

FCI-Africa Alliance

Scaling up What Commercialization of Agricultural Innovations can Achieve through
Food Convergence Innovation Platforms Ecosystem

Laurette Dube and Collaborators

Webinar 3: Thursday, March 4, 13:00-15:00 PM UTC

Shaping the future development and commercialization of innovations to improve food safety and nutrition in the context of food system transformation

IITA-Gates Webinar Series: Scaling Agricultural Innovations Through Commercialization for Sustainable Food System Transformation



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Outline

- FCI-AFRICA as building block for Human-Centered and Digital Powered Innovation Platforms Ecosystem
- FCI AFRICA consortium as scale up strategy for Commercialization of Agricultural Innovations taking food safety and nutrition security as entry point for sustainable agricultural and economic development
- Challenges and possibilities for such NextGen Approach to Change the Game for Actors in current Private, Public, Civil Society and Academic Sectors for a World Reset on Convergence Economy



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FCI-AFRICA as building block for Worldwide Human-Centered and Digital-Powered Innovation Platforms Ecosystem



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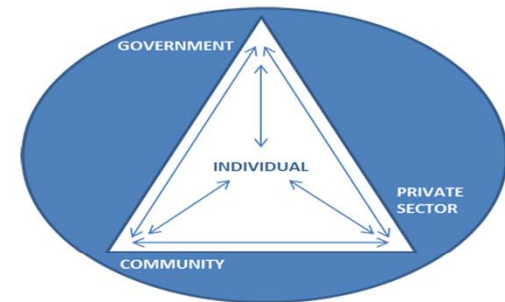
Convergent Innovation and Systems Science

A Person-in-Systems Approach to Science and Innovation for Adaptive Real World Behavior and Context

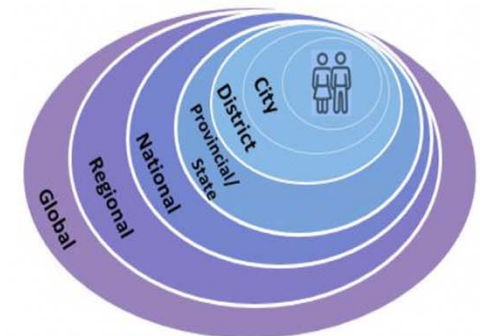
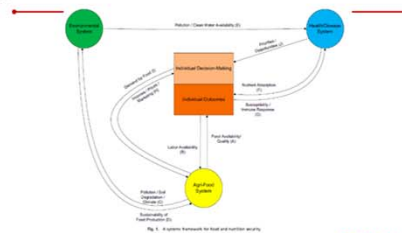
Innovation requires understanding a really complex system involving a number of diverse and dynamic components

A systems science perspective and transdisciplinary models for food and nutrition security

Ross A. Hammond^{a1} and Laurette Dube^b
^aCenter on Social Dynamics and Policy, The Brookings Institution, Washington, DC 20036; and ^bMcGill World Platform for Health and Economic Convergence, McGill University, Montreal, QC, Canada H3A 1G5
 Edited by Prabhu Pingali, Bill and Melinda Gates Foundation, Seattle, WA, and approved March 30, 2012 (received for review June 10, 2011)
 We argue that food and nutrition security is driven by complex underlying systems and that both research and policy in this area would benefit from a systems approach. We present a framework for such an approach, examine key underlying systems, and identify transdisciplinary modeling tools that may prove especially useful.



Complexity and Systems Science Framework for Food Choice, Eating Behavior and their Health and Economic Outcome



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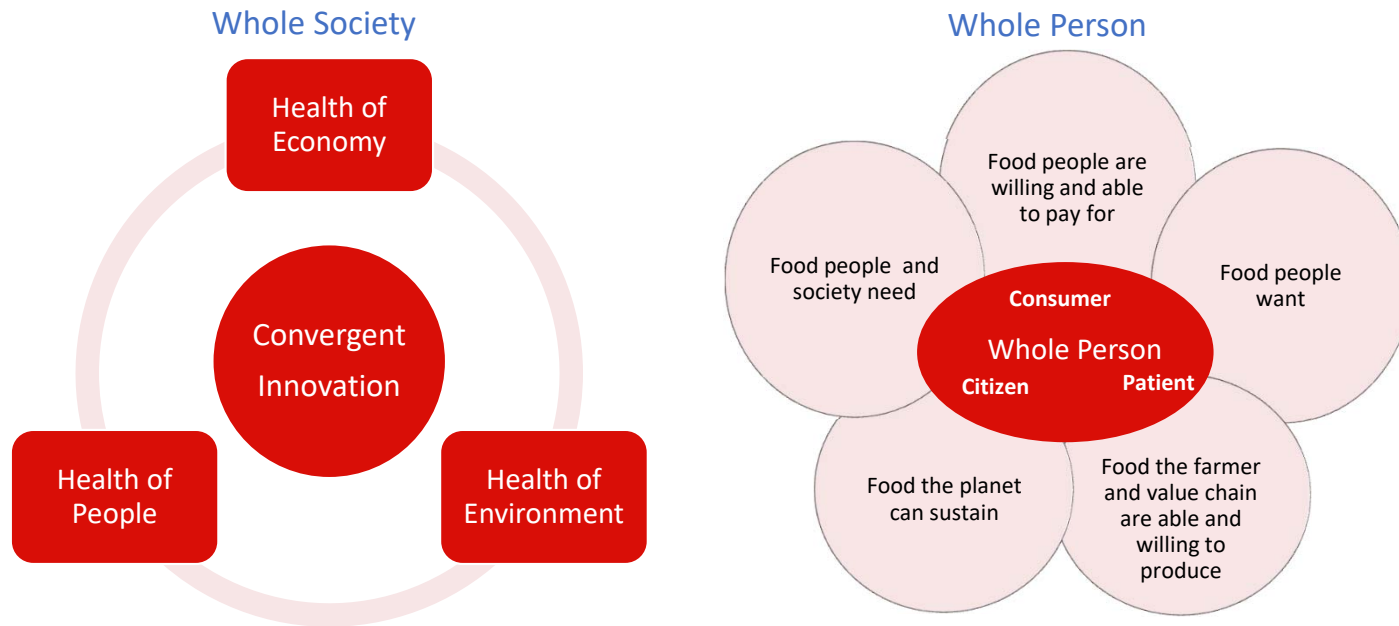
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Innovate the Way We Innovate in Agri-Food Sector and in Society

Food Convergent Innovation

Innovate the way we Innovate in the Agri-Food Sector and in Whole Society



Mission

A transformational discovery & innovation platform to produce, promote and consume food that sustains the health of people, planet and economy for sustainable development and affordable healthcare



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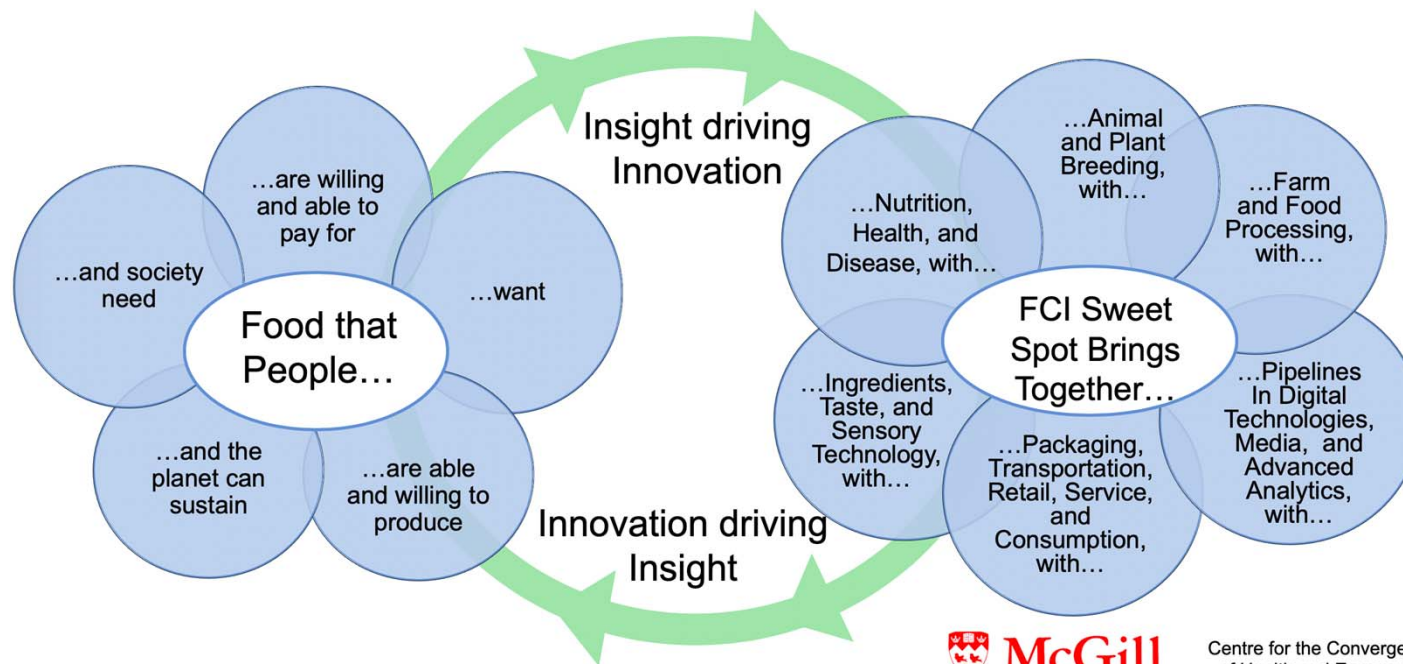
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The basis for innovation is to be in all dimensions impacting the food system and impacted by the food system. Studies on health require it, studies on food systems require it, studies on economics require it, food product R&D requires it, and quality assurance in trade requires it.

It is the basis for convergent innovation - As such, it must extend across all aspects of a crop, capturing everything from climate footprint to economics to human health.



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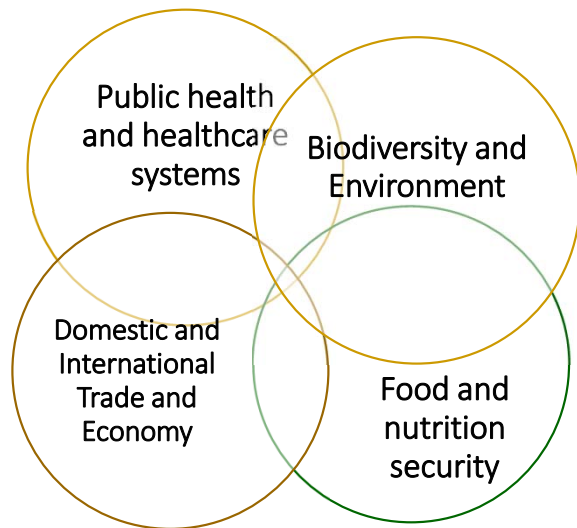


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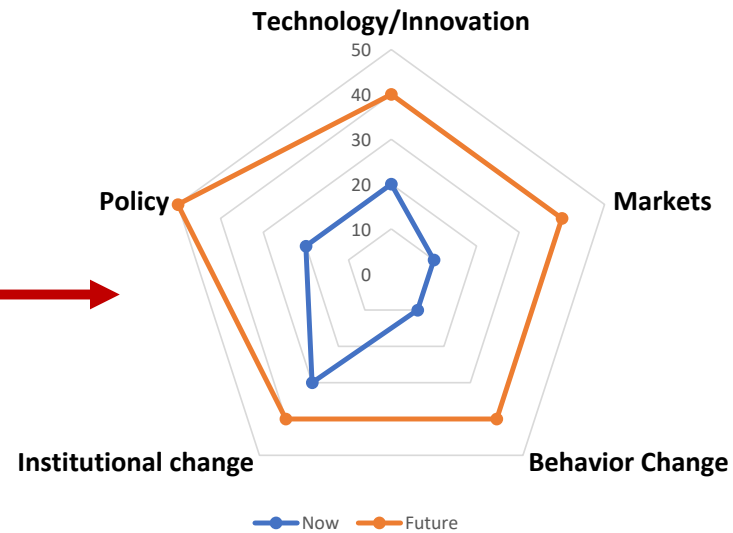
Solution at Scales to Multi-Sectorial Complex Issues Requires a Science- and Data-Driven Holistic Response

Impacts of Aflasafe, PICS, Biofortified Crops



Source: PACA

Responses



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Why do we need a Digital Infrastructure?

- Understanding the impact of innovation is very complex
 - Need to understand end-to-end the entire system to understand the impact
- Deluged with data of all types and sizes!
 - Multi-modal
 - Multi-scale
 - Varying openness and standardization
- New algorithms (e.g. machine learning / artificial intelligence)
 - These need lots of data that is machine readable to even begin
- Research and innovation is siloed and in complex systems information is key to transformation
 - Need for a platform that allows people and companies from multiple sectors to work together to solve problems.



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What data? Convergence - Integration



WUR Data Management Support

Digital Object Identifier (DOI)

GitLab

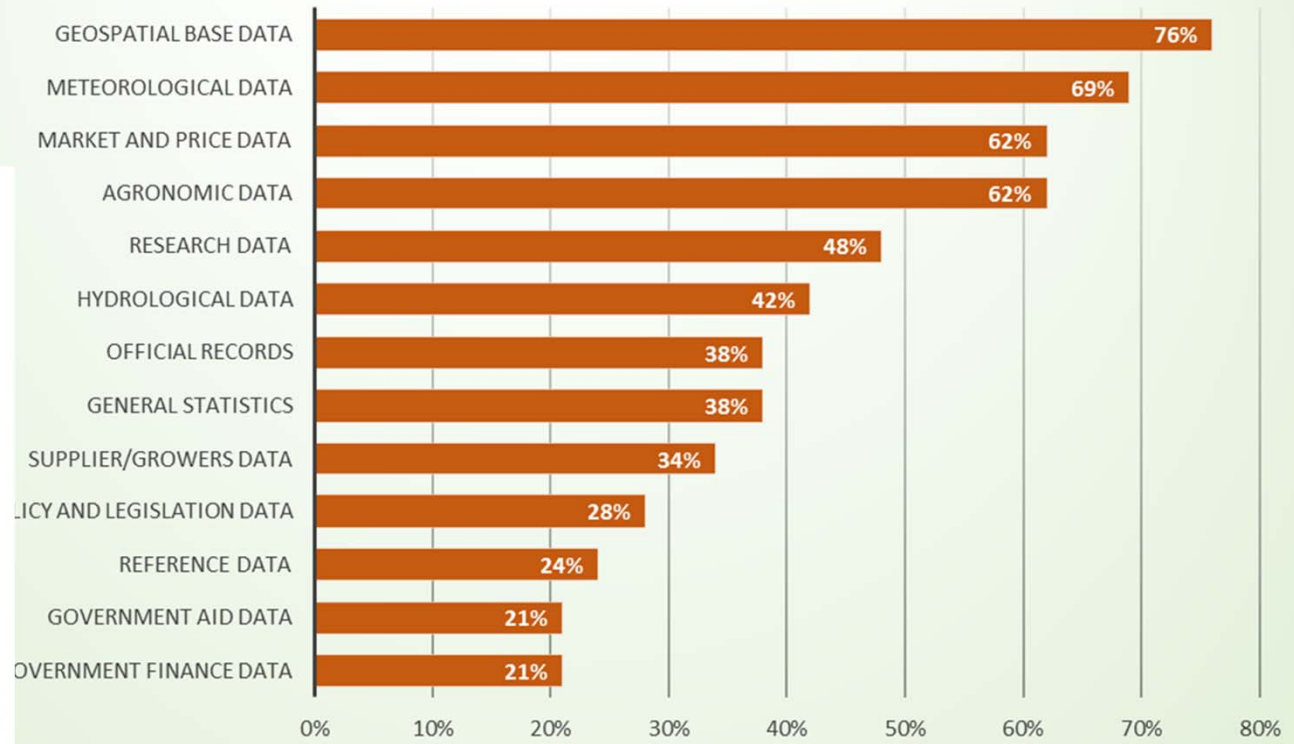
(Typical) Research Data Storage

Share with others		git drive	
only within WUR	(within and) beyond WUR	git drive	no office access needed
office access possible	office access possible	office access possible	no office access needed
<ul style="list-style-type: none"> • Only for working copies! • OneDrive for Business • SURFdrive 	<ul style="list-style-type: none"> • Only for working copies! • OneDrive for Business • SURFdrive 	<ul style="list-style-type: none"> • Teamate 	<ul style="list-style-type: none"> • Only for working copies! • OneDrive for Business • SURFdrive • H-drive

WAGeningen UNIVERSITY & RESEARCH

agro data cube

% of respondents indicating a data category as KEY



An Ecosystem for Rapidly Evolving, Data-Intensive Science & Engineering To Feed and Be Fed by Rapidly Evolving, Data Intensive Real-World Transformation



Connecting new communities to advanced research computing.

Converged computation and data ecosystem to empower users to explore new ways of doing computing.

Pioneered HPC+AI+Big Data
Bridges-AI expansion
Intel OPA first installation
Has become an ecosystem

2,100	projects
16,000	users
800	institutions
122	fields of study
130	education allocations

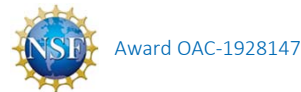
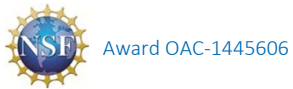


Provides transformative capability for rapidly evolving, computation-intensive and data-intensive research, creating opportunities for collaboration and convergence research.



Coming Q1 2021

More Science:	Approximately 3x larger than Bridges
Faster Computing:	Latest AMD EPYC processors
Faster Storage:	Fast flash array and tiered data management
Smarter Science:	Designed for Full System AI and data-centric computing
Scalable:	Interoperability with cloud and campus resources



For more information: <https://www.psc.edu/bridges>

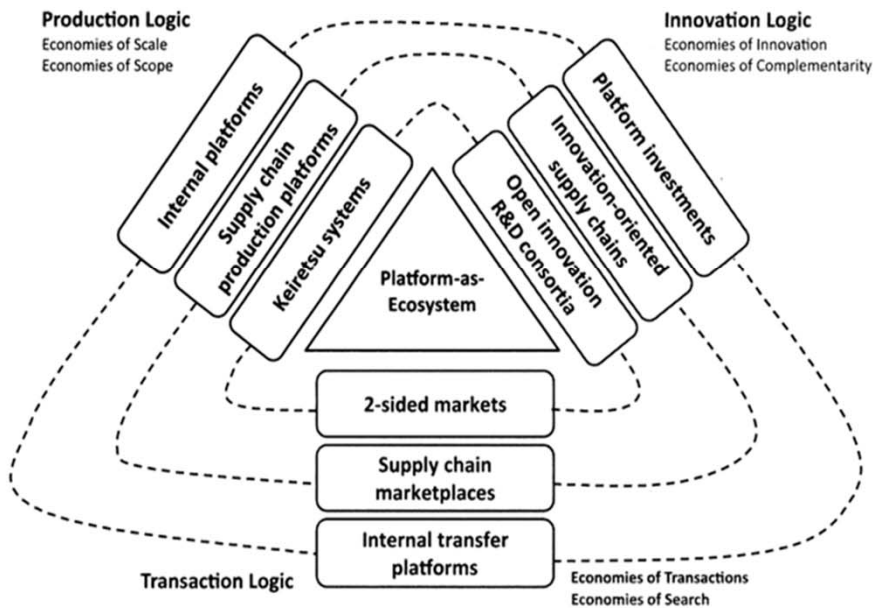


SCALING UP CONVERGENCE OUTCOMES: PLATFORMS ECOSYSTEM AFFORDANCES

Precision targeting, Connectivity, Modularity, Agility, Real-Time Part and Whole Monitoring

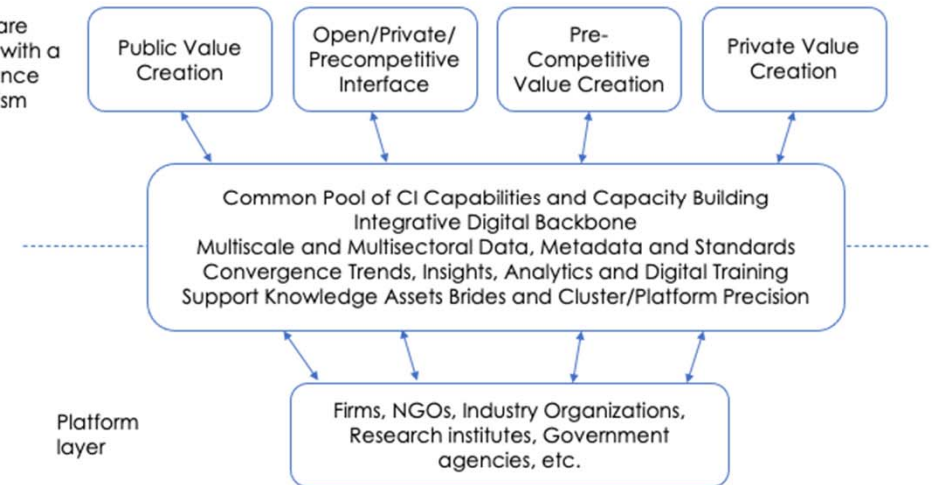
(Adapted from Thomas, L. D., Autio, E., & Gann, D. M. (2014), *Academy of management perspectives*, 28(2), 198-219)

FIGURE 2
Model of Architectural Leverage



Multi-Layered Platforms for Aligning Supply and Demand for Food at the CI Sweet Spot

Projects are Modular with a Governance Mechanism



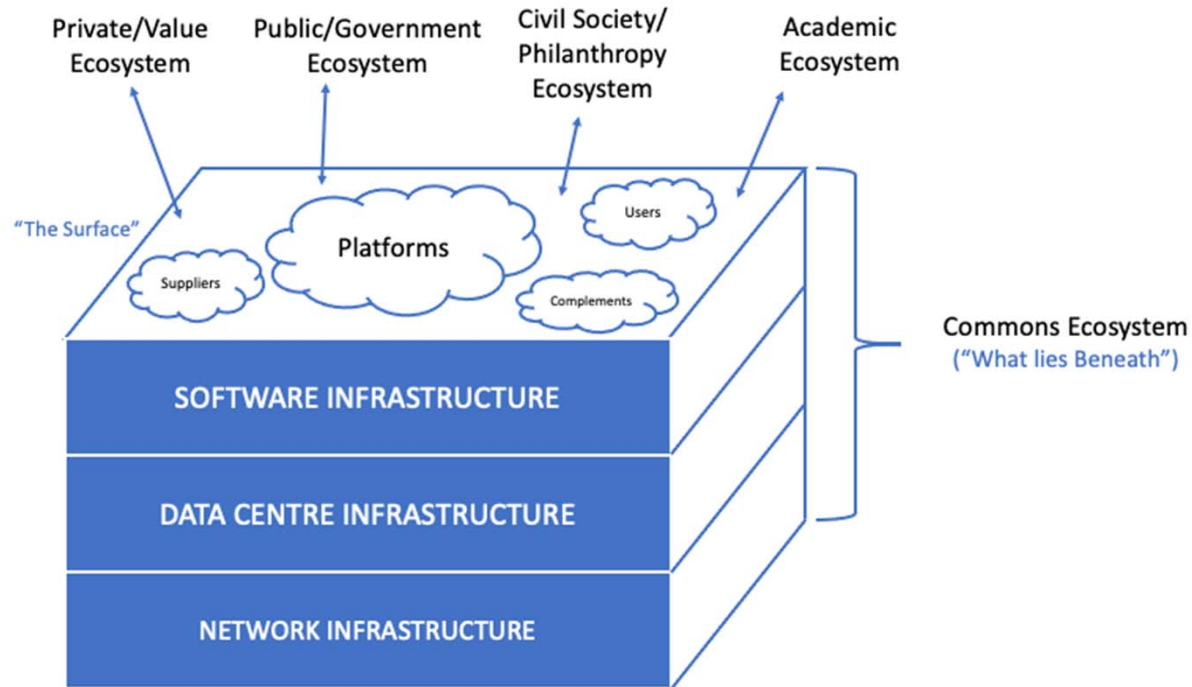
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Bridging Platforms-as-Ecosystems and Building Commons

(Adapted from Aunio 2021)



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FCI AFRICA consortium

A scale up strategy for Commercialization of Agricultural Innovations taking food safety and nutrition security as entry point for sustainable agricultural and economic development



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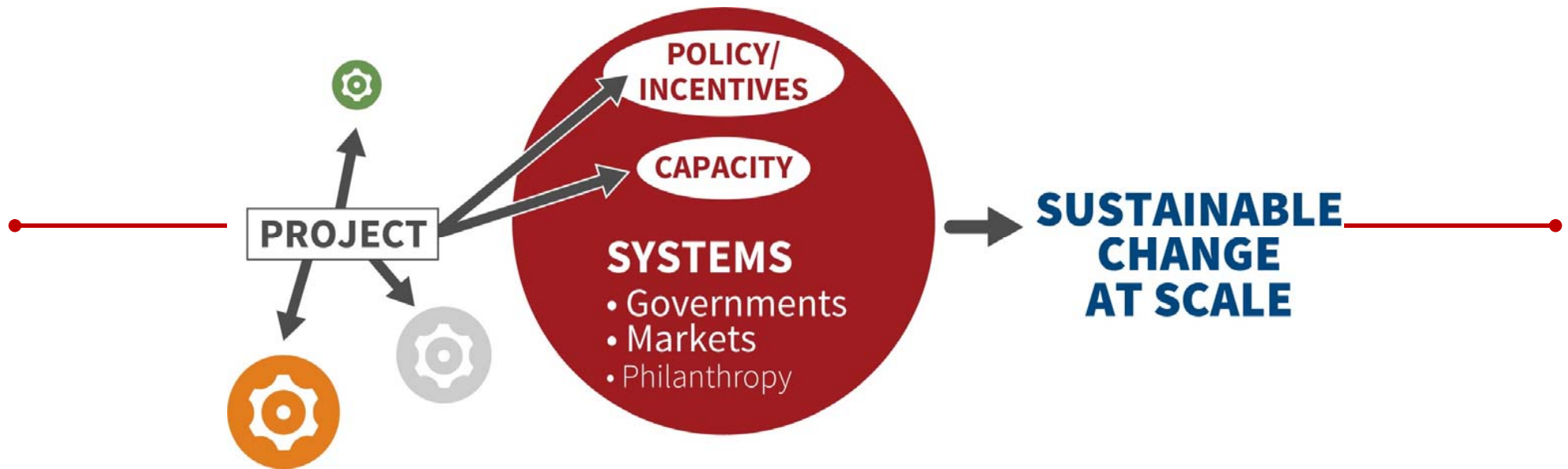
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Link between Projects and System change



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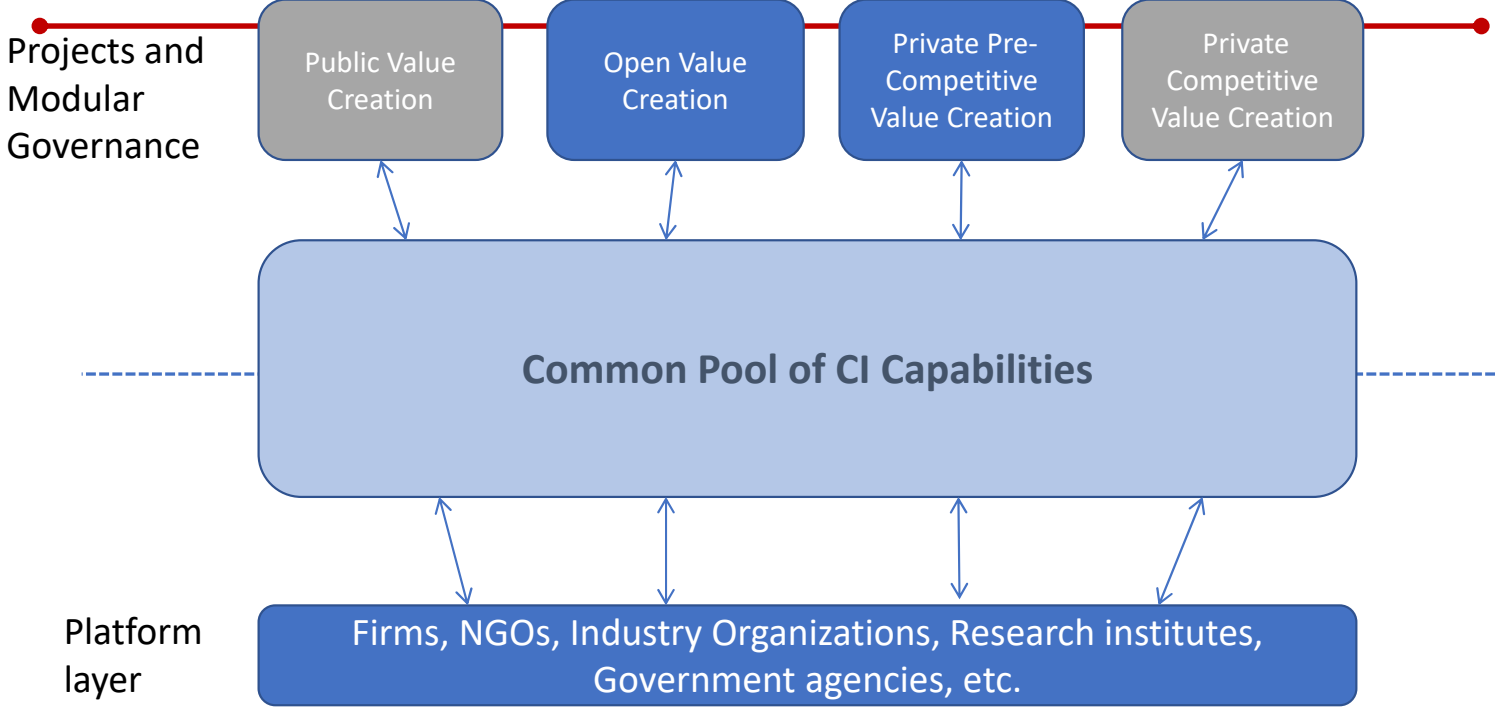
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Multi-Layered Platforms for Aligning Supply and Demand for Food at the CI Sweet Spot



Food Convergence Innovation (FCI) mobilises 3 core capabilities of an ecosystem approach that accelerates innovation

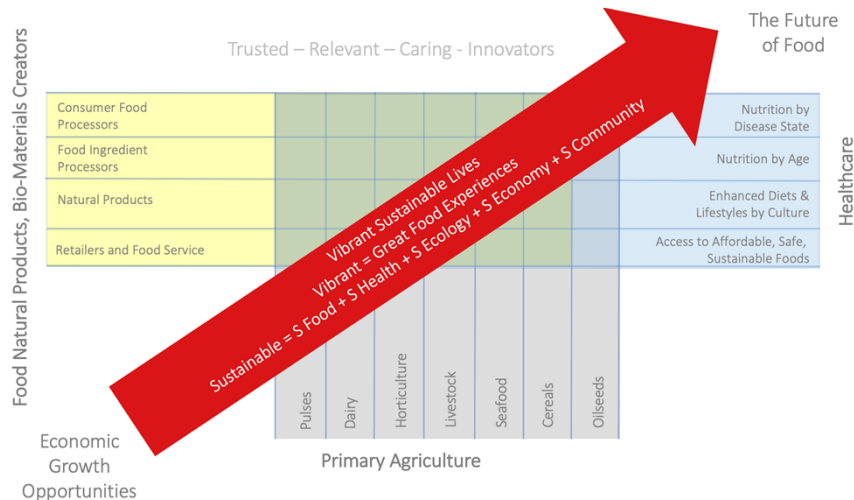
These are FCI multi-layered platforms utilizing a modular project approach, targeting real world impact through an open-source (shared learning) approach.

This approach is being implemented across the Ag sector.

Ongoing initiatives, cross-leveraging learnings from each.

Capabilities	Partners	Geographies	Entry Point
Integrative Digital Backbone (Connect People, Organizations, Knowledge, and Data)	Academic Partners	FCI Global	Plant-Based Protein-Pulses innovation
		FCI Canada	Plant based/Hybrid protein innovation
Behavior-Context-Market-Industry Insights and Trends, Research (\$&T) Support (Precision Retailing)	Digital & Data Partners	FCI Quebec	Clean label/ technology/ naturalness
		FCI Montreal	Food security/ local food systems
Integrative Human Backbone: (Industry, technical and strategic advice & support to action by FCI experts for accelerated on-the-ground support)	Action Partners	FCI Ghana	Consumer-facing CI branding for mother and child food with ecosystem building
		FCI India	Pulses

FCI is linked to and complements EU funded Wageningen University efforts in the Digitization of Agri-Food



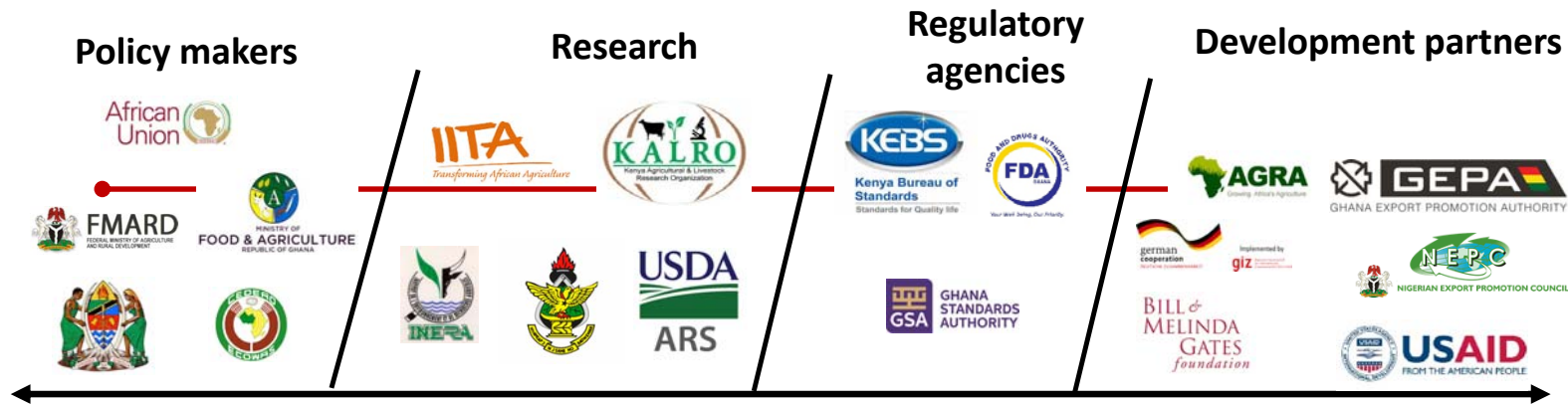
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Building an ecosystem to drive the scaling: Convening at each segment



Entrypoints for Agricultural Technologies with Less Apparent Social Benefits

Case: Aflatoxin Biocontrol with AFLASAFE



Treated vs non-treated

90%: <4 ppb
7-8%: 5 – 20 ppb
2-3%: >20 ppb
vs
>20, >100, >1,000 ppb

- A decade and a half of research and field trials
- Tailored product for national market
- Improves health and nutrition

Pathways to Scale

Entry-points to convene multiple stakeholders?

- Food safety and health?
- Access to MNCs?
- Access to export markets?

- Is there a Business case for use by farmers and other businesses?
- Is there an incentive for the private sector to lead the scaling?
- Is the public sector motivated and ready to lead or promote the scaling?
- What are enabling factors required to incentivise the private sector?
- Are there any opportunities for public–private partnerships to drive the scaling?



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FCI (Food Convergence Innovation)-Africa Alliance:

A multi-sector alliance for harmonizing conservation of biodiversity and Good Agronomic Practices for economic resilience and health in West Africa.

- To build a data-driven, shared investment and on-the-ground collaborative approach to create a convergence economy that enables the scale-up of sustainable use of biodiversity to enhance environmental and inclusive business, economic, social and health outcomes related to agriculture and food.
- The initiative aims to harness state-of-the-art private sector and institutional know-how and investment to scale-up the bio-control of aflatoxin contamination and insect pest infestation as the entry-point for transforming the relationship between biodiversity and agriculture.
- **Geographical outreach:** Burkina Faso, Ghana, Nigeria



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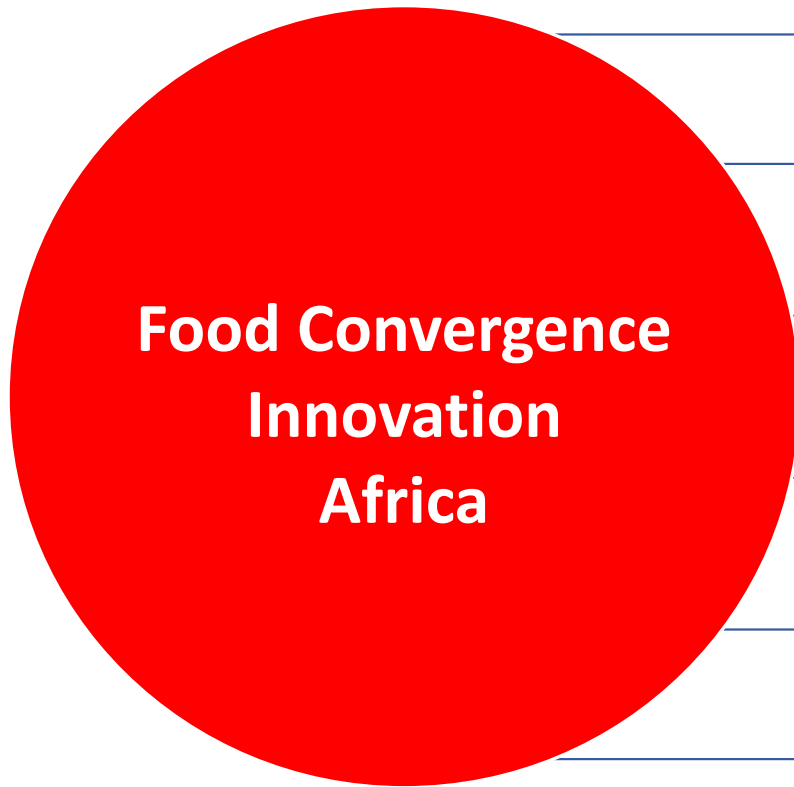
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FCI Africa Alliance:

+\$6.5M in Private Sector Investment to be Matched



Harvest
Industries



Uper
Arysta
Lifesciences



Saphyto



AgriBORA



eProd Solutions



Hone Global



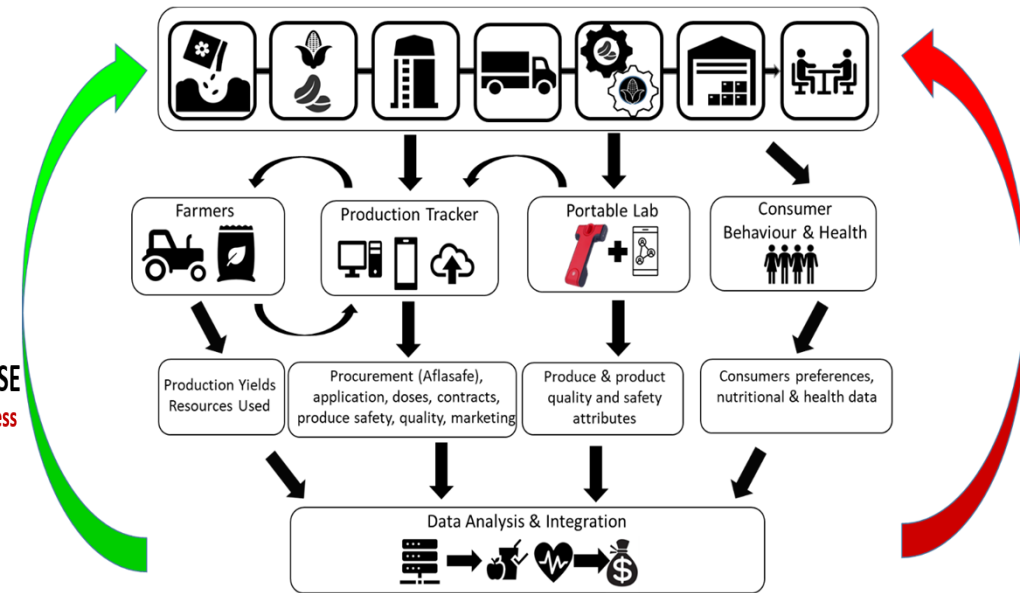
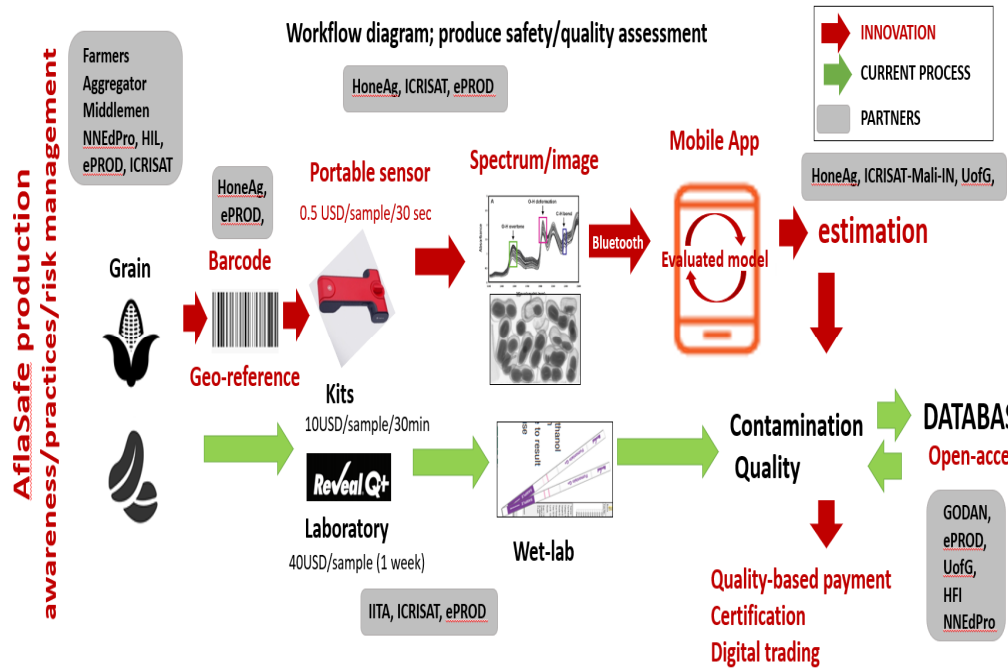
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Digital tool to improve the testing system

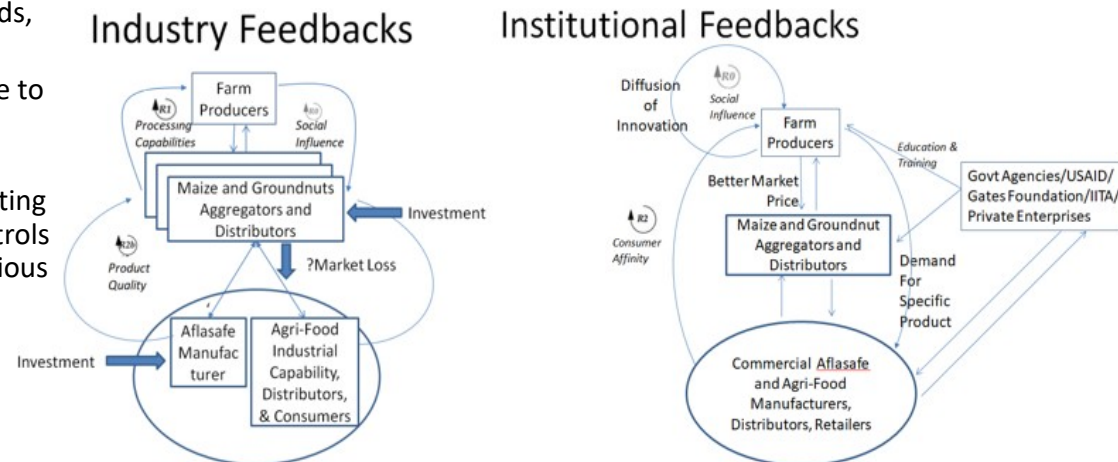
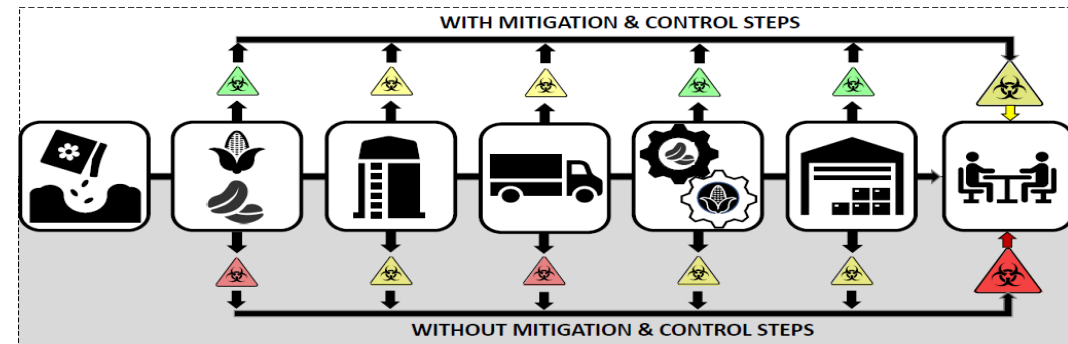
Work Package 2 will focus on enhancing nutritional quality, safety and traceability along the supply chain by resource optimization and sensing devices



AflaSafe production awareness/practices/risk management

Better food safety and nutritional quality achieved with aflatoxin management analysis via GeoCAB-FCI

- A Geospatial data Collection and Analysis Backbone (GeoCAB) for Food Convergence Innovation (FCI) in relation to managing aflatoxin risk in West Africa.
- We propose a Geospatial data storage, analysis and decision support system (termed GeoCAB-FCI) to support improvements in food commodity supply chains for West Africa. The aim is to identify, track and mitigate contamination of crops and their food products with aflatoxins, toxic metabolites produced by fungi with significant nutrition, health, and economic consequences. Capitalizing on advanced traceability methods, the project aims to:
 - (1) **Grain Mapper**: A web- and cell-phone enabled infrastructure to collect and organize a Geospatial database of production and supply-chains of maize and groundnut
 - (2) **Biocontrol-tracker**: a distributed Geospatial database indicating risk for aflatoxin contamination for capturing uptake of bio-controls (e.g., Aflasafe) and linking biocontrol users with aflatoxin-conscious buyers
 - (3) A computational infrastructure managed by Ghana High Performance Computing Center (HPC) at University of Ghana
 - (4) **Aflatoxin Management Simulator (AMS)**: a spatial decision support tool simulating policy feedbacks to improve aflatoxin management.
- **Geographical Outreach**: Starting with Nigeria and hosted in Ghana



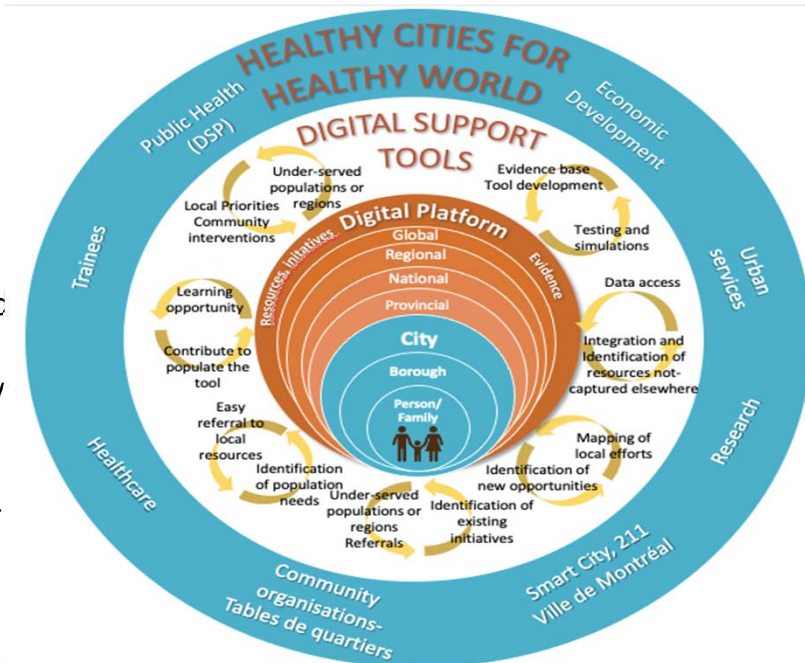
FCI -Africa Alliance: Project for Nutrition in Secondary Cities in West Africa

This initiative aims to prioritize nutrition in West-African secondary cities as entry points to improve the nutritional status and health of secondary cities dwellers by increasing sustainable production, supply and consumption of healthy foods under appropriate supportive policy and regulatory environments.

Project's Work Packages:

1. Food governance (focusing on focuses on limiting exposure, access to and consumption of nutrition-poor high-caloric modern food)
2. Nutrition quality and safety through inclusion, innovation and traceability
3. Nutrition and health through behaviour change and supportive environments
4. A platform for data acquisition, sharing, utilization and interpretation, for the development of multiscale digital food convergence ecosystem (DFCE)

Geographical Outreach: Agro-ecological zones in West-Africa: **Ghana** (Tamale, Sunyani, and Tema); **Nigeria** (Oyo, Ogbomosho, Zaria, Kubwa); **Burkina Faso** (Banfora, Diébougou, Orodara, and Boromo)



City-level work in FCI-Africa as part of World FCI Capacity Building



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Challenges and possibilities for such NextGen Approach to Change the Game for Actors in current Private, Public, Civil Society and Academic Sectors for a World Reset on Convergence Economy



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Convergence Economy

Intertwined Pathways of Science, Innovation, Operation, Policy and Impact for Economic (Linear and Circular), Environmental (Green and Bio Diversity) , Social (DEI, Diversity, Equity, and Inclusiveness) , and Health & Healthcare (Affordable for all) Development Goals

- The **digital transformation of science and society** is already fuelling an unprecedented synergy on the epidemiological and clinical sides of the pandemic. We propose a post-COVID-19 leapfrog for a next-generation combination of science, technology, innovation and policy to support a **World Reset**. This World Reset is **from a linear model of economic convergence** with its growing externalities, to a model of **convergence economy** that places **human and environmental health and their preservation/remediation/care systems** at the core of its wealth and social wellbeing creation engines, in a person-centered manner, and across sectors and jurisdictions, fully acknowledging that *developed* and *developing* worlds share the same planet



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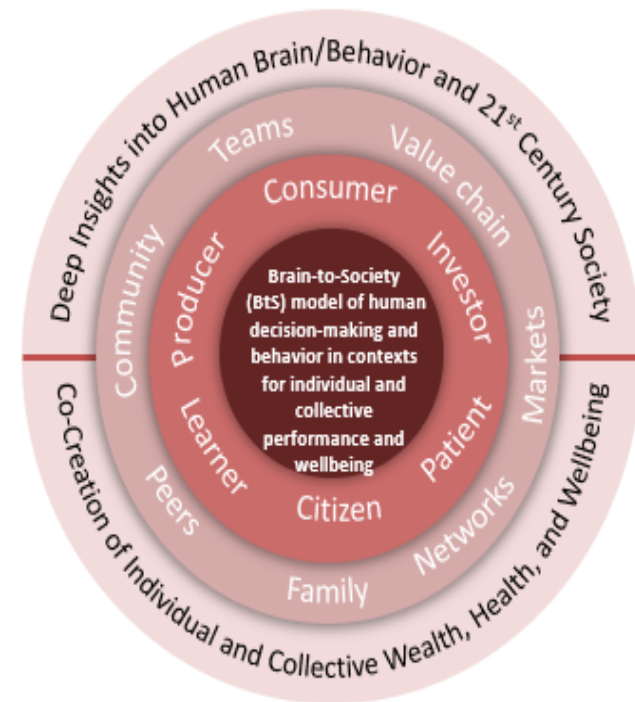
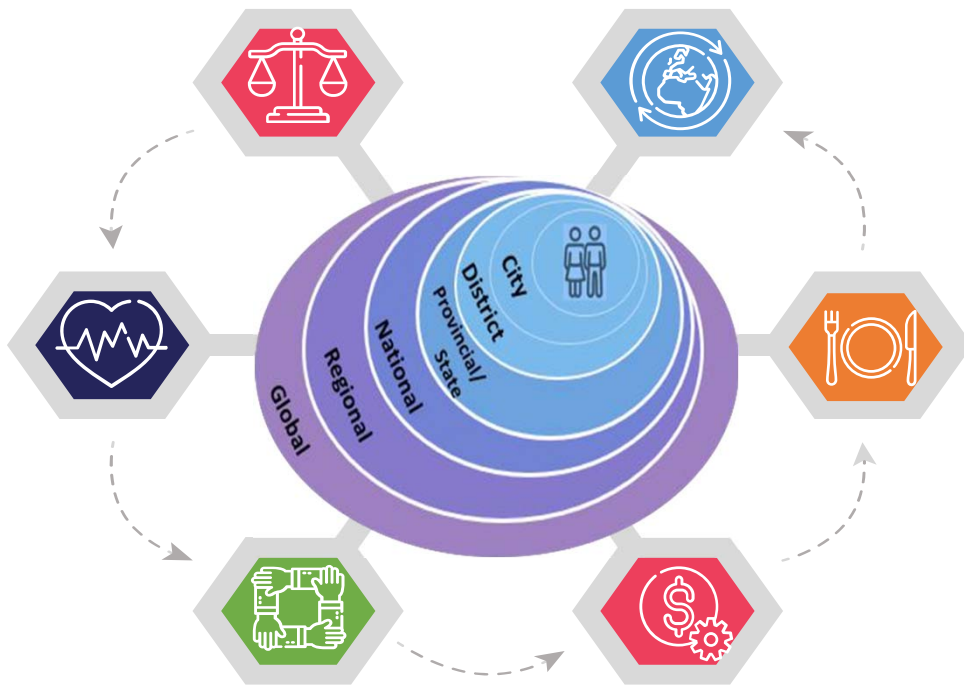
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CONVERGENCE ECONOMY: A Digital-Powered, Person-in-Systems Approach to Adaptive Real-World Contexts with Sectoral and Cross-Sectoral Action that Support Each Other to Provide Real Time and Long-Term Support to Individual Adaptive Real World Behavior



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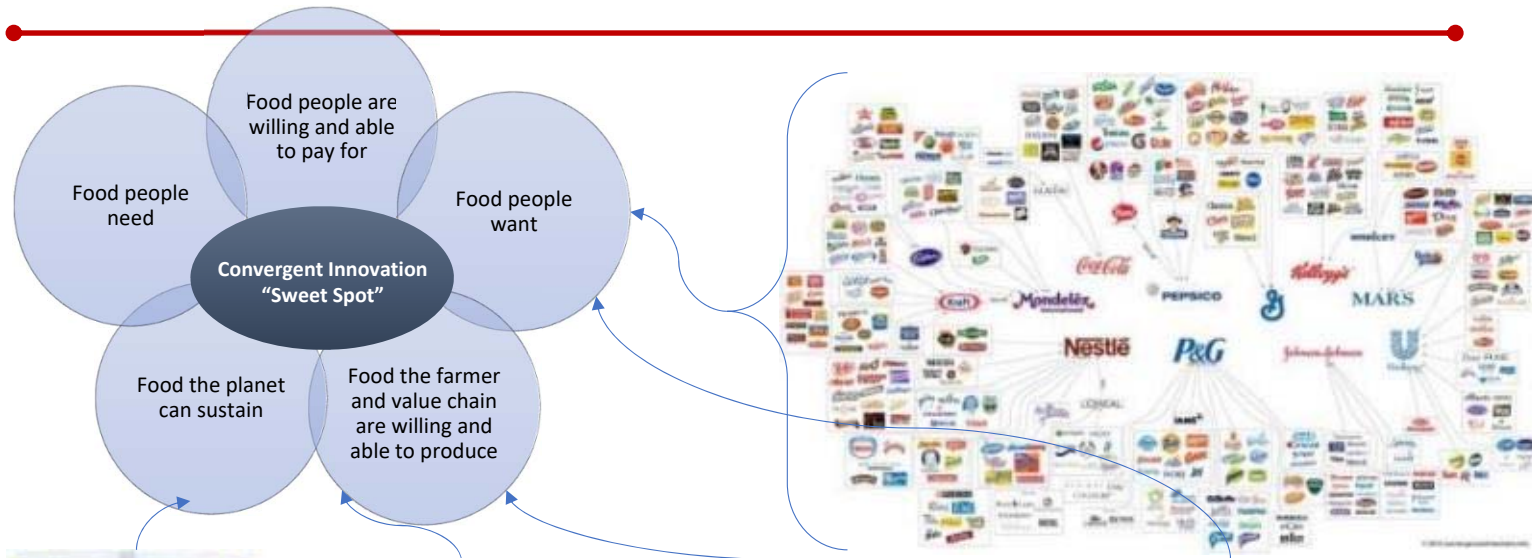
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Time May be Ripe for Bridging Investments and Innovation on Both Sides of the Social/Commercial Divide

New Approach to Branding and other Business Practices for Scaling up Supply and Demand for Healthy Foods and Diets Around the World



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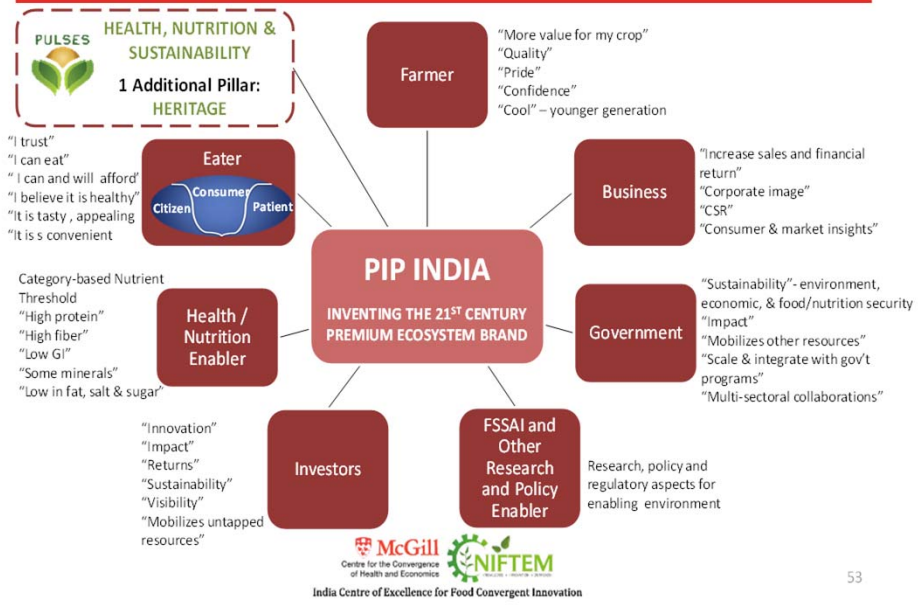


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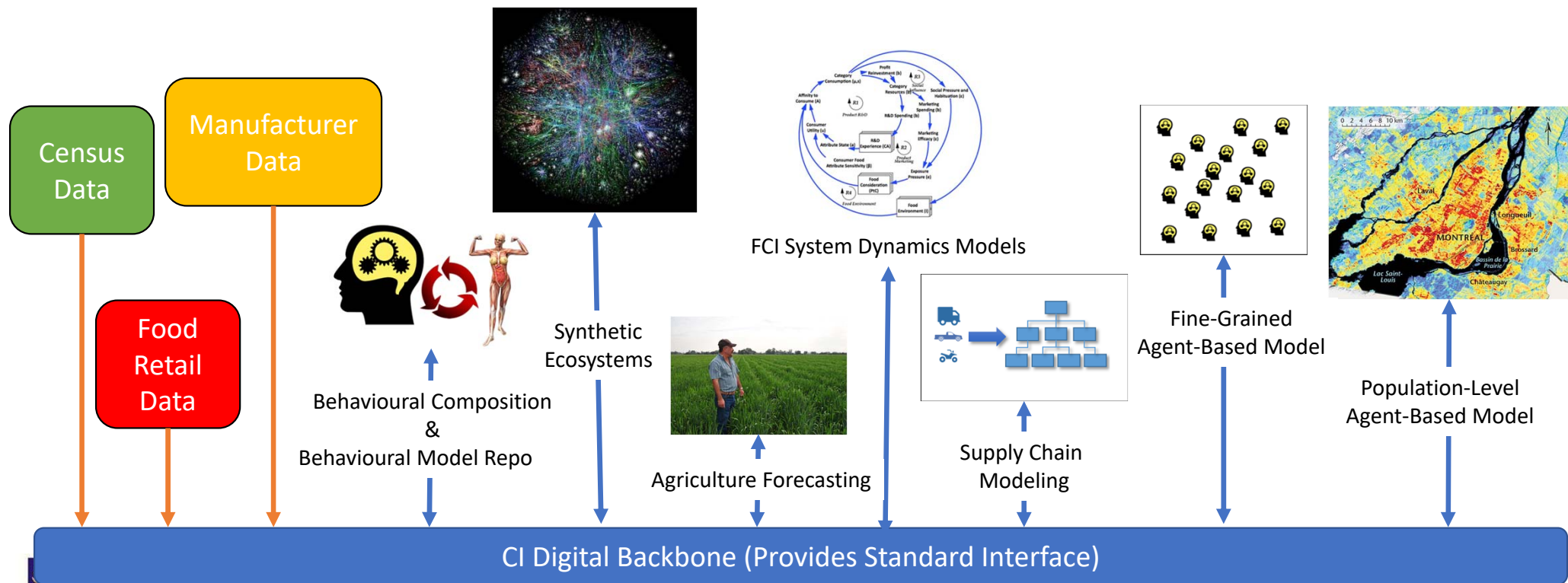
FCI ECOSYSTEM BRANDING FOR SOCIETAL SCALE BEHAVIORAL CHANGE AND ECOSYSTEM TRANSFORMATION

A 21ST CENTURY PREMIUM ECOSYSTEM BRAND FOR SUSTAINABLE DEVELOPMENT AND NUTRITION AT ANY PRICE POINTS



- Availability**
 - Nutrition quality
 - Nutrition sensitivity
- Access**
 - Variety (assortment)
 - Number of outlets
- Affordability**
 - Price per serving
 - Price discounts
- Appeal**
 - Advertising intensity
 - Non-price promotion/education

End-to-End FCI Multi-Scale Digital Support to Real-World Transformation through Science-Informed Convergent Innovation



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Thank you!

laurette.dube@mcgill.ca



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