

Responsible digitalisation: ethics of agri-food 4.0



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Prof David
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Engaging for Change



Dr Laura Palczynski

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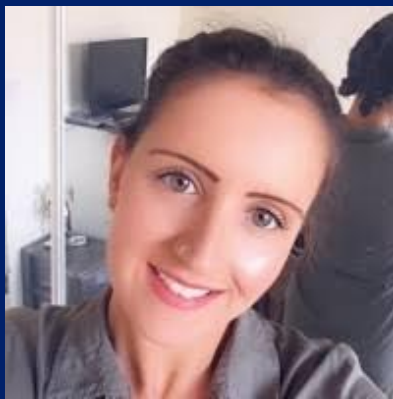
Prof David Rose

- Helping agri-food system stakeholders to:
1. Make the changes associated with sustainable transitions – technology adoption, skills development, behavioural change interventions.
 2. Engage with policy and R+D to co-design change with stakeholders.
 3. Evaluate the opportunities and risks associated with change – e.g. tech ethics, responsible innovation.
 4. Cope with change – with a focus on supporting farmer wellbeing.

Farmers, advisers, supply chain actors etc.



Joanne Sharpe (PhD, Harper) PLF and animal welfare



Jenny Howse (PhD, RAU) – Lecturer at HAU, Mental health in farming



Kirsten Ayris (PhD, Reading) Stakeholder inclusion agri-robotics



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“Just” agtech transitions



Distributional justice

- Costs, benefits, and how they are distributed in society

Procedural justice

- How society is involved in making decisions and the principles guiding this

Recognitional justice

- Involvement of marginalized groups and different interests, multiple scales, knowledge types

We would include multi-species justice into the third strand



Environmental Innovation and Societal
Transitions

Volume 46, March 2023, 100694



Research article

A psychometric approach to assess justice perceptions in support of the governance of agricultural sustainability transitions

Auvikki de Boon^a, Sabrina Dressel^b, Camilla Sandström^c, David Christian Rose^d

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Responsible innovation framework

In pursuit of responsible innovation for precision agriculture technologies

Maaz Gardezi ^a, Damilola Tobiloba Adereti ^b, Ryan Stock ^c and Ayorinde Ogunyiola ^d



Anticipation



Inclusion



Reflexivity



Responsiveness

“Responsible innovation means taking care of the future through collective stewardship of science and innovation in the present.”

Stilgoe, J., Owen, R., Macnaghten, P., 2013. Developing a framework for responsible innovation. Research Policy 42, 1568–1580.

Research so far: agri-food 4.0, Benefits and costs + how distributed




NJAS - Wageningen Journal of Life Sciences
Volumes 90–91, December 2019, 100294

Research paper

Looking through a responsible innovation lens at uneven engagements with digital farming


Kelly Bronson 



Global Food Security
Volume 24, March 2020, 100347



Dealing with the game-changing technologies of Agriculture 4.0: How do we manage diversity and responsibility in food system transition pathways?

Laurens Klerkx ^a  , David Rose ^b



Journal of Rural Studies
Volume 68, May 2019, Pages 112–122

Automated pastures and the digital divide: How agricultural technologies are shaping labour and rural communities

Sarah Rotz ^c  , Evan Gravely ^b, Ian Mosby ^b, Emily Duncan ^b, Elizabeth Finnis ^b, Mervyn Horgan ^b, Joseph LeBlanc ^a, Ralph Martin ^b, Hannah Tait Neufeld ^b, Andrew Nixon ^b, Laxmi Pant ^b, Vivian Shalla ^b, Evan Fraser ^b



NJAS - Wageningen Journal of Life Sciences
Volumes 90–91, December 2019, 100315

Review

A review of social science on digital agriculture, smart farming and agriculture 4.0: New contributions and a future research agenda

Laurens Klerkx ^a  , Emma Jakku ^b, Pierre Labarthe ^c

EDITORIAL |  Open Access

A call to expand disciplinary boundaries so that social scientific imagination and practice are central to quests for ‘responsible’ digital agri-food innovation

Simon Fielke PhD , Kelly Bronson PhD, Michael Carolan PhD, Callum Eastwood PhD, Vaughan Higgins PhD, Emma Jakku PhD, Laurens Klerkx PhD, Ruth Nettle PhD ... See all authors 

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ORIGINAL ARTICLE

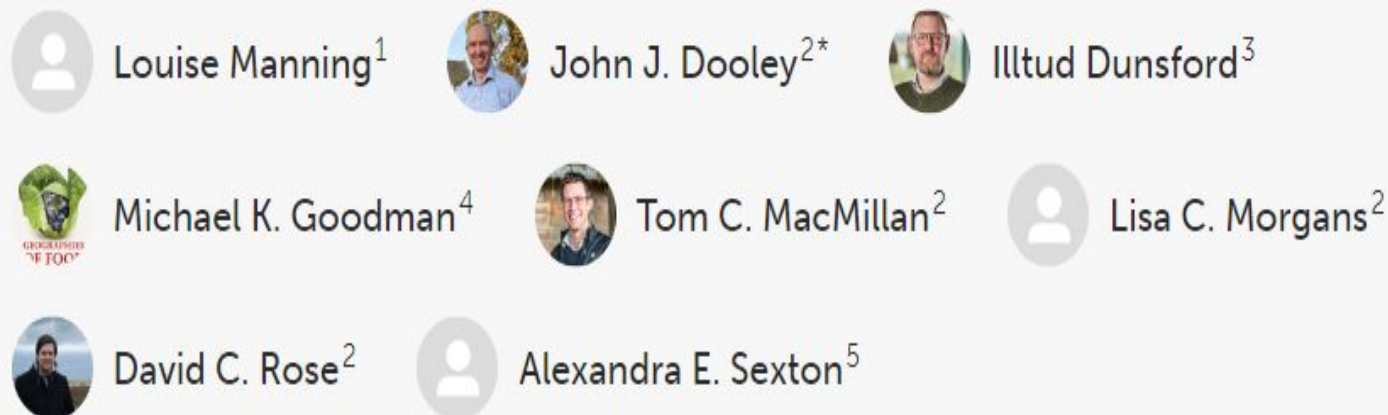
The *Red de Semillas Libres*: C

Laura Gutiérrez Escobar PhD candidate ✉, Eli

First published: 06 May 2016 | <https://doi.org>



Threat or opportunity? An analysis of perceptions of cultured meat in the UK farming sector



Culture Clash?

What cultured meat could mean for UK farming

July 2024

Agri-food 4.0: who is driving it? Where does power lie?



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APPLIED ECONOMIC
PERSPECTIVES
AND POLICY



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New but for whom? Discourses of innovation in precision agriculture

Published: 14 July 2021

Volume 38, pages 1181–1199, (2021) [Cite this article](#)

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[Emily Duncan](#) ✉, [Alesandros Glaros](#), [Dennis Z. Ross](#) & [Eric Nost](#)

Global Food Security

Volume 40, March 2024, 100726



Are AgriFoodTech start-ups the new drivers of food systems transformation? An overview of the state of the art and a research agenda

[Laurens Klerkx](#) ^{a b} ✉, [Pablo Villalobos](#) ^a

Featured Article

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Who drives the digital revolution in agriculture? A review of supply-side trends, players and challenges

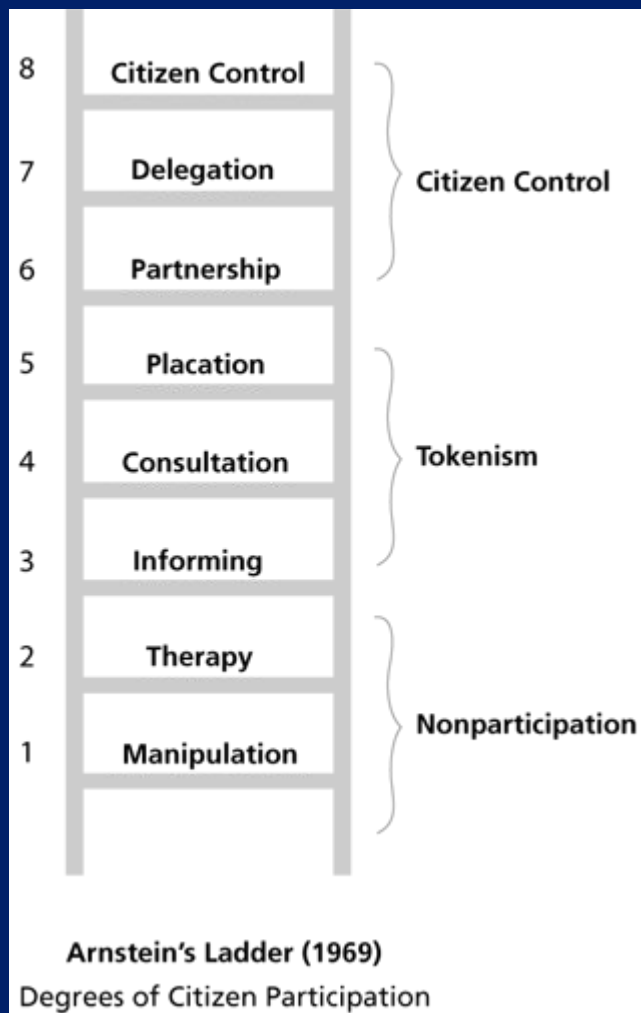
[Regina Birner](#), [Thomas Daum](#), [Carl Pray](#) ✉

JOURNAL ARTICLE

Diversity and directionality: friends or foes in sustainability transitions? 🔄

[Brit M Bulah](#) ✉, [Barbara van Mierlo](#), [Koen Beumer](#), [Alwin L Gerritsen](#), [Simona O Negro](#), [Marko P Hekkert](#), [Laurens Klerkx](#)

Procedural justice – Who is substantively involved? (inclusion, reflexivity, responsiveness)



Are we substantively including by encouraging citizens to 'open up' policy questions, questioning our assumptions, and acting on citizen views?

Or, are we just using narrow public acceptability lenses, focusing on adoption?

Responsible agri-food futures: the role of creative methods

SCIENCE & SOCIETY | VOLUME 36, ISSUE 9, P774-777, SEPTEMBER 2021

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Farm robots: ecological utopia or dystopia?

Thomas Daum [✉](#) [@](#) [✉](#) • [Show footnotes](#)

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Original Paper | [Open access](#) | Published: 22 January 2022

Volume 35, article number 2, (2022) [Cite this article](#)

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Lenora Ditzler [✉](#) & Clemens Driessen



Journal of Responsible Technology

Volume 13, April 2023, 100051



Ethics by design: Responsible research & innovation for AI in the food sector

Peter J. Craigon ^a [✉](#), Justin Sacks ^b, Steve Brewer ^c, Jeremy Frey ^d, Anabel Gutierrez ^e, Naomi Jacobs ^b, Samantha Kanza ^d, Louise Manning ^c, Samuel Munday ^d, Alexis Wintour ^f, Simon Pearson ^c

RESEARCH-ARTICLE

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Digital Technologies for Smallholder Agriculture: Tensions and Speculations

Authors: [Sebastian Prost](#), [Henry Collingham](#), [Jon Rogers](#) | [Authors Info & Claims](#)

DIS '24 Companion: Companion Publication of the 2024 ACM Designing Interactive Systems Conference • Pages 261 - 265
<https://doi.org/10.1145/3656156.3663714>

Published: 01 July 2024 [Publication History](#)

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Visions matter: they affect design

Future of Farming



JOHN DEERE



Association



Responsible agri-food futures: the role of creative methods

RESEARCH-ARTICLE



Digital Technologies for Smallholder Agriculture: Tensions and Speculations

Authors:  [Sebastian Prost](#),  [Henry Collingham](#),  [Jon Rogers](#) | [Authors Info & Claims](#)

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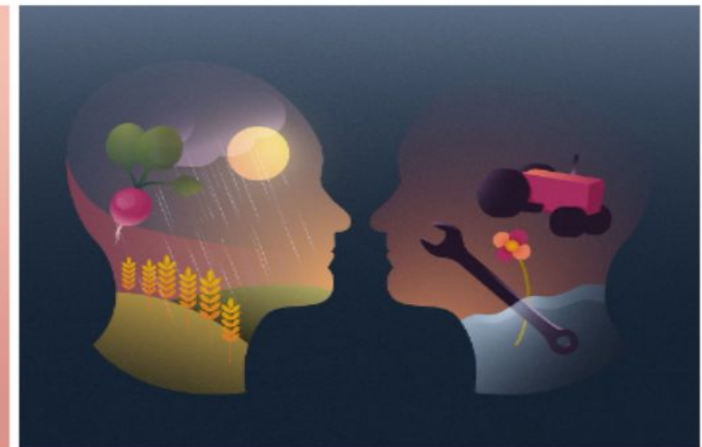
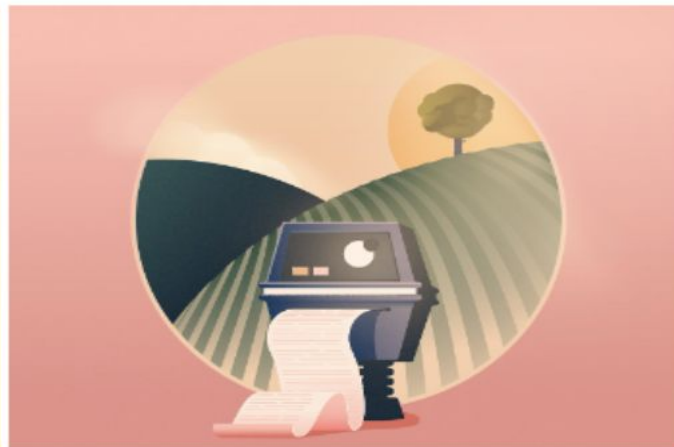
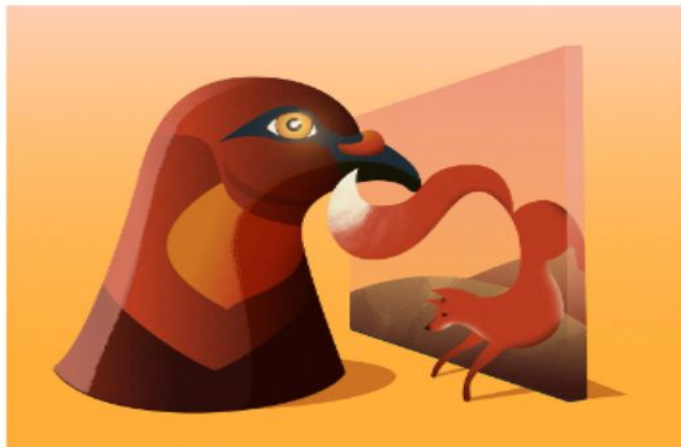
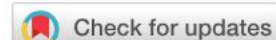


Figure 3: Design Speculations. Left: The Carrier Pigeon. Centre: The Robot Ethnographer. Right: The Questioning Answering Machine

Responsible agri-food futures: the role of creative methods

Automating Agroecology: How to Design a Farming Robot Without a Monocultural Mindset?

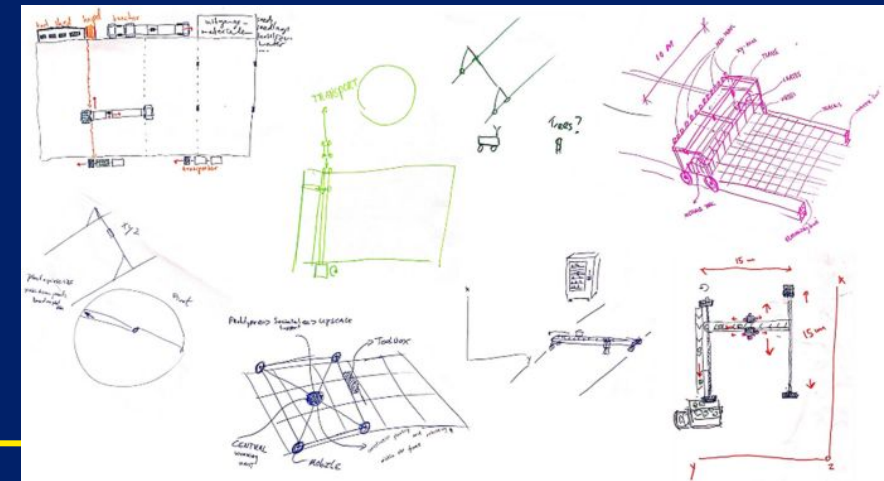
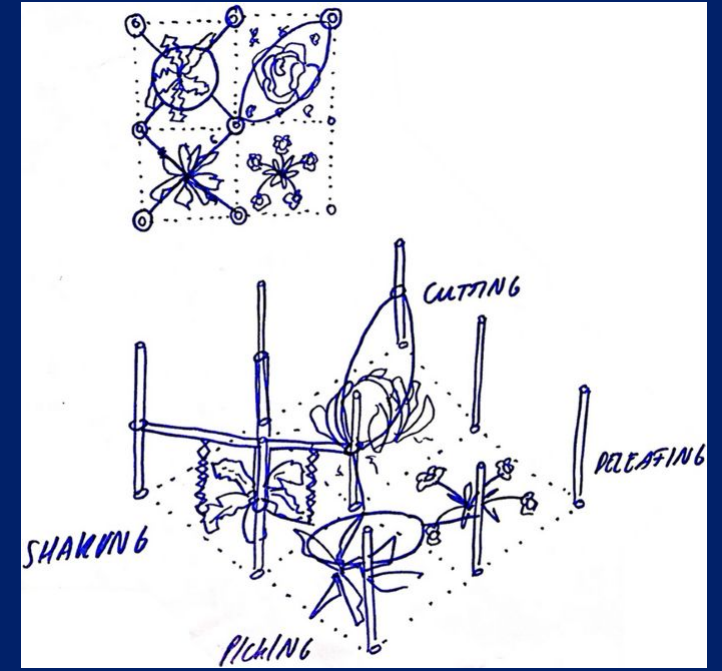
Original Paper | [Open access](#) | Published: 22 January 2022

Volume 35, article number 2, (2022) | [Cite this article](#)

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Digital futures in farming: utopia or dystopia?

SCIENCE & SOCIETY | VOLUME 36, ISSUE 9, P774-777, SEPTEMBER 2021

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Farm robots: ecological utopia or dystopia?

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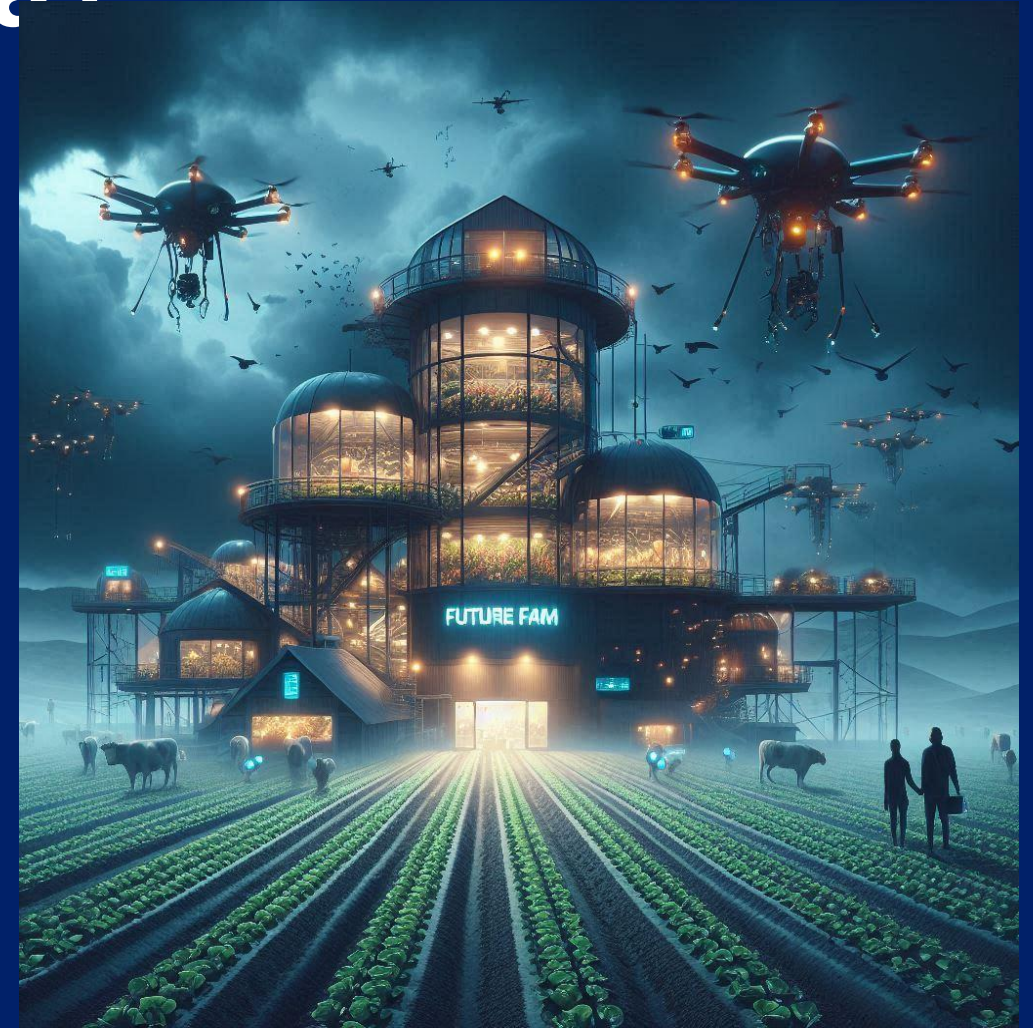


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Digital futures in farming: utopia or dystopia?



future farm, robots, drones, family, nature, profitable, healthy



Future farm, robots, drones, monoculture, surveillance, corporate

What do 'we' want agri-food tech to do, IF ANYTHING?



- This is the key question in a democracy and requires substantive inclusion – beyond an adoption focus, beyond the 'usual suspects', with creative methods.

THE DIGITAL AGRICULTURE REVOLUTION: WHAT TO CONSIDER TO MAKE IT WORK FOR SMALL OR MARGINALIZED FARMERS?

Jenny Melo-Velasco & Mary Hendrickson

Division of Applied Social Sciences. University of Missouri, Columbia, MO, USA.

Transformative policy mix or policy pandemonium? Insights from the Climate Smart Agriculture policy mix in Costa Rica

María Rodríguez-Barillas^{a b}  , Laurens Klerkx^{a c}, P. Marijn Poortvliet^d

New but for whom? Discourses of innovation in precision agriculture

Emily Duncan¹  • Alesandros Glaros¹ • Dennis Z. Ross¹ • Eric Nost¹

Automated pastures and the digital divide: How agricultural technologies are shaping labour and rural communities

Sarah Rotz^{c,*}, Evan Gravely^b, Ian Mosby^b, Emily Duncan^b, Elizabeth Finnis^b, Mervyn Horgan^b, Joseph LeBlanc^a, Ralph Martin^b, Hannah Tait Neufeld^b, Andrew Nixon^b, Laxmi Pant^b, Vivian Shalla^b, Evan Fraser^b

Automated agrifood futures: robotics, labor and the distributive politics of digital agriculture

Michael Carolan



ELSEVIER



Agricultural Systems

Volume 184, September 2020, 102901



Perspectives

Supporting food systems transformation: The what, why, who, where and how of mission-oriented agricultural innovation systems

Laurens Klerkx  , Stephanie Begemann

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