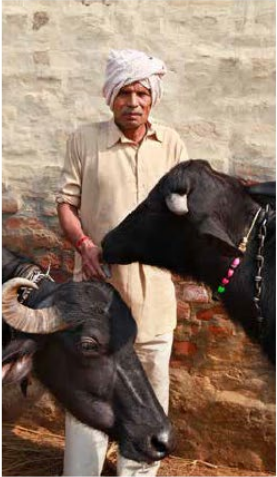




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**Socio-Technical
Innovation
Bundles for
Agri-Food
Systems
Transformation**



A Cornell Atkinson Center
for Sustainability/
Nature Sustainability
Expert Panel Report

December 2020

**nature
sustainability**



**Christopher B. Barrett
Dyson School/Economics/Global Development
Cornell University**

**Cornell School of Integrative Plant Sciences
virtual seminar
March 24, 2021**



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Expert panel

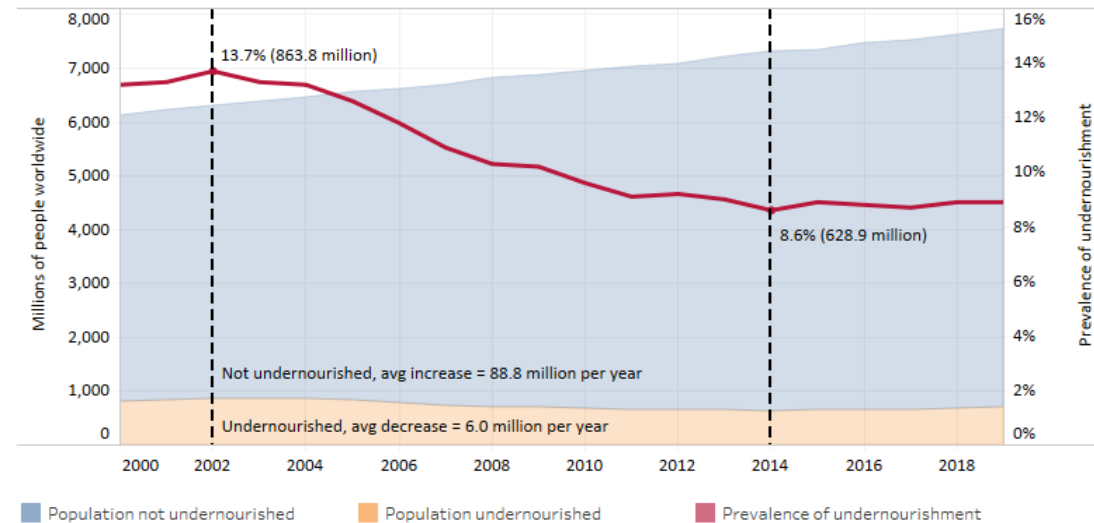


Cornell Atkinson – *Nature Sustainability* 2020 expert panel on “Innovations to Build Sustainable, Equitable, Inclusive Food Value Chains” comprised a diverse group of 23 experts from across disciplines, regions, organizations, etc. Met Dec 2019-Nov 2020. Added 10 additional co-authors, report issued Dec. 2020.



Must keep firmly in mind two key facts:

1. AFS innovations have enabled huge advances in human well-being.



2. But they have also had adverse, unsustainable spillover effects on climate, natural environment, public health/nutrition, social justice.

We must embrace/accelerate innovations but update/reorient objectives



The expert panel reached several key conclusions:

1. B/c AFS consist of complex webs of actors and processes, must keep four key features firmly in mind:
 - **H**uman agency by billions actors is key .. mechanism design
 - **H**eterogeneity precludes one-size-fits-all solutions
 - **S**pillover effects pervasive and demand portfolio approaches
 - **S**cience-based innovation needed in evolutionary systems



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Key conclusions

2. A shared vision of HERS agri-food systems.

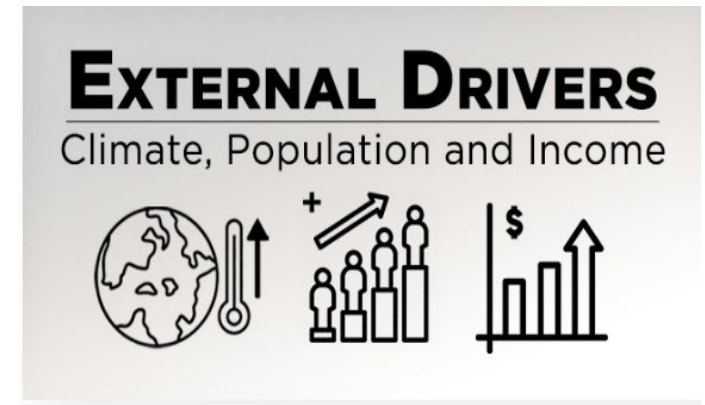
Must embrace multiple objectives simultaneously:





3. Must design for future states, not today's. Looking 25-50 yrs ahead (past 2030 SDGs, to scaled impact of emergent and ideated innovations), 3 major changes loom:

- Climate change
- Population shifts – urbanization, aging
- Income growth

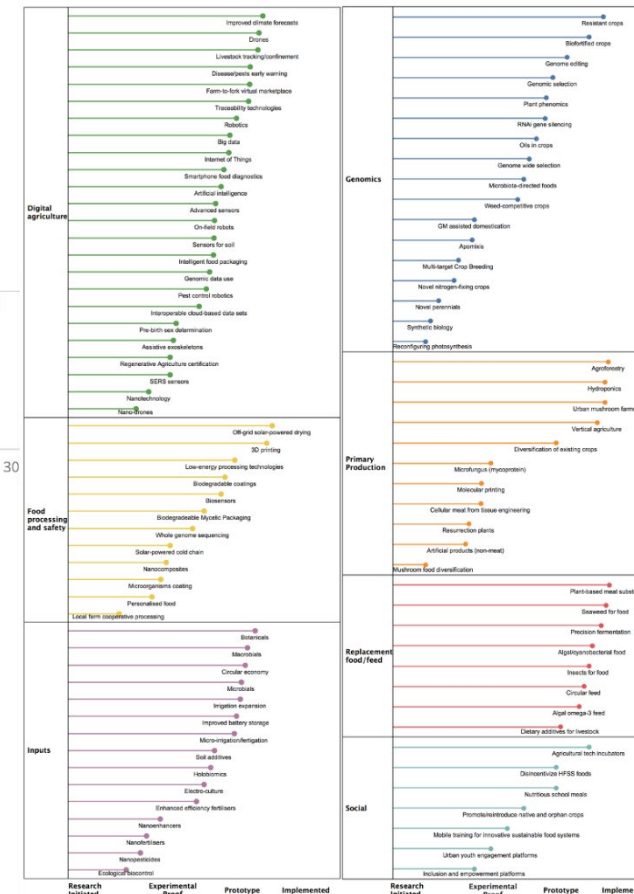
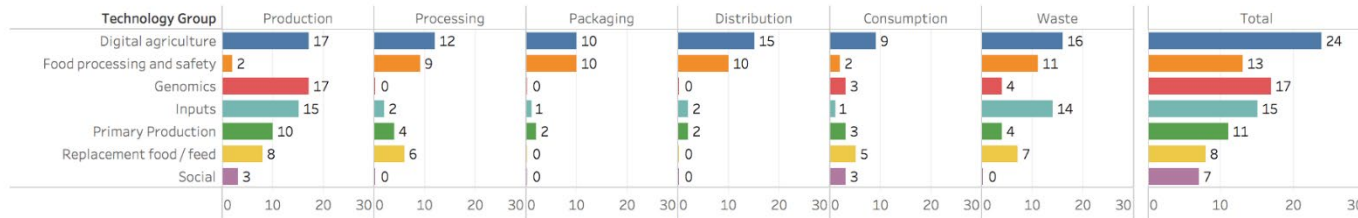


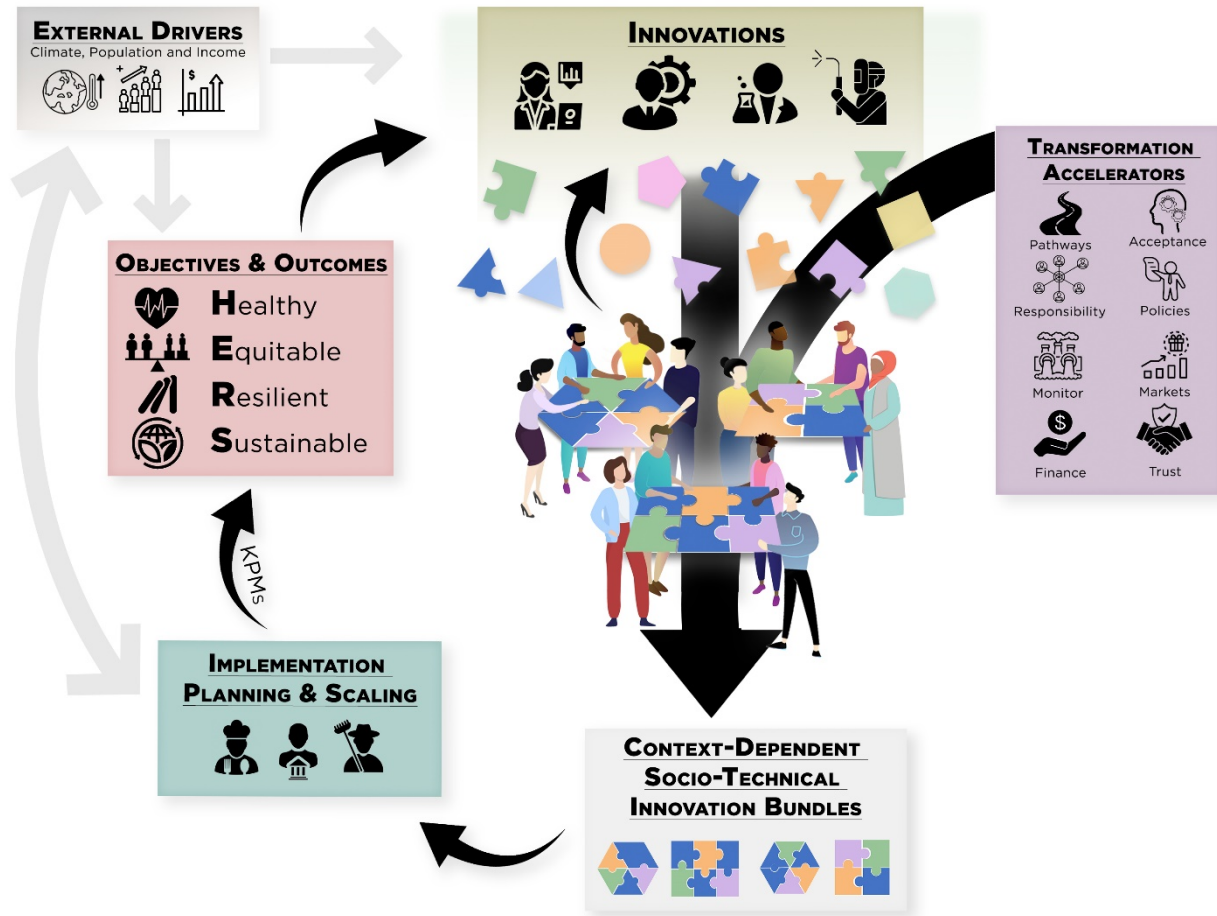
One key implication:

Pay FAR more attention to Africa ... will account for >50% of global food demand growth to 2100



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





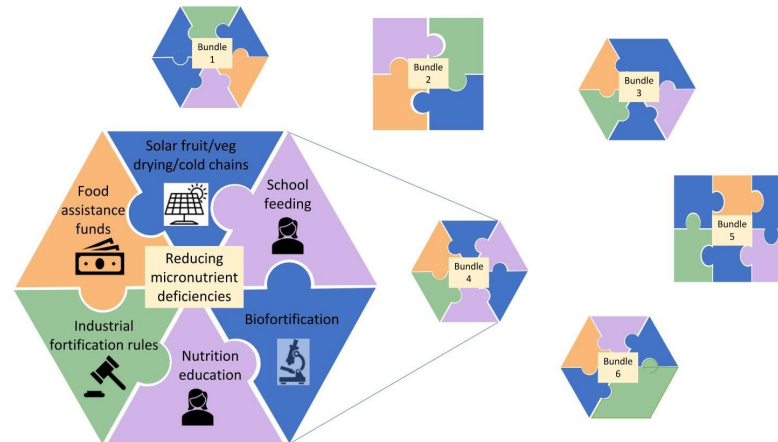
The agri-food systems innovation cycle



1. Develop socio-technical innovation bundles.

No magic bullets exist. Need to bundle in order to:

- (i) realize synergies needed to adapt/scale
- (ii) address political economy arising from spillovers
- (iii) meet heterogeneous needs





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7 Essential Actions

2. Reduce the land and water footprint of food.

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



Photo: Gerry Machen/Creative Commons



Photo: Betterindia.com



Photo: Beck Deifenbach/Reuters



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

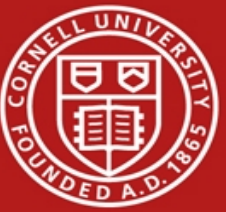




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7 Essential Actions

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



5. Mainstream systemic risk management.

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



6. Develop novel financing mechanisms.

AFS innovations require \$\$\$ (hundreds of billions annually).

How to mobilize private resources beyond public spending/philanthropy?



7. Reconfigure public support for AFSs

Two key roles for gov'ts:

- invest in essential public goods and services
- facilitate dialogue to find cooperative solutions.

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.



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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 Ricketts, 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