using Plantix. (I did not seek out users so these data are largely antidental, which is why this discussion was not included in the Findings section.) Both spoke positively of the platform. To quote one, a smaller-scale grower actively involved with the National Farmers Union of Canada, an organization with close ties to the international food sovereignty movement *La Via Campesina*:

[Plantix is] an example of how we *should* be building these technologies, to learn from farmers of all sizes and to be of value to them all, too; but also, the proof is in the pudding. It’s useful. Enough said. (F12)

This quote also aligns with both forms of political legitimacy mentioned by Muirhead and Rosenblum (2019): philosophic and sociological—the *principles* of the platform engender legitimacy as do the *outcomes* it affords, respectively.

This concludes my discussion of Plantix. It was not my intent to study the platform, having only learned about it through the interviews. Plantix does, however, seem good to think with when contemplating what it means to govern *with* algorithms, as an activity that grapples with the heterogeneous enfoldings common to digital farming platforms.

Conclusion

Drawing from 54 semi-structured interviews and many hours of observations, this paper adds to our understanding of farm data value chains. Before talking about the paper’s principle conceptual and empirical contributions, it is worth reviewing its methods and theoretical approach. Methodologically, I entered the field wanting to follow data from farm-to-farm, taking cues from the farm-to-fork approaches used in more conventional agrifood “follow the commodity” projects (e.g., de Sousa and Busch 1998; Friedland et al. 1981; Wells 1996). I did this to cast a broad empirical net, realizing, too, some of the limits and tradeoffs of this approach. Theoretically, the paper is animated by a posthumanist commitment, drawing heavily on assemblage thinking. This orientation positions its understanding of “chains” on a different conceptual plane relative to most commodity chain scholarship. As opposed to those linear applications, chains are understood here as referring to an orchestrating set of relations among humans, non-humans, products, spaces, places, and practices. This brings me to the paper’s principle contribution, which involves interrogating lock-in tendencies at different “points” of the assemblage while pushing for a varied understanding of governance depending on the roles of the actors and actants involved.

In future research, I would like to see additional empirical work targeting the heterogeneity of data value chains, involving both qualitative interviews and ethnographic methods. I would also encourage scholars to think more like a scavenger (Seaver 2017) when studying these platforms given their wildly distributed nature. For example, every farmer interviewed stored her data in the Cloud, meaning their data could have been anywhere in the world. (Cloud providers typically store your data in different locations for reliability; only a few give users the ability to choose which countries to store data in.) Assuming no social scientist has access to unlimited resources (including time), no one can be expected to faithfully trace this heterogeneity in its entirety. To say nothing about access: some of these spaces and practices are as guarded as nuclear codes. As more of us scavenge the digital foodscape, however, the clearer these routines, actors, and actants become, which can afford us insight into how best to work with these platforms and not be governed by them.

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Michael Carolan is a Professor of Sociology and Associate Dean of Research and Graduate Affairs for the College of Liberal Arts. Other appointments include: Distinguished Fulbright Research Chair, University of Ottawa, Ottawa, Canada; Professor of Political Science (Status-Only), University of Toronto, Toronto, Canada; Visiting Professor, Ruralis Research Institute, Trondheim, Norway; and Research Affiliate, Centre for Sustainability, University of Otago, Dunedin, New Zealand.



From left behind to leader: gender, agency, and food sovereignty in China

Li Zhang¹

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Abstract

Capitalist reforms usually drive outmigration of peasants to cities, while elders, children, and women responsible for their care are “left behind” in the countryside. The plight of these “left behind” populations is a major focus of recent agrarian studies in China. However, rural women are not merely passive victims of these transformations. Building on ethnographic research in Guangxi and Henan provinces from 2013 to 2017, and drawing on critical gender studies and feminist political ecology, I show how the food safety crisis in China creates conditions for peasant women to increase control and income from organic food production, often establishing alternative food networks with the support of female scholars and NGO organizers. Thus, I shift focus of scholarship on rural women from “left behind” to leaders in struggles for justice and food sovereignty.

Keywords China · Left-behind populations · Gender · Agency · Alternative food networks · Food sovereignty

Abbreviations

AFN	Alternative Food Network
BOFM	Beijing Organic Farmers' Market
CCP	Chinese Communist Party
COHD	College of Humanities and Development Studies, China Agricultural University
CSA	Community Supported Agriculture

Introduction

A central characteristic of China’s recent market-oriented reforms has been the massive outmigration of peasants to the cities, where they take up temporary jobs as migrant workers in industry, construction, and various service sectors. This results from an urban-focused export-oriented industrial policy, price differentials for agricultural and manufactured products, uneven incomes from agriculture and manufacturing/services, and an urban bias in cultural attitudes and the provision of social services (Wen 2001; Yan 2003). Moreover, China’s household registration system (*hukou*)

generally curtails the permanent settlement of rural populations in major cities, excluding them and their families from essential social services such as education (Wen 2001; Yan 2003). So as the working-age rural population migrates out for temporary urban employment, elders, children, and women responsible for their care are “left behind”. The characteristics and plight of these “left behind” populations have become focus of much scholarship in development studies, agrarian studies, and various social sciences (Ye and Wu 2008; Wu and Ye 2016; Ye et al. 2016), and these have contributed to promoting various government policies to address the predicament of these people and the “hollow villages” where they remain. This scholarship and the political mobilization around it are commendable for bringing much needed governmental policies and resources to address the social (economic, cultural, ecological, etc.) problems that come about through increasing rural–urban inequality. However, this scholarship and much of the policy recommendations it provides also faces important limitations. My purpose in this paper is to build upon this literature and advance it further through stronger and deeper engagement with feminist political ecology and critical gender studies.

Two aspects of this literature are particularly useful for expanding and deepening this scholarship. First, there is recognition that women are the pillar of “left behind” populations, as they are “left behind” precisely because they are considered to be responsible for taking care of children

✉ Li Zhang
li.zhang@uci.edu

¹ Department of Global and International Studies, University of California, Irvine, 3151 Social Science Plaza, Irvine, CA 92697-5100, USA

who cannot advance their education at the urban centers, and elders who are not capable of migrating to work in new factories and social services. Moreover, since women generally live longer than men, most of the “left-behind elderly” are also women. Second, there is also growing recognition that the tidal waves of migrant workers results in the “feminization” of agriculture, that is, the fact that much agricultural labor and other rural work is being done increasingly by women (Zuo and Song 2002; Chang et al. 2011). This feminization of agriculture had already been widely recognized across India, Africa, Latin America, and much of the rest of the world (Fortmann and Rocheleau 1985; Deere 2005; FAO 2010; de Schutter 2013; Lahiri-Dutt and Adhikari 2016). In China, however, there were powerful voices utilizing neoliberal discourses and patriarchal assumptions (mainly in economics, political science, and sociology) to question the prevalence of feminization and challenge those who argued this was taking place extensively (e.g. Zhang et al. 2004; de Brauw et al. 2008), since much of the female work in agriculture focused on household subsistence, and encompassed as well various other forms of unpaid, non-cash “household” economy (cf. Barker 2005; de Schutter 2013). As extensive documentation of feminization of agriculture continues to emerge through rigorous, extensive, and in-depth fieldwork-based research (mainly in critical agrarian studies, development studies, anthropology, and to a certain extent sociology as well) critics were forced to revise their previous statements (e.g. de Brauw et al. 2013). This growing recognition of the feminization of agriculture in China, therefore, is an important accomplishment in its own right.

In this paper, I argue that we must advance from merely describing the characteristics of women as “left behind”, and demonstrating the feminization of agriculture, to pay more attention to the manner that rural women are not merely passive victims during these transformations. Maintaining this currently limited perspective and purpose in the literature can even risk aggravating the condition of these women, reproducing a discourse of *victimization* that makes their agency invisible and their initiatives unimportant, and may even coopt their self-empowerment efforts (cf. Sangtin Writers Collective 2010; Gilson 2016). This critique is not new in gender studies, including the argument that certain “burdens” may also be opportunities for greater female agency (e.g. Schneider 1993; Chung et al. 2019). However, the growing attention to women and gender issues among overseas development practice, international scholarship, and policy since the 1990s (FAO 1996, 2010; UNDP 2003), including the promotion of women’s rural cooperatives and contract farming schemes (Dolan and Sorby 2003; de Schutter 2011), has generated a powerful new wave of scholarship on this topic, particularly in the way that NGOs and “participatory rural development” initiatives that were designed to “empower women” often failed to do so, and sometimes

even have the opposite effect (e.g. Sangtin Writers Collective 2010; Jacka 2013). Albeit focused on empirical cases and literature about China, therefore, my article does not rest upon nor suggest any exceptionalism about this country, but rather it engages with key debates in the international and interdisciplinary field of “agriculture and human values” worldwide.

In short, I argue we must shift focus of scholarship on rural women from “left behind” to leaders in various forms of resistance to displacement, marginalization, and discrimination. Discussion of feminization of agriculture in feminist political ecology, after all, has often indicated this can become an opportunity for female empowerment (Carney and Watts 1990; Rocheleau et al. 1996; Schroeder 1996; Vaz-Jones 2018). With this argument, moreover, we can also begin to deconstruct the dichotomies that separate “left behind” rural women from others in non-rural spaces where they exercise their agency, contributing to new analytic frameworks that recognize “translocal family reproduction” as key to understanding contemporary agrarian change (Jacka 2018), and female-led “rooted networks” as central to rural and environmental social movements (Escobar et al. 2002; Rocheleau and Roth 2007).

Theoretically, I build upon critical agrarian studies, development studies, gender studies, and feminist political ecology, particularly the feminist critique of Fraser (2003, 2009), Tamara Jacka (1997, 2010, 2013, 2018), Judith Butler (2004), and Erinn Gilson (2016), and both classic and new works of feminist political ecology (Fortmann and Rocheleau 1985; Carney and Watts 1990; Rocheleau et al. 1996; Jarosz 2011; Ge et al. 2011; Elmhirst 2011). Methodologically, I utilized ethnographic methods of semi-structured interviews, qualitative surveys, and participant observation during several months of in-depth fieldwork in Guangxi and Henan provinces from 2014 to 2017, which I supplemented with a critical review of media and government reports.

The paper is organized as follows. In the second section, I review the literature and outline my theoretical framework. In the third section, I present my methods and field sites. Then in the fourth section, I discuss various findings from my fieldwork to highlight how the feminization of agriculture and the ongoing food safety crisis in China are creating conditions for peasant women to increase control over food production and increase their income through sales of safer, organic food through “alternative food networks” (AFNs).¹

¹ AFNs contrast with mainstream agri-food commercial channels (such as major agribusiness companies, wholesalers, supermarkets, institutional canteens and restaurants), and include community-supported agriculture (CSA) initiatives, farmers’ markets, buying clubs, peasant cooperatives and even informal (e.g. family) producer-consumer connections that embed agri-food distribution in stronger social and ecological relations. For more details see Si and Scott (2019).

In the fifth section, I briefly discuss the ongoing challenges and obstacles faced by these female leaders, who are still subjected to the multiple burdens of advancing their agricultural, community, and/or political work alongside extensive unpaid domestic labor, and pervasive sexism and discrimination. In the conclusion, I revisit feminist debates in agrarian studies to argue that shifting our focus to women's role as leaders contributes to a better understanding of the complex manner in which the feminization of agriculture constitutes both a disproportionate burden for rural women and an important opportunity for female empowerment. This generates conceptualizations that better reflect these women's subjective understandings of their own condition and experiences, but also more productive grounds for scholarship that does not simply describe their plight, but also recognizes and contributes to the advancement of their struggles.

Literature review and theoretical frameworks

Critical agrarian studies and development studies

Scholarship from and about China has been formative to the international and interdisciplinary fields of agrarian and development studies. Arguably, Mao Zedong himself introduced the idea of the revolutionary leadership of the peasantry to the communist movement through his studies of the conditions of the peasantry in his native Hunan province (Mao [1926–1927] 1971). Liang Shuming and Yan Yangchu also led the creation of a non-communist “rural construction movement”, advancing both social science scholarship on agrarian societies and a broader social movement for peasant cooperatives (Si and Scott 2019). In addition, Fei Xiaotong is widely considered the founder of Chinese sociology through his ethnographic studies of the rural foundations of Chinese modernizing society (Fei [1948] 1992). Across all their scholarly and political differences, however, there is a theoretical commitment to researching the *agency* of peasants, a basic but fundamental insight that should orient critical agrarian studies worldwide.

Chinese agrarian studies then transformed radically from the socialist period, when the peasantry was discussed (at least officially among scholars and government officials) in very high regard, into the period of “reform and opening up”, when “members of the urban educated elite [began] seeking to reclaim a positive status and future for both themselves and the Chinese nation in the aftermath of late Maoist zealotry, in part by emphasizing the ‘backwardness’ of the peasantry” (Jacka 2013, p. 986; Schneider 2015). The peasantry began to be seen as “low quality” people whose numbers had to be contained through the one-child policy, and “backward” people who needed to be “modernized”

(Jacka 2013; Schneider 2015). An anti-Marxist and anti-Maoist neoliberal consensus began to emerge that agricultural development takes place through “technological modernization”, reducing the need for labor in the countryside while increasing “economic efficiency” and “productivity” of agriculture (e.g. Zhang et al. 2004; Huang et al. 2008; de Brauw et al. 2008, 2013). Such neoliberal agrarian studies became mainstream during the 1990s and 2000s, informing and supporting capitalist reforms, and removing the agency of the peasants from theoretical discussion.

In opposition to such neoliberal agrarian studies, there has been an increasingly strong current of what we call critical agrarian studies. These are largely driven by scholars who refer back to the non-communist currents of agrarian studies and “rural construction movement”, particularly Wen Tiejun (2001) and He X. (2007), as well as new Marxist scholarship in anthropology and sociology (Yan 2003, 2008; Yan and Chen 2013; Zhang 2015), and critical development studies (Ye and Wu 2008; Ye 2010). These scholars criticize the capitalist reforms in the Chinese countryside and offer alternative visions for Chinese development. They call attention to the historical and ongoing contributions of the peasantry to the wellbeing and advancement of society, and the need for continued and/or renewed labor-intensive agro-ecological production to reverse the socio-ecological crisis that China is facing.

A central aspect of this crisis turns on food safety, as became widely recognized in 2008 when adulterated milk formula caused the death of many infants. Major incidents of food contamination have continued to cause national public health scares each year. This crisis results from the commodification of food and farming, which enables and incentivizes overuse of toxic agrochemicals and adulteration of agri-food products (Zhang 2017; Zhang and Qi 2019). Consequently, Chinese society has a growing concern to access safer and organic food, creating conditions for peasant women to increase control and income from organic food production by establishing AFNs in collaboration with female scholars and NGO organizers. In this context, the struggles of peasants and urban food consumers to network for the provision of safer foods is fundamentally about regaining control (sovereignty) over food by re-embedding agri-food markets into social relations (as in a Polanyian countermovement). My contribution to this literature, therefore, simultaneously expands the empirical and theoretical scope of food sovereignty, and interlinks critical agrarian studies with broader debates about development studies.

Development studies emerged as a distinct field in China following upon the expansion of overseas development aid during the 1980s and 1990s. Since that time, overseas development agencies began funding not only development projects directly, but also an increasingly large number of development research initiatives, and training in

development project implementation and research (Ye 2010; Jacka 2013). This led to the creation of China's first College of Rural Development at the China Agricultural University in 1998, which later became the College of Humanities and Development Studies (COHD). The emergence of development studies, and its close association with critical agrarian studies, "reflected a broad shift in scholarly approaches to rural issues, away from a predominant focus on achieving increases in agricultural productivity toward a broader, more holistic conceptualization of rural social and economic development" (Jacka 2013, p. 988; cf. Ye 2010), including most prominently the need to recognize and address the plight of the "left behind" populations.

The terms "left behind" used to describe rural people who (mostly) remain in the countryside while others migrate for temporary employment in urban areas first emerged in short local news articles in the mid 1990s (Shangguan 1994; Yi 1994; Lu 1996), and the first scholars to discuss the topic academically began publishing in 2004 (Du 2004; Luo and Chai 2004). This issue of "left behind" populations continued gathering academic attention during the late 2000s, and received even more academic attention when Ye Jingzhong's team at the COHD gathered substantial resources to conduct national-level quantitative and qualitative surveys of "left behind" populations, triggering a larger wave of publications and even government attention to the topic (Ye and Wu 2008; Wu and Ye 2016; Ye et al. 2016).

These efforts have produced very empirically rich scholarship on the topic, demonstrating in very vivid terms the plight and suffering of "left behind" women, children, and elders, and critiquing this as a serious problem of contemporary Chinese development. These include mainly examination of the economic hardship faced by these individuals (low income, heavy workloads in agricultural production and care work, limited financial and other contributions from family members who migrated for temporary urban employment, and limited access to good quality social services, particularly healthcare and education), and their personal and psychological suffering (loneliness, depression, anxiety, problems with self-esteem, etc.). These challenges are especially difficult for women who suffer multiple layers of these problems, who are described as "burdened" with agricultural work to maintain the family's fields in addition to all the care work for elders and children, while receiving the least economic and social recognition, and facing the worst exclusion and marginalization among the family clans and villages of their husbands, as women traditionally "marry out" of their own family to go live *and work for* the husband's family (Zhang 2009).

Yet this literature has come under increasingly more sustained criticism in recent years for remaining limited to a description of the negative experiences of these victimized individuals, without theoretical advancements about

their condition or recognition of their agency.² Indeed, the most explicit attempt by members of the COHD team to advance this scholarship continue to frame the issue in terms of "burdens" and victimization (Ye 2018, 2019). When Ye Jingzhong (2018) wrote most explicitly about "left behind women's contribution to development", for example, he still regarded this contribution as the passive "sacrifice" of these women so that men can migrate to work in the cities, sustaining household reproduction and cheap labor for export-oriented industrialization. Evidently, this scholarship continues to neglect longstanding feminist debates regarding female agency, subjective interpretations of burden/care, and the opportunities that feminization of agriculture may generate for female empowerment (Carney and Watts 1990; Schneider 1993; Schroeder 1996; Chung et al. 2019), side-stepping the feminist arguments of female scholars, even when produced and/or presented at the COHD (Jacka 2012; Zhang 2016, 2018).

Gender studies and feminist political ecology

To build upon and advance this scholarship, I turn to critical gender studies and feminist political ecology. In particular, I draw upon Nancy Fraser for a feminist theory of justice that is especially attentive to the post-socialist condition and everyday capitalist relations (Fraser 2003, 2009), and build upon Tamara Jacka's feminist critique of the "rural reconstruction movement" and participatory development scholarship and practice in China (Jacka 2013). This feminist scholarship has shown that justice and injustice have multiple dimensions that go beyond economic exploitation and political oppression, and I focus particularly on what they call "cultural injustice", which includes not only cultural imposition or appropriation, but broader forms of disrespect, marginalization, and "non-recognition", that is, the rendering of a person as "invisible" (Jacka 2013, p. 984; Fraser 2003). Critical agrarian studies and development studies literature on "left behind" populations have explicitly sought to make these persons "visible" in a context where neoliberal agrarian studies, mainstream culture, and government policy was making them "invisible", and in this regard this literature has contributed to overcoming this cultural injustice.³

² Remarks made by Luo Cheng, professor at the Shaanxi Academy of Social Sciences, prefacing his presentation "Current situation and recommendations of support for poor rural left behind families", at the seminar on Rural Left Behind Populations: New Questions, New Characters, New Actions, China Agricultural University, College of Humanities and Development Studies (COHD), Beijing, March 23, 2019.

³ Since the publication of the Chinese Central Government Document Number 1 of 2008, for example, the government utilizes the explicit terms of this scholarship in its rural development efforts.

However, this scholarship would be problematic if it remains limited to this discourse of “the plight of the left behind”, since it is a reductionist approach to understanding a complex social problem that (1) does not necessarily identify concrete and constructive solutions to this crisis, (2) generates a discourse of victimization that makes the agency of these people invisible, and (3) may even aggravate their condition by undermining their initiatives, agency, self-esteem, or even coopt their self-empowerment efforts. In other words, this scholarship can “potentially help to address economic and cultural injustice by shifting understandings of ‘development’ and how it is achieved, and by changing perceptions of rural citizens and rural culture”, but since it also reproduces a discourse of victimization at the same time, the emancipatory potential of this scholarship could possibly be “undermined by a failure to develop effective strategies for overcoming gender injustice” and may even “contribute to the reproduction of injustice” (Jacka 2013, p. 985).

A common challenge to this critique has been that victimization and stigmatization are not actually *created* or *imposed* by scholars who research it, and in fact this concern amounts merely to a “misunderstanding” that results from the “shallow imagination” of society and “one-sided” presentation of information in the media (Ye 2019, p. 24). In order to advance this debate, I follow Butler (2004) and Gilson (2016) in theorizing stigmatization, victimization, vulnerability, and precarity in relation to various expressions of human identity and agency. Even when these women *become victims* of increased exploitation and oppression, “being a victim” is not their personal identity as the discourse of “left behind women” appears to suggest. Therefore, our own scholarship must shift theoretical focus to follow these women in their own agency, recognizing how their choices—albeit from precarious positions of vulnerability—still reveal daily-life struggles against displacement, marginalization, and discrimination. This includes their work in agriculture, rural cooperatives, and rural livelihoods, but also other work in non-rural spaces where they exercise agency, particularly their efforts to restructure gender, class, and rural-urban relations in the first place, and implicitly, address the greater social injustices engendered by these inequalities.

In this way, my feminist critique also builds on the theoretical advances of female Chinese scholars who already deconstructed similar victimization discourses about women who *did* migrate for temporary work in urban industries (e.g. Lee 1998; Ngai 2005; Yan 2008), and post-colonial studies of “quiet social movements” and “everyday life” resistance among the poor and marginalized elsewhere in the Global South (Bayat 2000, 2013; Roy 2015; Vaz-Jones 2018). In particular, I theorize food sovereignty initiatives among rural women as a *feminist movement* in China, which is unlike the high-profile account of middle-class liberal feminism

that is gaining attention recently (Milwertz 2002; Fincher 2016), as those accounts are almost entirely disconnected from the deeper social, political, economic, and ecological analysis present in critical agrarian studies and feminist political ecology.

Thus, I bring Fraser’s (2003) and Jacka’s (2013) feminist theory of justice to bear upon the broader fields of critical agrarian studies and feminist political ecology, enabling us to recognize the limitations of the existing literature on “left behind” women and promote distinct frameworks in the following manner. The mere description of rural women as simply “left behind” with the “burdens” of farming and social reproduction—which isolates rural women from their translocal family reproduction and political networks, and reduces them to a homogeneous and isolated group of victims—constitutes what Fraser (2003) and Jacka (2013) call an “affirmative” conception and strategy of justice. Affirmative approaches pivot on “inclusion”. They seek to address injustices by “identifying” and “including” victims of injustice in social, political, and economic structures, yet they do not call attention to or challenge the underlying structures of power that produce “invisibility” and “burdens” in the first place, nor do they reflect the agency of those who actively struggle against these conditions. In part as a result of scholarship on “left behind” populations, for example, the Chinese government is now superficially including women and other “left behind” populations in government policies for “poverty alleviation” and “rural vitalization” without challenging the capitalist reforms that generate this condition, or supporting the rooted networks and bottom-up initiatives of these vulnerable persons themselves to overcome this injustice.

Transitional conceptions and strategies of justice, on the other hand, do not simply rest upon the “inclusion” of the marginalized, but pivot upon their own agency to “alter the terrain” upon which struggles are waged in ways that may ultimately transform the underlying structures that generate injustice in the first place (Fraser 2003, p. 74; Jacka 2013, p. 985). Developing our conceptual framework from “left behind” to “leaders” harnesses the commitment to scholarship and engagement with people’s agency, and enables recognition of their quiet struggles in everyday life as a form of transitional approach to justice. Women across China’s villages, townships, and cities—including women who migrate from rural to urban spaces for higher education—are engaged in various forms of agroecological production to satisfy their household’s basic needs for food, especially safer, organic food in face of an aggravating food safety crisis (Zhang and Qi 2019). They are also collaborating in the creation of AFNs designed to cultivate and support the livelihoods of women, children, the elderly, the disabled, and other vulnerable persons, particularly through alliances between female scholars who may have their own roots in

the countryside, and now partner with those who remain engaged in agricultural production. As women take up leadership roles and positions of power and authority in rural cooperatives, local governments, universities, and AFNs, they *alter the terrain of struggle* and open the possibility for additional claims and forms of recognition that can *transform the underlying structures of power* that cause injustice. While both “affirmative” and “transitional” conceptions of justice have been features of critical agrarian studies and feminist political ecology, this explicit analysis of their different approaches enables us to recognize the limitations of the former and the need to expand the latter.

This work resonates with earlier critiques of liberal feminism and capitalist development from more radical perspectives (Carney and Watts 1990; Schroeder 1996), including feminist political ecology arguments that dismissed the “myths” that women do not engage in agricultural production and leadership of political struggles (Fortmann and Rocheleau 1985; Rocheleau et al. 1996), and that call attention to the “rooted networks” of female-led social movements (Escobar et al. 2002; Rocheleau and Roth 2007). The merits of this approach includes a refusal of simple binary thinking (such as rural/urban, producer/consumer, passive victim/active organizer, etc.), an attention to entanglements of power within networks, and a recognition that networks both shape and are shaped by territories (Escobar et al. 2002; Rocheleau and Roth 2007). Thus, the agency of peasant women in AFNs can be theorized as a form of “self-organization from below”, which reveals their “power of mobility and connectivity in horizontal and vertical dimensions” (Rocheleau and Roth 2007, p. 436) in ways that transcend the static imagined territoriality of the “rural left behind”, and the powerless condition of passive victim this discourse engenders.

Methods and field sites

I draw upon ethnographic research methods, including participant observation (of AFNs and government regulations of food safety), semi-structured interviews, and qualitative surveys. These methods have been widely used in interdisciplinary social sciences, and proved to be particularly useful in identifying the nuances of gender injustices in everyday life situations such as the plight and agency of female migrant workers in China (e.g. Lee 1998; Ngai 2005; Yan 2008) and female leaders and critics of rural development initiatives in China, India, Latin America, and beyond (Escobar et al. 2002; Rocheleau and Roth 2007; Jacka 2010, 2013, 2018; Deere 2005; Sangting Writers Collective 2010; de Schutter 2013; Ge et al. 2011; Elmhirst 2011).

Most of my fieldwork was undertaken in Gu⁴ village in Guangxi Zhuang Autonomous Region and Bian⁵ village in Henan province during the Summer of 2014, Spring of 2015, and Spring of 2017. I undertook 126 semi-structured interviews in Gu and Bian villages with peasant households, which included interviews with ten childless elders, disabled and orphans (五保户), six school teachers, and four spiritual leaders, the majority of whom were all female. I also undertook 86 semi-structured interviews with other key informants, including rural cooperative leaders, county and township officials, food vendors and brokers, agricultural input vendors and brokers, local food market and restaurant managers, and urban representatives of food safety-oriented NGOs, community supported agriculture (CSA) initiatives, and buyers’ groups.

The main focus of my research at the time was the establishment of new top-down government laws and regulations on food safety, and the AFNs among peasants and between peasants and urban consumers to produce and distribute safer, organic food (Zhang 2017; Zhang and Qi 2019). But one of my key findings was that the articulation of gender, ethnic, and class identity among peasants and rural cooperative leaders appears to influence how much they prioritize the production of safer organic food, as the female-led cooperative was doing in the ethnic minority village of Gu, or the scaling-up and commercial success of agricultural production, as was taking place in the male-led cooperative in Bian village (Zhang 2016, 2018). This two-case comparison may not be sufficient to draw clear conclusions about gender as a determinant factor, which requires not only more case studies but also clearer analysis of the way gender, class, ethnic identity, and other factors articulate in each situation. But it certainly enables us to pose questions about gender, agrarian studies, and rural development politics as undertaken in this present article.

Female leadership in food sovereignty

Many believe that China does not have “social movements” because of the authoritarian nature of its state, and the limited space for “civil society” to coordinate nationwide protests and organize openly, independently, and especially in opposition to the Communist Party (Ho and Edmonds 2007). Yet I argue bottom-up initiatives for self-protection in face of China’s ongoing food safety crisis (i.e. the establishment of AFNs) constitutes a key aspect of the global social movement for *food sovereignty*. This fits the theoretical foundations of “food sovereignty” as a political struggle for greater

⁴ Pseudonym.

⁵ Pseudonym.

control and autonomy over food production and consumption, contrasting it with commercial and distributive frameworks of “food security” that have not prioritized issues of quality or the agency of food producers (Wittman et al. 2010; McMichael 2013; Bezner Kerr 2013). Moreover, the literature on food sovereignty has become increasingly attentive to household-level power and gender dynamics (Wittman et al. 2010; McMichael 2013; Bezner Kerr 2013), and by reflecting upon female-led AFNs as part of the global food sovereignty movement, my work also expands upon the role of women in this struggle. In order to sustain this argument, I call attention to the growing literature on “everyday life” resistance among the poor and marginalized in the Global South as a form of “quiet social movement” (Zhang and Qi 2019; cf. Bayat 2000, 2013; Roy 2015; Vaz-Jones 2018). In this context, I discuss female leadership not merely in rural cooperatives, agrarian studies, development initiatives, CSAs and other AFNs, but collectively as female leadership in the food sovereignty movement in China, echoing the work of Diane Rocheleau and other feminist political ecologists on rooted networks of environmental and rural social movements worldwide (Rocheleau et al. 1996; Escobar et al. 2002; Rocheleau and Roth 2007; Jarosz 2011; Nyantakyi-Frimpong 2017). Identifying these AFNs as female-led rooted networks for food sovereignty accomplishes two theoretical and empirical purposes: first, it delineates the translocal connections through which so-called “left behind” women exercise agency and power, and second, it enriches formulations of the global food sovereignty movement with attention to these less confrontational everyday life practices and the centrality of food safety concerns for such struggles in places under more authoritarian regimes.

The role of female scholars and educated young women

First, it is worth highlighting that even though male scholars like Wen Tiejun usually get credit for leading the “new rural reconstruction movement” and several of their associated initiatives, very often there are younger people, and particularly younger women, who actually do the hard work of organizing, implementing, and cultivating these initiatives. This is particularly evident in some of the most famous AFNs emerging in China. One example is the Little Donkey Farm, a peri-urban farm in Beijing where urban intellectuals and young volunteers have been establishing a CSA and organic farming initiative. Its core founder was Shi Yan, a young woman who was a PhD student of Wen Tiejun, and spent some time as exchange student in a US university, where she learned the CSA model and practice. Upon her return to China, Shi Yan became one of the founders the Little Donkey Farm in 2008, and continues to play a leading role in promoting organic food production in China as

founder of Shared Harvest, another high-profile CSA-turned-agribusiness in Beijing.

The situation is similar with the Beijing Organic Farmers’ Market (BOFM), another very high-profile AFN in China. Chang Tianle was a young female social activist among the first group of volunteers of the BOFM, joining it upon her return from studying abroad in the US in 2010, while working in the Institute for Agriculture and Trade Policy think tank. The BOFM was originally founded by a foreign couple, but it was Chang Tianle’s initiative to create an online presence for the BOFM. Her online promotion was extremely successful, and as the market grew, Chang Tianle became increasingly involved, eventually leaving her other work to assume full-time management of the BOFM, and networking even more to expand China’s organic food social movement.

But the majority of female scholars and educated women cultivating their own and other female leadership in food sovereignty in China obtained their education and remain firmly rooted within China itself. Their input as critical agrarian scholars has been instrumental for the development of multiple other AFNs and food sovereignty initiatives in China. Tamara Jacka was supportive of the transformative potential of their work, yet apprehensive and critical of their limitations in addressing gender justice explicitly (Jacka 2013). My research findings support some of her critique, but also reveal more positive and optimistic trajectories. One of the female scholars somewhat critiqued by Tamara Jacka was He Huili, a professor of development studies at COHD who was very involved in the creation of the Bian rural cooperative and CSA in Henan province. As Jacka correctly points out, He Huili’s community engagement did attempt to empower women and improve the condition of the most marginalized persons—the “left behind” women, elders, and children—more clearly than Wen Tiejun or He Xuefeng, yet her publications never addressed gender issues directly (e.g. He H. 2007). After Tamara Jacka’s publication, I began my own fieldwork in Bian village, and examined the development of the Bian village cooperative that He Huili helped create.

The Bian village cooperative was created in 2004 with 39 households adapting the CSA model, in a village highly controlled by five men from the leading family clans. The only exception was He Huili herself, who was not only responsible for academic support for the project, but also politically responsible as deputy governor of the county in which Bian village is located. Their original aim was to produce organic rice for members who paid in advance to assist the cooperative with production. However, the cooperative was not able to fully abandon the use of synthetic fertilizers, and they failed to obtain government certification as “organic”, so they marketed it instead as “pollution free” (Zhang and Qi 2019). In 2009, the Bian village case received national attention, as their cooperative was showcased by then-vice

president Xi Jinping as an example to be followed for rural development. He Huili was a key organizer of this political and publicity stunt.

However, as expected from Jacka's (2013) critical assessment of the "new rural reconstruction" movement and other critical scholarship of the limitations and cooptation of China's new cooperatives (e.g. Yan and Chen 2013; Zhang 2015), the efforts of the Bian village cooperative to produce "pollution free" rice were largely coopted by male local cadres for their own personal gains. This happened especially after severe droughts affected the cooperative's own rice production in 2014, threatening the economic viability of the project. After all, the cooperative was contracting over 300 households to provide an ever growing amount of rice, even selling beyond their own CSA members, especially after their case gained national-level attention. And the male cooperative leaders feared their customers would not accept the CSA terms of shared cost, shared risk, and shared results. Therefore, the male leadership of the cooperative began buying up regular (i.e. not "pollution free") rice from neighboring villages, processing and repackaging them with the cooperative's brand, and selling it as if it was their own "pollution free" production. In other words, focusing on branding and sales instead of production. This was never admitted publicly, but it was an open secret among residents of Bian village and in the surrounding area at the time I conducted my fieldwork from 2014 to 2017.⁶ He Huili herself became frustrated with this outcome (and other complicated issues beyond the scope of this article), withdrew her leadership role in the Bian village project, and shifted instead to new collaborative research in her own home village, where she is placing culture and gender issues more prominently in her research and development agenda, as she indicated to me in a personal conversation in 2017.

He Huili's new collaborative research project in her own village (in Lingbao, Henan province) started around 2013, when she was growing distant from the Bian village cooperative to which she devoted her work for ten years. She realized it was not enough to promote economic production alone, and it was necessary to refocus on cultural and gender issues in their own right, as she perceived women to be "more active" in such initiatives already. Therefore, she combined various existing peasant cooperatives to established the Peasant Grassroots College (弘农书院), focusing on cultivating the traditional Chinese agricultural practice and spirit. All key leaders of the Peasant Grassroots College are female, after the only young man who participated its core group gave up the project. When I first met one of the

young leaders at Grassroots College in 2014, she was still very shy and nervous. With He Huili's support and encouragement, and especially after they transitioned to a female-only core leadership group, she was transformed. When I met her again, she was a strong and confident leader, even acting as the main organizer of the province-wide Grassroots College Forum in 2017. Despite the shift away from He Huili's intellectual leadership in the Bian village case, therefore, her own leadership role and attention to gender issues continues to grow with transitional approaches to justice, creating conditions for transformation of the structural conditions that negatively affect rural women.

In other words, when women advance in their own education, they can lead food sovereignty initiatives like Shi Yan and Chang Tianle have done, thus contributing to a change in the social and economic terrain upon which female peasants are marginalized (i.e. mainstream food networks), creating new markets and discourses that can empower broader counter-movements to the capitalist reforms that are aggravating women's exploitation and marginalization in Chinese society (Zhang 2016, 2018). When women take up leadership in academia and local government, as He Huili has done, they may even undertake efforts to alter more directly the structural conditions that preclude or enable other women to empower themselves, as illustrated by the case of this young female leader who emerged from the Grassroots College. These are not merely affirmative strategies of justice, but rather transitional strategies, since they alter the terrain upon which justice is conceived and grappled. Rather than merely affirming the existence of such women, or pivoting on their "inclusion" in agroecological initiatives, we can only fully grasp their significance when emphasizing their agency in a struggle for transitional justice.

Female leaders in local government, cooperatives, and AFNs

As implicit in the sub-section above, the role of female scholars and young social activists requires networking with the rooted leadership of cooperatives and CSAs. A clearer example of women networking in leadership across all these roles was evident in my second case study in Gu village, Guangxi province.⁷ In 2001, a female scholar and proponent of participatory rural development from the Chinese Academy of Sciences, Song Yiqing, went to Gu village to launch a development project focused on breeding local maize

⁶ Field site observations in 2014, 2015, and 2017, and various surveys and interviews with peasant households and key informants in and around Bian village, Henan.

⁷ The information in this and the following paragraphs comes from my field site observations in 2014, 2015, and 2017, and various interviews with peasant households and key informants in and around Gu village, Guangxi.

varieties and sustaining local culture. There she collaborated primarily with Lu Yanyan⁸, a female cadre who joined the village committee in 1991, and was vice-director of the village since 1999. Lu Yanyan was also among the most well-educated people in the village, having completed high school in a remote mountainous region where most ethnic minority children abandon school much earlier to work in the fields or migrate out to work in the factories and social services of neighboring Guangdong province. In addition, she is a committed CCP member, and received several awards from the CCP for the work I describe below.

Song Yiqing went to work in Gu village because Lu Yanyan had already established a cultural cooperative—which was composed almost exclusively of “left behind” women and female elders—to sustain Zhuang and Yao ethnic minority dances and traditions since 1998. Like He Huili, Song Yiqing believed they could develop from these cultural initiatives to economic projects (Zuo and Song 2002). Her initial efforts were limited to a traditional participatory rural development approach involving participatory mapping, rapid rural appraisal through surveying, and provision of seed varieties and short-term extension of breeding assistance. As was also found in several other similar cases (cf. Cahn and Liu 2008; Jacka 2010, 2013; Zhao 2011; Ge et al. 2011), these efforts themselves failed to produce any significant transformation of Gu village’s difficult social and economic condition. On the other hand, Song Yiqing’s intervention did serve a *transitional* function for Lu Yanyan and her female partners in the village to advance *their own* initiatives afterwards, shifting the conditions of the terrain of struggle and opening new opportunities for mobilization (cf. Fraser 2003). In particular, it enabled Lu Yanyan to lead the transformation of the cultural cooperative into bottom-up construction of AFNs of their own.

Lu Yanyan and her whole cultural cooperative were invited to the COHD in Beijing to give a show and participate in workshops, and connected with other peasant and ethnic minority leaders to cultivate a network of solidarity, especially in the practice of saving and reproducing local seed varieties. She continues to be frequently invited to national and even international workshops and meetings organized by critical agrarian studies scholars, but she almost always politely declines these invitations. Lu Yanyan explained to me in one of our many personal conversations

I don’t have time for all those meetings... my work needs to continue to focus on our cooperative, our village government, our own problems at home. All that training and experience-sharing are not really applicable to our village and cooperative, so instead of spend-

⁸ Pseudonym.

ing time on that, now I am more and more focused on our own things and experiences.⁹

Indeed, Lu Yanyan herself deserves credit for the most successful advancements in her village. In 2006, she led the development of their cooperative from merely cultural activities to the organization of organic vegetable production.¹⁰ Her efforts were directed primarily at improving the economic condition of “left behind” women, and particularly elderly women. As she explained to me in an interview:

Only the poorest villagers have the willingness to join the ecological cooperative to produce pollution-free vegetables and raise pigs and chickens. This is because they are old, and cannot migrate out of the village to earn cash. So this is a source of sustainable livelihood for them.¹¹

At first their production focused on distribution among the “left behind” households. But due to Lu Yanyan’s efforts, the cooperative grew from an initial 11 members to over 57 by 2010, renamed Yangshan Yanyan Ecological Planting and Breeding Cooperative¹², and expanded distribution to a NGO-operated farm-to-table restaurant in the provincial capital of Nanning (the Farmer’s Friend restaurant). In an even more illustrative contrast with the case of Bian village cooperative in Henan, when drastic floods destroyed much of the production of the cooperative in Gu village, Lu Yanyan and her female partners in the cooperative preferred to sustain organic production for their own household consumption, rather than scale-up production with a greenwashed alternative that could maintain their commercial supplies to the farm-to-table restaurant in Nanning. As Lu Yanyan explained to me, this required active leadership by her and the other elder women in the cooperative:

The ecological planting and breeding cooperative is facing a problematic issue: the younger peasants want to use a modern way to produce with hybrid seeds and fertilizer to sell to the ordinary market. However, the elderly members and I insist on using the ecological

⁹ Personal interview with Lu Yanyan, Gu village, Guangxi, January 15, 2017.

¹⁰ Their production was not certified organic, because the cost of obtaining and renewing government certification was beyond their capacity, so it was marketed as “green food” instead. But the cooperative members and its CSA consumers both recognized it as “organic” (绿色有机的). I verified through field site visits in 2014, 2015, and 2017 that in fact they do not use chemical pesticides and fertilizers, and so in this article I follow their convention in calling it “organic”.

¹¹ Personal interview with Lu Yanyan, Gu village, Guangxi, January 15, 2017.

¹² Pseudonym.

way to produce less but safer and good food to sell to those who think it is worthy to buy.¹³

The restaurant was also pushing down prices by purchasing from various other villages, and complaining that Gu's cooperative could not scale-up and guarantee a steady supply of all the vegetables they needed, so Lu Yanyan led efforts to establish new marketing channels at farmers' markets in their own county. Through her leadership, Lu Yanyan not only improved the economic conditions of the "left behind" women in her village, but also gained further political power for herself, becoming village director and Communist Party secretary since 2008.

We can conclude, therefore, the case of Gu village demonstrates precisely a successful case of the strategy of developing from cultural initiatives to economic cooperatives, and although external support was important, the determinant factor was essentially the strong female leadership by Lu Yanyan. Her bottom-up initiatives effectively transformed the "burden" of agricultural production faced by women labeled as "left behind" into a more fundamentally transitional strategy that is enabling vulnerable women, particularly elderly women, to transform structural conditions through self-empowerment by cooperation in agricultural production, self-governance, and food sovereignty. Affirmative approaches to justice, such as the simple identification of these women as "left behind" and their inclusion in externally-organized development projects, are not sufficient to recognize and leverage their self-empowerment initiatives. These initiatives rest upon their own agency and leadership, which improves both their livelihoods and their self-esteem, as they do not identify themselves as "left behind" victims, but women leading efforts in the production of safe and organic food for themselves and their own alternative markets.

Continuing challenges and obstacles

Despite the advancement of all these transitional approaches to gender justice across China's countryside and their networking with urban-based scholars and consumers, with their potential for transforming the structural conditions of power that make women more vulnerable to exploitation and oppression, there are still various challenges and obstacles to be overcome. As documented in several other cases across the "developing world", the "economic inclusion" of women in capitalist societies and the inclusion of "gender issues" in new governmental initiatives may actually

strengthen hierarchical power relations of female subordination to fathers, husbands, their families and clans, and even patriarchal states themselves (Ge et al. 2011; Lyon et al. 2017). Moreover, "female empowerment" initiatives may even become coopted to sustain neoliberal discourses and practices that ultimately undermine gender justice even further (e.g. World Bank and IFPRI 2010; cf. Sangtin Writers Collective 2010; Fraser 2009). Real transformations of society ultimately require radical shifts in social norms and institutional organizations.

Social and political conditions in China, however, remain very challenging for transitional strategies for gender justice. These range from social norms that discriminate against women in educational and employment opportunities, differential incomes and advancement trajectories for women in the workplace, gender bias in the recruitment and advancement in political offices, and social practices in both domestic and political spaces that are "both unappealing and risky for women" (Howell 2008, p. 76). Recognizing and encouraging women's leadership is therefore necessary, but not sufficient. In addition, it is also necessary to simultaneously redistribute unpaid care work and other *domestic* labor from women to men, and alter the social norms and institutional structures of *political* life. Otherwise, these new roles and responsibilities of female leadership may compound burdens rather than become a means for empowerment, as has been widely acknowledged in feminist literature (de Schutter 2013; Lyon et al. 2017).

The case of Lu Yanyan can be used once again for illustration, yet the narrative below is representative of virtually every single female leader who I have encountered through the course of this research. Many of the key challenges and obstacles she identified ultimately arise from the patriarchal relations with her husband, his family clan, and their children:

I got married when I was only 17 years old, and came from another poorer village. I am not a local person here and have different family name. I have to be very cautious to do anything, even to be excellent, because my husband belongs to the biggest clan in this village. There are more eyes on my behavior. When I began to engage in the village management affairs, my husband and his relatives did not believe that I could do well as a woman who came from outside [the village]. So I had to try very hard to convince them that I can take charge the village even though I am an "outside woman". Now I became very busy with my work, so I do not have time to cook for the family and to take care of my grandchildren. So sometimes my husband, my sons, especially my two daughters-in-law complain with me about this. I have no choice now because I

¹³ Personal interview with Lu Yanyan, Gu village, Guangxi, May 12, 2015.

have to sacrifice the time with them to help more the others.¹⁴

Additional challenges include women's systematic disenfranchisement from property ownership in both urban and rural areas, particularly in cases of divorce and displacement (Li and Bruce 2005; Sargeson and Song 2010; Fincher 2016), the destabilization of peasant knowledge for agroecological production (Bezner Kerr 2013), the limited understanding of middle-class consumers about the nature of the food safety crisis and the challenges of peasant production, and the sustainability of networks of mutual trust between peasant producers and urban consumers (Zhang and Qi 2019), all of which are especially serious obstacles for China's food sovereignty movement, and consequently women's leadership within it. Further empirical evidence of what is often termed the "multiple burdens" faced by women engaged in economic and political leadership seems hardly necessary in this article, as this finding is widespread among scholars who examine this topic in China (e.g. Howell 2008; Jacka 1997, 2018; Ge et al. 2011). Rather, it is more important to relate feminist theories of justice to the complexity of burden and opportunity for empowerment that results from the feminization of agriculture, and how this approach enables us to move beyond the victimization of supposedly isolated and homogeneous "left behind" rural women.

Conclusion

I have argued that the scholarship and advocacy on "left behind" populations, particularly women, needs to advance through deeper engagement with feminist theories of justice and feminist political ecology. Therefore, I developed a theoretical framework and illustrated it with my empirical research on how we can and must pay more attention to the manner that rural women are not merely passive victims during recent social transformations associated with rapid rural-to-urban migration and new dynamics of translocal family reproduction (Jacka 2018). In fact, these women are becoming leaders in agricultural production initiatives, particularly for safer and organic foods to address China's ongoing food safety crisis. This constitutes a "quiet" social movement for feminism and food sovereignty, as it addresses various forms of resistance to displacement, marginalization, and discrimination.

My theoretical contribution and empirical findings thus contribute to broader debates about capitalist transformation, rural activism and the "politics of possibility" in China

(Ho and Edmonds 2007; Day and Schneider 2018), and broader feminist debates about the feminization of agriculture as a burden involving socio-economic exploitation on the one hand, and opportunities for female leadership and empowerment on the other. In problematizing state efforts and academic scholarship that focus on "left behind" populations merely as victims, I contribute to the advancement of a collective argument that simply including women and other vulnerable populations in affirmative approaches to justice may still aggravate social relations of production that exclude, marginalize, and exploit women (Ge et al. 2011; Jacka 2013; Day and Schneider 2018). Moreover, such "affirmation" of rural women as a supposedly homogenous and isolated group of victims overlooks their agency, their heterogeneity in terms of socio-economic and geographical mobility, and their rooted networks that constitute a quiet social movement for food sovereignty. The significance and implications of my research are the following: shifting focus to women's role as leaders—rooted and networked peasant women, local cadre, scholars and NGO organizers—identifies a more productive path for research in critical agrarian studies and development studies in China, recognizing and supporting female-led transitional strategies that may transform the basic conditions of struggle for social justice, the reproduction of livelihoods, and food sovereignty in China.

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¹⁴ Personal interview with Lu Yanyan, Gu village, Guangxi, June 5, 2015.

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Li Zhang is visiting assistant professor of global and international studies at the University of California, Irvine. She was visiting fellow in the Department of Development Sociology at Cornell University in 2015–2016, and remained research fellow at the Cornell Contemporary China Initiative. Dr. Zhang was assistant professor of sociology at Henan Agricultural University, and research fellow at the China Agricultural University, COHD, where she obtained her PhD in 2017. Dr. Zhang has published on democracy and socialist theory, ecological agriculture, urban farming, and China’s food safety crisis.



Virtualizing the ‘good life’: reworking narratives of agrarianism and the rural idyll in a computer game

Lee-Ann Sutherland¹

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Abstract

Farming computer games enable the ‘desk chair countryside’—millions of people actively engaged in performing farming and rural activities on-line—to co-produce their desired representations of rural life, in line with the parameters set by game creators. In this paper, I critique the narratives and images of farming life expressed in the popular computer game ‘Stardew Valley’. Stardew is based on a scenario whereby players leave a [meaningless] urban desk job to revitalize the family farm. Player are given a choice to invest in the Community Center or to support ‘JojaMart’, a ‘big-box’ development. The farming narrative demonstrates the hallmarks of classical American agrarianism: farming as the basic profession on which other occupations depend, the virtue of hard work, the ‘natural’ and moral nature of agricultural life, and the economic independence of the farmer. More recent discourses of critical agrarianism are noticeably absent, particularly in relation to environmental protection. Conflict is centred on urban-based big business, whereas the farm is represented as a ‘bolt-hole’ or sanctuary from urban life. I argue that embedding issues of big-box development in gameplay enrols players in active reflection and debate on desirable responses, whereas the emphasis on reproducing classical agrarian tropes risks desensitizing game players to contemporary agrarian social and environmental justice issues. However, Stardew Valley gameplay implicitly reinforces the ideal that low input farming is the way that agriculture should be practiced. The success of the game in eliciting on-line debates, and the requirement for active performance and decision-making, demonstrates the specific potential of computer games as mediums for influencing and intervening in ongoing reworking of farming imaginaries, and enabling more critically engagement of the ‘desk chair countryside’ in important global debates.

Keywords Critical agrarianism · Rural development · Back-to-the-land movements · Big box development · Farming simulator

Abbreviation

RPG Role playing games

Introduction

You’re moving to the Valley... You’ve inherited your grandfather’s old farm plot in Stardew Valley. Armed with hand-me-down tools and a few coins, you set out to begin your new life!

Can you learn to live off the land and turn these overgrown fields into a thriving home? It won’t be easy.

Ever since Joja Corporation came to town, the old ways of life have all but disappeared. The community center, once the town’s most vibrant hub of activity, now lies in shambles. But the valley seems full of opportunity. With a little dedication, you might just be the one to restore Stardew Valley to greatness!

Thus reads the official advertisement for what GQ magazine dubbed the “unlikeliest independent video game triumph since Minecraft” (White 2018). In stark contrast to Grand Theft Auto and numerous popular first-person shooters, the text and images of Stardew Valley present an opportunity to engage in bucolic farm and community life: the image presented is of rustic housing; a few crops, with a chicken ranging free; travel is by horseback and mine cart; a neighbour comes bearing gifts; trees, wooden fences, mountains and a clear blue sky dominate the landscape. Stardew is pitched as a playground for agricultural production and rural exploration, with a strong ‘retro’ vibe. It has sold over

Lee-Ann Sutherland
Lee-Ann.Sutherland@hutton.ac.uk

¹ Social, Economic and Geographical Sciences Department,
The James Hutton Institute, Aberdeen AB15 8QH, UK



Image 1 Stardew Valley promotional image. Source www.stardewvalley.net. Image copyright Eric Barone

10 million copies (Strickland 2020), staying near the top of the Personal Computer (PC) game charts since its launch in 2016. Available in multiple formats (e.g. PlayStation, Xbox, Nintendo Switch) and 12 languages (including Russian, Turkish, Brazilian-Portuguese and several Asian languages), it is a global phenomenon. As a platform for contemporary imaginings and interactions with rurality, I argue that it is an important site of cultural production (Image 1).

In this paper I assess the narratives of rurality and farm life embedded in Stardew Valley gameplay, critiquing the extent to which this portrayal of idyllic rurality reflects tenets of classical and critical agrarianism. I focus the paper particularly on what players of Stardew Valley may learn through gameplay about farming practices, the contemporary imaginaries of rural life which are encouraged or challenged, and how these differ from those found in other forms of media engagement. I thus critically appraise how rurality and farm life are represented within the game. Analysis of Stardew narratives and game constructs offers insights into the recreational appeal of rural landscapes, and the aspects of farming life which are selectively re-configured into recreational experiences. The analysis thus advances thinking on how popular notions of idyllic rurality are constructed for public consumption, and how that public consumes them.

Understanding these representations is important in several respects. Social representations of rurality and agriculture underpin public policy, particularly planning guidelines and agricultural subsidies (Beus and Dunlap 1994; Clark and Jones 1998; Satsangi et al. 2010). Migration—particularly counter urbanization—is also influenced by these representations, both within countries (Halfacree 2011) and between countries (Gaspar 2015). Although these ideals of rural life may be acted upon in

only a few cases, it can be a useful indicator of urban understanding and preferences for rural areas (Blekesaune et al. 2010), influencing consumer behaviour (e.g. food, agri-tourism, Flanigan et al. 2015). Critically, players of computer games represent a substantial population which has previously been unrecognized within agrarian and rural studies. I term this cohort the ‘deskchair countryside’: individuals who primarily experience farming and rural life through their computer screens (see also Sutherland 2020).

In coining the term ‘desk chair countryside’ I develop work by Bunce (1994) on the ‘armchair countryside’—generations of people whose primary experience of rural life is through art, literature, cinema and television (i.e. a step removed from direct experience). Both armchair and deskchair countryside cohorts have highly selective experiences of the countryside, which have been actively edited, produced and marketed to them, and are experienced remotely. For example, as Horton (2008) demonstrates in his analysis of a popular British rural television series, television shows need to be commissioned, scripted and promoted (often by networks of white males), and target specific demographic cohorts. Paul Cloke (2003), writing in the early 2000s, argued that rural life as portrayed in film, television, art, books, toys and magazines is uncritically idyllic—a form of “brainwashing” (p. 1) that underpins public expectations of rurality. These expectations have traditionally omitted less than idyllic features of rural life, such as crime, alcoholism, and homelessness (Yarwood 2001; Jayne et al. 2011; Cloke et al. 2001), focusing instead on representations of farming and rural community life which emphasize the picturesque, recreational and bucolic (Bunce 2003).

More recent media studies reveal a less rosy set of representations, integrating issues of housing and poverty into televisual landscapes for dramatic and comedic effect, but continuing to present rural residents in a positive light (Dickason 2017). Peeren and South (2019) demonstrated the resilience of the ‘good life’ genre and its association with rurality in their analysis of the multiple genres utilized in the popular Dutch TV show ‘The Farmer Wants a Wife’. Early episodes emphasize the farm as a place of difference, an “unsentimental globalized business” (p. 39) utilising modern technology, to which incomers (i.e. prospective wives) must adjust. However, Peeren and South argue that by Series 8, the show had evolved to emphasize the romance genre (i.e. dating), with idyllic rurality forming an uncritical backdrop. The agricultural context became incidental, and potential wives—and viewers—were no longer challenged on their idealized conceptions of farming life. Candidates instead engaged in ‘romantic’ actions of petting livestock and enjoying sunsets over the farm. Peeren and South (2019) argue that it is possible to challenge the good life genre through integration with other genres, pointing to

spin-off series that more critically present the practicalities of contemporary farming. Although the appeal of the good life genre is highly durable, popular media thus can act as an entry point into more critical representations of rural life.

Computer gameplay has similarities to other forms of popular media engagement, but has some important differences. Like most rural television programs, gameplay is oriented primarily towards entertainment, involves substantive scripted components and evolves over time in response to participant feedback and changes in the market. Consumers choose the programs in which they invest their time. Computer games also include a flow of visual images (Gee 2015)—you can physically see the depiction, the way you would a painting or a television show. Games are more flexible in some respects—unrestricted by prevailing weather or other geophysical realities (see Phillips et al. 2001), but inevitably an animation and thus not bound by logics of gravity or time. However, the major difference is that 'armchair countryside' consumption is largely passive. In contrast, computer and video games require active engagement—players drive the story forward, making choices about how to respond to different scenarios and shape their rural 'worlds'. By changing the story through their own actions, players impact on the outcome and develop their own preferred narratives. Players thus both produce and consume the narratives and experiences embedded in computer games, within the limits set by the game designers.

Murray (2006) argues that contemporary computer games represent a variation on traditional forms of play, where myths and legends are taught and acted out in order to teach children and pass on wisdom. Play involves tangible engagement with objects and practices, implicating multiple senses (e.g. sight, touch, movement). As such, games both influence how the setting is understood, and offer opportunities for experiential learning. The learning potential of games is an opportunity which has been recognized by sociologists like James Coleman since the 1960s (Starr 1994). 'Serious games' are currently utilized for educating children and adults on a range of topics (Wouters et al. 2011; Kaufman and Flanigan 2015). Educational theory argues that people learn better when placed in authentic contexts and are given the opportunity to make decisions and interact in the world of the game (Draefer 2014). However, there is considerable question of the extent to which in-game learning and experiences transfer into 'real life': regular participants in first person shooters do not typically become mass murderers. There is one example of a Stardew Valley player who was directly motivated by the game to establish a farm (see Messner 2017), but this is an isolated occurrence. Successful—and enjoyable—gameplay requires learning the 'rules of the game' set by the game developer, but it is unclear to what extent this influences real

world beliefs and practices (Bos 2018). Owing to the specific nature of role playing games like Stardew Valley, I argue that narrative analysis offers insights into what players may consciously and unconsciously 'learn' about rurality and agricultural production through participating in the game.

Agrarianism and the rural idyll

In this paper I critically evaluate the tenets of agrarianism which are—and are not—represented in Stardew Valley gameplay. The basis of agrarianism is the tenet that agriculture is "not an occupation so much as an all-encompassing lifestyle whose purpose was sustaining families and communities in addition to fields and pastures" (Mariola 2005, p. 209). Agrarianism is deeply embedded in Western cultures—Montmarquet (1989) traces cultural scripts describing the positive social and moral value of agriculture and farm work back to Virgil and Cicero. Wolf (1987) describes (state supported) efforts made by scholars and poets in first century Rome to encourage agrarian sentiments, which associated family-led farming with profitability, pleasure and virtue. In the United States, Thomas Jefferson (amongst others) wrote of the moral value specifically associated with agrarian life.

In seminal work on agrarianism, Flinn and Johnson (1974) describe five major elements:

- farming as a basic occupation on which other occupations depend
- the virtue of hard work
- the 'natural' and moral nature of agricultural life
- the economic independence of the farmer
- engagement in agriculture as contributing to the successful maintenance of democracy

For the purposes of this paper, I term these elements 'classical agrarianism': historic ideals of the positive role of agriculture in society. Within classical agrarianism, engaging in farming practices is understood as inherently wholesome and of high moral value—farmers are identified as the 'bedrock' of a successful society. The willingness of farm households to work long hours and the desire for economic independence underpin responses to the 'Agrarian Question'—the persistence of 'family farming' under capitalism (e.g. Kautsky 1988; Chayanov 1927; Friedman 1978). The practices of working the land and caring for livestock are understood as building moral character. As the source of food, fibre, and energy, farming is understood as the only true wealth-generating activity, and thus the basic occupation on which other occupations ultimately depend (Montmarquet 1989).

At root, classical agrarianism tenets idealize and romanticize farming practices, supporting imagery and tropes that feature in historic and contemporary art, literature, and cinema. However, the tenets also reify existing power relations in the countryside (Carlisle 2014), particularly the moral and economic right to private land ownership (and associated inheritance practices i.e. protected rights to transfer land ownership between generations), the right of farmers to pursue profits through intensification, public supports to maintain farm businesses, and the assumption that farmers are producing important public goods and value to society simply by running their farm businesses. Classical agrarian tenets thus underpin contemporary policies to support and protect farmers in the US (Graddy-Lovelace and Diamond 2017) and Australia (Berry et al. 2016).

Classical agrarian representations also reflect differing regional and national histories—American and Australian imagery is lodged in their shared history of colonialism; farmers are portrayed as highly independent, tamers of the wilderness and dominant over their land. Van Keulen and Krijnen (2013) demonstrate how international differences play out in representations of farmers in TV programming: in their cases, Australian ranchers are presented as ‘real men’—dominant, rough and muscular outdoor types, whereas the Dutch version of the same program portrays farmers as less physically attractive or socially capable, but more interested in women who will partner with them in operating their farms. In Japan—where Stardew Valley gained its inspiration—geophysical conditions for farming have made it difficult to follow the typical Western agrarian pathway of consolidation and industrialisation; agrarianism remains lodged in small-scale family-style farming, often performed non-commercially and/or on a part-time basis (Hisano et al. 2018).

Resurgence of agrarianism in the mid twentieth century has led to a parallel, more critical agrarian stance, orienting practices and concepts towards addressing social justice and environmental sustainability issues. New forms of ‘critical agrarianism’ emerged in the 1960s and 1970s, evident in ‘back-to-the-land’ movements, and literature by writers like Wendell Berry and Rachel Carson, who challenged the growing economic power and environmental impacts of agribusiness, played out against broader social influences such as the Vietnam War (Carlisle 2014). Although these critiques diminished in the 1980s, a resurgence has occurred from the late 1990s onwards (see Halfacree 2011) and agrarian ideals of farming as a simpler, purer life have been taken up by a new generation of newcomers to farming. While both critical and classical agrarianism privilege family farming as a way of life, perspectives on how these ideals should be achieved radically differ (Beus and Dunlap 1994). Whereas classical agrarianism is aligned with industrialisation

and modernisation, critical agrarianism proposes radical alternatives to the contemporary food system. A revival of small-scale, arguably ‘peasant’ style production is presented as essential to countering global food and energy security problems, as well as environmental degradation and climate change (Marsden and Farioli 2015; van der Ploeg 2014).

Contemporary critical agrarianism encompasses a wide scope, bringing together broader societal impetuses for environmental protection and public goods from agriculture (e.g. European and Australian conceptualizations of multifunctionality—see Holmes 2012; Marsden and Sonnino 2008; Wilson 2007) with critical practices of new land holding formations (e.g. community supported agriculture, collective land ownership and co-operatives) (Wittman et al. 2017) and the ecological and financial potential of local food networks (Tregear 2011; Trivette 2012). The opportunities for newcomers to establish farms, enjoy the affordances of farm life (e.g. simplicity, working with nature and animals), to produce healthy food and to protect the environment are vocalized by a growing cohort of activists as environmental and social justice issues, countering intersecting issues of race, gender and socio-economic privilege in the countryside (Carlisle 2014). Establishing a new entrant farm becomes an intentional, critical practice. The arguments of critical agrarianism extend into the global South, where the role of small-scale farmers as efficient, ecological providers of much of the world’s food is championed (Ricciardi et al. 2018; Netting 1993).

There is a further cohort of newcomers to agriculture who pursue agrarian ideals. Recent literature has demonstrated the growing cohort of hobby or ‘non-commercial’ farmers across the global West (Sutherland et al. 2019; Sutherland 2019, 2012; Gosnell and Abrams 2011; Hisano et al. 2018). This approach to farming life as self-actualizing and recreational has roots in both classical and critical agrarianism, but is embedded within broader notions of idyllic rurality. Little and Austin (1996) define the rural idyll simply as a set of myths or images that endure over time, particularly invoking nostalgia and heritage. Halfacree (2010) identifies three ‘styles’ of consuming the rural, using the metaphors of rural idylls as ‘boltholes’, ‘castles’, or ‘life rafts’. The rural as bolthole is an escape from toxic urban life, engendering practices of flight and disappearance. The rural as ‘castle’ involves defensive and protective practices: fortification against urban pressures. The rural is positioned as an escape, but less completely so than the rural as bolthole—as a castle, the rural idyll must be defended against urban threats, including the incursion of other exurbanites. Halfacree’s third reading is of ‘life rafts’—temporary escapes to the countryside for second homeowners or tourists who engage with the rural idyll on a part-time basis. All three readings of the rural represent

critiques of urban life, rather than critiques of agricultural practices.

The key issue for this paper is that idealized representations of rural and farm life selectively emphasize particular aspects; computer games and other media can thus perpetuate, challenge or establish new rural tropes. By engaging in these staged farming practices, game players 'perform' farming and rural life activities, learning in-game skills that may influence in-life perspectives on the desirability of different farming and rural practices.

Stardew Valley: a role playing game

The focus of this paper is on the representations of agrarianism and idyllic rurality produced and consumed within a computer game. In this section I situate Stardew Valley within the broader field of computer and video games.

Contemporary computer games engage millions of players world-wide, representing a larger industry than cinema and music combined (Parsons 2019). 'Role playing games' (RPGs) like Stardew Valley occupy about 11% of the US gaming market (behind 'Shooters'—26% and 'Action'—22% genres, Statistica 2019), representing a type of computer game where the player or 'gamer' constructs a character or 'avatar' that undertakes quests in an imaginary world (Technopedia 2020). Through the avatar, the player pursues storylines and open world opportunities, with varying degrees of scripting. Stardew is based on a scenario whereby the avatar gives up a [monotonous] urban desk job to revitalize the family farm. Freedom is an overarching theme of the game (Lin 2016); players can pursue the main storylines at their own speed or opt to simply explore the game-world. As gameplay progresses, players become embedded in the local community 'Pelican Town', farming, foraging, fishing, and mining to gain the resources necessary to improve the farm, make friends, and (if they choose) restore the Community Center. The game thus embraces familiar tropes of going 'back-to-the-land', family farming and the rural idyll, engaging the player in producing his or her own version of idealized country life.

Stardew Valley was an unexpected hit when it was released in 2016—the product of a single developer, at time when most successful RPGs have hundreds of developers, writers, artists and sound technicians, with budgets in the millions of dollars (White 2018). Creator Eric Barone (also known by his on-line user name 'ConcernedApe') has repeatedly stated that he intentionally modelled Stardew on Harvest Moon, a successful Japanese console-based game (e.g. playable on SuperNintendo) created in the 1990s (Leask 2016). Whereas Harvest Moon was based on its creator (Yasuhiro Wada)'s lived experience of farming in Japan (Wada 2012), Barone's primary experience of farming

appears to be through computer games (i.e. he is a member of the desk chair countryside). Barone spent much of his childhood playing near a rural wetland (Grathwohl and Lachausse 2016), and thus has lived experience of rural, outdoor play. Stardew's overtly anti-corporate narrative reflects Barone's personal journey towards creating his own job, on his terms, in his mid twenties. Although he applied (unsuccessfully) for jobs following completion of his computer science degree, he describes his reluctance to become involved in corporate-style employment: *I didn't want to work at a normal job, I wanted to do my own thing, that's kind of the message of Stardew Valley, to follow your heart* (GameInformer 2016). As the sole developer, Barone represents his personal ideals and imaginaries of farming, food consumption, rural space and leisure practices, and those which he believes will appeal to other gamers.

As an RPG, Stardew Valley is an 'open world', where elements of the story become apparent as players interact with different characters or landscape elements. Stardew has two major plot options—to rebuild the Community Center or to purchase a membership in JojaMart, the local branch of a 'big-box' corporate superstore. Rebuilding the Community Center involves donating over 130 different products or resources which the player produces or sources; membership in JojaMart involves substantial donations of 'g' (in the in-game currency, which accumulates largely through produce sales). The two major plot options cannot both be pursued in a single play through the game. RPGs are typically designed to be played multiple times, enabling the player to explore game dynamics and produce different outcomes, thus co-constructing the story to varying degrees. In Stardew Valley players choose whether to build or expand buildings; whether to plant crops and/or have livestock; whether to refurbish the Community Center or join JojaMart; whether to marry, have children and indeed whether to interact with local community members at all (i.e. opting in or out of learning the histories and peculiarities of those people). Players are thus able to influence the story and construct a farm and community life of their choosing.

In Stardew, players learn (the commands to perform) specific skills (e.g. how to cultivate crops, forage, mine etc. and also how to make friends), thus gaining various forms of reward. While these skills in themselves have limited real world value, the principles behind them have meaning. Barone is clear that the critique of corporate practices is intentional:

Corporations are some of the biggest players in the global arena. They wield extraordinary power over governments, communities, and individuals. Joja Corporation represents that power, taken to a frightening extreme. It's a bit of a caricature, but also disturbingly realistic. I wanted the game to have some

real-world messages, something for modern audiences to relate to. Stardew is mostly just a fun game, but maybe also a plea for individuals and communities to empower themselves. Barone in Leack 2016

Stardew is thus consistent with other contemporary computer games (e.g. Metal Gear Solid, Stamenković et al. 2017), which integrate commentary on contemporary societal issues, while encouraging players to respond in particular ways. However, this commentary does not actively extend to farming practices: although Barone describes how he initially allowed livestock to be butchered in early (pre-release) versions of the game, he ultimately decided that butchering was not in keeping with the peaceful nature of the game (Singal 2016). This is consistent with his vegetarianism, but he has expressed no overt critique of industrialized farming practices in his public interviews.

Stardew Valley begins by requiring players to customize an avatar, select a farm type and name their farm. The avatar is clearly human, male or female, with a wide range of potential features—there are 24 skin colours (including purple and green), 56 hair styles, 20 facial accents (ranging from beards to make-up and jewellery) and 112 shirts from which to personalize the avatar, which the player can also name. The five farm types¹ each offer opportunities for farm development—the ‘standard farm’ has the largest space for production; others increase access to one of the four major resource extraction opportunities: forestry and foraging on the ‘forest farm’, fishing on the ‘riverland farm’, mining on the ‘hill-top farm’ and nocturnal monsters (which drop sap, slime and the occasional gemstone) on the ‘wilderness farm’. Gameplay itself starts with a ‘cut scene’ (short video) to establish the context to the game; cut scenes appear throughout, as key plot points or milestones in friendship with local community members are reached.

Barone (in Singal 2016) describes initial gameplay as intentionally overwhelming—the numerous possibilities of the farm and village landscapes require players to prioritize which options to pursue. A typical day lasts 15–25 min in real time. There are four, 28-day, 4-week seasons comprising a ‘year’ of in-game play, 9 annual festivals and 30 local residents, each with their own weekly and seasonal schedules and birthdays. Each season, different crops can be cultivated, forage items (e.g. mushrooms, wildflowers, berries) collected and fish caught. The landscape is malleable: the initial farmhouse, boundaries and community setting is largely stable, but the farm itself can be altered through crop and livestock selection, placement of buildings and fences, as well as afforestation and ‘clearing’ the land.

Stardew Valley symbolically takes the player back in time, but the specific time period is difficult to determine—the use of hoes and axes to clear and cultivate land are more characteristic of gardening than contemporary Western agricultural production (i.e. there are no tractors, or even horse-drawn equipment). Travel around the landscape is on foot, or later by horse or by mine cart, or magical totems. A steam train runs through the valley, but avatars ‘arrive’ in Stardew Valley by bus and have access to television. Initial cut scenes show avatars working at desk-top computers. Stardew is thus located outside of conventional time.

The ‘end’ of Stardew Valley gameplay is largely determined by the player (Moore 2016). Discussion in the forums indicates that some players stop when the Community Center tasks are completed, which can be achieved by early winter of the first year; others consider the return of Grandpa to evaluate player achievements at the beginning of year three to represent the time to stop playing (e.g. Carl’s Guide, year unknown). A few players consider exhausting all of the game dynamics (e.g. following through all possible story lines and production options), to be an end point. Even so, gameplay never officially stops: on-line forums and You-Tube videos show farms which have reached up to 20 years in duration, and Barone has released multiple up-dates to the game, increasing the options and experiences available. For the purposes of this paper, the return of Grandpa at the beginning of Year 3 is considered to be the end point. Further detail on gameplay can be found in “Appendix A”.

Methodology

There are different schools of thought about the suitability of computer games for narrative analysis. ‘Narratologists’ argue that video games are story-telling mediums, with game writers holding a similarly expressive position to authors of books; ‘ludologists’ argue that games are simply games (Mukherjee 2015). Part of the challenge is in the complex array of contemporary computer games. Few would argue that puzzle-based video games (e.g. Tetris) have appreciable narratives. First person shooters and action games may have very limited narratives, whereas ‘sandpit’ games like Minecraft set players free to create a story in-line with their creations. Within the RPG genre, some RPGs are directly based on substantive works of fiction, such as Lord of the Rings On-line. Others are based on successful movies (e.g. Star Wars), or become successful movies (e.g. Lara Croft Tomb Raider). Stardew Valley has thousands of lines of dialogue and the stated intention of its creator to produce credible in-game interactions: *Ultimately, I wanted the game world to feel like a living place. I wanted you to forget that it was a video game and to feel like these people had a life of*

¹ A sixth type enables up to four players to play together, an option that was released after this study began. This option is not considered in the paper.

their own (Barone in White 2018). This depth of narrative development and clear international popularity makes it a suitable candidate for analysis.

This paper is based on over 300 hours of PC gameplay. Stardew Valley is also available for other mediums, with slightly different dynamics (Verret 2017). My initial gameplay was purely recreational; I decided to pursue academic analysis following my first play through the game (approximately 80 hours). I recorded all subsequent gameplay, and selectively transcribed scenes the first time they appeared in gameplay: much of gameplay is rote repetition with few words (e.g. watering plants, feeding livestock) where transcription is unnecessary. I created and played avatars of both genders, and established all five types of farm, in order to assess differences in dialogues and events, discovering that these are very minor. I played both the 'Community Center' and 'support Joja' storylines until all of the associated tasks were completed, in order to elicit the primary game discourses. Data is thus comprised of videos of gameplay, which were transcribed and logged with screen shots for reference. I reviewed 3 YouTube videos and 14 on-line articles of interviews with Eric Barone, reaching saturation in his available statements on game dynamics and his personal intentions for the game. I also reviewed forum discussions on the issues addressed in the findings, in order to provide context and critical support to the narrative analysis. I analysed the data deductively in relation to the tenets of classical agrarianism, critical agrarianism and idyllic rurality. Analysis was thus instrumental in approach (van Vught and Glas 2018): I treated the game as an object of study, following the intended progression set by the game designer.

Analysis of media content inevitably reflect the perspective of the analyst. The positionality of the researcher impacts on every stage of the research process (Coghlan and Brydon-Miller 2014). I bring with me substantial experience in studying agricultural adjustment, which influences how I 'read' the narrative, as does my direct experience with farming practices, gained during my childhood on a commercial livestock farm and engaging in 4H (rural youth) clubs. My personal stance on agrarianism is not strongly towards either critical or classical orientations, whereas some of my colleagues are clearly active proponents of critical agrarianism.² Players from other cultures and farming backgrounds may similarly interpret Barone's representations differently. I am a casual gamer with experience of other RPGs; playing Stardew Valley would

be challenging for a non-gamer, as there are no instruction manuals or formal guidelines for gameplay. I found the extensive wiki and forums to be useful both for successfully playing the game and gaining insights into others' experiences, but the observations and analysis presented here are my own unless otherwise identified.

A key challenge in analysing game narratives is differentiating the narrative content from the characteristics of the medium in which it is developed. As a medium, computer games are evolving and difficult to categorize. Written text and language have limitations of expression (e.g. Gkartzios and Remoundou 2018); computer games are also restricted by the capabilities of the code utilized, and the mechanisms of gameplay. Stolnik (2014) argues that conflict is at the root of all good gameplay, setting a challenge for the player to aim to address. This challenge may be artificially exaggerated by game designers to motivate gameplay, as Barone has done in his portrayal of JojaMart. In-game interactions also have limits. In Stardew, statements made by in-game characters are necessarily short, confined to text boxes. Player responses to dialogues are multiple choice, limiting their range. While some text appears to comprise stories to entertain or attract the curiosity of the player, other texts actively encourage the player to explore or do particular tasks (e.g. are game mechanics to encourage players to visit specific locations, learn to fish or explore the mines). RPGs more broadly are based around regular rewards and breaking down the action into small chunks of achievement, which can lead to space/time incongruities (e.g. in Stardew crops typically mature within 4 to 12 days of planting; livestock are bought as young animals but mature to adulthood within days or weeks). These achievements further engage the player in the game (e.g. yielding a profit which enables purchase of further seeds or tool upgrades).

Findings

Findings are organized into a progressive critique of the major narratives identified in the analysis: the rejection of urban life, tenets of classical agrarianism, the critical practices which are (and are not) embedded in game narratives, and the protection of the rural idyll.

Rejection of urban life

The bleakness and futility of urban life is established at the beginning of the game. As twinkly music plays, a cut scene with 'Grandpa'—old and in bed—sees him hand the player's avatar an envelope.

And for my very special granddaughter, I want you to have this sealed envelope ... No, no, don't open

² This is evident in the papers they write and responses to the content of this paper when presented at conferences—some colleagues were personally outraged at the sanitization of farming practices presented in the game.



Images 2-3 Contrast between the grey monochrome of urban employment and the colourful countryside of “Stardew Valley” Images copyright Eric Barone

it yet... have patience. Now listen please, there will come a day when you feel crushed by the burden of modern life... and your bright spirit will fade before a growing emptiness. When that happens, my dear, you'll be ready for this gift. Now let Grandpa rest.

With this ominous introduction, the scene fades, and a blank screen with *XX Years later* in the middle appears. Cut to scene at the Joja corporate offices, where there are numerous identical cubicles, and overseers watching through glass windows; the ‘work’ button glows green. The view pans along a row of desks—past one with a skeleton, another with a ‘terminated’ sign, to one occupied by Lucy (Image 2), my avatar. The office space is grey, with tall barriers separating office workers, and an [ironic] ‘Life’s better with Joja’ moto on the wall.³ Clearly the time has come to open the envelope from Grandpa, which is found in the desk drawer. It reads:

Dear granddaughter,
If you’re reading this, you must be in dire need of a change. The same thing happened to me, long ago. I’d lost sight of what mattered most in life...real connections with other people and nature. So I dropped everything and moved to the place I truly belong. I’ve enclosed the deed to that place...my pride and joy. It’s located in Stardew Valley, on the southern coast. It’s the perfect place to start your new life. This was my most precious gift of all, and now it’s yours. I know you’ll honor the family name, my dear. Good luck.
Love, Grandpa.

The primary themes of the Stardew Valley discourse are thus established: the crushing burden and emptiness of urban life, the importance and authenticity of connecting

to people and nature, the pride and joy inherent in agrarian/rural life, and the precious opportunity and ‘gift’ of engaging in these experiences. The natural and moral nature of rural life—Flinn and Johnson’s (1974) third characteristic of agrarianism—is implicit in the words “what matters most in life”. Heritage is identified in the reference to family, Grandpa’s evident love and forward planning for his grandchild, and in the inheritance of the farm. Grandpa has set the precedent of “dropping everything” and finding a place where he “truly belonged”. “Dropping out” is thus not a novel or radical contemporary innovation, but a fulfilment of tradition (and a form of farm succession). Life in Stardew Valley is described as more “real” than urban experiences. There is no mention of why Grandpa left the valley, other family members, why his place has been vacant for a lengthy period of time, or why one would need to experience modern life as a “crushing burden” before moving there. Unlike the characters living in Pelican Town, there will be no opportunity to delve into Grandpa’s backstory, beyond the tiny snippets given by his old friend the mayor. The “family name” is unknown, as the player never selects or is identified by a surname—all of the characters in the game have first names only. Notably, Grandpa does not refer to his legacy as a farm, despite multiple opportunities to do so—instead, the word “place” is reiterated three times. The experience of Stardew Valley is thus of the whole valley, rather than the farm alone.

The social and psychological distance between the urban and rural settings are also embodied in landscape differences. The avatar takes an apparently lengthy bus ride into the ‘mountains’ to reach Stardew Valley. The cheerful palette, wooden fences and dirt paths (Image 3) are in stark contrast to the grey tones and desk-top computers of the Joja offices (Image 2). Cheerful background music plays throughout the game, and non-player characters reinforce the pleasures of farm life in interactions with local residents.

³ The heavy black borders to the scene are characteristic of all indoor scenes.

For example, Leah (the local artist) comments that *The simple things in life are best: a soft summer breeze, majestic clouds, and a goblet full of Stardew Valley red*. Imagery thus emphasizes outdoor experiences, nature and consumption of local produce, although there is no option in the game for local residents to purchase produce directly from the farm. The game thus positions local production as an amenity and opportunity for income generation, rather than a critical practice.

The ‘dropping out’ proposed by Grandpa to pursue an authentic lifestyle is not ‘alternative’ in the meaning employed in critical agrarianism. The place is a source of pride, joy and opportunity to connect with people and nature. New friendships are anticipated but they are with existing community members, not other newcomers or members of a social movement. The rejection of urban life is unrelated to alternative discourses around agricultural production (e.g. the meaning of sustainable agricultural practices, ‘healthy food’, or environmental degradation caused by intensive practices). At no point in the game is there even recognition that there are multiple, competing approaches to farming. The only other agriculturalist in the valley—Marnie, a rancher—has a tiny farm holding, where livestock are kept in small pens. Although sometimes dubbed a ‘farming simulator’ (e.g. Dieker 2016), the villain is not industrial agriculture, it is a big-box store, unidentified by Grandpa at any stage. This is a new problem in the valley, one he did not face.

Classical agrarianism

The farm is clearly the central location of the game—the player starts each day by waking up at the farmhouse at 6 am and must return every evening or receive a penalty. Gameplay is consistent with the agrarian concept of farming as the central profession, on which all others are dependent (see Flinn and Johnson 1974). The businesses of local community members appear to exist primarily to serve the farmer: local residents are never seen using the blacksmith, carpenter, or fishing hut. They can be found shopping, using the library and drinking in the pub but there is never a queue. The virtue of hard work is implicit in ‘grafting’—the daily grind of watering rows of crops, mining ores, foraging or fishing in the lakes and rivers—rewarded with accumulating g. The mayor reinforces this norm by invoking his memories of Grandpa: for example, when the avatar interacts with him in the pub, the mayor states that *Your grandfather always worked himself too hard... I'll have an extra beer in his honor tonight*.

The avatar’s primary identity is of farmer—the player is routinely greeted as ‘the new farmer’ by community residents—although throughout gameplay the player may

choose to spend more time mining or fishing. Farming is thus pluriactive in Stardew, but the farm remains central—crop and livestock production are by far the most lucrative game activities. The multiple reasons for becoming a farmer are raised through an interaction with Leah in Pierre’s shop in the second week of play:

Leah: So why did you become a farmer? [Multiple choice options appear]

- I want to make tons of money.
- It’s more “real” than living in the city.
- To follow in grandpa’s footsteps.
- I wanted to escape my old life.

The exchange reveals the four primary reasons Stardew’s creator sees for moving to the valley. Three of these reasons are already evident in the initial set up of the game, but this is the first mention of the lucrative nature of agricultural production—not economic independence as identified by Flinn and Johnson (1974) but the massive accumulation of g. Although this appears to be an unlikely reason to engage in Stardew Valley, it is consistent with the reward structures embedded in RPGs more generally—it is a clear indicator of progress, always present in the top right of the player’s screen, and enables progression through the game’s narratives (e.g. accumulating sufficient g to purchase livestock or construct new buildings). Rapid pursuit of wealth is also a reason to choose Joja over the Community Center, and can be linked to a form of freedom—as the author of the guidebook to becoming a Stardew millionaire reasons *once you make enough money, you can play the game however you like without worrying about farming or tedious gameplay* (Verrett 2017, kindle 6%). Notably, there is also no discourse around part-time farming, or the trope of working to build up sufficient capital for financial independence (i.e. to achieve the status of ‘full-time farmer’). The avatar’s identity as farmer is already secured, and regularly reinforced through interactions with community members.

The second option is consistent with the narrative introduced by Grandpa at the beginning of gameplay, about the “things which matter most” being “real relations” and interacting with nature, but appears somewhat ironic when directly expressed within a cartoonish computer game. If the player chooses this option, Leah will respond *That’s pretty much the reason I came here too!* The suggestion that Leah herself has dropped out of urban life is confirmed as the player interacts with Leah (and eventually her ex-boyfriend, who attempts—unsuccessfully—to lure her back to the city). The opportunity to interact with animals may also be implicit in option two. Livestock are individual and personalized: livestock come with a name than can be changed

Image 4 Heart bubbles from happy livestock in a poultry coop (The small green animals are ‘dinosaurs’, adding a playful and sometimes humorous addition to the standard livestock available: cattle, pigs, sheep, goats, rabbits, chickens and ducks.) Image copyright Eric Barone



upon purchase. ‘Happy livestock’—a status achieved by regularly feeding, petting and opening barn doors to enable them to graze outside—produce higher quality products, which earn higher sales values at Pierre’s store or through the collection box (Image 4).

Petting an individual animal also raises a heart bubble over it, if the animal has also been fed; a double click will identify the animal’s happiness rating (e.g. *Polly looks happy today!* or *Peppa looks grumpy.*). Livestock are thus anthropomorphized—positioned as sources of love (or guilt) for the avatar, with a heart meter (shorter but similar to those of the human residents of Pelican Town).⁴ Livestock ‘matter’, requiring regular care but offering affection to their carer.

Option three, following in Grandpa’s footsteps, clearly references the family heritage of farming, although the reasons farming has not been pursued by Grandpa’s children are unclear. Throughout the game the avatar’s parents will send gifts through the post (ranging from cash to homemade cookies), stating that they are proud of the avatar’s progress, but they never appear in person. The ‘family’ aspect of Grandpa’s farm is made possible through game dynamics that encourage courtship, marriage and even having a family with one of over a dozen other community members (selected by the player). Once a spouse is secured (achieved largely through persistent gift giving), the spouse will increase farm labour—occasionally watering and harvesting crops, and feeding livestock. The player is thus encouraged to establish their own family to undertake work on the family

farm, although will typically spend the first ‘year’ of game time working the farm alone.⁵

Option four reinforces the farm as an escape. Farm life thus represents what Halfacree (2010) terms a ‘bolt hole’—a refuge from urban life. The farm is clearly a sanctuary—other community residents rarely venture on to it (and only during cut scenes, typically offering gifts or assistance), unless the player takes a spouse. The farm is a safe environment—there are no farming ‘accidents’ or events that have the potential to cause physical harm. Although there is considerable work to tidying the farm and producing crops, it is impossible for the avatar to become injured (unless the player has selected the ‘wilderness farm’ where creatures normally restricted to the mines come out at night). Commodity production is not entirely without challenges: crows will eat individual crops (addressed by installing scarecrows) and single plants occasionally die, but most crops reach maturity and yield a consistent profit. There is no bank: no mortgage or need to borrow; no interest rates. Commodity prices are stable—the economic ‘losses’ occur only if the advice on the television and letter from Granny Evelyn are ignored and slow-maturing crops are planted at the end of the season, or animals are locked out of the barn at night. By and large g accumulates; the player’s success in accumulating it increases in speed over time. The economic independence of the farmer is thus ensured.

⁴ For further analysis of the role of sentience and affective encounters in Stardew gameplay, see Sutherland (2020).

⁵ An update to Stardew Valley in 2018 made it possible for ‘multi-player’ play on PCs, where a group of players could develop the same farm. This version is not considered here.

Critical practices

Critical agrarianism emphasizes the environmental damage caused by industrialized, large-scale agricultural production, and social justice issues around land access (Carlisle 2014). In Stardew, the farm is inherited; land access is not identified as an issue at any point in the game (i.e. no community members indicate their interest in acquiring a farm, nor is farm expansion an option). Farming practices are clearly low input, involving no mechanization, pesticides or even manure—fertilizers can be made from seashells and tree sap, but are not identified as 'organic' or controversial in anyway. Fertilizer is simply a product to speed plant growth; similar products are not available for livestock. Players are encouraged to clear undergrowth and rocks to use as building materials: library books and the 'Livin' off the Land' television program inform the player that cleared areas are more likely to produce forage items. Trees are attractive and varied, but function as harvestable resources, regenerating within a month. Frogs, squirrels and rabbits scamper away as undergrowth is cleared but appear unharmed. It appears impossible for the farmer to appreciably damage—or improve—the natural environment. There are no rats or other vermin, but it is not possible to remove the litter from areas of the Stardew waterfront or to produce renewable energy. Players can craft a recycling machine, which turns 'trash' collected from fishing into useful resources, representing a nod to contemporary expectations around recycling, but it is never raised in discussions with community members. The opportunity to work in a natural environment is clearly an attraction of farm life but there is no mention of the city as polluted. Moving to Stardew Valley represents a retreat from the monotony and pointlessness of urban life but not an act of environmental activism.

The potential for environmental damage is clearly linked to JojaMart. The player may venture into JojaMart while exploring the landscape, but the first game-directed encounter with Joja does not occur until day 5. The post arrives with the following notice:

To our valued JojaMart customers: our team members have removed the landslide caused by our drilling operation near the mountain lake. I'd like to remind you that our drilling operation is entirely legal (pursuant to init. L61091, JocaCo Amendment). Responsible stewardship of the local environment is our top priority! We apologize for any inconvenience this accident may have caused. As always, we value your continued support and patronage!—Morris, Joja Customer Satisfaction Representative.

The message is part of a game mechanic that opens the mines for exploration, but it also serves as an expression of the sinister nature of Joja Corp, who are clearly damaging

the local environment. It is not an accident in the game writing that Joja Corp was the source of the urban desk-job from which the player has fled. The player's escape from urban life has not led to complete separation from Joja Corp; by positioning JojaMart as the villain, the narrative prompts the player to make that disconnection complete.

The 'evil' of Joja is reinforced by a cut scene in Pierre's shop (the local grocery store), which opens with Joja Manager Morris entering and offering 50% discounts to the customers inside the store. Clearly this is an unethical and socially unacceptable business practice—but Pierre's patrons promptly leave to take up Morris' offer. This lack of support is evidence of the lack of leadership or conviction amongst Pelican Town residents. The action causes Pierre distress: he is unable to compete. However, the opportunity to receive a massive discount at JojaMart is never open to the player. Membership is the only option, requiring a visit to the Joja store, with its sterile rows of products and ice blue interior, where Morris' sales' patter is full of insincere propaganda (e.g. referring to Joja membership as a *joyous experience*). To buy a Joja membership requires 5000 g—a considerable sum at the beginning of the game, when parsnip seeds cost 20 g and ripe parsnips sell for 40 g. The player needs to farm for several weeks to accumulate sufficient g before this decision can be made. In contrast, opportunities to start completing Community Center tasks begin immediately, which involve foregoing income (i.e. 'donating' produce to the Community Center rather than selling it to gain g to invest in the farm). The player is thus clearly positioned to support the Community Center.

JojaMart is juxtaposed against the derelict Stardew Valley Community Center. A cut scene with Mayor Lewis opens up about day 6:

Lewis: What an eyesore... This is the Pelican Town Community Center... or what's left of it, anyway. It used to be the pride and joy of the town... always bustling with activity. Now... just look at it. It's shameful. These days, the young folk would rather sit in front of the TV than engage with the community. But listen to me, I sound like an old fool.... Joja Corporation has been hounding me to sell them the land so they can turn it into a warehouse... Pelican Town could use the money, but there's something stopping me from selling it...I guess old timers like me get attached to relics of the past... Ah well. If anyone else buys a Joja Co. Membership I'm just gonna go ahead and sell it. * sigh * ... Here, let's go inside...

Lewis thus invokes nostalgia, and the classical trope of disengaged youth. Big-box development is identified as a potential source of revenue but there is concern about the loss of opportunity for community engagement. These

are well versed concerns in the rural (and indeed urban) development literatures: Walmart and other superstores typically have negative impacts on rural economic development, offering cheap produce and local jobs, but putting local ‘mom and pop’ stores out business and reducing local tax revenues (Hernandez 2003; Salkin 2005; Freilich et al. 2010). Notably, competition with Pierre’s shop is identified as an issue, but not the benefits to the local communities of jobs provided by Joja. Mayor Lewis instead defines the economic issue purely in relation to the financial gains from selling the Community Center property.

Protecting the rural idyll

If the farm represents a ‘bolthole’, then the Community Center is a castle, to be fortified and defended from urban influence (following Halfacree 2010). Exploration of the Community Center reveals that it is literally a magical space—populated by ‘Junimos’: mysterious, harmless spirits who invoke a mystical connection to the environment.

We the Junimo, are happy to aid you. In return, we ask for gifts of the valley. If you are one with the forest then you will see the true nature of this scroll.

Interacting with the Junimos in the Community Center is embedded in its refurbishment. Completing the Community Center is a mechanic to engage the player in exploring a wide diversity of game activities and nuances. The magic of the Community Center is known only to the player and a local wizard—the other community members do not see it, or indeed contribute in any way to the Community Center’s redevelopment. No interactions with local residents are specifically required by the Community Center tasks, although friendship points with several of the residents are identified as rewards. The Community Center is lodged in discourse about nature and the forest but remains part of the magic rather than practical action.

Within the community, Morris is presented as the stereotypical villain: dark hair, dressed in black, and unusual amongst local residents in not having a specified home or friendship meter—it is impossible to give him gifts, gain friendship points and there is no back-story to access. His sole personality trait appears to be his loyalty to Joja. JojaMart itself is notable for not being particularly convenient—players have to travel past Pierre’s store and cross a river to reach it. For the player, prices are approximately 20% higher than in Pierre’s shop until Joja membership is purchased, at which point they become the same. The products are the same, with the exception of Joja-themed home furnishings and wallpaper, and Joja Cola cans, which can also be fished out of the river as trash. The rewards of completing ‘rooms’ of the Community Center

are identical to the improvements offered for direct payment through JojaMart, but are of dubious ‘community value’—the greenhouse solely benefits the player, and although the bus employs a community member, no other characters are seen using the bus, quarry, minecarts or panning for gold options that open up. The primary benefit to the local community (other than a prosperous local farmer) is the refurbished Community Center, which cannot be achieved in collaboration with Joja. Purchasing JojaMart membership is thus a means to more efficiently achieve up-grades which advantage the player, but at the expense of the Community Center, and thus the local community.

The relative merits of supporting the Community Center, and by association Pierre’s shop have been substantially debated in the forums.

Forum Participant A: The bottom line is, the lazy or incompetent citizens of Pelican Town didn’t take the initiative to fix their OWN TOWN, even so far as to not have a working transit system for YEARS if the player doesn’t fix it themselves, and I’m expected to believe Joja is evil for coming in and simultaneously making a profit and fixing a podunk shantytown back up to a modern standard?

Forum Participant B: Just like Walmart: minimum wage, little advancement, no benefits, drive the small, local businesses out of business. Good-going JojaMart.

(Steamcommunity 2017)

So Jojamart came to town to try out their “community revitalization project” and set up a store in a town, population 30. They even want to build a warehouse in an unused abandoned building in town, which would create jobs and help the local economy. They didn’t drive their prices absurdly low to put their competition out of business. It would appear that Joja has Pelican Town’s best interests at heart except for them sending out a villain in Morris.

(Reddit 2018)

Forum participants point out that Pierre becomes progressively less likeable during gameplay, talking primarily about making money, having an ‘illicit stash’,⁶ and filling players’ mailboxes with irritating adverts. On the first play through the game, siding with the Community Center is the obvious choice, but upon repeated plays, the choice becomes more complex, as players seek to explore subplots and make achievements more quickly.

⁶ There are forum debates on whether his stash is pornography or drugs, but Barone leaves it to players’ imaginations.



Image 5 Community members unite against JojaMart. Image copyright Eric Barone

The conflict between Joja and the Community Center is resolved immediately when Joja membership is purchased—Joja employees are seen refurbishing the Community Center into a warehouse that night. Pierre’s shop remains open and there appear to be no secondary consequences of the player’s choice. If the Community Center option is pursued, victory is more prolonged. The cut scene pans over a range of community members enjoying the different rooms. The major presents the avatar with a ‘Stardew hero trophy’ for her work in revitalising the Community Center. Morris appears, grumbling that his sales have plummeted and disturbed to see his customers in the Community Center. This leads to an altercation with Pierre. The player is given two options: “Let’s be reasonable” and “Let’s settle this the old-fashioned way”.⁷

The “let’s be reasonable” scenario has Pierre giving an impassioned speech on the importance of community, and the specific experiences of community members:

I remember when I first came to Pelican Town. This building was active and vibrant. We worked together to make the town a better place. There was a real sense of community.[He goes on to reminisce about the idiosyncratic activities of local residents—George with his crossword puzzle, Emily weaving a banner for the fair, Willy’s gaff with runaway crabs and Gus’s community—building solution.] You see, everyone? Our community is what makes Pelican Town special. When JojaMart came to town we lost sight of that. But now, thanks to Lucy [the avatar], we have a second chance. I’m asking that you join me in boycotting JojaMart! We have the power to reclaim our old way of life. Whose with me?

Pierre thus invokes nostalgia for the ‘sense of community’ he experienced upon arrival, and how the community ‘worked together’. Success for the player is enabling the community to ‘regain their old way of life’. The responses are unanimous; Morris recognizes he’s *done for* and leaves,

⁷ The ‘old fashioned way’ is a fist fight between Morris and Pierre, which Pierre instigates by insulting Joja workers as ‘cowards’. They proceed to sling punches and entertaining produce-related insults at each other (e.g. “you’re even weaker than your fresh produce selection”). Pierre soon lands a punch that sends Morris literally flying out of the Community Center.

never to be heard from again... The power of ‘community’ has won out. The Junimos leave but the ‘magic’ of community is now physically embedded in the Community Center and the unity of the community, brought about by the player as a moral good. The farmer has solidified her position as the pillar and savior of the community. In the coming days, the avatar receives a flood of ‘thank yous’ and gifts through the mail from grateful community members, due in part to the two heart-point bump granted by Community Center completion (Image 5).

Discussion

The portrayal of farming in Stardew Valley is consistent with classical American tenets of agrarianism (Flinn and Johnson 1974)—the value of hard work, centrality of farming to other occupations, the economic independence of the farmer, and the inherent goodness and moral value of farming as an occupation. The role of farming in preserving democracy is implicit: Pelican town residents ‘vote with their wallets’, initially by supporting JojaMart, but later follow the leadership of the local farmer, and unite against Joja. The farmer is thus positioned as the moral compass for the community. The Community Center is portrayed as a magical space, of central importance to community life, and the player draws on supernatural assistance to refurbish it.

Stardew Valley players do not have the opportunity to practice critical agrarianism. Although the lifestyle encouraged is pluriactive—Involving mining, fishing and foraging, in addition to farming—game dynamics do not allow farming to be undertaken as a political action, and there is no discourse which connects environmental outcomes to farming activities. The environmental preservation discourse is instead associated with magic. Players conquer and subdue their farming landscapes, comfortably deforesting in the secure knowledge that trees will automatically regenerate. Threats to the environment are external (the villain Joja). The sanctity of farming as a moral practice is preserved, but disconnected from debates on meat consumption, animal welfare, pesticide use, pollution and intensification. Instead, long-standing tropes of the rural ‘good life’ are reinforced—the farm is positioned as a refuge or bolt-hole from the problems of urban life; the local community is a precious castle to be fortified and defended from invaders, particularly big-box development. Players of Stardew arguably consume rurality as a life raft—a temporary escape from urban life (following Halfacree 2010).

My analysis of Stardew Valley is thus consistent with Peeren and Souch (2019) in demonstrating the resilience of the ‘good life’ genre, and its appeal to contemporary

audiences. Stardew also demonstrates the universality of this appeal, with over 10 million copies sold (Strickland 2020) across 12 languages. The deep connections between people and place inherent in classical American agrarian tenets clearly resounds with a global audience. The distinction is that in Stardew, rather than simply observing, players repeatedly perform farming practices in this sanitized environment, reinforced by rapid accumulation of g and positive representations of farm life (e.g. heart bubbles from happy, productive livestock). Players face none of the risks of fluctuating commodity prices and bank loans, challenges or responsibilities of land ownership, or negative environmental impacts dealt with—or caused—by contemporary farmers. Farming is represented as ‘peaceful’—players engage in and reproduce a farm life that is free from moral and ethical dilemmas. Game dynamics mirror the positive aspects of farm life—working outdoors, independence, and being your own boss—identified by Gasson (1973) in seminal work on the goals of contemporary farmers—but offer none of the controversies that might inspire critical sensibilities to arise. Whereas Peeren and Souch identify the television program ‘The Farmer Wants a Wife’ as a potential gateway to more critical portrayals of farming, this is less clear for Stardew Valley. Although players may be inspired to engage in more realistic games like Farming Simulator, on-line recommendations for other games which players may also enjoy suggest that these games are similarly sanitized and uncritical of farming practices (e.g. Morton 2019; Loveridge 2018).

A key question for this analysis is what players may learn from gameplay. The cartoonish style of Stardew does not preclude experiential learning: studies of recreational computer games have demonstrated that cartoon-based games are more effective than photo-realistic realistic games in facilitating learning (Mayer 2019). Barone has clearly been successful in his aim of engaging players in making decisions about whether to support big-box development, provoking active forum discussions. Although the negative outcomes of big-box developments are well recognized in the academic literature (e.g. Carr and Servon 2008; Vias 2004; Goetz and Swaminathan 2006), the continued popularity of these developments to consumers is evident in their commercial success. The fullness of these issues is not explored in Stardew (e.g. issues around local employment and taxation remain unaddressed) but this is to be expected in a recreational game which is not designed to educate, or to confront. Invoking nostalgia for the Community Center yields an image of rural life which is lodged in the past but may enable a more critical understanding of contemporary rural economic development issues.

It is less clear what players learn about farming practices. Arguably, Stardew Valley reinforces positive normative associations with low input agriculture (i.e. that low

input farming is the right or best way to farm). However, by sanitizing farming production, it substantially underplays the importance of contemporary debates on major social justice and environmental degradation issues (ranging from mental health and farm safety, to biodiversity preservation, animal welfare, water pollution and cheap food). I argue that playing Stardew Valley both reinforces classical agrarian tenets and reduces social consciousness of contemporary farming practices, contributing to their invisibility. Many industrialized practices (e.g. intensive pig and poultry production) are located indoors, out of public sight. The distance between Stardew and contemporary practices is also highly varied, making it challenging for players to connect their on-line actions to real farming practices. For example, small-scale egg production and sale at farm gates is common across the global North. This type of poultry may even have names and be treated as pets by their owners (see Kyle and Sutherland 2018), much as they are in Stardew. In contrast, the production of 'free range' eggs sold in supermarkets involves huge barns populated by thousands of nameless poultry with short lifespans—but may evoke a similar image in consumers whose primary experience of farming is from their desk chairs. Gameplay 'teaches' that happy animals produce higher qualities and quantities (e.g. of milk and eggs), which may encourage players to pay premiums for 'organic' or free-range products. However, it may also lead players to believe that all farmers must be committed to high standards of welfare, as these practices yield higher outputs. This connection between perceptions, gaming practices and in-life decision-making is an important topic for future study.

The major contribution of this paper is the recognition and advancement of knowledge about the desk chair countryside. Stardew Valley's creator is clearly a member of this cohort. The consistency of Stardew Valley representations with classical American agrarian tenets is therefore somewhat surprising. Not only has Barone had limited (if any) direct experience of farm life, he was intentionally mimicking a Japanese video game (*Harvest Moon*) when he designed Stardew Valley. The international popularity of Stardew suggests that Barone's representations are deeply embedded in broader social ideologies which transcend national boundaries. The imagery and positive cultural associations of small, independent family farmers and the simple life in the countryside is shared amongst a wide range of cultures (Netting 1993), not least Japan, where there is a trend towards part-time, rather than industrial farming (Hisano et al. 2018). Although the USA is known for industrial farming practices, part-time farming is also common: the USDA (2015) has identified some 39% of farms as 'off-farm occupation farms' and a further 29% as 'retirement farms'. The recreational appeal of farming life is thus evident amongst farming practitioners as well as participants in the desk chair countryside. What is particularly important about

the desk chair countryside is that they actively engage in farming practices, albeit mediated through their computer systems. Unlike Bunce' (1994) armchair countryside, they are not casual observers but active decision-makers in deciding what to produce, and seeing their production through to sale. How this active engagement is shaping consciously and unconsciously held beliefs and normative associations amongst the desk chair countryside is an important topic for future research.

The reasons behind Barone's omission of critical perspectives on agrarianism also warrants exploration. Clearly, he is not averse to including 'real world messages' and integrated his own vegetarianism into the game. It could be that for the game to be 'fun', he preferred to limit the 'villain' to a single agent which was external to the local community. However, although Barone researched farming production mechanics (White 2018), it could also be that his knowledge of broader agricultural industry issues is primarily informed by computer games. Although he is not comfortable with butchering livestock, he may not be aware of or concerned about the processes and negative externalities of industrialized agricultural production. This may also be true of a substantial cohort within the desk chair countryside. The representations in Stardew Valley thus raise the possibility that its creator—and the people who play it—are disconnected from or disinterested in the debates on critical agrarianism which heavily populate the literature in this journal. If academics are aiming to reach this cohort with their critiques, there is a considerable distance to travel.

Contemporary computer games thus present both challenges and potential solutions for engaging the general public in contemporary agrarian debates. My analysis demonstrates that Barone's game has engaged (some) players in actively debating the merits of big-box development. It follows that there is similar potential to engage players in debates on the practices of contemporary agricultural production, using computer games as mediums. This is already underway, evident in organisations like 'Games for Change' and computer games like Third World Farmer⁸ (which challenges players to experience the difficulties of farming amidst military unrest, disease outbreaks and drought). Computer games thus embody not only contemporary representations of rurality, they offer spaces in which a substantial global cohort can be enrolled in actively considering the practices and desired future of the farming sector.

⁸ www.thirdworldfarmer.org.

Conclusion

In this paper I have analysed a farming computer game as a site of cultural production for and by the ‘desk chair countryside’: the millions of people who engage in farming and rural life through their computer systems. I see considerable potential in computer game studies for updating our understanding of contemporary representations and classical issues in rural studies, such the reproduction of the rural idyll, ideologies of rural development and critical agrarianism, and associated implications for governance. As highly interactive mediums, computer games offer important opportunities to assess how players interact with and construct rural and agrarian spaces. The precise mechanisms of these encounters—how difference is negotiated and made meaningful by players (Wilson 2017)—are specifically developed in another paper from this dataset (Sutherland 2020), which demonstrates how game players are actively co-constructing and performing ‘authentic idylls’ through affective encounters in their gaming worlds.

Analysis of *Stardew Valley* has been particularly useful for demonstrating how recreational game players can be enrolled in debates and personal decision-making on contemporary rural issues. Comparative analysis of other popular games could provide further nuance to the discussion of contemporary renderings of idyllic rurality and their influence on game players. For example, it was not possible to play *Farming Simulator* (first released in 2011) as a female avatar (farmer) until 2016 (Famularo 2016). Persistent patriarchal relations are well established in the agricultural sociology literature (Shortall 2016; Price and Evans 2009) but it appears that these are being normalized to an enormous global audience—*Farming Simulator* has sold over 25 million copies across its multiple versions to date (VB Staff 2020). Games like *Stardew Valley* also offer opportunities for player ‘mods’ (modifications of game constructs)—altering the underlying code to produce individualized games, which are then made broadly accessible—and open to critique. For example, there was considerable outrage in the forums about a mod that made (mixed race) Maru ‘more appealing as a marriage partner’—by lightening her skin tone. Computer games thus offer important opportunities for methodological advances which explore the relationships between on-line and real-life communities and practices, and the materiality and ‘more-than-representational’ aspects of on-line farming activities. The desk chair countryside is an important cohort with whom to engage, as well as a cohort it may be possible to mobilise, if we are to understand and influence how contemporary ideals of farming and rural life are being remade.

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Appendix A: Further information on *Stardew Valley*

Playing *Stardew Valley* involves considerable ‘grafting’—repetition of activities to gain skills or resources. The screen features a clock, important for identifying progress through the day and following the opening hours of the various businesses, homes and schedules of Pelican Town residents. Under the clock is a statement of the ‘g’ (*Stardew* currency) available to spend, and an ‘!’ sign, which links to a ‘journal’—a list of current tasks (each of which arrive in the mail or are posted as ‘help wanted’ at Pierre’s shop in the village). Pierre’s store window also hosts a monthly calendar which identifies birthdays and the dates of nine annual festivals, which mimic Christmas, Easter, Halloween and assorted village gatherings.

Achievements and skill advances are regularly highlighted through pop-ups on the screen. Speech similarly occurs through pop-ups and occasionally speech bubbles; the soundscape of *Stardew* is primarily seasonal theme songs, punctuated by seasonal birdsong, although specific locations have their own sounds (e.g. waves at the beach, ominous music in the mines); all can be found in the jukebox at the pub. An energy meter in the bottom right of the screen shows energy consumption, and encourages a varied lifestyle: some activities require more energy than others. Energy can be replaced by eating crops, or after the first month, by soaking in the village spa. A health meter also appears when in the mines, to reflect the damage inflicted

by various monsters, but there is no 'death' option (the avatar simply loses consciousness and is rescued). Across the screen is the top line of a 'backpack', which holds the player's tools and portable items. Initially these are farming tools (e.g. hoe, watering can); a basic fishing rod and sword complete the primary set within the first week.

Information on the different characters and items in the game can be found in an extensive on-line wiki⁹ and through independent gaming forums. In-game, information comes from four primary sources: the television set, the mail, interactions with other residents of Pelican Town, and a nightly financial reckoning of the returns from the conveniently placed collection box, in which produce is placed for sale during the day. Information is also available from 'books' (short texts) that appear in the library. The television provides daily weather and fortune telling up-dates, which enable a degree of forward planning, as well as programs with farming tips and recipes. Twice weekly 'Livin' off the Land' and Sunday 'Queen of Sauce' programs teach about the opportunities of the landscape (e.g. which berries are in season for foraging) and new recipes (which increase the energy content and occasionally add skills boosts to food produced). Learning also occurs through action (e.g. developing the skill of catching fish, how much energy it takes to do particular tasks).

Most characters are white, with the exception of Demetrius, and his mixed-race daughter Maru. Several community members have useful professions—Robin is a carpenter who can build farm buildings or up-grade the farmhouse; Clint is a blacksmith who can break open geodes found in the mine and up-grade tools; Marnie is a rancher who sells livestock, feed and equipment. Other community members will help to develop skills, following cut scenes about their history: Willy gives you your first fishing pole, and Marlon your first sword. 'Granny' Evelyn will give you gardening tips. All 30 of Stardew's residents will send you recipes, blueprints or resources once you become 'friends' (indicated by a heart score on a friendship bar and achieved largely by giving gifts). As friendship increases, cut scenes will open, showing you a more detailed picture of the character's personality, interests and problems, typically offering multiple choice options to interact. At ten hearts it is possible to marry, and subsequently have 'children' with single characters of either gender. The spouse will water plants and feed livestock, if a high heart score is maintained. Divorce is possible and unwanted children can be turned into doves and set free.

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⁹ https://stardewvalleywiki.com/Stardew_Valley_Wiki.

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Lee-Ann Sutherland Ph.D., is a Research Leader at the James Hutton Institute. She was raised on a family farm in Canada, and has spent her career to date studying the development of farming culture, and how it influences human–environment relations and farm-level decision-making. She is particularly interested in recreational approaches to farming, and her work has recently shifted into studying how perceptions of farming are formed by non-farmers. She holds leadership positions in a number of Scottish Government and European Commission-funded projects focusing on agricultural structural adjustment and the associated knowledge systems, and is a Visiting Professor at the University of Guelph (Canada).

Books received

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The Book Review Editor has review copies of the following books. Potential reviewers should contact Carol J. Pierce Colfer to obtain a review copy (cjc59@cornell.edu). **Books not previously listed are in bold-faced type.**

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