Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
https://foodsystemsjournal.org

VIEWPOINT

Embracing digital sovereignty to counter capitalist entrenchments in food and agricultural systems

Abdul-Rahim Abdulai *
University of Alberta and University of Guelph

Submitted July 22, 2026 / Published online November 24, 2026

Citation: Abdulai, A.-R. (2026). Embracing digital sovereignty to counter capitalist entrenchments in food and agricultural systems. *Journal of Agriculture, Food Systems, and Community Development*, *16*(1), Article 006. https://doi.org/10.5304/jafscd.2026.161.006

Copyright © 2026 by the Author. Published by the Lyson Center for Civic Agriculture and Food Systems. Open access under CC BY license.

Abstract

This viewpoint contributes to ongoing debates on food systems transformation by arguing that digitalization constitutes a clear continuation of the capitalist food regime, as reflected in the types of actors and institutions involved as well as the interests and values that underpin its tools and services. Essentially, what is unfolding is merely an extension of the dominant food system that must be resisted. Digital sovereignty, grounded in democratic and collective values, can offer alternative ways to understand and address the ills of the current trajectory. This approach must center marginalized groups and uphold the values of equity and justice in all digitalization processes.

* Abdul-Rahim Abdulai, PhD, Postdoctoral Fellow, University of Alberta; 116 St & 85 Ave.; Edmonton, AB T6G 2R3 Canada; and University of Guelph; 50 Stone Road East; Guelph, N1L 2W1 Canada; abdulai1@ualberta.ca; https://orcid.org/0000-0003-4699-2407

Declaration of Conflicting Interests

The author declares no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Keywords

digitalization, capitalist agriculture, food systems, digital sovereignty

Introduction

Deploying digital technologies, which may include mobile phones and the sophisticated use of drones, robotics, and blockchains to support food system activities and practices, is expected to be the next transformative force for agri-food productivity and sustainability (Abdulai, 2022; High Level Panel of Experts on Food Security and Nutrition [HLPE], 2020; Tsan et al., 2019). These technologies will change the practices of food and agricultural actors in many ways (see King, 2017; Rotz, et al., 2019; Weersink et al., 2018), including improving efficiency in creating, accessing, and utilizing relevant information to support production processes. But uncritical views of emerging digital innovations

Availability of Data and Materials

No primary data were collected for this paper, and all articles consulted are readily available online and are included in the reference list.

appear to ignore the experiences of earlier technological innovations, such as mechanization and biotechnologies, which were co-opted into capitalist practices to reinforce inequalities and ecological catastrophe (Patel, 2013).

Through a political economy analysis, this viewpoint argues that current agricultural digitalization exhibits clear signs of capitalist practices and ideals, making it less likely to deliver radical change without a change in course. Digital sovereignty, however, presents an alternative approach to better align digitalization with equitable, fair, and just food systems.

How Digitalization is Following the Path of Capitalist Food Systems

This section highlights how current forms of digitalization continue the hegemonic capitalist organization of food systems.

Capitalist Actors and Institutional Alignments Drive Digitalization

The digitalization of food systems is driven by the same actors and institutions that dominate the capitalist food regime. Political economists since the 1980s have described the food system as being controlled by corporate players wielding enormous power (Clapp, 2021; Friedmann, 2016; McMichael, 2005). Both old and new actors are (re)entering the digital food system space (Clapp & Ruder, 2020; Rotz, et al., 2019). In agriculture, for example, large equipment and input manufacturers, such as John Deere, Bayer, and Allis-Gleaner, have now engaged in digitalization. John Deere Digital Agriculture Hub (Australia and New Zealand) and Bayer's Climate FieldView exemplify how these established actors are using digital innovations to consolidate influence. In Africa, where my colleague and I have extensively researched this topic in the last decade (Abdulai, 2022; Duncan et al., 2021), evidence suggests that the digitalization process on the continent is driven by private, small start-ups to large multinational corporations (Food and Agriculture Organization of the United Nations [FAO] & the International Telecommunication Union, 2022; Tsan, et al., 2019).

Also, it is worth noting that digitalization has drawn new corporate actors into food systems. For example, the emergence of tech companies such as Google and Microsoft is a case in point. The Google AI Lab in Ghana focuses on agricultural analytics. Likewise, Microsoft's Farmbeats in Kenya and other countries help to support agricultural activities, as do the Chinese e-commerce giant, Alibaba, and IBM (Birner et al., 2021; ETC Group, 2022; International Panel of Experts on Sustainable Food Systems [IPES-Food], 2023). The corporate nature of these tech giants makes them well suited to entrench themselves in the capitalist regime.

The critical role of international development actors (e.g., the World Bank, the World Economic Forum) in the digital space must also be emphasized. Similar to the supposed Green Revolution (Patel, 2013), which is partly credited for the birth of the capitalist food system (Herring & Paarlberg, 2016; Kloppenburg, 2005; Stone & Glover, 2017), development actors are pushing digitalization as a development tool rooted in capitalism.

Capitalist Interests and Values are Embedded in Digitalization

Another area in which digitalization exhibits characteristics of the capitalist food regime lies in the interests and values they carry. Here, corporate profit-making that favors individualism over the collective interest strongly stands out.

The capitalist ideal of treating everything as a tradable commodity has been extended to digitalization, where, for example, farmers' data are increasingly aggregated and traded for profit. This issue is partly evident in what has been described as the datafication of agriculture, where farmers' data—such as weather, soil, and plant health—and practices like harvesting and irrigation, are turned into data and captured by corporations for profit (Fraser, 2019; Sauvagerd et al., 2024). Here, corporations (e.g., John Deere, Syngenta, Google) have created platforms to gain control over digital data, all at the expense of farmers (Carolan, 2018). These practices indicate that corporations in the digitalization sector prioritize their own interests and reproduce capitalist ideals.

Another area of concern is how digital agriculture prioritizes individual values over collective

values. The promotion of tailored treatments informed by big data for farmers shifts the values of agriculture from cooperation to individualism. Furthermore, corporations' primary control over digital software and associated data signifies that farmers are unable to share information in their communities, which contrasts with the collective, communal, and relational identities that are traditionally associated with agriculture (see Berry, 2011; Martini et al., 2023). By focusing on farming at the individual level, digitalization promotes competition and discourages cooperative strategies between farmers and their communities.

Digital Sovereignty Could Counter Capitalist Entrenchment

Digital sovereignty could ensure that agricultural digitalization serves the needs of vulnerable and marginalized groups. The propositions of digital sovereignty are not entirely new (Pohle & Thiel, 2020), but three features are elaborated here in the context of ensuring that food and agricultural digitalization transformative.

First, digitalization in food systems must be democratic, collective, and managed in ways that give real decision-making power to diverse actors. Here, farmers and other grassroots food system actors must be recognized as equal partners in digitalization rather than as tools to extract value. Creating cooperative-supported digitalization that enables farmers to co-create digital services will be critical in this process.

Secondly, it is essential to recognize that there is no universal approach to digitalization in food and agriculture systems. Needs may vary by geography, food system type, and processes involved. Digitalization must be tailored to local contexts and needs. For example, the nature of digitalization offered to smallholders, who may be unable to read and write in English, must be appropriately attuned to their circumstances. Likewise, digitalization must also help change existing systems to create an enabling environment in which marginalized groups can benefit from technology.

Finally, digitalization needs to put marginalized groups first and uphold values of equity and justice. In this sense, there must be digital tools and services that address the needs of all food system actors, irrespective of size. For example, tools that address the needs of smallholders must be prioritized as much as, if not more than, other tools for large, well-funded farms. At the heart of the approach will be digitalization intentionally designed to respect the diverse needs of all actors in the food and agricultural system.

Conclusion

It is no longer a question of whether digital innovations will become mainstream in the food system. Hence, it is essential to focus conversations on how they will shape the food system. Evidence points to how current market and governance loopholes favor dominant capitalist actors and values. This trend must be countered, especially given the growing use of artificial intelligence in food systems. Taking measures that ensure these innovations will benefit vulnerable and marginalized food system actors are critical to making them more inclusive while better serving society. Digital sovereignty processes grounded in the values of democracy and autonomy, social and contextual relevance, and user agency are among the first steps toward redirecting digitalization for fairer, more just food system outcomes.



References

Abdulai, A.-R. (2022). *The digitalization of agriculture and the (un)changing dynamics of rural smallholder farming systems in Ghana, Sub-Sahara Africa* [Doctoral dissertation, University of Guelph]. https://hdl.handle.net/10214/27141

Berry, W. (2011). *Another turn of the crank: Essays*. Counterpoint Press.

Birner, R., Daum, T., & Pray, C. (2021). Who drives the digital revolution in agriculture? A review of supply-side trends, players and challenges. *Applied Economic Perspectives and Policy*, *43*(4), 1260–1285. https://doi.org/10.1002/aepp.13145

Carolan, M. (2018). 'Smart' farming techniques as political ontology: Access, sovereignty and the performance of neoliberal and not-so-neoliberal worlds. *Sociologia Ruralis*, *58*(4), 745–764. https://doi.org/10.1111/soru.12202

Clapp, J. (2021). The problem with growing corporate concentration and power in the global food system. *Nature Food*, *2*(6), 404–408. https://doi.org/10.1038/s43016-021-00297-7

Clapp, J., & Ruder, S.-L. (2020). Precision technologies for agriculture: Digital farming, gene-edited crops, and the politics of sustainability. *Global Environmental Politics*, *20*(3), 49–69. https://doi.org/10.1162/glep_a_00566

Duncan, E., Abdulai, A.-R., & Fraser, E. D. G. (2021). Modernizing agriculture through digital technologies: Prospects and challenges. In H. S. James, Jr. (Ed.), *Handbook on the human impact of agriculture* (pp. 138–161). Edward Elgar Publishing. https://doi.org/10.4337/9781839101748.00018

ETC Group. (2022). Foo*d barons 2022: Crisis profiteering, digitalization and shifting power*. https://www.etcgroup.org/sites/www.etcgroup.org/files/files/food-barons-2022-full_sectors-final_16_sept.pdf

Food and Agriculture Organization of the United Nations [FAO] & the International Telecommunication Union. (2022). *Status of digital agriculture in 47 sub-Saharan African countries*. https://doi.org/10.4060/cb7943en

Fraser, A. (2019). Land grab/data grab: Precision agriculture and its new horizons. *The Journal of Peasant Studies*, *46*(5), 893–912. https://doi.org/10.1080/03066150.2017.1415887

Friedmann, H. (2016). Commentary: Food regime analysis and agrarian questions: Widening the conversation. *The Journal of Peasant Studies*, *43*(3), 671–692. https://doi.org/10.1080/03066150.2016.1146254

Herring, R., & Paarlberg, R. (2016). The political economy of biotechnology. *Annual Review of Resource Economics*, *8*(1), 397–416. https://doi.org/10.1146/annurev-resource-100815-095506

High Level Panel of Experts on Food Security and Nutrition [HLPE]. (2020). *Food security and nutrition: Building a global narrative towards 2030*. Committee on World Food Security. https://openknowledge.fao.org/server/api/core/bitstreams/8357b6eb-8010-4254-814a-1493faaf4a93/content

International Panel of Experts on Sustainable Food Systems [IPES-Food]. (2023). *Who's tipping the scales? The growing influence of corporations on the governance of food systems, and how to counter it*. https://ipes-food.org/wp-content/uploads/2024/03/tippingthescales.pdf

King, A. (2017). Technology: The future of agriculture. *Nature*, *544*(7648), S21–S23. https://doi.org/10.1038/544S21a

Kloppenburg, J. R. (2005). *First the seed: The political economy of plant biotechnology*. University of Wisconsin Press.

Martini, E., Pagella, T., Mollee, E., & van Noordwijk, M. (2023). Relational values in locally adaptive farmer-to-farmer extension: How important? *Current Opinion in Environmental Sustainability*, *65*, Article 101363. https://doi.org/10.1016/j.cosust.2023.101363

McMichael, P. (2005). Global development and the corporate food regime. In F. H. Buttel & P. McMichael (Eds.), *New directions in the sociology of global development* (Research in Rural Sociology and Development, 11th vol., pp. 265–269). Emerald Publishing. https://doi.org/10.1016/S1057-1922(05)11010-5

Patel, R. (2013). The long Green Revolution. *The Journal of Peasant Studies*, *40*(1), 1–63. https://doi.org/10.1080/03066150.2012.719224

Pohle, J., & Thiel, T. (2020). Digital sovereignty. *Internet Policy Review*, *9*(4), 1–19. https://doi.org/10.14763/2020.4.1532

Rotz, S., Duncan, E., Small, M., Botschner, J., Dara, R., Mosby, I., Reed, M., & Fraser, E. D. G. (2019). The politics of digital agricultural technologies: A preliminary review. *Sociologia Ruralis*, *59*(2), 203–229. https://doi.org/10.1111/soru.12233

Sauvagerd, M., Mayer, M., & Hartmann, M. (2024). Digital platforms in the agricultural sector: Dynamics of oligopolistic platformisation. *Big Data & Society*, *11*(4), Article 20539517241306365. https://doi.org/10.1177/20539517241306365

Stone, G. D., & Glover, D. (2017). Disembedding grain: Golden Rice, the Green Revolution, and heirloom seeds in the Philippines. *Agriculture and Human Values*, *34*(1), 87–102. https://doi.org/10.1007/s10460-016-9696-1

Tsan, M., Totapally, S., Hailu, M., and Addom, B. K. (2019). *The digitalisation of African agriculture report 2018–2019*. CTA/Dalberg Advisers. https://hdl.handle.net/10568/101498

Weersink, A., Fraser, E., Pannell, D., Duncan, E., & Rotz, S. (2018). Opportunities and challenges for Big Data in agricultural and environmental analysis. *Annual Review of Resource Economics*, *10*(1), 19–37. https://doi.org/10.1146/annurev-resource-100516-053654