

“Disadvantaged by Digitization”

Technology, Big Data, & Food Systems

View show notes at <http://tiny.cc/hps2e2>

What is digital agriculture?

Digital agriculture—also called smart farming, precision agriculture, or farming 4.0—makes use of sensing technology, robotics, and sophisticated computing software to make decisions about all aspects of the farm including crop choice, inputs, irrigation, and harvesting.



What are the supposed advantages?

- Can improve animal welfare
- May improve farmer lifestyle by reducing workload and increasing leisure time
- Helps manage resources like water more precisely
- May address labour shortages through efficiency
- Can contribute to better crop yields



What are the critical concerns?

- Smaller-scale farmers face multiple barriers to entry for farming technologies, such as the steep price tags and learning curves.
- Large tech companies and agribusiness have disproportionate access to technology and data leading to inequitable market power
- Farmers don't have the rights, access to, or control over data about their own fields and equipment
- Most technologies are designed for large-scale, mono-crop farming and industrial food production, which deplete biodiversity and soil quality, pollute the air and water, and don't work for farmers using regenerative or agroecological practices
- Technology-enabled large scale agriculture prioritizes growing food for export markets, which means we have less local food
- Local food supplies are less resilient as markets are consolidated and consumer choices are shaped by big data algorithms

🔍 DID YOU KNOW...

Small scale farms are key to our food system

Of the world's 570+ million farms, some 84% are small (<2 hectares) and they have higher yields than larger farms (Food and Agriculture Organization of the United Nations, 2014).

✉ MESSAGE

Kelly Bronson

“Small diverse farms are really important for resilience in the food system and beyond. And we really see that they are disadvantaged by digitalization.”

🟡 🟢 🟠 Case study: Who gets to “farm forward”?

The privatization of research combined with consolidation of power leads to data collected from producers, retailers, and consumers in ways that are not transparent or equitable.

John Deere, one of the world's largest farm equipment companies, advertises their smart tractors with the tagline “Farm Forward.” Their commercials, available on their YouTube channel, paint a futuristic picture of farmers digitally running their farms from the comfort of their homes. However, that picture includes only the largest, mono-crop farms, leaving smaller more diverse farms out of their vision of a farm forward future.



John Deere's commercials portray farmers working with digital tools. Home office control panels, real-time weather information delivered directly to the cab of a tractor or combine, and tech-savvy farmers prompt the viewer to imagine a farm future defined by control, precision, and ease.



Farm Forward commercials feature artificial intelligence advice as a way to help farmers make farm-related decisions and predict how their farm will fare in any given year. What they don't say is how that data will be collected, shared, and used by the company to increase their own profits and market power.

Who benefits from digital agriculture?

The privatization of research combined with consolidation of power leads to data collected from producers, retailers, and consumers in ways that are not transparent or equitable.

| Whose data are collected? | How are these data collected? | How are these used, and who benefits? |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Producer data | Local and remote sensing linked to farming equipment, cloud computing software | Data sharing agreements between corporations allow companies that sell agricultural inputs like fertilizers and pesticides to respond to data received directly from farming equipment and sensors in order to maximise profits at the farmers' expense. This leads to unfair market power for the biggest corporate agribusinesses like Monsanto and John Deere. |
| Online retailer data | Sales volumes, pricing and product information, and customer shopping behaviour collected from third-party sellers through Amazon Marketplace or AWS/cloud computing (Palmer, 2020) | Food retailers who don't want to establish their own e-commerce platform or delivery system may use Amazon Marketplace. While Amazon has policies governing the use of third-party seller data to develop its own products, a 2020 report in the Wall Street Journal found that they were using seller-specific data to develop their own private label products. |
| Consumer data | Shopping behaviours, preferences, and patterns collected and sold by online retailers like Amazon Marketplace or social media platforms like Facebook | Amazon and other online retailers collect consumer data to inform marketing, research, and product development and to predict or guide consumer buying habits through incentives, such as free delivery through Amazon Prime, or other methods. |

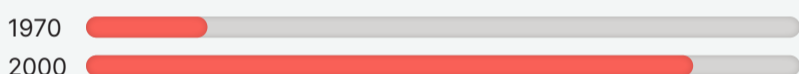
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Trend of corporate over public interest

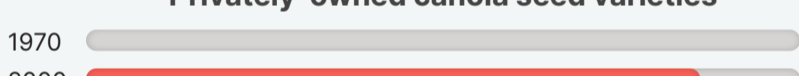
As recently as the early 1980s, the vast majority of seed breeding research in Canada was taking place in the public sector. A mere two decades later, public research accounted for a fraction of seed research.

For instance, canola research went from being 83% publicly funded in 1970 to just 15% in 2000. During the same period, new canola seed varieties went from exclusively public ownership to 86% of new varieties owned by private breeders (Kuyek, 2007).

Privately-funded canola research



Privately-owned canola seed varieties



✉ MESSAGE

Irena Knezevic

“When we think about digital technologies as the only way forward we are ignoring all sorts of other things that offer promising futures, not just for farming, but also how we exist as a society.”

🟡 🟢 🟠 Case study: How does Amazon use food retailing data?

Amazon's goal is to become a one-stop shop for all consumer goods. Since food retail has more customers than any other retail industry, food is an important part of that initiative.

Amazon's 3 digital pillars

Each of these pillars are opportunities to collect data on customers, products, and suppliers—with the ultimate goal to absorb or push suppliers out of the market and predict and guide consumer purchasing practices to maximize Amazon's profits.

The control of all of this data gives Amazon the ability to influence the food system and how people produce, distribute, sell, purchase, and eat food.



Amazon Web Services
Supports agri-tech services, such as Bayer Crop Science



Amazon Prime
Subscription service that gives customers perks and discounts while collecting their preferences and shopping habits



Amazon Marketplace
Allows retailers to pay to sell products on Amazon's e-commerce platform



The price of convenience

Amazon makes things convenient by mining our data, but this is occurring at the expense of:

- Our privacy**
Amazon uses your data to increase their market power.
- Our economy**
Smaller and local retailers can't compete, leading to fewer consumer choices.
- Our communities**
Fewer market options make communities more vulnerable to price fluctuations and supply chain problems.

Accept

Learn more

🟡 🟢 🟠 Amazon's transition into food retail, 1996–2020 (Livingstone & Knezevic, 2020)



1996–2020

1999
Amazon acquires 35% stake in HomeGrocer.com for US\$42.5 million.

1996–2000

2001–2005

2006–2010

2011–2015

2016–2020

2003
Amazon launches Amazon Gourmet food store.

2003
Amazon Services Europe Inc. announces alliance with UK retailer Marks & Spencer (which also owns U.S. supermarket group, Kings Supermarkets).

2006
Amazon launches Amazon Fresh, offering free delivery on dry groceries.

2007
Amazon launches Subscribe and Save, offering free shipping and product discounts on grocery deliveries.

Amazon is listed among the “Ten to Watch in 2007” in Global Retail Innovation, hailed for its “strong launch into online grocery retail.”

2012
Amazon launches Amazon Wine Store.

2013
Amazon Prime launches in Canada.

2014
Amazon launches Prime Now with 1-hour deliver of fresh produce from local NYC stores.

Amazon Echo and Alexa launch. Customers can now shop using voice command.

2015
Prime Now expands to more cities. Delivery from local farmers' markets and grocers becomes a key marketing feature.

Amazon introduces the Dash button. Prime members can order groceries at the press of a button.

2017
Prime Now is available in more than 30 U.S. cities (and is increasingly focused on organic and seasonal options).

Amazon acquires U.S. organic retailer, Whole Foods Market (WFM), for US\$13.7 billion.

Amazon introduces Instant Pick-up for Prime and Prime Student members, making self-service lockers available in 22 staffed pick-up locations.

2018
Amazon and WFM announce Prime Pick-up for members to shop online for WFM products and pick up orders in under 30 minutes.

✉ MESSAGE

Carly Livingstone

“As eaters, what's the role we want to play in shaping our food system?”

🔍 DID YOU KNOW...

Activist Farmer Organizations

Gathering for Open Agricultural Technology (GOAT) and Farm Hack are international communities of farmers who make and modify their own technologies.



A home-built no-till seed drill, shared under a Creative Commons Attribution 4.0 International License by Sunny Slope Orchard (2013).

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Amanda Di Battista

“Agricultural technology isn't inherently bad, but we really need to be aware of who holds the most power and how they're using technology and data to impact the food system.”

How can we rethink food system innovation?

Technological visions of the future of food exclude other types of innovation—such as agroecological or regenerative food growing—that put people and the planet before profit. While digital technologies hold promise for the future of farming, they are not the only way forward. We need a diversity of scales, approaches, and ways of growing food that work with nature rather than against it.



How do we move forward?

- Be critical of self-regulation from big tech companies**
 - Regulate data mining, use, and privacy policies
- Focus on good food policies**
 - Incentivize local food infrastructures
 - Take a systems-wide approach to research
 - Put anti-poverty, food security, and community health measures at the forefront
- Find ways for community food systems and technology companies to work together**
 - e.g., Open Food Network, an open source platform that enables ethical supply chains
- Rethink and invest in a diverse range of food system innovations, not just new technologies**

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Handpicked Podcast

The Laurier Centre for Sustainable Food Systems' podcast, Handpicked: Stories from the Field features researchers, students, and food system actors working together to create more sustainable food systems. Handpicked explores how research changes the ways we produce, get, eat, and understand our food.

Listen to Handpicked wherever you get your podcasts and find show notes and teaching resources on our website.

Sources & Resources

To see sources and resources, including hyperlinks, please view the show notes at <http://tiny.cc/hps2e2>

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