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'Cropaganda': Mythology of Corn Belt agriculture

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ABSTRACT

Even as scholars have increasingly recognized the role of industrial agricultural practices in contributing to non-point source pollution, drinking water in the Corn Belt remains perilously contaminated with excess nitrates, which pose a significant risk to human health and the environment. A recent lawsuit filed by the city of Des Moines, Iowa against three upstream counties over chronic nitrate pollution sparked heated debate around the roles and responsibilities of agricultural production. Drawing on Barthes' theory of mythology, this paper explores how three core myths influence agricultural management paradigms and practices that contribute to the water quality crisis in Iowa and shape how key stakeholders have responded (Barthes, R. 1972 [1957]. *Mythologies*. New York: Hill and Wang). This article relies on ethnographic data to explain agricultural nitrate pollution and the stalled progress on water quality improvement. Together these myths draw on post-enlightenment ideas of nature, security, and modernity to perpetuate productivist behavior, claim resources for conventional commodity agriculture, and impede widespread adoption of alternative agricultural practices. By identifying and interrogating each myth, I aim to reveal and complicate the inherent contradictions in its representation of reality to strip it of ideological function and, in doing so, cultivate opportunities to imagine and create an alternative system that benefits both people and the planet.

1. Introduction

After over half a century of attempting to manage rising nitrate levels in drinking water sources, the water utility serving the capital city of Iowa filed a federal lawsuit against three upstream agricultural counties. In their 2015 suit, the Des Moines Water Works (DMWW) alleged that the drainage districts in those counties had violated federal standards set by the Clean Water Act (CWA), compromising the safety and availability of the drinking water for over half a million people living in and around the metro area of Des Moines. State policymakers, including the governor and members of the legislature, amplified the 'urban versus rural' framing of the lawsuit, fomenting bitter, politically-charged divisions. In response to the allegation that their management practices contaminate water, farm groups articulated their cultural and social role as "stewards of the land". Individual farmers echoed these sentiments, blaming urban water users for the increased nutrients and evoking their moral responsibility to "feed the world". Although the DMWW suit was ultimately dismissed by a federal judge, it created a nationally salient conflict and has since inspired two more lawsuits framed around the struggle over water resources in a heavily agricultural landscape.

This paper explores the dominant discourse articulated by politicians, agricultural groups, and individual farmers in response to the DMWW lawsuit and the growing debate over water quality. Through interviews with row-crop farmers and stakeholders in Iowa, I uncover how three interlocking myths legitimate specific agricultural production practices that extend and maintain the non-point source pollution. I argue that the contemporary cultural paradigm guiding the policies and practices of Corn Belt agriculture hinges on mythologized roles and responsibilities of farmers in global food provisioning and their historical relationship with 'nature.' Together these myths draw on post-Enlightenment interpretations of nature, security, and modernity; bolster status-quo productivist paradigms; and forestall action on growing environmental and public health catastrophes. Tracing the discursive heritage of the myths that engender the contemporary agricultural landscape yields insight into how normative discourses of farming and resource use function as socio-material levers for or against environmental progress.

Myths, in this analysis, are understood to be socially constructed ideas that have become normalized over time to perpetuate a particular arrangement of social power, typically in the interest of the dominant or ruling class (Barthes, 1972; Nally, 2016). By naming each myth, I aim to expose and dispel the contradictions inherent in its representation of reality in order to strip it of ideological function. Myths, as human creations, can be destroyed. Demythification interrupts their power and

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may ultimately offer opportunities to imagine and create an alternative system that benefits people and planet. To this end, I rely on ethnographic data from interviews to reveal the underlying power structures and political dynamics at play in the debate around drinking water contamination in Iowa.

This article begins with a section conceptualizing myth. Following that I briefly review the agronomic underpinnings of Iowa agriculture to contextualize the origin and progression of both the present water quality conflict and the ideological reactions it has engendered. Before turning to the myths themselves, I review the qualitative methods used to build my argument. Finally, I document the contemporary forms of three core myths and the incongruous claims upon which they rest. I conclude with a discussion of how these myths perpetuate productivism, legitimate claims to land and other resources, and impose a position of power for conventional grain and livestock farming practices above agroecological alternatives.

1.1. Conceptual background: a theory of myth

Roland Barthes' *Mythologies* (1972) articulates a theory of myth through a semiological analysis of the propagation of myth in mid-twentieth century France. A literary theorist, Barthes interrogates common narratives and mundane objects including steak-frites, cleaning products, children's toys (Barthes, 1972). His journalistic critique illuminates the everyday manifestations of culture and the metamorphic process whereby familiar refrains legitimate class interests. Barthes argues that myths are not arbitrary, but rather created with a purpose. Their construction is an ideological process. Myths naturalize cultural and social inventions through their repetition to support a particular set of power relations and social norms as dictated by dominant classes. Barthes contends that myths do not hide reality, but rather distort it, abolishing complexity and contradictions along the way. As they are propagated, myths "empty" history to establish bourgeoisie worldviews as "evident laws of a natural order" (Barthes, 1972: 139). Apparently neutral, timeless, and universal, Barthes demonstrates that mythology is actually political, historical, and contingent (Huppatz 2011). To Barthes, demythification is an essential act required to divest myths of their political purposes. As a first step in this process, Barthes sought to expose the passive and habitual consumption of myth through a critical reading of contemporary discourse.

I connect Barthes' concept of myth with the explication of narratives considered in Leach and Mearns' collection of essays *The Like of the Land: Challenging Received Wisdom on the African Environment.* Leach and Mearns explore and problematize unfounded narratives, what the editors dub "received wisdoms," of environmental degradation. Drawing on Roe's (1991) theory of blueprint development, they demonstrate how received ideas are actualized into a cultural paradigm; more than a set of beliefs, narratives are a "blueprint for action" (Leach and Mearns, 1996: 188). For Leach and Mearns, narratives are stories with implied premises and conclusions, simultaneously describing a problem and prescribing its solution. Narrative therefore functions as a rationale for policy and becomes embedded in institutional structures, with practical and material consequences. The essays in *Lie of the Land* illustrate the totalizing capacity of narrative: how narrative misrepresents and precludes alternatives; how local actors are ensnared in narrative propagation (though without much power to define them); and how corollary narratives, programmatic approaches, and technological apparatuses consume political imaginaries.

As forms of discourse, both narrative and myth represent power relations that may go unnoticed (Foucault, 1981 cf Leach and Mearns, 1996; Barthes, 1972). Narrative, however, in Roe's conceptualization, is more programmatic; it implies an objective and outlines a script for conduct (Roe, 1991 cf Leach and Mearns, 1996). In this examination of the rhetorical devices that have emerged in Iowa's debate over water quality, I incorporate the programmatically purposeful concept of narrative into Barthes' concept of 'myth'. Building on these frameworks, I understand myths to be socially constructed ideas that are naturalized into "truths" and guide policies, programs, and practices to align with political interests. In this form, the concept of myth may deepen political ecological exploration of how discourses are used to legitimate a narrow range of social behaviors and allowable human-environmental interactions. Next, I provide background on the agronomic context to which I apply this concept of myth.

1.2. Context: an 'inherently leaky' system

The Corn Belt is a geographical region in the Midwestern U.S., covering Illinois, Indiana, Iowa, Minnesota, Nebraska, and Ohio, characterized by vast production of *Zea mays* L. (corn) (USDA NAL, 2021). Since 1850, this area in the upper Mississippi River Basin has been distinguished by the combination of corn cultivation and fattening of livestock, alongside small grains in the cool season (Hudson, 1994). In the post-war intensification of U.S. farming, agricultural production in the region narrowed significantly to a select few crops requiring increased reliance on purchased fertilizer inputs. Today the Corn Belt is defined by large and mid-sized farms specializing in corn and soybeans (Buttel et al., 1990). Both geographically and symbolically, Iowa is situated at the heart of the Corn Belt. More than 90% of harvested cropland and over 60% of the state's overall land base annually is planted to monoculture corn or soybean (USDA, 2018a, USDA, 2018b).

Corn is the most intensive user of nitrogen (N) fertilizer in the U.S., both on a per acre basis and in total usage (Ribaudo, 2011). In Iowa several types of N fertilizers are used, most commonly anhydrous ammonia and liquid manure from the state's 24 million hogs (USDA National Agricultural Statistics Service, 2018c; Iowa Department of Agriculture and Land Stewardship, 2020). Once land-applied, the added N converts to nitrate (NO_3), the form of the nutrient that can be taken up by plants. Nitrate-nitrogen is highly mobile in water and readily leaches through soils (Helmers et al., 2007).

Conventional agronomic management in Iowa leaves fields bare over winter, allowing soluble nitrate-N to readily leach through soils and run off (David et al., 2010; Hatfield et al., 1999; Hatfield et al., 2009). This issue is exacerbated by the extensive subsurface artificial drainage installed across Iowa's former wetlands, which speeds water movement from fields and leads to significant N leaching into Iowa's streams, lakes, and rivers (Blesh and Drinkwater, 2013).

This *leaky* system has left more than half of Iowa's water bodies impaired with respect to nitrates (David et al., 2010; Iowa DNR, 2018).[1] Nitrate pollution in Iowa has been recognized for decades as contributing to hypoxic conditions in the Gulf of Mexico and imperiling drinking water supplies (Jones et al., 2018; Robertson and Vitousek, 2009). Health effects of nitrates include blue baby syndrome (Methemoglobinemia) and increased risk of certain types of cancer (Inoue-Choi et al., 2015; Jones et al., 2016; Mathewson et al., 2020).[2]

The Iowa Department of Natural Resources (DNR) acknowledges that agricultural sources are responsible for over 90 percent of the nitrogen entering Iowa's waterways (Jones et al., 2018). Along with the Iowa Department of Agriculture and Land Stewardship (IDALS), the DNR developed the Nutrient Reduction Strategy (NRS), a voluntary,

[1] All agricultural productions systems are "leaky" to some extent. The research reviewed here highlights that the specific agronomic practices in use in Corn Belt agriculture, in particular the temporal dynamics of bare fields in late winter and early spring, make this system much significantly more leaky with respect to nitrate. I thank a reviewer for helping me elucidate this distinction.

[2] The current drinking water standard of 10 mg/L of nitrate-nitrogen was established in 1962 to protect pregnant women and young children from acute effects of nitrate pollution (Brender et al., 2013). Increasingly, the long-term impact of chronic nitrate pollution is understood to be carcinogenic, leading some to call on the U.S. Environmental Protection Agency (EPA) to reduce the allowable nitrate level in drinking water sources (Weyer et al., 2001).

incentive-based approach to reduce nitrogen and phosphorus loading in Iowa's waterways. However, despite these efforts, the number of impaired water bodies in Iowa continues to rise, spurring toxic algal growths and endangering local drinking water sources across the state (IEC, 2021).

Faced with a lethargic progress on nutrient reduction goals, escalating treatment costs, and dwindling clean drinking water supplies, in 2015 the DMWW sought damages in a federal lawsuit to help pay for nitrate removal (Meinch, 2015). Although the suit failed, it ignited statewide and national conversations over the political and ecological management of shared resources and the appropriate role of commodity agriculture. Since then, two more similar lawsuits have been initiated in the state, highlighting the ongoing struggle over the meaning and territorial control of water in Iowa.

1.3. Mythology and agroecological transition

This paper develops mythology as a theoretical tool to interrogate the persistence of chronic nitrate pollution in the Corn Belt. Farmers embedded in this system are subject to socially circulating discourses as they face dual pressures to continue producing agricultural commodities while also limiting their environmental nitrate contributions. This analysis aims to extend the robust literature on nutrient-related water-pollution in the Midwestern U.S., which has largely centered farmer identities and structural constraints, through an attention to the mythic discourses that reproduce and reinforce individual actions.

Assessments of what motivates or deters adoption of agroecological practices that could reduce agricultural N runoff have often focused on operator characteristics and values, though often without much interpretive success. In a 2008 meta-analysis, Prokopy and co-authors reviewed 55 studies and found no consistent explanatory factor for agricultural best management practice adoption (Prokopy et al., 2008). Many scholars have similarly evaluated farmer behavior by surveying individuals' attitudinal dimensions across profitability and stewardship identities (e.g. Arbuckle, 2013; Chouinard et al., 2008; McGuire et al., 2013; Reimer et al., 2012; Thompson et al., 2015). There is a tendency in the literature to highlight individual characteristics, even while recognizing that farmer choices are made within a constellation of broader cultural, social, and economic factors (e.g., Reimer et al., 2014). Myriad barriers, constraints, and system 'lock-in' impact farmers willingness or ability to implement on-farm management changes that could improve water quality. In the Corn Belt, Mortensen and Smith argue that a pernicious feedback cycle of "simplification forces" exists that perpetuates the continuation of the current system of large-scale monoculture (Mortensen and Smith, 2020: 2). These barriers act both at the field-level and more broadly to restrict individual actions, regardless of environmentally aligned farmer attitudes (Baur, 2020; Blesh and Wolf, 2014; Roesch-McNally et al., 2018).

Other scholars have investigated how discursive strategies come to naturalize or legitimate industrial agricultural production systems through the lens of social symbolism, ideological frameworks, and narrative themes (e.g., Burton, 2004; Shipley et al., 2022). Examining farmer behavior through a culture of "productivism," Burton (2004) looks to the symbolic meanings associated with farming practices, including ever-increasing yield and general field tidiness, that entrench farms in utilitarian agriculture. This study takes up Burton's call to recenter analyses within cultural logics, in addition to macro-economic factors, though more attention to the "language of farming" (Burton, 2004: 212).

Houser et al. (2020) explore how farmers respond to disruptive crises, such as legal conflicts around water quality, and participate in the reproduction of the "industrial [capitalist] agricultural system" (985). They find that farmers hold three primary ideological positions – agrarianism, market fundamentalism, and techno-optimism – through which they shift the blame for environmental outcomes away from agricultural practices. Midwestern farmers express conviction that technology and market forces will provide solutions without requiring significant systemic changes. The concept of myth advanced here engages with the theory of "discursive repair" elaborated by Henke (2008) and Houser et al. (2020). I extend their work to emphasize the political valence of discursive strategies that reproduce agricultural-environmental disasters and rhetorical frames that are especially prevalent in Iowa.

Mythological analysis incorporates into a single framework much of the ideological, symbolic, and structural properties explored in the existing body of scholarship on impediments to an agroecological transition. Myths, as politically influential and repetitive modes of discourse that are rich in symbolism, highlight the socially-circulating cultural forms that are invoked in response to perceived challenges and the power they hold in perpetuating system stasis. In this paper, I employ mythology to identify the political meanings attached to oft-repeated cultural beliefs and restore the nuance they obscure. As a theoretical tool, myth builds on the literature reviewed above to dismantle and denaturalize the tropes embedded in individual actions and institutional practices.

2. Methods

This paper develops an ethnographic analysis to understand the on-the-ground perspective of Iowans around this conflict (beyond stylized media portrayals, politicians' statements, and agribusiness press releases). Over the course of six months in 2021 and 2022, I held over 55 semi-structured interviews with farm operators[3] (n = 38), and agricultural conservation professionals (n = 17) within the Des Moines Lobe in Iowa. Interviews were conducted one-on-one between researcher and participants. Almost all interviews were done in person and on-farm, when applicable. A small handful were conducted over the phone. All interviews were audio-recorded with permission from the participant.

Initial interview participants were recruited through the author's pre-existing network of farmers, farm managers, University Extension agents and other conservation professionals, and subsequent network sampling from initial contacts. Research participants were also selected using a purposeful sampling method to account for differentiations across gender, marital status, age, and farm size. The majority of the farmers interviewed were white, English-speaking males who had been farming for over 15 years, which coincides with the demographics of the farming population in the Corn Belt more generally. Most grew corn and soybeans (n = 36), although a few also had contracted hogs. I sought out farmers that grow vegetables and other specialty crops (n = 2), which they marketed through community-supported agriculture markets, and ranchers that raise pastured beef cattle (n = 1) for local customers. The conservation experts and stakeholders interviewed were also white and English-speaking, though this group included more women. This group included extension agents, environmental engineers, former state representatives, and community activists involved in water quality improvement efforts.

All participants were asked to share how long they had lived in Iowa, their relationship to farming, and what they perceived to be the most pressing issues in the state. Participants were asked if they were familiar with the Des Moines Water Works lawsuit and if so, what they thought about the lawsuit then and now, whether they discussed it with peers, and what they had heard about the suit. Farmers were also asked information about the practices they use in their operation. Finally, participants were asked to share what they were optimistic about in Iowa and in agriculture. I asked follow-up questions to clarify participants'

[3] The term 'farm operators' indicates individuals who are engaged in regular on-farm activities. Some members of this group would reject my use of the word "operator", preferring to be called "farmers". For ease of comprehension, however, I use these terms interchangeably. These terms include both owner- and tenant-farm operators.

responses, ask them to expand on a comment, or to pursue a line of inquiry brought up by respondents, when necessary.

Interviews lasted between 42 min and 3.5 h. Following completion, interviews were transcribed by the author and analyzed using MAXQDA software. Coding focused on how participants discussed the severity and proximate causes of water quality, as well as the roles and responsibilities of farmers. Although I was familiar with existing literature on farmer ideology and agricultural practices, I aimed to let main themes emerge from the data.

In addition to interviews, while in Iowa I observed public events, such as field days, workshops, and town halls, where farmers, residents, researchers, and local leaders came together to discuss the topic of water quality. I also followed news reports from local media outlets and agricultural publications related to the DMWW lawsuit and water quality more broadly. Fieldnotes from these ethnographic experiences were also coded for thematic grouping. I situate my findings from field interviews and participant observation within the broader scholarship of agrarian change and political ecology to explore the material processes and cultural logics surrounding the issue of water quality in Iowa.

3. Results

Though it had been several years, every single person interviewed remembered the Des Moines Water Works lawsuit. Participants recalled the lawsuit vividly, some with regret and others with reanimated anger. While most farmers noted that they didn't really believe that Des Moines would win,[4] they asserted that they had found the legal approach to be disrespectful and unbefitting of the collaborative spirit of Iowa. Reflecting on the lawsuit, one farmer proclaimed "It was mean." Another told me, "I talked to some other farmers, and they wanted his head," referring to then director of the utility, Bill Stowe, who led the legal action. A state conservation professional commented, "It was unfortunate, but at least it got people talking about the water."

In line with past work, both farmers and residents were aware of the problem of water quality, though many farmers did not believe that agriculture significantly contributed to the issue (see Houser et al., 2020). Farmers and residents drew on key narratives in responding to questions about the DMWW lawsuit and nitrate pollution. Below I illustrate the three most prominent myths that emerged.

3.1. Myth #1: farmers are the natural, historical stewards of the land

As noted in the introduction, the federal lawsuit brought by DMWW was perceived by many in the state as an attack on the rural livelihoods. In response, farm groups articulated their cultural and social identity as natural and historical "stewards of the land" (Masters, 2016; Comito et al., 2013). In my interviews, farmers echoed this myth, situating themselves as the appropriate custodians of the public good and tapping into broad ideologies of nature and ownership. Many see their work as inherently, and historically, oriented toward environmental 'improvement'. As one row-crop farmer in the Des Moines lobe told me, "We're really the original stewards, and so, you know, we really care about [water quality], and we're doing it by keeping the land producing" (IA36). This farmer connected environmental stewardship with cultivation. When asked about the practices employed on his operation, another conventional farmer reflected that "We've always done conservation, it's just what we do. My family's been here since the 1800s and, and, so, you know, it's just how we've always done it (IA15)." These farmers felt that it was only natural, and historically precedented, that they fulfil the role of primary conservators of Iowa's common resources.

Within a cultural "resource logic" that sees nature as needing to be tamed, disciplined, and made productive, this myth naturalizes the role of the farmer as the primary agents responsible for the long-term care and environmental health of the landscape (Merchant, 1989; Wenzel, 2020: 148). This myth relies on a Lockean vision of row-crop farmers as having 'reclaimed' the wild and economically worthless wetlands of pre-settlement Iowa into today's high-yielding, civilized agricultural landscape (Wenzel, 2020). A farmer assured me: "I mean, this land, they're not making any more of it. But we've been here for generations, and, and farming is our livelihood. This is some of the best land in the world to raise these crops, so we have to, we have to make do (IA62)." Cultivation rescues an economically 'wasted' landscape through title, enclosure, and productive improvement (Wenzel, 2020). In Iowa, where the neatness of your rows is seen as a measure of your character; the productivity of your fields indicates the "moral fruits of [your] labor" (Comito et al., 2013: 287). Realizing the productive potential of the land requires regular human intervention, which, accordingly, the Iowa farmer is uniquely suited to manage.

Within "stewards of the land" mythology, property rights are assumed to guarantee care. Many of the land-owning farmers I spoke with repeatedly assured me that they would never "screw up" the resources "that make their living (IA17)." A row crop farmer stated it like this:

> That ground out there is our factory. And we're going to do the best we can to make it as efficient as it can be. So, we're not going to purposely over-fertilize- we're going to try and make it as efficient as possible. Because that's what makes our livelihood, right? And so, to hear that, well, you know, they're abusing it, or they're, that's just ridiculous. (IA33)

Extension agents affirmed this commonly held conviction telling me "I hear from farmers a lot that farmers are the, are the best caretakers, because it's their land. And I do think farmers know their land the best. … A lot of farmers think they're already doing all they can (IA07)." Another put it more simply: "It is our livelihood. We're not going to mess it up on purpose (IA40)." These comments reveal that ownership is presumed to incentivize environmental stewardship by ensuring long-term interest in the resource.

Many operators cited also financial incentives as the main reason they engage in land conservation practices that could protect water quality. A row crop farmer told me, "As a farmer, you're not going to go out and spend dollars, you don't want to put this stuff on the ground to have it to have it wash away. You want that to turn into food (IA18)." A few counties away I was told, frankly, "I do conservation, from the beginning, as economics (IA 27)."

The farmers I spoke with perceived the DMWW suit and unfolding conversation around water quality as a challenge to their role as stewards of the land. "We just need more time" for nutrient reduction, several farmers, as well as a few extension agents, assured me – "It's a big issue, for sure, but its gonna take us some time to get it all there (IA35)." In the meantime, this myth renders environmental regulations as unnecessary, since it is inherently in line with farmers' identity, cultural role, and historical practice to support the land's natural capacity for production.

3.1.1. Unveiling myth 1: problematizing nature, history, and property

This myth, like other two I document below, is rife with contradictions and omissions. First, the emphasis on farmers as *historical* stewards of the land necessarily erases the Indigenous populations of the Oneota nations who occupied and worked the land for centuries before European settlers arrived. The Oneota people, thought to be the direct ancestors to the Sauk, Ioway, and Meskwaki tribes that Europeans encountered upon arriving in modern-day Iowa, were partially dependent on agriculture and maintained the grassed prairie through massive burnings, localized clearing, weeding, and planting (Hudson, 1994).

[4] The ultimate dismissal of the case may influence how farmers reflect how threatening they perceived the lawsuit. Whether farmers truly felt safe from legal censure and liability at the time is not the focus of this paper but is worth exploring in future work as more lawsuits emerge pitting municipal stakeholders against agricultural interests.

Living along the edges of receding glaciers, they hunted large game, including bison, and grew maize, beans, and squash (Iowa DCA, n.d.). Their use of fire prevented woodland incursion, allowing cultivation, and maintaining the bountiful prairies (Hudson 1994; Mutel, 2008). In the 1830s the U.S. government forcefully removed Sauk, Ioway, and Meskwaki populations as part of resettlement programs[5] (Mutel, 2008). However, the ecological management by Indigenous populations prior to the arrival of colonists helped to establish the fertile landscape that European settlers would later 'discover'.

The construction of agriculturalists as *natural* custodians of the environment also disguises the dramatic transformation of landscape that large-scale cultivation has wrought in Iowa. The view of nature that undergirds this myth demands continual intervention in landscape. Within a cultural context that values land for its productive capacity, Iowa's rivers and streams have been straightened, engineered, and even removed to increase crop harvests. The wetlands that span the prairie pothole region were turned over to the newly formed state of Iowa in a series of Federal Swamp Acts on the condition that they be reclaimed for cultivation. The state facilitated draining of wetlands by authorizing Drainage Districts, quasi-governmental entities charged with constructing ditches to connect fields and remove water from agricultural lands. Together, these programs have resulted in over 95% of the state's wetlands being drained for agriculture by 1930 and new drainage tiles are being installed every year with little government oversight (Dahl and Allord, 1982; Jones, 2019). These changes all but ensure that agrochemical inputs applied to fields (particularly those that are non-vegetated) speed into local waterways.

The "stewards of the land" myth positions individual ownership of private property as the guarantor of sound environmental management. Property ownership, according to Lockean resource logics, induces operators to conserve the resource by tying environmental stewardship to the long-term well-being of their asset. In theory, this may work well.[6] In Iowa, however, over half of farmland is rented (Hoffman, 2023; Tong and Zhang, 2023). One farmer told me that rates of tenancy are likely even higher in the Des Moines Lobe, the watershed that supplies the city of Des Moines with drinking water. One farmer implicitly acknowledged this disconnect, telling me "I mean, think about it, if it comes down to owners or helpers, those helpers don't have the same feeling toward that animal or that water or that ground or whatever (IA21)." In fact, research has shown tenant farmers may be less likely to adopt conservation practices than owner-operators (Carolan et al., 2004; Varble et al., 2016).

The cultural identity of farmers as "stewards of the land" can be traced to Jeffersonian agrarianism and the belief that an agrarian society of independent farmers who own and cultivate their land fosters democratic political stability (Henke, 2008). Jefferson's vision of rural life portrayed farmers as virtuous stewards, economically self-sufficient, and politically engaged. In this romantic imaginary, farmers are rugged individualists and entrepreneurs prospering and taming the American frontier. Scholars have challenged this myth of the "happy yeoman," noting the economic insecurity, indebtedness, and external dependence farmers have faced throughout U.S. history (Calo, 2020; Hofstadter, 1956). Hofstadter argued that this myth was deployed as a rhetorical device to promote agrarian interests and to justify policies that favor landowners. The myth remains potent as the impact of agricultural practices on rural community and environmental well-being becomes clear (Calo, 2020).

Through today, the ethos of stewardship suggested by this myth is assumed to be perfectly complementary to their economic objectives. However, it is frequently in direct tension with the demands of operating a successful farming business (Comito et al., 2013). The capitalist reconfiguration of agriculture in the twentieth century has made debt and dependence on purchased inputs a feature of contemporary agriculture (Buttel, 2006; Cochrane, 1993; Fitzgerald, 2003; Lobao and Meyer, 2001). Securing a marginal profit, particularly in the face of escalating production costs and an unstable climate, is increasingly difficult (Burchfield et al., 2022). In turn, economic pressure forces many to rationalize the environmental costs of their management practices to sustain, if only in the near-term, their livelihoods. One farmer who exclusively produces corn and soybeans told me, in a slightly deflated tone, this:

> If somehow you could make forages or, you know, some kind of sustainable agriculture profitable, it would help everything it would help the nutrient runoff into the raccoon river, it would, it would just do a world of good for everyone. But economics, you can't do that (IA44).

This contradiction between environmental stewardship and financial pressure leads to the invocation of the second, and arguably the most potent, myth in industrial agricultural production, that Iowa farmers "feed the world".

3.2. Myth #2: Iowa farmers 'feed the world'

Justifying production decisions in terms of economic feasibility can overwhelm the noble responsibility of land stewardship, supplanting this core identity with a deeper moral imperative to "feed the world" (Comito et al., 2013). This phrase was by far the most common explanation of the contemporary agricultural landscape I heard in my interviews as well as in the public discussions over water quality that I observed while in Iowa. In my conversations, when farmers acknowledged the deleterious effects of agriculture on the environment, they consistently asserted the need to "feed the world." Continued production is necessary to meet global demand, they would tell me, and some tradeoffs, such as N pollution, are unavoidable to fulfill this obligation. When I asked about the DMWW lawsuit, one farmer told me:

> People think that tile and soil is hurting a lot, but also as far as helping to feed the world, I guess. You're, you're doing, I mean, there's very little we do that doesn't have some sort of cause and effect (IA03).

In this vein, another farmer said:

> As far as the [DMWW lawsuit], I think everybody kind of went, you know, if you, if you want reasonably priced food, or if you want ethanol to drive your cars, we're gonna raise corn and corn needs nitrogen, which creates nitrate (IA13).

These farmers suggested that nitrate pollution was an unfortunate consequence of their role as global food providers. This myth presented frequently in conversations about the role livestock production in water quality impairment as well, with one farmer noting "[Confinement] is more efficient, and there is a world to feed (IA26)." Conservation professionals I spoke with were well acquainted with this refrain, telling me, "Farmers really feel like they're under siege. And I think that food, feed the world, kind of, mantra is a way that they help to make themselves feel better about things (IA31)." Several farmers mentioned their duty to feed the world with a sense of pride, declaring that "We take it seriously, we feed the world (IA78)," and "It's what we do, we provide food to a hungry world (IA17)." Another farmer, after giving me a tour his farm, said "I'm just happy to show how we help feed the world (IA24)."

Iowa farmers' claims to feed the world echo the rhetoric employed by Iowa politicians, farm groups, and agribusiness leaders. Following a damaging derecho storm in 2020, Governor Kim Reynolds was quoted as stating "Iowa farmers feed the world and it's essential that we keep

[5] Although there are no American Indian reservations in Iowa, many members of the Meskwaki tribe have returned to the state and currently maintain a tribal settlement in Tama County (Iowa Environmental Council, 2021).

[6] Wendell Berry was critical of the limits to ownership as an incentive for care, noting that as farm size increases the attention farmers can give to each field correspondingly decreases (Berry 1997).

business open, from the farm to the processor to the grocery stores" (Putze, 2020). The same year, the president of Tyson Fresh Meats announced a partnership with Iowa State University by celebrating their shared vision: "We strive to feed the world" (ISU, 2020). The Iowa Corn Growers Association highlights this powerful myth in their Iowa Corn Message Toolkit, noting their mission to assist the "state's farmers to continue to feed and fuel the world" (ICGA, 2018). Their current social media toolkit likewise encourages members to share reminders that "Countries rely on us to feed their people. #StrongerTogether" (ICGA, 2023). The well-established 'feed the world' narrative frames agricultural production as a heroic duty in the face of global hunger (Rissing, 2021). Under this myth, success in farming is defined as ever-increasing crop yields, positioning Iowa agriculture as fulfilling a moral obligation to feed a growing population.

3.2.1. *Unveiling myth 2: "food"? For whom?*

The claim that Iowa farmers 'feed the world' attempts to evade critique of industrial agriculture practices by moralizing productivity. Just as food was explicitly used as "a weapon" by Nixon's Secretary of Agriculture, Earl Butz, the narrative refrain that Iowa farmers "feed the world" has been weaponized in the current era to justify gross overproduction (Rissing, 2021; Wallensteen, 1976). In reframing productivism as humanitarianism, conventional farming avoids confronting demonstrable environmental degradation by equating high yields with beneficence.

The "feed the world" myth has accompanied broader changes in agricultural production paradigms and politicized food security discourses (Holt Giménez and Shattuck, 2011; Nally, 2011; Nally, 2016). The last century brought a transformation in grain farming through innovations in mechanization, hybrid seed, and ammonium nitrate fertilizers, which together allowed for dramatic increases in crop yields across the Corn Belt. This revolution in agricultural production, and the overproduction that it created following World War-II, required government intervention to secure new markets for American farmers' products. Neo-Malthusian assumptions about hunger aligned with US imperialist interests in the Cold War period resulting in a heavily subsidized food aid program undergirded by deep political and ideological motivations. Formerly self-sufficient nations became reliant on imports from the US (McMichael, 2009). Under this model, amid growing fears of communism's influence, agricultural exports and 'green revolution' technologies were shipped across the globe to prevent starvation while ensuring international allegiances. The political convenience of this narrative was repurposed in the 1990s to promote free trade and open markets as trade liberalization became directly linked to food security (McMichael, 2009). The current world order carries these political-ideological undercurrents in the myth that Iowa farmers must 'feed the world.' Today, the U.S. remains a net exporter of agricultural commodities (USDA Economic Research Service, 2022).

To fully understand the pervasive "feed the world" myth, it is useful to question its key components: who or what constitutes 'the world', and what does it mean to 'feed' them? In my conversations with Iowa farmers, 'the world' was typically framed in two ways. First, agricultural producers are responsible for providing the primary sustenance for non-agricultural populations, that is urban dwellers, across the US. As discussed in more depth below, this relates in part to the myth of the fundamental divide between urban and agricultural populations. With a slight note of disdain, one farmer noted:

> It's a cycle where the world needs to eat. People, some people don't want to hear that. And I don't like the elitism that a lot of people are taking with their food, this way and this is how you have to raise it. Well, okay. What are the people? You know, there are people who can't afford that (IA31).

It is true, of course, that rural agriculture undergirds much of urban development and industrialization (Danbom, 2017; Mazoyer and Roudart, 2006). Farmers of all types should and do feel pride in their capacity to provide food for themselves and other workers, allowing for a diverse economy and social community.

More acutely, however, in this rhetorical account the 'world' refers to the malnourished and impoverished living in other countries.[7] When discussing her marketing position within one of Iowa's commodity boards, a farmer told me "I said, don't ignore Africa. Because there's a whole mess of people there. And we need to feed them (IA06)." Here the Neo-Malthusian undercurrents of the 'feed the world' myth configure the problem of starvation and hunger abroad as one of underproduction, rather than of distribution or access. Assuming that scarcity is the primary cause of food insecurity reinforces the "narrow utilitarian goal of yield and productivity increases" (Nally, 2016: 576. Scholars have long argued that famines are not caused by demand outstripping supply and that current food production could potentially meet global needs if food waste and equitable access were systematically addressed (Sen, 1982). Yet, popular accounts of hunger and food insecurity in policy, industry and media spheres continue to bolster investment in large-scale, high--yielding agriculture under the guise of humanitarian rhetoric (Nally, 2016).

The "feed the world" myth suggest that farming is oriented around food provisioning. However, conventional agricultural production in the Corn Belt is increasingly entangled with industry. In Iowa, the primary crops of maize and soybeans are not foodstuffs– that is, they are not predominantly consumed by humans. Nearly 60% of the corn grain yield from the state is used to make ethanol, and most of the rest is used for livestock feed (ICGA, 2021). Soybeans, rich in protein and oil, primarily feed animals, including the 24 million hogs in the state. The oils are increasingly used to make biodiesel and household replacements for petrochemical products (Hinrichs, 2003; ISA, 2021). Meanwhile, Iowans import up to 90% of their food from out of state[8] (ISU, 2021). Upon sharing this statistic and lamenting the rates of childhood hunger in the state, one conservation professional remarked, "Okay, lets feed the world, but let's feed Iowans first (IA47)." How livestock-fattening feed and industrial inputs contribute to alleviating global food insecurity is open for debate, but I contend that the emphasis on 'food' in the 'feed the world' myth fails to acknowledge agribusiness interests and the political-economic inequalities of the current food regime.

3.3. *Myth #3: dualism of town and country*

The DMWW lawsuit alleged that tile-drained farm fields ought to be considered point source polluters and therefore subject to federal water quality standards. In making this its juridical claim, the legal action identified and centered two discrete groups: municipal ratepayers in metropolitan Des Moines, the capital city, and agricultural producers in Sac, Buena Vista, and Calhoun counties (Vos, 2017). This positioning generated national media attention, articulating this specific conflict with broader historical and contemporary political frames of urban versus rural (e.g., Masters, 2016; Royte, 2017; Shapiro, 2018). In response to the lawsuit, then governor of Iowa Terry Branstad proclaimed that "Des Moines had declared war on rural Iowa" (Petroski, 2015a). Other politicians reiterated his combative framing as one rural state assemblyman calling on all Iowans to boycott Des Moines (Masters, 2016). He maintained, "Being a rural Iowa legislator, I see this snob urban-versus-rural mentality on a regular basis. Urban cities no longer have any regard for the state's agricultural community" (Petroski, 2015b).

Agribusiness publications located the blame for water quality

[7] The colonizer's concept of the 'white man's burden' is a claim as powerful as ever (Nally 2016).

[8] Many Iowans, including the group FeedIowa1st, critique the overuse of the "feed the world" narrative, and have been working to build robust local food systems. This figure, however, suggests that there is much more work to be done.

degradation on urban sources, including residential lawns and municipal golf courses (Comito et al., 2012; Kilen, 2016; Lamm, 2019). Echoing the finding by Farber (2018) and Houser et al. (2020), many farmers I spoke with pointed to the use of fertilizer on suburban and urban lawns as equally, if not more, responsible for Iowa's degraded water quality. When asked about the lawsuit one farmer told me "Oh yeah, the lawsuit was just ridiculous. I mean, you know how much of that stuff is dumped on [urban] lawns (IA17)." Another row crop farmer reiterated this claim, saying "You know, relatively, the fertilizer you put on your lawn is so much stronger (IA25)." As to why farmers, instead of other sources, were being blamed for nitrate pollution I was told that "Everyone's so far removed from their food now that they have, and they're being told things that are not true (IA34)." For these farmers, city folks just don't understand farming and therefore should not be prescribing agricultural practices.

The perceived duality of town and country is a longstanding ideological framing in agrarian spaces that posits an oppositional and exploitative relationship between urban citizens and farmers (Mooney and Hunt, 1996). At its core, this third myth advances the idea that town and country are not only different, but distinct and often, intrinsically opposed (Williams, 1975). This myth goes beyond apparent differences town in their spatial arrangement, demographic make-up, and key economic sectors. Urban and rural populaces, in this telling, are understood to be fundamentally divergent, antagonistic, and inherently in competition for resources.

3.3.1. *Unveiling myth 3: distracting with a false dichotomy*

The oft-invoked dualism of town-country, urban-rural, industry-agriculture, locates geography as a central fault line in modern American economics, politics, and social life (e.g. Badger, 2019). Conflict and antagonistic relationships between urban and rural geographies have been documented across a range of socio-ecological issues, including economic disparities, environmental exploitation, and political representation (e.g., Cramer, 2016; Kelly-Reif and Wing, 2016; Lichter and Brown, 2011; Meijers and van der Wouw, 2019; Pellow, 2016). It has been argued, however, that the simple dichotomy of town and country is not a simple binary opposition, but rather a complex and evolving relationship shaped by myriad factors (Woods, 2009). Raymond Williams traces the historical development of this relationship, illuminating the political-economic structures, technological changes, and cultural values that are embedded in representations of the urban-rural divide (Williams, 1975).

In Iowa, political interests have leaned on narratives of farmer victimhood at the hands of townsfolk to cultivate loyalty among farmers. The Iowa Farm Bureau (IFB), a powerful lobbying organization, foments this division by stoking fear that urban citizens and environmentalists are intent on installing oppressive regulations aimed to destroy their profession (Rissing, 2021). The IFB claims to represent producers' interest, guarding them against unfounded accusations from environmental activists, public health advocates, and others deemed to be 'urban elites'. In part fueled by the rhetoric used by the IFB and other agribusiness organizations to frame conversations around food systems, many conventional farmers today perceive their livelihood as being under attack by urbanites with little knowledge about rural lifeways, as the quotes above highlight. This polarizing framework, however, misrepresents the productive unity and structural interdependence of these two seemingly disparate spatial locations in Iowa (Woods, 2009).

While the political rhetoric around water quality in Iowa has relied on the mythic trope of urban vs. rural, the false dichotomy inaccurately represents the spatial and economic overlap characteristic of human and hydrological concerns. Obscured in this myth is the messy reality of on-the-ground relations between 'municipal' and 'agricultural' water users. In my fieldwork, I spoke at length with a full-time farmer living on the outskirts of a small, rural town whose farmhouse drinking water was served by DMWW. He told me frankly:

> Farm Bureau, is, they were behind a lot of this, right? Farm Bureau is going to find some way to make it, you know, you know, rural versus urban. But, you know, it's it really is not a rural versus urban problem because it's a rural area and an urban problem (IA13).

In conversations with the managers at DMWW, I learned that many urban dwellers own farmland upstream and are being recruited to participate in new programs to protect water quality on their fields. Although some farmers contest this dualistic urban-rural framing, including the ratepaying farmer I spoke with, the myth persists in the circulation of media, policy, and community discourses.

Like the other myths, the urban-rural rhetoric overstates the relative power of the individual farmer in the contemporary food regime and hides the significant structural constraints that limit individual agriculturalist's ability to protect rural drinking water. Intertwined state policies and corporate influences work to maintain the material conditions that ensure nitrate pollution of Iowa's shared waterways (Jackson, 2008). Beyond the prairie pothole, national agriculture policies, including those implemented at local levels, have enabled capitalist production dynamics to become the norm in U.S. agriculture. These processes divide farmers from means of reproduction, ensure reliance on purchased inputs, and expose farmers to increasingly untenable levels of debt (Burchfield et al., 2022; Harris et al., 2009; Roberts and Lighthall, 1991: 437). Rural community organizers are well-aware of the intentions behind this political maneuver:

> The urban versus rural narrative …. think it is real in some senses, but not in the ways that that Branstad and then industrial ag were using it, they were using the urban versus rural to divide and to steel their supporters against this lawsuit, out of out of fear for their own economic interests, to drive a wedge to cause division where there shouldn't have been division. We would say that the rural urban division, they were using it in a way that was inauthentic. We do believe that there is an urban rural divide right there. We would connect it back to this lack of economic opportunity. And because of that, you know, who's leaving rural communities for jobs in town? Who's left in those rural communities? And what's there for them? (IA49)

The shift in power from individual farm operators to consolidated agribusiness industries vertically integrated across the supply chain, is well documented in the political economy of agriculture literature, which highlights the pronounced roles of market-oriented, productivist policy in mediating dispossession of the 'American family farm' (Davidson, 1996; Jackson, 2008; Roberts and Lighthall, 1991). To the individual farmer in the competitive landscape of the industrial Corn Belt, nitrogen fertilizer becomes "cheap insurance for expensive seed" and an inescapable feature of the market economy in which they operate (Royte, 2017).

A deeper problem with this framing of the water quality debate is that it invisibilizes non-farming rural residents. Rural residents largely obtain drinking water from individual wells, which are not subject to environmental regulation under the CWA and are often more vulnerable to agrochemical contamination due to their proximity to cultivation (Eller, 2019; Environmental Working Group, 2019). Further, these Iowans cannot benefit from economies of scale to purchase the expensive equipment necessary for treating nitrate-polluted water supplies (Royte, 2017). A community activist I met called this out explicitly:

> You know, it's the rural communities that are very much impacted by, by water quality, you know, particularly communities that have, you know, rely on the wells. And, and here's the thing, it's like, municipal-, most municipalities in Iowa do not have the money to get the nitrates out of their drinking water that Des Moines Waterworks has, you know, so they're not, they're not able to denitrify their water (IA56).

A water quality expert put it even more bluntly saying "I think that this urban versus rural is one of these fake tropes, because if you're on well water, you're rural, you're pretty much screwed, right?" (IA42)

4. Discussion

Braided throughout each of the myths explored here are post-Enlightment ideas of nature, security, and modernity that together perpetuate productivist cultural scripts and associated claims to resources (Worster, 1994). The myth that farmers are "stewards of the land" disguises the socio-economic precarity of Iowa farmers who work the land, many of whom do not own the resource they are working. Further, this myth sustains the voluntary approach to nutrient management, interrupting attempts to install regulatory oversight on agricultural practices that might improve water quality. The "feed the world" myth distorts the geopolitical and industry interests that propel ever-increasing commodity production through a veil of heroic humanitarianism. The town-and country dichotomy depicts rurality in opposition to metropolitan areas, reflecting notions of civilization and progress and provoking resentment among producers and consumers. Together, these myths legitimate ever-increasing yields as the ultimate production goal and impede widespread adoption of alternative agricultural practices that emphasize smaller fields, diversity in production, and fewer chemical inputs.

Although I have presented each of these three core myths separately for analytical clarity, they often work in and through each other. The passive view of nature inherent in the stewardship myth frames the environment an external entity, separate from and subservient to human civilization (Merchant, 1989). This resource logic fosters the othering of those who work the land from those who do not, sowing divisions between producers and consumers, and between rural and urban spatialties (Wenzel, 2020). The agrarian logic underpinning the myth of the urban rural dichotomy, in turn, serves to discredit critiques levelled against the other two myths. Similarly, production practices like tile drainage were often characterized as both a form of caring for the land and a way to guarantee food production for a hungry global population.

A critical reading of common narratives evoked in response to the DMWW case reveals the productivist values undergirding the contemporary mythology of Corn Belt agriculture. This mythology influences management decisions by narrowing the spectrum of possible metrics through which to comprehend human-environmental interactions (Ribaudo, 2015). In Iowa, success is measured by gross profit, acres harvested, and, above all, yield (Arbuckle, 2013; Burton, 2004; Buttel, 2006; McGuire et al., 2013). As one local scientist told me summarizing the state of Iowa's water quality, "We're not willing to sacrifice one bushel for better water (IA20)."

Mythology is a product of collective consciousness and reflects cultural values, but it is frequently cultivated by particular parties, such as commodity groups, agribusiness publications, and politicians, to serve ideological purposes. The pervasive propagation of the myths discussed above naturalizes the current hegemonic order. As a result, farmers evoke certain narratives that emphasize commodity and economic orientation "almost without thinking" (Shipley et al., 2022: 1473). The analysis presented here extends previous scholarship by emphasizing the ideological functions and historical precedents of three key myths in producing, and reproducing, the polices, practices, and programs that maintain Iowa's immense production. The theoretical framework of mythology provides a lens for recognizing and disrupting power relations in commodity agriculture.

Farmers are subject to both ideological and structural forces that constrain their choice of what they produce, how they produce it, and where they can sell it, limiting their agency and participation in an agroecological transition (Hendrickson and James, 2005). The findings discussed here complement existing literature that document the influence of agribusiness in perpetuating productivist agriculture (Bell et al., 2015; Stuart and Houser, 2018) as well as the forms of agrarian ideology that propagate the industrial farming system (Houser et al., 2020; Mooney and Hunt, 1996). As Roesch-McNally and co-authors described, I found that some monoculture farmers recognize the environmental benefits of diversified cropping system but feel unable to implement such changes on their farms due to both field-level and structural economic barriers (Roesch-McNally et al., 2018). As U.S. farmers face increasingly precarious livelihoods (Burchfield et al., 2022), the perceived risk of under-fertilizing will likely continue to spur farmers to apply N fertilizer to cash-cropped fields and result in further degradation of drinking water downstream (Ribaudo, 2011; Robertson and Vitousek, 2009).

My intention in this analysis has not been to discredit or devalue the cultural identity of farmers in Iowa. Rather, I have tried to disentangle the origins and impact of the myths I discuss in order to highlight both the structural and the ideological constraints that limit farmers' ability to participate in an agroecological transition. Mythic forms circumscribing the social roles and moral responsibilities of farmers as stewards and heroes reinforce modern capitalist agriculture, resist regulatory intervention, and constrain diversified forms of production (Blesh and Wolf, 2014; Comito et al., 2013; Vanclay and Enticott, 2011).

For Barthes, the use of the term "myth" allowed readers and theorists to recognize the ways in which contemporary society was still subject to mythic constructions of culture, despite assertions of being more technologically advanced than the classical Greek and Roman cultures typically associated with mythology. I adopt his term to undercut the post-Englightenment ideology sustaining productivism in Iowa. While other scholars have utilized alternate framings to describe the powerful discourses operating in conventional agriculture, such as cultural scripts or narratives (e.g., Houser et al., 2020; Rissing, 2021), I suggest the tool of mythology to attend to the seemingly neutral and timeless presentation of these forms and to suggest a process for demythification. Mythology reminds us of the ideological, the political, and the historical undercurrents informing our perception of our modern reality.

5. Conclusion

I have explored how, in response to the DMWW lawsuit and escalating water quality crisis in Iowa, farmers, agricultural groups, and politicians recapitulated three core myths that serve to legitimate commodity (over)production. I argue that the myths that sustain productivism both influence the agronomic practices that contribute to non-point source pollution and inform reactions to it. I expose the contradictions inherent in this mythology as the first task necessary to break down the obstacles precluding progress on both ecological and public health goals and begin to imagine an alternative system that works for people and planet. The durability of these myths despite their contradictions highlights their power to shape the social relations and material distribution of resources among Iowans.

I do not suggest that simply naming and complicating these myths will alleviate the ecological and human health crises in the Corn Belt. However, given the imbrication of structural and ideological forces at play, I argue that revealing the hidden power of contemporary mythology is a necessary task, rather than sufficient, in beginning to move towards a just agroecological transition. While Barthes's original essays advocated semioclasm, or the complete destruction of myth, a nuanced approach may be more feasible. The myths Barthes identified were almost exclusively considered corrupting influences on culture. However, as social constructions, myth need not be negative. Lévi -Strauss and other scholars of pre-modern cultural myths document their role in explaining natural phenomena, conveying moral lessons, and shaping cultural identities (Lévi-Strauss, 1995). As such, myths may function as useful heuristics, collaboratively created and disseminated through cultural institutions.

While most farmers recited the core myths to explain their practices, several of the community organizers I spoke with emphasized how restoring the nuance obscured by the myth of the urban-rural divide helped them build political solidarity across groups facing interconnected social and environmental challenges. Could exposition of the distortion embedded in the other two myths similarly be used in advocating for positive change? Policy reform could assist farmers to

actualize their role as "stewards of the land," just as it could direct resources from production of industrial feedstocks to distribution of edible foodstuffs.

While I have focused on the role of mythology in the debate over water quality in Iowa, the interlocking myths identified here may be deployed to foreclose action on a range of environmental issues. The DMWW lawsuit explored here provides a useful window into mythologies of the Corn Belt more broadly. In addition to lacking access to safe drinking water Iowans face extensive soil erosion (Thaler et al., 2021), rural community collapse (Edelman, 2021), deteriorating air quality (Hunt et al., 2020), and environmental injustice (Son and Bell, 2022), each linked to the productivist project discussed in this paper. Farmers, too, are ultimately victims of the resulting economic and cultural model that impels increasing production (Burchfield et al., 2022). The lens of mythology can be applied in other contexts across food systems as well, such as debates over agricultural water allocation in the West. Future work should extend this analysis to examine how the ideological power of myths functions in global resource challenges and the potential socio-natural transformations afforded by nuancing the monolithic realities they purport to represent.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee (University of California, Berkeley Committee for Protection of Human Subjects #2021-04-14266) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all individual participants included in the study.

CRediT authorship contribution statement

Anaya L. Hall: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The author declares that they have no conflict of interest.

Data availability

The data that has been used is confidential.

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References

Arbuckle, J.G., 2013. Farmer support for extending Conservation Compliance beyond soil erosion: Evidence from Iowa. Journal of Soil and Water Conservation 68 (2), 99–109. https://doi:10.2489/jswc.68.2.99.

Badger, Emily, 2019. How the rural-urban divide became America's political fault line. New York Times. https://www.nytimes.com/2019/05/21/upshot/america-political-divide-urban-rural.html. (Accessed 11 December 2021).

Barthes, R., 1972. Mythologies [1957]. Hill and Wang, New York.

Baur, P., 2020. When farmers are pulled in too many directions: comparing institutional drivers of food safety and environmental sustainability in California agriculture. Agriculture and Human Values 37 (4), 1175–1194. https://doi.org/10.1007/978-3-031-18560-1_17.

Bell, S.E., Hullinger, A., Brislen, L., 2015. Manipulated masculinities: agribusiness, deskilling, and the rise of the businessman-farmer in the United States. Rural Sociol. 80 (3), 285–313. https://doi.org/10.1111/ruso.12066.

Berry, W., 1997. The Unsettling of America: Culture & Agriculture. Sierra Club Books, San Francisco.

Blesh, J., Drinkwater, L.E., 2013. The impact of nitrogen source and crop rotation on nitrogen mass balances in the Mississippi River Basin. Ecological Applications 23 (5), 1017–1035. https://doi.org/10.1890/12-0132.1.

Blesh, J., Wolf, S.A., 2014. Transitions to agroecological farming systems in the mississippi river basin: Toward an integrated socioecological analysis. Agriculture and Human Values 31 (4), 621–635. https://doi.org/10.1007/s10460-014-9517-3.

Brender, J.D., Weyer, P.J., Romitti, P.A., Mohanty, B.P., Shinde, M.U., Vuong, A.M., National Birth Defects Prevention Study, 2013. Prenatal nitrate intake from drinking water and selected birth defects in offspring of participants in the national birth defects prevention study. Environ. Health Perspect. 121 (9), 1083–1089. https://doi.org/10.1289/ehp.1206249.

Burchfield, E.K., Schumacher, B.L., Spangler, K., Rissing, A., 2022. The state of US farm operator livelihoods. Front. Sustain. Food Syst. 5, 795901 https://doi.org/10.3389/fsufs.2021.795901.

Buttel, F.H., Larson, O.F., Gillespie Jr, G.W., 1990. The Sociology of Agriculture. Greenwood Press, Inc.

Burton, R.J., 2004. Seeing through the 'good farmer's' eyes: towards developing an understanding of the social symbolic value of 'productivist' behaviour. Sociologia ruralis 44 (2), 195–215. https://doi.org/10.1111/j.1467-9523.2004.00270.x.

Buttel, F.H., 2006. Sustaining the unsustainable: agro-food systems and environment in the modern world. In: The Handbook of Rural Studies. SAGE Publications Ltd., United Kingdom, pp. 213–229. https://doi.org/10.4135/9781848608016.n15.

Calo, A., 2020. The Yeoman Myth: A Troubling Foundation of the Beginning Farmer Movement. Gastronomica 20, 12–29. https://doi.org/10.1525/gfc.2020.20.2.12.

Carolan, M.S., Mayerfeld, D., Bell, M.M., Exner, R., 2004. Rented land: barriers to sustainable agriculture. J. Soil Water Conserv. 59, 70A–75A.

Chouinard, H.H., Paterson, T., Wandschneider, P.R., Ohler, A.M., 2008. Will Farmers Trade Profits for Stewardship? Heterogeneous Motivations for Farm Practice Selection. Land Economics 84, 66–82.

Cochrane, W.W., 1993. The Development of American Agriculture: a Historical Analysis, second ed. University of Minnesota Press, Minneapolis.

Comito, J., Wolseth, J., Morton, L.W., 2012. Tillage practices, the language of blame, and responsibility for water quality impacts in row crop agriculture. Hum. Ecol. Rev. 19 (2), 146–158.

Comito, J., Wolseth, J., Morton, L.W., 2013. Stewards, businessmen, and heroes?: role conflict and contradiction among row-crop farmers in an age of environmental uncertainty. Hum. Organ. 72 (4), 283–292. https://doi.org/10.17730/humo.72.4.j422740156v16602.

Cramer, K.J., 2016. The Politics of Resentment: Rural Consciousness in Wisconsin and the Rise of Scott Walker. University of Chicago Press, Chicago.

Dahl, T.E., Allord, G.J., 1982. History of wetlands in the conterminous United States. US Geological Survey Water Supply Paper 19. https://www.fws.gov/wetlands/documents/History-of-Wetlands-in-the-Conterminous-United-States.pdf. (Accessed 2 May 2022).

Danbom, D.B., 2017. Born in the Country. Johns Hopkins University Press, Baltimore. https://doi.org/10.56021/9781421423357.

David, M.B., Drinkwater, L.E., McIsaac, G.F., 2010. Sources of nitrate yields in the Mississippi River Basin. J. environ. quality 39 (5), 1657–1667. https://doi.org/10.2134/jeq2010.0115.

Davidson, O.G., 1996. Broken heartland: the rise of America's rural ghetto. In: Expanded (Ed.), Osha Gray. University of Iowa Press, Iowa City.

Edelman, M., 2021. Hollowed out Heartland, USA: how capital sacrificed communities and paved the way for authoritarian populism. J. Rural Stud. 82, 505–517. https://doi.org/10.1016/j.jrurstud.2019.10.045.

Eller, D., 2019. Nitrates in Iowa drinking water: What you should know about health effects. Des Moines Register.

Environmental Working Group. 2019. Interactive Map: Iowa's Private Wells Contaminated by Nitrate and Bacteria. http://www.ewg.org/interactive-maps/2019_iowa_wells/ (accessed 3.27.24).

Farber, B., 2018. Ground truthing: the politics and culture of soil and water conservation in Iowa agriculture. Theses and Dissertations.

Fitzgerald, D., 2003. Every farm a factory: the industrial ideal in American agriculture. Yale Agrarian Studies Series. Yale Univ. Press, New Haven, Conn.

Foucault, M., 1981. The Order of Discourse, in: Untying the Text: A Post-Structuralist Reader. Routledge.

Harris, J.M., Johnson, J., Dillard, J., Williams, R., Dubman, R., 2009. The Debt finance Landscape for U.S. Farming and Farm Businesses (No. AIS-87). USDA Economic Research Service.

Hatfield, J.L., Jaynes, D.B., Burkart, M.R., Cambardella, C.A., Moorman, T.B., Prueger, J. H., Smith, M.A., 1999. Water quality in walnut creek watershed: setting and farming practices. J. Environ. Qual. 28, 11–24. https://doi.org/10.2134/jeq1999.00472425002800010002x.

Hatfield, J.L., McMullen, L.D., Jones, C.S., 2009. Nitrate-nitrogen patterns in the Raccoon River Basin related to agricultural practices. J. Soil Water Conserv. 64, 190–199. https://doi.org/10.2489/jswc.64.3.190.

Helmers, M.J., Isenhart, T.M., Kling, C.L., Moorman, T.B., Simpkins, W.W., Tomer, M.D., 2007. Theme overview: agriculture and water quality in the corn belt: overview of issues and approaches. Choice 22, 79–86, 316-2016-7005.
Hendrickson, M.K., James, H.S., 2005. The ethics of constrained choice: How the industrialization of agriculture impacts farming and farmer behavior. J. Agri. Environ. Ethics 18, 269–291. https://doi.org/10.1007/s10806-005-0631-5.
Henke, C., 2008. Cultivating Science, Harvesting Power: Science and Industrial Agriculture in California, inside Technology. MIT Press, Cambridge.
Hinrichs, C.C., 2003. The practice and politics of food system localization. J. Rural Stud. 19, 33–45. https://doi.org/10.1016/S0743-0167(02)00040-2.
Hoffman, J., 2023. 84% of Iowa farmland now owned debt-free. AgWeb. https://www.agweb.com/news/business/farmland/84-iowa-farmland-now-owned-debt-free. (Accessed 30 January 2024).
Hofstadter, R., 1956. The myth of the happy yeoman. Am. Herit. (7), 3.
Holt Giménez, Eric, Shattuck, Annie, 2011. Food crises, food regimes and food movements: rumblings of reform or tides of transformation? J. Peasant Stud. 38 (1), 109–144. https://doi.org/10.1080/03066150.2010.538578.
Houser, M., Gunderson, R., Stuart, D., Denny, R., 2020. How farmers "repair" the industrial agricultural system.". Agric. Hum. Val. 37, 983–997. https://doi.org/10.1007/s10460-020-10030-y.
Hudson, J.C., 1994. Making the Corn Belt: A Geographical History of Middle-Western Agriculture. Indiana University Press, Bloomington.
Hunt, N.D., Liebman, M., Thakrar, S.K., Hill, J.D., 2020. Fossil energy use, climate change impacts, and air quality-related human health damages of conventional and diversified cropping systems in Iowa, USA. Environ. Sci. Technol. 54 (18), 11002–11014. https://doi.org/10.1021/acs.est.9b06929.
Huppatz, D.J., 2011. Roland Barthes, Mythologies. *Design and Culture*, vol. 3, pp. 85–100. https://doi.org/10.2752/175470810X12863771378833.
Inoue-Choi, M., Jones, R.R., Anderson, K.E., Cantor, K.P., Cerhan, J.R., Krasner, S., Robien, K., Weyer, P.J., Ward, M.H., 2015. Nitrate and nitrite ingestion and risk of ovarian cancer among postmenopausal women in Iowa. Int J Cancer 137, 173–182. https://doi.org/10.1002/ijc.29365.
Iowa Corn Growers Association, 2018. Iowa Corn Message Toolkit. In: https://www.ans.iastate.edu/news/2020/gift-tyson-foods-supports-beef-iowa-processing-iowa-state-university. (Accessed 3 June 2023).
Iowa Corn Growers Association, 2021. Corn facts. https://www.iowacorn.org/media-page/corn-facts. (Accessed 14 December 2021).
Iowa Corn Growers Association, 2023. Social media toolkit. https://www.iowacorn.org/media-page/social-media-toolkit. (Accessed 3 June 2023).
Iowa Department of Agriculture and Land Stewardship. 2020. Fertilizer Tonnage Distribution in Iowa 2020 Crop Year. https://iowaagriculture.gov/sites/default/files/feeds/Commercial%20Fertilizer/Fertilizer%20distribution%202020.pdf (Accessed 3.27.24).
Iowa Department of Cultural Affairs. American Indian removal and relocation. https://iowaculture.gov/history/education/educator-resources/primary-source-sets/american-indian-removal-and-relocation. (Accessed 13 December 2021).
Iowa Department of Natural Resources, 2018. Iowa's section 303(d) impaired waters listings. https://www.iowadnr.gov/Environmental-Protection/Water-Quality/Water-Monitoring/Impaired-Waters. (Accessed 25 March 2020).
Iowa Environmental Council, 2021. Iowa nutrient reduction Strategy: policy solutions to actually reduce nutrient pollution in Iowa's water. https://www.iaenvironment.org/webres/File/NRS%202_0-%20Policy%20Solutions%20to%20Reduce%20Nutrient%20Pollution%20in%20Iowa's%20Water.pdf. (Accessed 3 May 2022).
Iowa State University, 2020. Gift from Tyson Foods Supports Beef up Iowa with Processing at. Iowa State University. In: https://www.ans.iastate.edu/news/2020/gift-tyson-foods-supports-beef-iowa-processing-iowa-state-university. (Accessed 3 June 2023).
Iowa State University, 2021. 10 facts about local food systems. Extension and Outreach. https://www.extension.iastate.edu/ffed/10-things-to-know-about-local-food-systems/. (Accessed 14 December 2021).
Iowa Soybean Association, 2021. Soybean Demand. https://www.iasoybeans.com/about/our-work/demand. (Accessed 14 December 2021).
Jackson, L.L., 2008. Who "Designs" the Agricultural Landscape? Landscape Journal 27, 23–40. https://doi.org/10.3368/lj.27.1.23.
Jones, Chris, 2019. Cry Me a Raccoon River. University of Iowa Chris Jones Blog. https://cjones.iihr.uiowa.edu/blog/2019/12/cry-me-raccoon-river. (Accessed 14 December 2021).
Jones, C.S., Nielsen, J.K., Schilling, K.E., Weber, L.J., 2018. Iowa stream nitrate and the Gulf of Mexico. PloS one 13 (4), e0195930. https://doi.org/10.1371/journal.pone.0195930.
Jones, R.R., Weyer, P.J., DellaValle, C.T., Inoue-Choi, M., Anderson, K.E., Cantor, K.P., Krasner, S., Robien, K., Freeman, L.E.B., Silverman, D.T., Ward, M.H., 2016. Nitrate from Drinking Water and Diet and Bladder Cancer Among Postmenopausal Women in Iowa. Environ Health Perspect 124, 1751–1758. https://doi.org/10.1289/EHP191.
Kelly-Reif, K., Wing, S., 2016. Urban-rural exploitation: an underappreciated dimension of environmental injustice. J. Rural Stud. 47, 350–358. https://doi.org/10.1016/j.jrurstud.2016.03.010.
Kilen, Mike, 2016. Is your perfect lawn hurting Iowa's water quality? Des Moines Register. https://www.desmoinesregister.com/story/money/agriculture/2016/07/15/your-perfect-lawn-hurting-iowas-water-quality/86870500/. (Accessed 10 December 2021).
Lamm, C., 2019. Is Iowa's drinking water safe? Spokesman. https://www.iowafarmbureau.com/Article/Is-Iowas-drinking-water-safe. (Accessed 10 December 2021).
Leach, M., Mearns, R., 1996. The Lie of the Land: Challenging Received Wisdom on the African Environment. James Currey Ltd, London.
Lévi-Strauss, C., 1995. Myth and Meaning: Cracking the Code of Culture. Schocken, New York.
Lichter, D.T., Brown, D.L., 2011. Rural America in an Urban Society: Changing Spatial and Social Boundaries. Annu. Rev. Sociol. 37, 565–592. https://doi.org/10.1146/annurev-soc-081309-150208.
Lobao, L., Meyer, K., 2001. The Great Agricultural Transition: Crisis, Change, and Social Consequences of Twentieth Century US Farming. Annu. Rev. Sociol. 27, 103–124. https://doi.org/10.1146/annurev.soc.27.1.103.
Mathewson, P.D., Evans, S., Byrnes, T., Joos, A., Naidenko, O.V., 2020. Health and economic impact of nitrate pollution in drinking water: a Wisconsin case study. Environ Monit Assess 192, 724. https://doi.org/10.1007/s10661-020-08652-0.
Mazoyer, M., Roudart, L., 2006. A History of World Agriculture: from the Neolithic Age to the Current Crisis. Monthly Review Press, New York.
McGuire, J., Morton, L.W., Cast, A.D., 2013. Reconstructing the good farmer identity: Shifts in farmer identities and farm management practices to improve water quality. Agriculture and Human Values 30, 57–69. https://doi.org/10.1007/s10460-012-9381-y.
McMichael, P., 2009. A food regime genealogy. J. Peasant Stud. 36 (1), 139–169. https://doi.org/10.1080/03066150902820354.
Meijers, E., van der Wouw, D., 2019. Struggles and strategies of rural regions in the age of the 'urban triumph.'. J. Rural Stud. 66, 21–29. https://doi.org/10.1016/j.jrurstud.2019.01.027.
Meinch, Timothy, 2015. Water Works Votes to Sue 3 Counties over Nitrates. The Des Moines Register. https://www.desmoinesregister.com/story/money/agriculture/2015/03/10/utility-consider-pursuing-water-quality-suit/24728999/. (Accessed 24 March 2020).
Merchant, C., 1989. The death of nature: women, ecology, and the scientific revolution. Harper & Row, New York.
Mooney, P.H., Hunt, S.A., 1996. A repertoire of interpretations: Master frames and ideological continuity in US agrarian mobilization. Socio. Q. 37 (1), 177–197.
Mortensen, D.A., Smith, R.G., 2020. Confronting barriers to cropping system diversification. Frontiers in Sustainable Food Systems 4, 564197. https://doi.org/10.3389/fsufs.2020.564197.
Mutel, C.F., 2008. The Emerald Horizon: the History of Nature in Iowa. University of Iowa Press, Iowa City.
Nally, D., 2011. The biopolitics of food provisioning. Trans. Inst. Br. Geogr. 36 (1), 37–53. https://doi.org/10.1111/j.1475-5661.2010.00413.x.
Nally, D., 2016. Against food security: on forms of care and fields of violence. Global Soc. 30 (4), 558–582. https://doi.org/10.1080/13600826.2016.1158700.
Pellow, D.N., 2016. Environmental justice and rural studies: a critical conversation and invitation to collaboration. J. Rural Stud. 47, 381–386. https://doi.org/10.1016/j.jrurstud.2016.06.018.
Petroski, William, 2015a. Branstad: 'Des Moines has declared war on rural Iowa. The Des Moines Register. https://www.desmoinesregister.com/story/news/politics/2015/01/13/branstad-nitrates-war-rural-iowa/21722629/. (Accessed 10 December 2021).
Petroski, William, 2015b. Rural lawmaker calls for boycotting Des Moines over water works lawsuit. Des Moines Register. https://www.desmoinesregister.com/story/news/politics/2015/03/19/rural-iowa-boycott-des-moines/25024389/. (Accessed 14 December 2021).
Masters, C., 2016. Iowa's nasty water war. Politico Magazine. https://www.politico.com/magazine/story/2016/01/iowas-nasty-water-war-213551. (Accessed 10 December 2021).
Prokopy, L., K. Floress, D. Klotthor-Weinkauf, and A. Baumgart- Getz. 2008. Determinants of agricultural best management practice adoption: Evidence from the literature. J. Soil and Water Conserva. 63: 300–311.
Putze, A.. One-third of Iowa cropland Impacted by Monday Storm | ISA. Iowa Soybean Association. https://www.iasoybeans.com/newsroom/article/one-third-of-iowa-cropland-millions-of-bushels-of-grain-storage-adversely-impacted-by-monday-storm.
Reimer, A.P., Thompson, A.W., Prokopy, L.S., 2012. The multi-dimensional nature of environmental attitudes among farmers in Indiana: Implications for conservation adoption. Agriculture and human values 29, 29–40. https://doi.org/10.1007/s10460-011-9308-z.
Reimer, A., Thompson, A., Prokopy, L.S., Arbuckle, J.G., Genskow, K., Jackson-Smith, D., Lynne, G., McCann, L., Morton, L.W., Nowak, P., 2014. People, place, behavior, and context: A research agenda for expanding our understanding of what motivates farmers' conservation behaviors. J. Soil and Water Conserv. 69 (2), 57A–61A. https://doi.org/10.2489/jswc.69.2.57A.
Ribaudo, M., 2011. Nitrogen in agricultural systems: implications for conservation policy / Marc Ribaudo [and others]., Economic research report ; no. 127. U.S. Dept. of Agriculture, Economic Research Service, Washington, D.C.
Ribaudo, M., 2015. The limits of voluntary conservation programs. Choices 30 (2), 1–5.
Rissing, A.L., 2021. "We feed the world": the political ecology of the Corn Belt's driving narrative. Journal of Political Ecology 28 (1). https://doi.org/10.2458/jpe.2959.
Roberts, R.S., Lighthall, D.R., 1991. The Political Economy Of Agriculture, Ground Water Quality Management, And Agricultural Research. J American Water Resour Assoc 27, 437–446. https://doi.org/10.1111/j.1752-1688.1991.tb01443.x.
Robertson, G.P., Vitousek, P.M., 2009. Nitrogen in agriculture: balancing the cost of an essential resource. Annu. Rev. Environ. Res. 34, 97–125. https://doi.org/10.1146/annurev.environ.032108.105046.
Roe, E.M., 1991. Development narratives, or making the best of blueprint development. World Development 19, 287–300. https://doi.org/10.1016/0305-750X(91)90177-J.
Roesch-McNally, G.E., Basche, A.D., Arbuckle, J.G., Tyndall, J.C., Miguez, F.E., Bowman, T., Clay, R., 2018. The trouble with cover crops: Farmers' experiences with overcoming barriers to adoption. Renewable Agriculture and Food Systems 33 (4), 322–333. https://doi.org/10.1017/S1742170517000096.

Royte, Elizabeth, 2017. The simple river-cleaning tactics that big farms ignore. Food and Environmental Reporting Network, with National Geographic. https://thefern.org/2017/12/simple-river-cleaning-tactics-big-farms-ignore/. (Accessed 10 December 2021).
Sen, A., 1982. Poverty and Famines: an Essay on Entitlement and Deprivation. Oxford University Press, New York.
Shapiro, Mark, 2018. In the Heart of the Corn Belt, an Uphill Battle for Clean Water, vol. 360. Yale Environment. https://e360.yale.edu/features/in-the-heart-of-the-corn-belt-an-uphill-battle-for-clean-water-iowa. (Accessed 11 December 2021).
Shipley, N.J., Stewart, W.P., van Riper, C.J., 2022. Negotiating agricultural change in the Midwestern US: seeking compatibility between farmer narratives of efficiency and legacy. Agriculture and Human Values 39 (4), 1465–1476. https://doi.org/10.1007/s10460-022-10339-w.
Son, J.Y., Bell, M.L., 2022. Exposure to animal feeding operations including concentrated animal feeding operations (CAFOs) and environmental justice in Iowa, USA. Environ. Res.: Health 1 (1), 015004. https://doi.org/10.1088/2752-5309/ac9329.
Stuart, D., Houser, M., 2018. Producing compliant polluters: seed companies and nitrogen fertilizer application in US corn agriculture. Rural Sociol. 83 (4), 857–881. https://doi.org/10.1111/ruso.12212.
Thaler, E.A., Larsen, I.J., Yu, Q., 2021. The extent of soil loss across the US Corn Belt. Proc. Natl. Acad. Sci. USA 118 (8), e1922375118. https://doi.org/10.1073/pnas.1922375118.
Thompson, A.W., Reimer, A., Prokopy, L.S., 2015. Farmers' views of the environment: The influence of competing attitude frames on landscape conservation efforts. Agriculture and Human Values 32 (3), 385–399.
Tong, J., Zhang, W., 2023. Iowa farmland ownership and tenure survey 1982–2022: a forty-year perspective (working paper No. 23-WP 651). Iowa State University, Center for Agricultural and Rural Development.
USDA Economic Research Service, 2022. U.S. Agricultural trade at a glance. https://www.ers.usda.gov/topics/international-markets-u-s-trade/u-s-agricultural-trade/u-s-agricultural-trade-at-a-glance/. (Accessed 4 May 2022).
USDA National Agricultural Library, 2021. Corn belt. Thesaurus and Glossary. https://agclass.nal.usda.gov. (Accessed 14 December 2021).
USDA National Agricultural Statistics Service, 2018a. Table 1. State summary highlights: 2017. 2017 Census of Agriculture. https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_US_State_Level/st99_2_0001_0001.pdf. (Accessed 14 December 2021).
USDA National Agricultural Statistics Service, 2018b. "Table 8. Farms, land in farms, value of land and buildings, and land use: 2017 and 2012" 2017 census of agriculture. https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_US_State_Level/st99_2_0008_0008.pdf. (Accessed 14 December 2021).
USDA National Agricultural Statistics Service, 2018c. Table 34. Hogs and pigs. 2017 Census of Agriculture. https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/Congressional_District_Rankings/cdr_1_034_034.pdf. (Accessed 14 December 2021).
Vanclay, F., Enticott, G., 2011. The role and functioning of cultural scripts in farming and agriculture. Sociol. Rural. 51 (3), 256–271. https://doi.org/10.1111/j.1467-9523.2011.00537.x.
Varble, S., Secchi, S., Druschke, C.G., 2016. An examination of growing trends in land tenure and conservation practice adoption: results from a farmer survey in Iowa. Environ. Manag. 57, 318–330. https://doi.org/10.1007/s00267-015-0619-5.
Vos, N., 2017. Agricultural drainage and the Des Moines water works lawsuit. Drake J. Agric. Law 22 (1), 109 [viii].
Wallensteen, P., 1976. Scarce goods as political weapons: the case of food. J. Peace Res. 13 (4), 277–298.
Wenzel, J., 2020. The Disposition of Nature: Environmental Crisis and World Literature / Jennifer Wenzel, First edition. ed. Fordham University Press, New York, NY. https://doi.org/10.1515/9780823286805.
Weyer, P.J., Cerhan, J.R., Kross, B.C., Hallberg, G.R., Kantamneni, J., Breuer, G., Jones, M.P., Zheng, W., Lynch, C.F., 2001. Municipal drinking water nitrate level and cancer risk in older women: the Iowa Women's Health Study. Epidemiology 12 (3), 327–338.
Williams, R., 1975. The Country and the City. Oxford University Press, New York.
Woods, M., 2009. Rural geography: blurring boundaries and making connections. Prog. Hum. Geogr. 33, 849–858. https://doi.org/10.1177/0309132508105001.
Worster, D., 1994. Nature's Economy: A History of Ecological Ideas. Cambridge University Press, New York [1977.