Food, digital life, and new environment-development dynamics

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Abstract

This chapter calls attention to new connections between digital technologies and food that can be found all across the world. It scrutinizes these developments against the light of an environment-development nexus engineered by mainstream development theorists, which assumes that an embrace of digital technologies in and across food systems will boost "development" and reduce the environmental impact of "modern" agricultural practices. The chapter uses materials on emerging configurations in the digital-infused food system to probe the possibilities for critical subjects to blend technical proficiencies to create alternative, conceivably more just, digital futures than those called forth by the well-established and many new firms using digital devices and services to generate and capture value across the food system.

Introduction

All stages or components of the global food system – food production, food processing, food distribution, and ultimately consumption – are in the purview of well-established, and now many new, firms looking to use digital devices and services to generate and capture value across a system infused with digital technologies. A new, digital, and more integrated food system is in formation (Bronson and Knezevic 2016; Fraser 2019a). Consider Brazil. Against a wider backdrop in which new food delivery firms are emerging, such as Deliveroo, JustEats, and UberEats; the Brazilian food delivery company iFood announced in late 2018 that it had raised $US500 million in funds (Mari 2018). iFood runs a smartphone "app," which links consumers in Brazil, Argentina, Mexico and Colombia with restaurants and arranges deliveries. The money will be invested to improve logistics – it currently processes almost 400,000 orders per day but has room to expand – and develop the firm's underlying technologies, such as artificial intelligence (AI) and voice recognition. The funding is a boost to iFood and complements its successful social media strategy, which cuts across Facebook, Twitter, YouTube, and Instagram and connects it with 2.6 million "followers" or "subscribers" to whom it can send messages, write posts, or create media such as videos or photographs. By using social media in these ways, iFood joins numerous other food firms such as Coca-Cola and McDonald's who work on platforms such as Facebook to market 'ultra-processed' food products (e.g. see Monteiro et al. 2013) via "videos, celebrities, gift offers and rewards" (Horta et al. 2018, 1516). Unlike marketing via television, the digital landscapes of social media platforms offer food firms continuous and round-the-clock access to consumers. Digital life – played out on smartphones and using a wide and growing range of services – alters how food is marketed, distributed, and indeed produced, with many of Brazil's agricultural systems incorporating digital technologies for "real-time quality monitoring in vineyards, fruit crops, and coffee as well as in the transportation of food products"

(Pivoto et al. 2017, 26). There is still significant scope for further integration of digital technologies if hindrances are addressed, such as a poor telecommunications infrastructure. The digital is undoubtedly a growing factor in Brazilian food systems.

Although there are inevitably peculiarities about the Brazilian case, the picture emerging therein calls attention to new connections between digital technologies and food that can be found all across the world. In “majority world” contexts and in wealthier regions such as North America and Western Europe, new arrays and combinations of diverse digital technologies are taking shape to alter, if not transform, food systems. Autonomous machines, opaque algorithms, and smartphone apps are in play alongside consumers and the trillions of clicks, taps, swipes, and “likes” they make. In turn, new environment-development dynamics are called forth and demand critical attention.

In response, I begin this chapter by arguing that the integration of digital technologies in food systems should be seen against the light of an environment-development nexus engineered by mainstream development theorists, which assumes that an embrace of digital technologies in and across food systems will boost “development” and reduce the environmental impact of “modern” agricultural practices. I subsequently use materials on emerging configurations in the digital-infused food system – a system guided by data, controlled by artificial intelligence (AI), and conceivably generating profits for giant food firms; a system involving so-called “smart farming” on the land and numerous other digital practices beyond the farm – to question these assumptions. Finally, as I outline in the concluding section of the chapter, I argue that digital life interacts with food systems in some ways that depart from a strict business-as-usual interpretation. Of central importance here is the contingent nature of digital life. Indeed, digital life takes shape, in part, via "data curation" by digital subjects, which includes actions by critical subjects capable of blending technical proficiencies to create alternative, conceivably more just, digital futures. Forthcoming conditions are still, as-yet, unwritten. Using data curation as a form of resistance stands some chance of success, despite the powerful array of forces trying to use digital technologies to create a predictable and closed-off future.

Development, food, and environment

Dominant mainstream development theorists – whether they are calling for interventions per Rostow's modernization theory or deregulations per Friedman's version of neoliberalism – agree about the need for technological development in food systems. One component in this consensus is the existence of "yield gaps" between capital-intensive systems in North America or Western Europe and 'traditional' systems in majority world contexts (e.g. see World Bank 2007). The core assumption is that traditional systems and their associated environments require transformation, for example via an embrace of "Green revolution" technologies such as hybrid seeds, irrigation, and synthetic fertilizer; or via use of "Gene revolution" techniques to alter the inherited properties of plant DNA. A related component concerns integrating food systems within value chains, for example by linking the producers of non-traditional agricultural exports with foreign supermarket chains promoting a "permanent global summertime" (Blythman 2004). In this view, the production and re-production of a *global* food system requires the development of standards, new knowledge flows, and ultimately an ongoing overhaul of technical practices that transform socio-ecological relations.

If an expanded food supply is one key outcome of all these moves (Food and Agriculture Organization 2018a, 46), another is growing corporate control over the food system. There are still producer-run cooperatives; nationalized agricultural marketing boards; publicly-funded agriculture and food research laboratories; and extensive systems of state subsidies. But the general drift has been towards the formation of a "corporate food regime" (McMichael 2005) in which trade, regulatory, and subsidy arrangements are designed or heavily influenced by, and inevitably disproportionately benefit, a small group of large and powerful firms (for an up-to-date analysis, see IPES-Food 2017). In public pronouncements – often while proclaiming the value of their corporate social responsibility initiatives – these firms emphasize how the environment and human health are their first priorities. However, critics point out that the corporate food regime expands via ongoing efforts to privatize the commons (e.g. see Kloppenburg 2004), displace traditional practices (seed saving, mixed cropping, etc.) (e.g. see Wittman et al. 2010), and simplify complex environments and ecologies (e.g. see Weis 2007).

Digital technologies come into play here as simply the logical next step in a broader process of deepening technical sophistication and system-wide integration and coordination led by food firms. Their potential is celebrated by development theorists because digital technologies should increase the food supply, thereby reducing inflation, and their use will boost “development” as measured by increased investment, greater technical proficiency among populations, or simply growth in Gross Domestic Product. Digital technologies might also help food production keep pace with global population growth and rising incomes. Official measures of absolute poverty and (albeit, crude) figures on GDP per capita in “developing” countries demonstrate that incomes have improved since the 1970s and 1980s. With even the poorest people on the planet enjoying more disposable incomes, there has been a concomitant increase in demand for animal protein, which expands the “meatification” of human diets, a major characteristic of dietary shifts in wealthier societies over the last half a century (Weis 2013). With many observers concluding that the planetary agricultural system will need to rapidly increase outputs (e.g. Food and Agriculture Organization 2018b), digital technologies are proclaimed as part of the solution.

Then, with regards to critiques of the corporate food regime – specifically, that reliance on “industrial” agriculture pivots on the over-use of agri-chemicals such as pesticides or the use of antibiotics in livestock farming – proponents of digital technologies suggest there is potential to create adjusted, conceivably more sustainable practices that reduce negative impacts (e.g. see Balafoutis et al. 2017). At the same time, the incorporation of digital technologies in food systems – to pursue, as the European Union describes it, “digitalisation” (European Commission 2019) – is presented by some observers as a way to improve efficiencies, for example by reducing food waste, or to increase the nutritional content of food by empowering firms to know their customers and thereby produce products that can satisfy a desire for balanced diets. In view, therefore, is a food system infused by sensors, “bots,” and artificial intelligence; a system in which digital technologies are mobilized and exploited to maximize the potential of the “circular economy,” which recycles resources across production, distribution, and consumption (Jeffries 2018). In a celebration of the market’s ability to (eventually) strike a balance between the environment and development, some scenarios even depict a food system infused with digital technologies, such as blockchain, that *regenerates* environments, while simultaneously boosting the food supply (e.g. see Nori 2019). At issue are emerging dynamics to the environment-development nexus engineered by mainstream development theorists: the core claim is that digital technologies can reduce the environmental impact of “modern” agricultural practices.

But the emergence and growth of digital technologies raises the prospect of entirely new dynamics taking shape that call into question a lot of what we know about the relationship between environment and development. On the technological horizon are advanced waves of artificial intelligence using techniques such as “unsupervised predictive learning” (Anthes 2017, 20) that will move far beyond the actions occurring mostly behind-the-scenes today in business processes. AI looks set to gradually begin occupying the main stage of social life due to its “ability to extract value from unstructured data [and thereby] help us find answers to some of our biggest problems, such as fighting disease, providing food, energy and water security, keeping well ahead of the effects of climate change and managing ever more complex algorithm-centric economies" (Curioni 2019, 10). Amplifying the extant and emerging drive to compute and control space via algorithmic machinations intended to boost profits (e.g. see Zuboff 2019), new forms of AI will look to reform the environment and re-position the lives of all populations (Tegmark 2017). Per the technological optimists, certain environments could flourish if AI deems it beneficial to protect or conserve species or biodiversity (Curioni 2019). Such a vision goes far beyond the hope that digitalization will lead to reduced use of agricultural pesticides, say. Instead, it posits that AI will see a more abstract picture of the planet's future and accordingly activate socio-technical relations in ways to create an idealized equilibrium of human and non-human life.

Per some critics, however, far too many humans could occupy a marginal position in these scenarios (e.g. see Häggström 2018). The obvious danger with regards to food systems pertains to the position of smallholders or peasant producers producing food on small portions of land and remaining relatively independent of corporate control. In play here is an emergent "planetary cognitive ecology" (Hayles 2017) underpinned and driven by AI, which will mobilize and mold cognitive processes occurring within machines and people with a view to constructing a more predictable world. "Development" shifts gears to become a matter of expanding AI's knowledge about the future. The environment, as a space of non-human action, which is to be drawn upon by humans operating within social structures, is a source of uncertainty and contingency that should be populated by sensors and modeled and adjusted by algorithms. To the extent the environment can interrupt action and flows within the purview of AI, its latent capacities should as much as possible be held within certain parameters.

Digital technologies are therefore foundational to the expanded subordination of the environment to development. The basis for this effort consists of technocratic dreams (e.g. on the dream of "solutionism," see Mozorov 2013); but in contrast to the visions of *possible* future economic growth that modernization theorists or practitioners might have had when they drew up plans to construct dams or build new port cities, the drive to expand AI is about eliminating possibility and creating *certainty*. The soil bulldozed to make dams or reclaim land from the sea in the 1960s or 1970s – and all of the other environments altered for the sake of development – was moved in the hope it would pay off. It was development over environment but without certainty, because the environment-development relationship *here* in *this* place was unfolding in relation to a wider geography. The "chance of space" (Massey 2005, 111-117) intervened and many projects went awry (e.g. see Stiglitz 2002). In 1960s Afghanistan, for example, the Helmand Valley Authority implemented an ambitious dam project funded by the United States, which led US planners to dream of creating "an America-in-Asia"' (Arnold Toynbee, quoted in Cullather 2010, 108). However, subsequent Green Revolution developments, with irrigated high-yield seeds fed by fertilizer, were confounded and ultimately overcome by the local topography, national politics, international geopolitics, and global climatic patterns (Cullather 2010, 108-133). Development negotiated unpredictability. The difference today is that the soil to be moved now or in the future, or the environments to be transformed for the sake of development, will be underpinned by a drive not to negotiate but rather to *eliminate* the chance of space. Digital life permits firms to collect and analyze data; to understand patterns and make appropriate predictions. The dream is to increase knowledge about the future; to chase after "guaranteed outcomes" (Zuboff 2019).

Digital life and food systems: Emerging configurations

In light of the issues raised above, it is helpful to consider some of the emerging configurations. I first examine smart farming before addressing the impact of digital technologies on food marketing.

Smart farming

Incorporation of digital technologies in agricultural systems gives rise to the term "smart farming," which is intended to be the rural corollary of the "smart city" (e.g. see Shelton et al. 2015). It is a development of earlier rounds of investment under the label of "precision agriculture," which involved using technologies to maximize the effectiveness and efficiency of inputs (Wolf and Buttel 1996). The major factor that converts precision agriculture into smart farming is the integration, rather than occasional inclusion, of digital technologies. The underlying idea is that entire systems are (amenable to be) populated by digital technologies in the form of sensors, in particular, and wider monitoring and reporting systems tied into off-farm agricultural technology providers

(ATPs). In theory, smart farming systems should lead to higher yields per unit of land as well as higher yields per unit of inputs such as fertilizer or pesticide.

In terms of its geography, smart farming is a growing feature of capital-intensive farm operations globally. But a crucial dynamic here is that the underlying technologies consist of devices and services that need not be beyond the reach of even some of the world's poorest farmers. Economies of scale in manufacturing are driving down the sale price of sensors. Moreover, some of the software farmers might use is available in free or open source formats developed by non-profits or volunteers. A final element is the business model of software firms demonstrates the value of providing services to customers for free but under the condition that firms can collect and use data generated by users with a view to improving services and developing products. Even some of the world's poorest farmers will be able to access relatively useful digital services if they own a digital device such as a smartphone. As such, the emerging configurations of smart farming point toward a planetary development.

To the extent that smart farming involves the production of socio-ecological data by diverse food producers and their subsequent capture, distribution, and analysis by ATPs (or other firms pursuing and benefitting from these new waves of technological development), a core analytical consideration is the flow of data in numerous directions across smart farming systems. Data become a significant new farm output beyond crops or animal protein. As a consequence of data flows and their centrality to smart farming systems, ATPs within the overall agricultural system are now beginning to occupy prominent positions as aggregators and processors of data. Elsewhere in debates about digital life, firms that accumulate and control the value emerging from data have been theorized as engaged in “data colonialism” (Thatcher et al. 2016) insofar as they pursue accumulation by dispossession via colonizing *social* life. With respect to smart farming, however, ATPs pursue accumulation by dispossession of social *and* environmental data. The life of the farmer matters along with the biological or chemical conditions of their (and surrounding) land. Smart farming brings data colonialism into new territory and dimensions. Indeed, much like “bioprospecting” (e.g. see Bingham 2008), whereby wealthy research institutes collect biological material from poor countries for analysis and potential use in the development of drugs; the planetary dynamics of smart farming is tantamount to “data-prospecting” insofar as the collectors and analysts in ATPs or other technology firms create mechanisms, via the pervasive use of digital technologies, for mining or more simply grabbing environmental data. Powerful new arrangements are now on the horizon, as Mooney (2018, 392; my emphasis) points out:

> Since the 1980s, farm equipment companies have been accumulating weather and market data, along with ever-improving satellite information, to understand crop and livestock production and markets. More recently, they have added a battery of sensors – linked to drones and satellites – that can record everything put into and taken out of the field, measured every few centimetres. This gives the equipment companies unprecedented and

> unchallengeable detail down to the plant variety (including fertilizer and pesticide seed dressings and injections) and, ultimately, the yield quality. Linked to the equipment companies' historic data on weather and markets, and their ability to advise producers and processors, *this detail gives them enormous power*.

Although equipment companies are engaged in a data grab that makes use of specialist knowledge of their markets and customers, they are not plowing these furrows alone. Of note here is that leading farm equipment company John Deere's investment in research and development, which reached $US2.6 billion in 2018 (Deere & Company 2019), is only a fraction of Amazon's total expenditure of $US28.8 billion (Amazon 2019), which is undoubtedly directed at a wider range of contexts but nevertheless connects with food systems in numerous opaque ways. Then there are firms such as Alphabet (owner of Google) that try to deploy machine learning techniques in new artificial intelligence configurations that depend on accessing huge quantities of data, including the type of environmental data collected via data-prospecting. In short, therefore, data colonialism becomes a strategy within smart farming configurations that can yield profits for ATPs and other firms based on the accumulation and subsequent dispossession of data about people and the non-human worlds they live alongside. It follows that more and more data about the planet's diverse environments will be established and eventually stored in local and private, as well as global and conceivably public, data reserves (e.g. see Cheney-Lippold 2017). The analytical question is what it will mean for the environment-development nexus when machine learning algorithms and artificial intelligence make use of these datasets and begin introducing new calculations about smart farming operations. A major concern is that ATPs or other firms in the technology sector will be empowered to create and structure corporate strategies that displace smallholders and peasant producers standing in the way of smart agricultural systems controlled by automated arrangements of drones and robots.

Digital life and food systems beyond the farm

Digital technologies also infuse food systems beyond the farm, with some new practices and emergent effects coming into view in diverse settings. The food system's environmental impact is an active component in these developments. As is the case with the emergence of digital technologies in smart farming operations and systems, there is potential to create new arrangements across food processing, marketing, distribution, and consumption that ameliorate the food system's environmental problems. For example, one possibility is for applications to emerge that reduce total food waste by connecting separate parts of the value chain and exploiting the possibilities of the circular economy (Jeffries 2018). Then there are signs from projects and practices across the world that electric or low-carbon vehicles will reduce the food system's greenhouse gas emissions (e.g. on the Indian food delivery firm Ola's use of electric rickshaws, see Shu 2018).

However, digital technologies are also amplifying some problems. Consider the matter of ultra-processed food (Monteiro et al. 2013), the "production, distribution, marketing and consumption [of which leads] to damage to culture, social life, *and the environment*" (Horta et al. 2018, 1517; my emphasis). One component here is that ultra-processed food tends to be sold in plastic packaging, which is often discarded and thereby pollutes diverse environments such as beaches (e.g. see Andrades et al. 2016). Another is that the low sale price of ultra-processed food also invites waste, much like the phenomenon of throw-away or "fast" fashion (e.g. see Bhardwaj and Fairhurst 2010). But the absolutely crucial consideration is the link between consumption of ultra-processed food and malnutrition (e.g. see Monteiro et al. 2017). To understand how digital life comes into play, a key analytical factor concerns changes in the notion of the so-called "digital divide," which once simply referred to differences between those with or without access to the Internet but is now more a matter of the quality or speed of access (e.g. see Pierce 2019); if it was once possible to imagine digital technologies as mainly a matter of life in wealthier societies, it is much harder to do so today because access has expanded considerably in the last decade, matched by a significant growth in the number of connected devices, including many relatively low cost handheld devices such as smartphones. The effect is widespread, although still uneven, enrolment of consumers in digitally-mediated chains of social relations worked out across devices, inside web sites, or within social media platforms.

Consider now the world's largest food processing firm, Nestlé, which made sales in 2018 of $US90.6 billion across 190 countries and operated factories in 86 countries (Nestlé 2019). Digital life presents Nestlé (and firms like it) with a challenge and opportunity.

The *challenge* entails finding ways to drive up e-commerce sales, which were worth $US6.7 billion to Nestlé in 2018 and had grown by 18 per cent from the previous year. One factor is the emergence of new competitors, such as the online retailer Amazon, which purchased the US supermarket Whole Foods in 2017 for $US13.2 billion (Amazon 2019). Amazon is a competitor with a reputation for aggressive practices, including the development of its own-brand product lines. For food processing firms such as Nestlé, therefore, the challenge is effectively interacting with Amazon. In this regard, it is instructive that Nestlé has tapped into a platform developed by Boomerang Commerce which "uses machine learning to scrape data signals and uses sales, marketing, operations and competitor data to automate brands' programmatic advertising on Amazon. Brands can also use it to identify high-value keywords on consumer searches in their categories and estimate their competitors' spend and share of search on Amazon Marketing Services" (Dua 2019). Navigating digital life drives the development of new digital solutions.

Meanwhile, the *opportunity* for Nestlé is to develop "digitally-centric business models" that use data to deliver "personalized messaging, services and products to consumers at scale" (Nestlé 2019, 8). Public health and nutrition scholars are tracing outlines of what this type of personalized strategy might mean in practice. On social media applications, for example, firms target children and adolescents using celebrity endorsements, peer endorsement, prizes, and games; and use tracking software embedded within Internet browsers to target them "based on their demographic characteristics and interests" (Kent et al. 2019, 6). Indeed, in a Canadian study of 54 million food ads on children's top ten preferred websites from June 2015 to May 2016, “a large proportion of the five most advertised products, accounting for 45 % of total ads on all ten websites, featured advertising techniques that expressly appeal to children, including, among others: the use of branded or licensed characters (e.g. Frosted Flakes and McDonald’s Happy Meal), the promotion of a prize giveaway (e.g. Pop Tarts) and the use of cartoons and animation (e.g. Red Bull energy drink and Lunchables)” (Kent and Pauzé 2018, 1614). The vast number of ads means “children and adolescents view on average 0.14 and 0.26 instances of branded [food marketing] content per minute” (Kent et al. 2019, 5), which translates to an exposure to food marketing of 30 and 189 times per week respectively. Crucially, “more than nine out of ten products advertised were ultra-processed with the most frequently advertised food categories being restaurants, cakes, cookies and ice cream, and cold cereal” (1614).

Online spaces must be understood, therefore, as arenas in which food firms market, target, and track consumers all over the world. Interaction with and use of digital technologies empowers firms to pursue strategies to boost sales of ultra-processed food. In Brazil, then, when firms producing ultra-processed food or drink products such as Coca-Cola or McDonald’s curate Facebook pages, the consumers who visit and/or like content therein (e.g. see Horta et al. 2018) generate data that Facebook can share with or sell to those firms, thereby providing knowledge that can inform future product or marketing development. As such, the core conclusion to make is that the spread and prevalence of digital technologies – in the form of devices such as smartphones and services such as social media platforms – alters the dynamics of food systems beyond the farm by amplifying the speed at which "the toxic food and activity environment [is] spreading around the world" (Brownell 2010, 718).

Conclusion: Contested digital foodscapes

Corporate-driven uses of digital technologies can amplify extant societal problems. There are good reasons to be alarmed, given the likely outcomes are reduced sovereignty, new forms of opaque governance, and heightened concentrations of economic power. Ultimately, as noted by Mooney (2018, 394), "Whether the final winner in the battle to control the food chain is Bayer, John Deere, Walmart, or Amazon, there is no reason to trust them – or their theoretical technologies – to take care of our food security." However, a curious and significant feature about digital life is that arrangements can also emerge that empower resistance. Relative to the specific issues raised in this chapter, therefore, I argue there are possibilities to use digital technologies in "food sovereignty construction" (Schiavoni 2017).

Food sovereignty is often used as a contrasting concept to the concept of "food security" which governments promise but regularly fail to actually deliver. Whereas the pursuit of food security has tended to prioritize and justify large-scale, quasi-industrial agriculture using inputs purchased from transnational corporations (TNCs) such as synthetic fertilizer and agri-chemicals, food sovereignty emphasizes small-scale, traditional approaches to food production which eschews inputs sold by TNCs and demands that food producers have sovereignty over the food they produce, distribute, and sell (Wittman et al. 2010). Food sovereignty construction builds an alternative food system around notions of justice, democracy, equality, women's rights, and indigenous rights. Might the use of digital technologies bolster food sovereignty construction?

One pertinent concern is "data curation," which involves presenting, positioning, and translating data in a similar manner to the way an art curator presents, positions, and translates an artifact in a museum or art gallery (Fraser, 2019b; citing Villi 2012). Data curation for food sovereignty construction can involve using social media to campaign for policy change, for example when movements such as La Via Campesina use hashtags or tagging to build momentum around a particular action (Schiavoni 2017). Another example is when civil society organizations use e-newsletters to raise awareness about unjust practices in the food system (Schneider et al. 2017). Then there are instances where environmental conditions are tracked and recorded by grassroots organizations using open-source software and thereby informing broader publics of changing circumstances and potentially criminal activities affecting marginalized peasant producers (Gutierrez and Milan 2016). Finally, data curation for food sovereignty construction can entail the use of commercial platforms such as YouTube to share hacks or forms of knowledge about agroecology among peers, in much the same way as the Cuban *campesino-a-campesino* approach to expanding agroecological knowledge (Rosset et al. 2011), only in the context of digital life peer-to-peer networks for food sovereignty construction exploit the possibilities of data curation. The fact is that:

> …almost all the world's farmers either have cell phones or have access to cell phones, and are constantly exchanging production and research information – including news and descriptions of advancing pests and diseases and new techniques. Even with language barriers, the information flow has grown massively over the last decade, and there is a constant scientific exchange among farmers' organizations and through direct seed exchanges from country to country and continent to continent (Mooney, 2018, 395).

As such, it might be the data curated by small-scale farmers or peasants constructing food sovereignty that will ultimately come to matter in the coming years. Certainly, despite all the talk of smart farming and its potential, it remains unclear if all the investment and actual practice of the pertinent technologies will truly pay off. The expectation might be that smart farming will generate new rounds of consolidation that will increase the power of ATPs or other firms and enable them to create the automated farms of the future; and there are plenty of reasons to expect food processing firms such as Nestlé to expand their operations and thereby drive up sales of ultra-processed food. But an alternative scenario – perhaps bolstered by efforts such as the International Panel of Experts on Sustainable Food Systems and its vision of a Common Food Policy in Europe (IPES-Food 2019), which might encourage positive developments elsewhere – could involve a more democratic, even a post-capitalist, food system in which the "smart" in smart farming describes the ability of food producers to use digital technologies while eschewing data colonialism and the ATPs or other technology firms driving its expansion. By effectively curating data to oppose dominant, and then to build alternative, arrangements of digital technologies, critical subjects in the food system might take advantage of the affordances of digital life to create new relationships between environment and development defined by notions of social or environmental justice.

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