



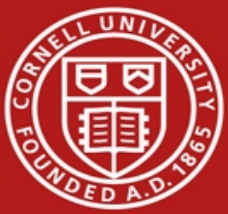
Cornell University

Why Socio-Technical Innovation Bundles for Agri-Food Systems Transformation?

Christopher B. Barrett
Cornell University

National Science Foundation
Convergence Accelerator Workshop on
Sustainable Systems Enabling Food Security in
Extreme Environments and Food Deserts Employing
a Convergence of Food, Energy, Water and Systems

May 19, 2021



Cornell University

Expert panel



Cornell Atkinson – *Nature Sustainability* 2020 expert panel on “Innovations to Build Sustainable, Equitable, Inclusive Food Value Chains,” a diverse group of 23 experts from across disciplines, regions, organizations, etc., w/10 additional co-authors.

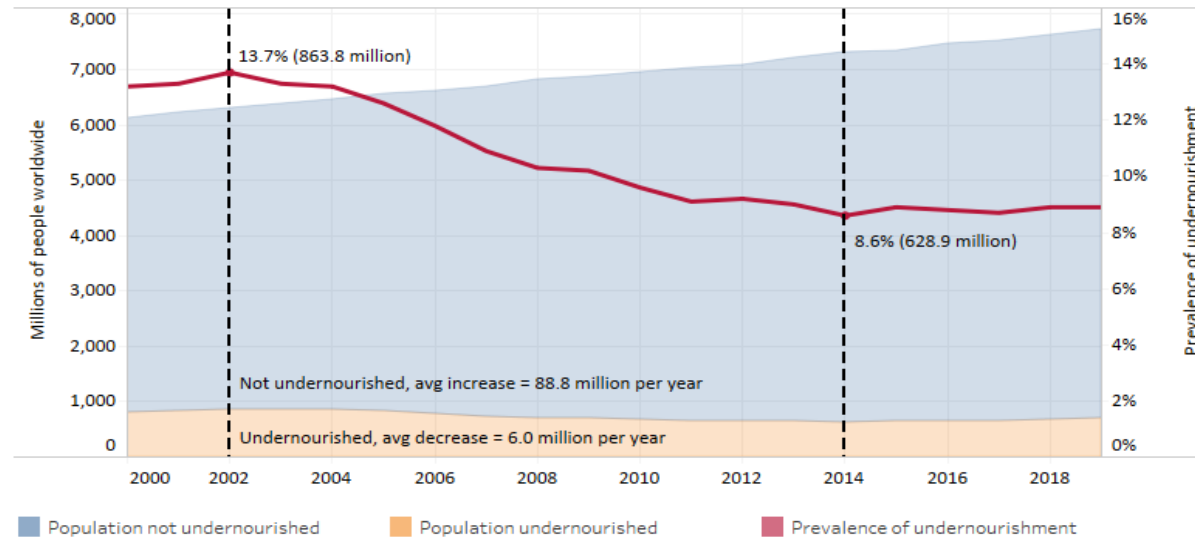
Report issued Dec. 2020 on *Nature* web site. Book forthcoming in Palgrave Macmillan SDG series.





We must hold two fundamental truths firmly in mind:

(1) 1960s/70s objectives – grow supply of staple cereals to avert famine – sparked AFS innovations that enabled huge advances in human well-being.



(2) Those innovations also had major, adverse, unsustainable spillover effects on climate, natural environment, public health/nutrition, social justice.

We must update objectives, accelerate/reorient innovations for 21st century.



Cornell University

Key conclusions

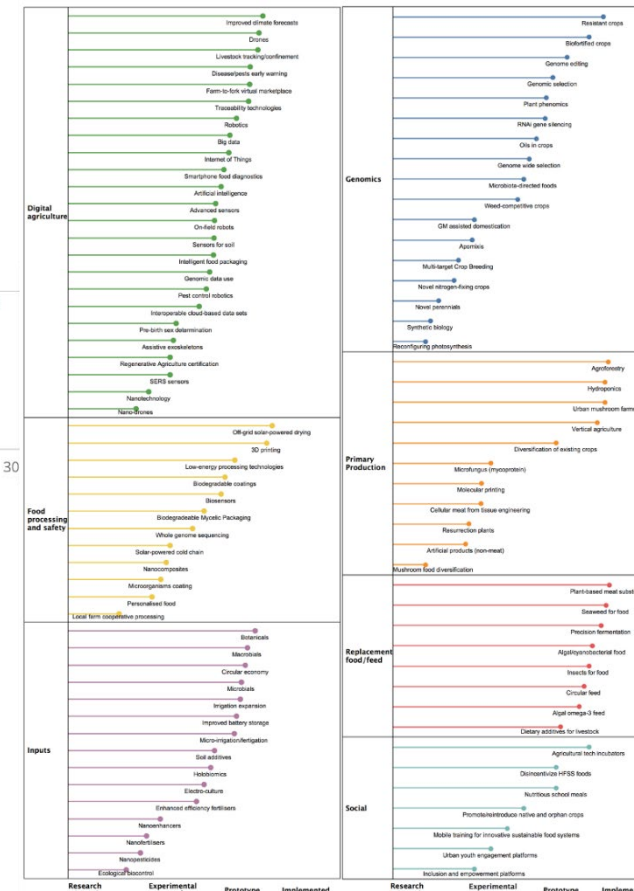
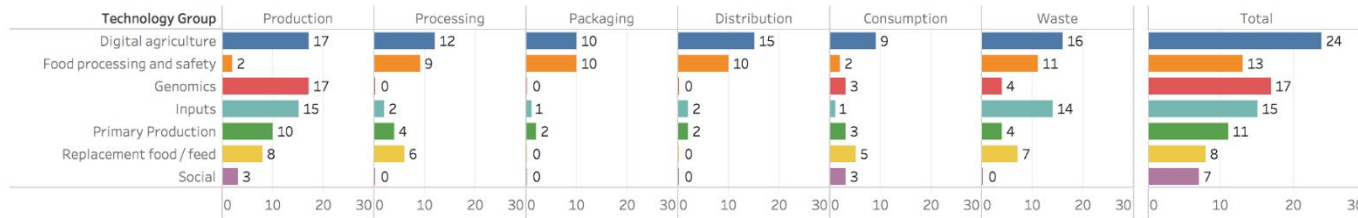
Build around a shared vision of HERS agri-food systems.

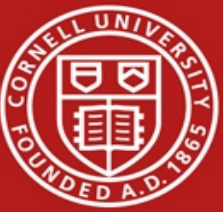
Must embrace multiple objectives simultaneously:





A profuse pipeline exists of promising (natural and social) science advances at various stages of deployment readiness. Span value chains and geographies.

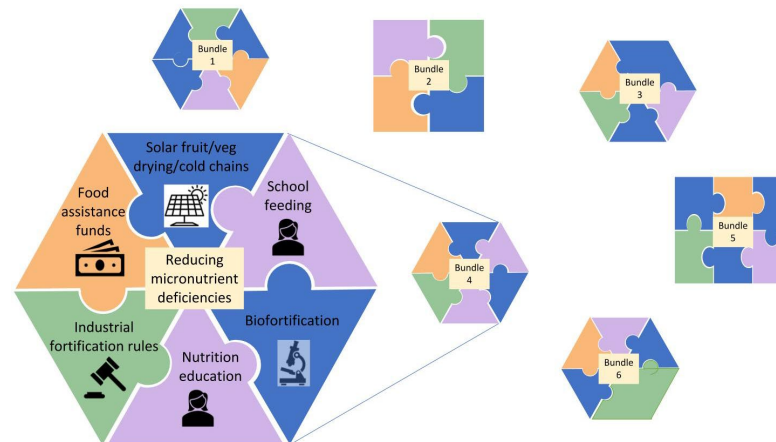




1. Develop socio-technical innovation bundles

Why bundle?

- (i) No magic bullets exist. Must realize synergies to adapt/scale.
- (ii) Must address political economy of spillovers and creative destruction.
- (iii) Heterogeneous needs require bundled solutions





Cornell University

7 Essential Actions

2. Reduce the land and water footprint of food

Decoupling food production from land increasingly culturally, economically, technologically feasible. Must manage de-agrarianization's creative destruction.



Photo: Gerry Machen/Creative Commons



Photo: Betterindia.com



Photo: Beck Deifenbach/Reuters



3. Reconfigure public support for AFSs

Two key roles for gov'ts:

- invest in essential public goods and services: e.g., NSF-funded research
- facilitate dialogue to find cooperative solutions: e.g., workshops like this!

Much current government AFS spending is wasteful (\$2bn/day!)

Redirect towards social protection programs, agri-food research, and physical and institutional infrastructure.

Foster civil society dialogues to identify and support contextually appropriate socio-technical bundles.



Cornell University

Other Essential Actions

4. Commit to co-creation with shared and verifiable responsibility Agreed KPMs, safety nets, penalties can accelerate beneficial innovation and minimize adverse unintended consequences.

5. Deconcentrate power
Reducing market and political power imbalances and broadening participation in innovation dialogues can accelerate innovation.

6. Mainstream systemic risk management
COVID-19 underscores the rising importance of effective systemic risk management. Need innovative risk reduction and risk transfer mechanisms.

7. Develop novel financing mechanisms
AFS innovations require \$\$\$ (hundreds of billions annually).
How to mobilize private resources beyond public spending/philanthropy?





Cornell University

Thank you

Report and associated journal articles, videos, etc. available at
<https://blogs.cornell.edu/nature-sustainability/>

Thank you for your time and interest!

Bundling innovations to transform agri-food systems

NATURE SUSTAINABILITY | VOL 3 | DECEMBER 2020 | 974-976 | www.nature.com/natsustain

Coupling technological advances with sociocultural and policy changes can transform agri-food systems to address pressing climate, economic, environmental, health and social challenges. An international expert panel reports on options to induce contextualized combinations of innovations that can balance multiple goals.



editorial

Bundling agri-food innovations

Our expert panel on food value chains now shares recommendations on how to transform agri-food systems.

Articulating the effect of food systems innovation on the Sustainable Development Goals



Mario Herrero, Philip K Thornton, Daniel Mason-D'Croz, Jeda Palmer, Benjamin L Bodirsky, Prajal Pradhan, Christopher B Barrett, Tim G Benton, Andrew Hall, Ilje Pikaar, Jessica R Bogard, Graham D Bonnett, Brett A Bryan, Bruce M Campbell, Svend Christensen, Michael Clark, Jessica Fanzo, Cecile M Godde, Andy Jarvis, Ana Maria Loboguerrero, Alexander Mathys, C Lynne McIntyre, Rosamond L Naylor, Rebecca Nelson, Michael Obersteiner, Alejandro Parodi, Alexander Popp, Katie Rickerts, Pete Smith, Hugo Valin, Sonja J Vermeulen, Joost Vervoort, Mark van Wijk, Hannah HE van Zanten, Paul C West, Stephen A Wood, Johan Rockström



Food system innovations will be instrumental to achieving multiple Sustainable Development Goals (SDGs). However, major innovation breakthroughs can trigger profound and disruptive changes, leading to simultaneous and

Lancet Planet Health 2021;
5: e50-62

Amer. J. Agr. Econ. 103(2): 422-447; doi:10.1111/ajae.12160

OVERCOMING GLOBAL FOOD SECURITY CHALLENGES THROUGH SCIENCE AND SOLIDARITY

CHRISTOPHER B. BARRETT