2. The Agricultural Data Imaginary

Precision Farming's Reinforcement of the Productivist Approach to Agriculture

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Abstract

Big Data come with the promise of a better future. In the agricultural discourse on smart technologies and data-based applications in farming, so-called "precision farming" is envisioned as a "revolution" of traditional agricultural mass production of crops and livestock. Big Data are imagined as making the agrifood industry more efficient, more profitable, and more sustainable. Drawing on David Beer's concept of the "data imaginary" (2019), this chapter examines discourses on precision farming in corporate advertisements, lobbyist agricultural journals, and review articles in academic journals in the field of agriculture and computing. It argues that data-based agrifood production is seen as the next technological fix of the broken system of traditional industrial farming, while it in fact reinforces the devastating environmental and social damages that traditional industrial farming has caused.

Keywords: big data, smart farming, data imaginary, productivist agriculture, technological solutionism

While the famous metaphor of Big Data as "the new oil" of digital economies (e.g., van't Spijker 2014) has conclusively been criticized by a variety of academic commentators (c.f. Bucher 2018, 88), it is far from losing its social and discursive power in the business world and related sciences. On the contrary, the more data available and the more that data collecting technologies and practices proliferate, the more players in the looming data business invest in the development of new business opportunities based on the power of massive data-driven and algorithmically processed solutions (Beer 2019).

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As Stefania Milan and Lonneke van der Velden note, "Big data evokes a broad set of socio-technical phenomena enveloped in quasi-mythological narratives that univocally emphasize possibility and magnitude" (2016, 60). In the realm of Big Data, such quasi-mythological narratives create what David Beer (2018, 2019) has called a "data imaginary"—a presentation of "a series of problems and inadequacies to which data analytics are offered as the solution" (Beer 2018).

One of these sectors in which data-based technologies are presented as the solution is the agrifood industry. Agriculture accounts for 4% of the global domestic product (GDP) worldwide (World Bank 2020) and is responsible for more than 25% of the greenhouse gas emissions, mainly caused by livestock production (Willet et al. 2019). However, as the driving companies of data-based technologies in this sector claim, data-based solutions will help fix the most urgent food- and sustainability-related issues of our planet—once the sector embraces its data-driven future. An article published in *Forbes* in 2019 summarizes this imagination of a future datafied agrifood sector as follows:

> In just 30 years' time, it is forecasted that the human population of our planet will be close to 10 billion. Producing enough food to feed these hungry mouths will be a challenge, and demographic trends such as urbanization, particularly in developing countries, will only add to that. To meet that challenge, agricultural businesses are pinning their hopes on technology, and that idea that increasingly sophisticated data and analytics tools will help to drive efficiencies and cut waste in agriculture and food production. (Marr 2019)

Indeed, the "datafication" (Mayer-Schönberger and Cukier 2013, 78) of agriculture is imagined as making food production and distribution more effective and, consequently, more sustainable. This so-called "precision agriculture" (Carolan 2016, 138) is the "revolution" for which the agrifood industry is striving, supported by international governmental institutions (Zaruo-Tejada et al. 2014) and the applied sciences in this sector (c.f. Himesh et al. 2018; Sponchioni et al. 2014). In the Netherlands, one of the world's leading countries in this sector, precision farming already covered about 65% of the arable farmland in 2015 (Michalopulos 2015).

Addressing the digital revolution in industrial farming, Kelly Bronson and Irena Knezevic (2016) have advocated for critical data scholarship in food and agriculture. This critical scholarship would include research into how "the images circulating in the promotion of Big Data tools normalize

hegemonic farming systems" (3), as they argue with respect to manufacturing company John Deere's visionary *Farm Forward* marketing video from 2012. In this chapter, I discuss such images as an agricultural data imaginary that started forming a dominant discourse in public relations, journalism, and science in the agrifood sector since the 2010s. First, I discuss the theoretical background of my approach, inspired by the work of David Beer (2016, 2019), in addressing how we should understand and analyze the work of affirmative discourses on the revolutionizing power of data and corresponding industrial practices and institutions. I revisit two marketing videos from John Deere's *Farm Forward* campaign that promote smart farming in an imaginative way and can be seen as the popularizing representation of the data imaginary of precision farming. After this, I review two other types of sources in more depth to reconstruct the agricultural data imaginary: articles on smart farming in the lobbyist online magazine *Future Farming* and scientific literature review articles on precision farming published in academic journals during the past ten years. Like the *Forbes* article quoted above, the diverse types of sources unanimously represent data-based precision farming as a profitable solution for major environmental problems. At the same time, they legitimize and reinforce what is known as the "productivist" approach to agriculture (Kneen 1995). This shows that the data imaginary in agriculture has formed a powerful discourse that infiltrates all three areas thoroughly: public relations, specialized journalism, and academic research. In the final section of this chapter, I then critically discuss the role of the agricultural data imaginary in reinforcing the disastrous productivist approach to food production.

The aim of this chapter is twofold: it presents an approach to the Big Data discourse in agriculture and analyzes the politics of the Big Data imaginary in that sector. In other words, the data themselves are not the object of my analysis but rather the discourse on the data-based agricultural technologies and applications. In doing so, this chapter develops a media studies perspective on Big Data in agriculture that critically discusses a blind spot in agricultural science that neglects the discursive work of Big Data. This focus on discourse and the data imaginary implies that I will not discuss the current developments of data-driven precision farming in depth (c.f. a short overview in Carolan 2015, 137ff. and in more detail García et al. 2020; Miles 2019; Sponchioni et al. 2014; Wolfert et al. 2017). Herein I follow David Beer's suggestion that it is the data imaginary that legitimizes and shapes data-led practices. However, as my findings show, the data imaginary as described by Beer is not universal but develops situated sets of ideologies legitimizing datafication in different sectors.

The Data Imaginary as Productive Discourse

The meaning of Big Data technologies is created in narratives and practices that situate these technologies in concrete everyday contexts. I draw on David Beer's (2016, 2018, 2019) work on discourses of Big Data, conceptualizing the "data imaginary" not just as the communicative "mirror" or "overflow" of actual Big Data practices in social, political, or economic reality, but as a productive power in shaping data-driven practices. Taking Foucault's *Birth of the Clinic* as a model, Beer explores in *The Data Gaze* "how data-led processes spread, how data-informed knowledge is legitimated and how this industry approaches and frames data" (2019, 1). Particularly the latter is consequential, since, as Beer emphasizes, mythological discourses on Big Data fed by the ideology of technological solutionism (Morozov 2013) are critical for the introduction and adaptation of data-driven technologies in the business world. Following Beer's discourse analytical approach, it is these mythological discourses and their rationales— defined as the "data imaginary"—that shape the realities and practices of Big Data:

> The data imaginary can be understood to be part of how people imagine data and its existence, as well as how it is imagined to fit within norms, expectations, social processes, transformations and ordering. (2019, 18)

With his concept of the "data imaginary," Beer draws on Charles Taylor's elaboration of "social imaginaries" as discussed in the book *Modern Social Imaginaries* (2004). Taylor defines "social imaginaries" as the ways people imagine their social world, including how they interact, communicate, and expect their environment to act based on shared norms and values. Social imaginaries thus have the power of ordering the social world and people's interactions, and they lend legitimacy to shared social practices. Beer's conceptualization of the data imaginary is designed to:

> reveal the embedded rationalizing discourses that are deeply woven into data analytics. This rationalizing discourse—which reflects wider norms, modes of calculative thinking, forms of governance and political ideas—is doing a significant amount of work to shape the integration and realization of data analytics in different settings. (2019, 7)

As I show in the following sections, Beer's concept of the data imaginary is instructive in identifying the features of the agricultural data imaginary as they are promoted in the productivist discourse on smart farming. However,

instead of departing from the six characteristics that Beer (2019) distilled from Big Data industries' self-promotion—namely "speedy," "accessible," "revealing," "panoramic," "prophetic," and "smart"—my analysis follows a bottom-up approach to unravel the specificity of the data imaginary in the agrifood sector. In the following section, I take a closer look at how two promotional videos by the machine and smart technologies manufacturer John Deere envision future farming.

Imagining Future Farming with John Deere

In agricultural production, data do not occur as side effects of everyday activities and interactions, unlike in computing, internet, and social media, domains that are the focus of most scholarship on Big Data within Media, Data, and Communication Studies (c.f. van Dijck 2014). One of the major developers and advocates of data-based precision farming is the John Deere company, the largest agriculture machinery producer worldwide founded in 1837 in Grand Detour, Illinois. In 2012, the company started equipping their agricultural machines with sensors to collect data about soil quality and crop condition and connect these data with other sets of information about weather, agricultural markets, and price developments (van Rijmenam 2013; Carolan 2017). To promote their data-driven systems of precision farming, John Deere launched a marketing campaign under the slogan "farm forward" that same year (Bronson and Knezevic 2016).

Central to this campaign was a video entitled *Farm Forward* illustrating the company's vision of data-based precision farming of the future. This six-minute video (John Deere 2012) establishes what the end title articulates below the company's yellow-green brand logo: "The future of farming is in sight." It describes the start of a day on a future farm. In this futuristic vision of farming, smart technologies and linked data processed by John Deere's platform have completely replaced heavy physical labor on the farm. A farmer's job is to make decisions based on the suggestions from the proprietary system that processes huge amounts of diverse data. With this algorithmically generated information, farming, it is suggested, becomes more effective, productive, and secure. Farmers can adapt to local circumstances such as weather, soil quality, and the growth of crops in real time, but the system also calculates external information about developments of markets and prices. In this vision of the future, the labor of farming is depicted first and foremost as managing information in a somewhat sterile environment. Except for a short virtual exchange with

his son out on the fields, the only human trace in this technology-loaded vision are the automatic female voices of John Deere's platform *Farm Site*.

While the first *Farm Forward* video from 2012 depicts a mix of already available and envisioned technologies linked to the virtual John Deere platform, the level of sci-fi in the 2019 video is far smaller. Most of the depicted technologies and services were up and running at this point and only some of them were still under development. What is called "The John Deere Farm Site" in the 2012 video was launched in that same year as the *MyJohnDeere.com* platform, designed to collect huge amounts of data from the buyers of John Deere's equipment and services. Combining these with weather and market data, the platform allows one to optimize production based on algorithmic calculations. In this respect, John Deere's strategy can be seen as a perfect example of what boyd and Crawford have identified as the "deep government and industrial drive toward gathering and extracting maximum value from data" (2012, 675).

The 2012 video was not well-received by its target group. Farmers felt that they were reduced to white collar workers that manage information instead of being in touch with nature, animals, and machines. As John Stone, SVP of John Deere's Intelligent Solutions Group (ISG), stated in an interview with Bernard Maar (2019), "the farmer has been the primary "sensor" on a farm for years – and so much of farming is visual." However, in John Deere's vision of the future, smart technologies take over and do a better job than any farmer before.

Not surprisingly, the 2019 revision of the video with the title *Farm Forward 2.0* (John Deere 2019) created a more lively and communicative representation of future farming that included women and family life on the farm. This time, the video starts with a scene where the farmer and his wife are out in the fresh air observing the rain falling on their fields and discussing how to approach the new day's tasks. The futuristic displays from the first video have shrunk to a real-size portable tablet that now provides the necessary data-based and algorithmically processed information. Life on the farm is represented in a more traditional, pastoral way, while the technology and data-based innovations are implied in emphatic interpersonal communication between human actors. The farmer interacts with John Deere's smart farming platform on a virtual screen in his pickup truck, suggesting that he is still out in the fields and in contact with nature. The scenes now include automated processes such as tractors performing a software update during the night or smart self-riding "see and spray systems" that apply pesticides effectively at night while the farmer's family is enjoying rest.

With few newly developed smart technologies and machines added, the 2019 video articulates the same discourse that Bronson and Knezevic have identified in the first video of the campaign as a traditional "productivist" approach to agriculture. More precisely, John Deere's vision of future farming implies claims of enhanced efficiency, security, resilience, and—new and rather explicitly in the second video from 2019—sustainability, while at the same time advocating a traditional productivist approach. This traditional productivist approach has been criticized for creating a treadmill of production and profit maximization (Ward 1993) and is, as Geoff A. Wilson argues, "strongly rooted in memories of wartime hardships" (2001, 79). It has resulted in an unsustainable system of industrial overproduction of food in the global West, causing massive health issues and irreparable environmental damage (Willet et al. 2019) while leaving significant parts of the world population with draughts, malnutrition, and starvation (Bronson and Knezevic 2016, 3). However, as the *Farm Forward* campaign imagines, future data-based farming technologies will help to fix at least the environmental problems. In the next section, I discuss lobbyist discourses in the agricultural magazine *Future Farming* before I analyze exemplary academic review articles on precision farming.

Agricultural Data Imaginary in the Expert Magazine *Future Farming*

Future Framing is an online platform and magazine that, according to its own marketing, forms the "gateway to the world of smart farming" (www.futurefarming.com). Together with several "content partners" in the precision agrifood industry, it covers and promotes smart technological and data-based innovations in the agricultural production chain. Along with the website *Future Farming*, it runs four other websites with expert and industry information about innovations in diverse sectors of livestock production: *Pig Progress*, *Dairy Global*, *Poultry World*, and *All About Feed*. The platform's close connection to the industry is not seen as problematic but is instead featured as an asset: well informed experts from the smart agrifood industries regularly publish on these platforms, including *Future Farming*. For this chapter, I have reviewed articles published in the section "Smart farming" that address data-related innovations and Big Data.

Ofir Schlam's commentary on the "4 ways big data analytics are transforming agriculture" (2019) can be seen as exemplary of *Future Farming*'s discourse. It states from the start that "[d]ata-driven farming is on course to reshape the entire agricultural economy." The author, president, and co-founder of Taranis,

a company offering AI and machine learning systems for precision monitoring crop growth (including stand count, insect damage, weed detection, nutrient deficiencies disease pressure; https://taranis.ag), identifies the following four aspects of the data-driven transformation of the agricultural economy:

1. Boosting productivity and innovation
2. Managing environmental challenges
3. Cost savings and business opportunities
4. Better supply chain management (Schlam 2019)

These four aspects cover all dimensions of a productivist discourse: Big Data guarantee that production becomes more efficient, fertile, and sustainable and will be more profitable for those who embrace the new data-led technologies. In his explanation of the four aspects, Schlam reproduces typical tropes that regularly surface in *Future Farming*'s coverage of data-driven solutions:

– The growing world population and "global food demand"
– Better management of "key resources including seed, fertilizer, and pesticides" implying that fewer resources will be wasted during the production process
– The claim that data from soil and plant sensors "gaining unprecedented visibility" outperform the farmer's eyesight
– The possibility to adapt to "climate change and other environmental challenges"
– More income and thus the opportunity to save money and manage risks of volatile markets
– A supply chain that "will be better equipped to tailor their product offerings and services according to the needs of the agricultural market"

The final statement of the article summarizes all the central tropes of this discourse as follows:

> That's the benefit of precision agriculture and data-driven farming: It doesn't just make farmers smarter, more productive, and more efficient. It's on course to reshape the entire agricultural economy—and to help feed billions of people in the process. (Schlam 2019)

It is not surprising that Schlam, as a representative of a start-up in precision farming, reproduces a discourse that promotes data-driven technologies as the solution to challenges that extensive industrial mass production

of crops and livestock in the Western world have caused. These ideas are typical for the professional discourse in this field, as a study based on forty interviews with US farmers by Christopher Miles (2019) has demonstrated: "Big data, and automation will create more accurate, efficient, transparent and environmentally friendly food production," as Miles (2019, 1) summarizes the farmers' beliefs. However, this discourse implies that diets will not change, that populations and up-and-coming economies will follow Western patterns of food consumption, and that industrial agriculture will remain the standard form of the production of food. Before addressing the problematic dimensions of this productivist discourse, I will have a short look at the academic discourse reviewing studies on the development of data-driven precision agriculture.

Big Data Imaginary in Scientific Literature Reviews on Precision Farming

It is not surprising that lobbyist publications promote big farming companies' vision of and approach to data-based precision farming technologies and solutions. However, one might expect a different discourse in scientific publications on Big Data in agriculture. And indeed, papers and statements linked to alternative, sustainable agriculture and the *Right to Repair* movement (Bloomberg 2017; Carolan 2016; Wanstreet 2018) indicate that there is a critical scholarship regarding the social and economic consequences of data-based precision agriculture. However, my analysis of articles published in leading academic journals in agronomy reveals a dominantly affirmative discourse embracing and reproducing the industrial Big Data imaginary of precision farming. My sample is taken from the extensive bibliometric literature review of the "Digital Agricultural Revolution" by Bertoglio et al. (2021). I will examine one article that I find exemplary of this as the main source for my analysis.

In their review of academic literature on "the use of machine learning in precision livestock farming" of the past 10 years, Rodrigo García et al. (2020) introduce precision livestock farming as the "fourth industrial revolution, also known as Industry 4.0" (1) and summarize its main advantages as follows:

> (i) to identify the most appropriate livestock feeding, (ii) reduce environmental impact through efficient management, (iii) manage crop processes to make a perfect synergy with livestock feeding, (iv) ensure food safety through traceability [...] of products, and (v) improve animal health and crop efficiency. (García et al. 2020, 1)

It is immediately obvious that this condensed overview, based on publications in scientific journals over the past ten years, reproduces the typical tropes of the productivist discourse: enhanced efficiency including synergy between different sectors, enhanced food security, enhanced health of livestock and crops, and enhanced sustainability. Sustainability relates in this context specifically to "improved productivity," which is enabled by adequate data management. Obviously, the data imaginary also here does its discursive work:

> To improve efficiency, it is essential to, correctly, manage data generated every day in livestock farms [...]. A correct data management can result in improved productivity, in terms of grazing lot management, livestock nutrition, and animal health. (García et al. 2020, 1)

Again, the argument is that connected data sensors can deliver Big Data information in real-time that generates better insights than a farmer could access ever before, since in

> traditional livestock farming, decisions are often based—only—on the experience of the producer. In PLF [precision livestock farming; E.M.], such decisions are based on quantitative data, such as liters of milk per milking. In addition, quantitative data can be obtained in real-time. To obtain and study such data, PLF systems use data analysis, *machine learning* (*ML*), control systems, and ICT. (García et al. 2020, 1)

And the central legitimizing trope of data-based precision farming is not missing in the introduction to this literature review:

> At present, PLF seeks, through technological solutions in agricultural livestock production systems, to supply adequate food for the expected world population of more than nine billion inhabitants by 2050 [...]. (García et al. 2020, 2)

This claim then is supported by repeating the argument that precision livestock farming will also enhance sustainability by improving animal health, and it is then added that

> PLF allows producers to maintain an optimum number of animals per farm, find prompt solutions to animal diseases, and define a more efficient production model. (García et al. 2020, 2)

Again, the trope of sustainability is linked to the tropes of productivity and efficiency, which means optimizing the livestock per farm. Although, technically speaking, that could include reducing the number of animals per square meter, it seems that this sentence does not suggest this rhetorically. More radical steps towards enhanced sustainability, like the reduction or the abolition of livestock production, are certainly not what this productivist discourse proposes. On the contrary, the trope of the growing world population again functions as the rational and moral legitimation of an intensified productivist approach to farming.

My review of a broader sample of literature largely showed the same patterns: productivist discourses based on the Big Data imaginary prevail and exclude critical voices in the discussion about the sustainability of the industrial mass-production of food (e.g., Himesh et al. 2020; Wolfert 2017). This is the case despite mass production of food being responsible for major damage of the environment and of the health of human and nonhuman animals (c.f. Willet 2019). Such exclusion seems to be the most powerful discursive effect of the amalgamation of the agrifood industry's data imaginary with the discourse of productivist industrial production. There seems to be no alternative, since data-based precision farming is imagined as more effective and at the same time more sustainable than traditional, analogue farmer-based agriculture.

However, as I show in the final section of this chapter, there are also critical and alternative voices addressing problematic ownership-related and environmental implications of this productivist data imaginary. Theses voices are rooted in different scholarly traditions, such as the sociology of food and agriculture (c.f. Carolan 2022), political economy and environmentalism (Dauvergne 2020), and critical data studies (Bronson 2022; Bronson and Knezevic 2016; Wanstreet 2018).

Productivist Data Imaginary Reinforcing Unsustainable Food Systems

As discussed above, Ofir Schlam's commentary on the "4 ways big data analytics are transforming agriculture" (2019) describes John Deere as an exemplary company helping farmers with their innovative technologies and access to Big Data to increase their production by 30%. John Deere's services work not only with data generated by the individual farmer covering his own soil, seeds, and plants, but, as Schlam emphasizes, "the portal also includes data from outside sources, including other farmers, offering insight into

productivity under a wide range of conditions" (2019). John Deere owns these data, and though the company has signed the *Privacy and Security Principles for Farm Data* formulated by the American Farm Bureau, commentators expect that the services will in fact turn out to be a closed system on which farmers will be dependent once they have subscribed to the services. As Rian Wanstreet comments in an article discussing John Deere's policy:

> Equipment manufacturers know their customers will find it almost impossible to leave their precision agriculture data platforms once they've joined, and almost as hard to stay away. […] The general belief is that those who buy-in to a precision data platform will have no choice but to stay in, and as more come onboard, the more it will seem that everyone *has* to join. Think about it like Facebook, but for agricultural equipment. (2018)

This view is supported by a sociological study by Michael Carolan, who interviewed fourteen professionals involved in the large-scale precision agrifood industry and nineteen regional food entrepreneurs engaged in making precision farming accessible for sustainable small-scale farms. As Carolan shows, representatives of the large-scale agro industry believe in Big Data as "the next 'big thing'" (137), while those involved in regional or local initiatives trying to adapt smart technologies for sustainable farming and food products are critical of the proprietary systems that will reinforce and probably intensify farmers' existing dependencies on the dominant, globally operating companies. As one representative of a precision tech company stated in one of Carolan's interviews,

> Farmers needn't to worry about losing control of the data. […] What we provide, and what we want farmers coming back for year in and year out, are our tools, our platforms, algorithms, and our expertise. (2016, 147)

However, when Carolan then asked whether farmers would become dependent on the data-based services and thus be forced to come back, the industry representant's self-confident, if not threatening, answer was: "It's always their choice. If they want to remain profitable, they'll keep coming back" (2016, 148). Not surprisingly, entrepreneurs in regional or local food initiatives, aimed at challenging the dominant productivist food system using AI to support sustainable developments, expressed their concerns about farmers' intensified dependencies once they have subscribed to corporate systems of data-based precision technologies, even if this is accomplished in vague terms of community building.

Like Carolan, Peter Dauvergne (2020) emphasizes in his book *AI in the Wild* (2020) that farmers who subscribe to the technologies and services of John Deere or other leading precision farming companies would be locked into the company's system and would become totally dependent on that company's policy. This was already John Deere's business model—heavily criticized by the *Right to Repair* movement—in the analogue era with their "hardware," the agricultural machines. No external service, and not even farmers themselves, were allowed to fix a broken machine from the John Deere company. Not surprisingly, the *Right to Repair* movement also fights John Deere's data policy that copies the company's infamous "hardware" policy (Bloomberg 2017). The movement has since proliferated widely to other sectors including ICT and was recently picked up as a European Union directive (Hernandez, Miranda, and Goñi 2020).

However, buying a John Deere means to subscribe and pay for the company's services. As the *Farm Forward* videos by John Deere illustrate, too, farmers using the "John Deere Farm Site," or in the real world the MyJohnDeere.com platform, are attached to the company's services. These include not only selling agricultural equipment, seeds, fertilizers, pesticides, and fuel, but also providing loans for buying these resources or leasing new, expensive data-ready equipment (Wanstreet 2018). What the *Farm Forward* videos and Schlam's article imply are the new dependencies for farmers: dependencies on the "needs of the agricultural market"—as Schlam (2019) addresses these—are shaped by the mayor players on that market, with John Deere being one of these mayor players ready to exploit the new dependency of the individual farmer.

This, too, is an effect of the power of the pervasive Big Data discourse on productivist agriculture that Dauvergne discusses from a critical political economy perspective in *AI in the Wild* (2020). While acknowledging the potential role of AI for the future of global sustainability (2020, 112), Dauvergne also points to "a risk of smart city and farming technologies reinforcing global forces of unsustainable consumption and production." (102) With the enhanced dependency of farmers on technological innovations and on data-based governance and the big transnational conglomerates in the agrifood industry, Dauvergne sees precision farming as a powerful discourse that will foster the traditional productivist approach to agriculture. As he states,

> [...] more often than not, the environmental gains from the commercial applications of artificial intelligence are rebounding into greater extraction, production, and consumption, doing more to prop up failed models of technocratic management than truly advance global sustainability. (2020, 10)

And while smart agriculture cannot "fix the broken system" (2020, 113), i.e., the unsustainability of the global extractive agrifood industry, the data imaginary of precision farming has generated a powerful discourse that supports this very broken system by promising that AI and Big Data in the sector will solve one of mankind's most urgent problems: feeding a growing world population while respecting the limits of our planet. This powerful discourse is today evident in the institutionalization of systems that companies such as John Deere or Monsanto, now acquired by the German multinational pharmaceutical and life sciences company Bayer, have developed. It is evident in agricultural equipment such as drones that scan the soil, and in self-steering tractors that do the sowing and the harvesting on the fields. And it is manifest in governmental policies (e.g., Zarco-Tejada et al. 2014) and managerial and financial infrastructures that push data-based precision farming as the only futureproof approach to agriculture. Rian Wanstreet therefore speaks of the momentum of a "'treadmill-like' discourse that prevails in industry" (2018).

Conclusion

As I have shown, the particular data imaginary of precision farming comprises the tropes of enhanced effectivity, accuracy, safety, and thus profitability and links these to the topics of sustainability, climate change, and of the moral obligation to care about a vast, growing world population. These three topics, perhaps the most urgent global issues, are thus presented as the core problems for which data-based precision farming is presented as the solution. Or as David Beer has put it when referring to the promotional discourse of the data analytics industry:

> A life without data is left unimaginable, and a life with data is glossy, shiny, and full of hope. That is the image that is conjured. The result is that data analytics become much harder to turn away from. (Beer 2018)

The same principle applies for agriculture where production without data-based precision farming is left unimaginable, although the legitimizing ideologies are situated in the particular sector: not only will farming be more effective and a farmer's life "shinier" and without all the uncertainty of traditional farming, data-based precision farming will save mankind and our planet. This agricultural data imaginary is widely shared amongst industry representatives, lobbyists, policy makers, and academic experts

in agricultural science. It is an imaginary that must be deconstructed vis-à-vis the devastating effects of productivist agrifood industries in the Anthropocene: deforestation, overfertilization, pollution of water and soil, greenhouse gas emission, climate change. These problems result in ever more draughts, wildfires, floods, and famines particularly, but not only, in less developed regions of the world.

Bronson and Knezevic (2016) are right: we do need a critical data scholarship in food and agriculture that includes a media studies–inspired critical perspective on the discourses of Big Data in agrifood production (cf. Miles 2019). We need to ask critical questions about which players embrace and develop data-based technologies; how existing infrastructures transform by being datafied and what new infrastructures emerge; what discourses promote and structure these transformations; and what are the societal and, in the specific case of this chapter, environmental effects. Those are questions that a critical data scholarship poses when discussing the Big Data discourse. For a critical analysis of the politics of the Big Data imaginary in the agrifood sector, Beer's approach is instructive, as I have shown in this chapter with regard to the productivist discourse in agriculture. The concept can be applied as a critical analytical tool to other fields of society where data-led transformations, based on the ideology of technological solutionism, are embraced as the "next big thing." The danger is that such transformations do reinforce existing unsustainable, undemocratic, and discriminatory systems.

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