



## ISDC Innovation Brief: Incubating Innovation

### Purpose

This discussion brief for SC14 complements the Independent Science for Development Council (ISDC)-moderated reviews of CGIAR's 19 Initiative proposals and the Companion Document to the 2022 – 2024 CGIAR Investment Prospectus. The Brief establishes some of the core topics that would serve as the heart for an ISDC-convened Science Forum Series proposed in its multi-year workplan for the period 2022-2024. The Brief contains specific and actionable recommendations for System Council.

### Action Requested

System Council is invited to consider this Brief, in the context of the launch of the new CGIAR portfolio, and furthermore, to consider recommendations directed to Council that pertain to their support of an innovation culture and mindset in CGIAR.

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## Incubating Innovation: A One CGIAR Culture and Mindset

The CGIAR partnership has reinvented itself as a single global research-for-development organization, building on the foundation of a successful half century of agricultural research. CGIAR's 2030 Strategy presents a roadmap for CGIAR to fulfill its mission by delivering innovations, capacity development, and policy change, using systems approaches that emphasize transformational change. The centerpiece of CGIAR's strategy is a prospectus of 32 Initiatives that are now undergoing independent review. With a new portfolio and strategy, implemented under unified governance, what does CGIAR need to focus on *now* to advance innovation in agri-food systems?

The Independent Science for Development Council (ISDC), which is conducting the independent review of the Initiatives, provides advice to the CGIAR System Council on topics of strategic scientific importance. Accordingly, this brief summarizes the

### WORKING CONSTRUCTS

Innovation drives institutional and social change (Harris, 2012), and CGIAR's 2030 Strategy positions the organization at the center of innovation systems. The strategy defines innovations as "*new ideas, products, services and solutions capable of facilitating impact*" and innovation systems as "*the interlinked set of people, processes, assets, social institutions and commercial markets that enable the introduction and scaling of [innovations] to deliver impact.*" For this brief, ISDC relies on these definitions, noting that the strategy implies a range of innovation types, from incremental to transformative.

This brief discusses innovation activity through an Agriculture Innovation System (AIS) lens (Aerni et al., 2015). Models such as AIS provide a useful way of conceiving the delivery of innovations in context; they portray the non-linear complexity that characterizes change in agricultural systems. Furthermore, the brief supports a shift from *innovation system thinking* toward *system innovation thinking* (Hall & Dijkman, 2019), which confers "*a framing concerned with the networks and institutional and policy conditions that enable the development and use of goods and services.*"

Beyond this, in conceiving how innovations in agri-food systems contribute to impact, ISDC recommends the work of an international expert panel that has described the bundling of innovations as essential for scaling, in-built analysis of trade-offs, and delivery of broad-scale results (Barrett et al., 2020). Finally, One CGIAR board, researchers and partners have robust, ongoing work untangling the topic of innovation; all such work is acknowledged but not unpacked in this brief.

### ADVICE SUMMARY

- ✓ Identify and leverage CGIAR's comparative advantage to attract new innovation investors.
- ✓ Foster an enabling environment that bolsters integrative and transdisciplinary skills.
- ✓ Model an institutional culture of inclusion.
- ✓ Require complexity-aware measurement and quality frameworks.
- ✓ Create broad partnership networks built for scaling innovation.
- ✓ Take a managed portfolio approach to investment.
- ✓ Support a paradigm shift towards sophisticated risk management.
- ✓ Keep the conversations active.

ISDC's advice for the System Council on how the Council can help build an innovation culture and foster innovations that incorporate inclusiveness and recognize and address trade-offs. The brief is not meant to be comprehensive but timely: it points to priorities where the System Council may have the most immediate impact.

***This brief's purpose is to summarize ISDC's advice for System Council on what CGIAR needs to focus on now, as its core responsibility in improving innovation systems.***

In preparing the brief, ISDC is guided by several assumptions:

- Agri-food systems are complex, evolving systems that are increasingly disrupted by transformative or radical innovations.
- Risks are implicit. In environments where stand-alone innovations are adopted, there will be winners and losers, and the position of losers needs to be understood and weighed.<sup>1</sup>
- CGIAR is positioned among many innovators. Innovation happens at all levels of agri-food systems and is not owned by any single sector or actor.

This brief concentrates on immediate and practical steps, which complement ISDC's review of the Investment Prospectus Companion Document (CD) and the first 19 Initiative proposals.

### DISCUSSION

#### **Complexity**

In the past, agricultural innovation consisted largely of prescriptive technology packages that traveled in a one-way flow from researcher to farmer (Hall &

Dijkman, 2019; Douthwaite & Hoffecker, 2017). Developing countries were regarded as “technology-users reliant on imports of technology” (Mytelka, 2016). Now CGIAR is moving beyond linear thinking. In this new environment, understanding and responding to complex systems are essential to CGIAR’s groundbreaking contributions.

Because CGIAR plays a key role within a broader array of international sustainable development efforts across food, land, and water systems, part of the complexity it must navigate relates to network effects in these systems. CGIAR simultaneously holds contributing, stimulating, and brokering roles in innovation system networks. To operate effectively, CGIAR must understand the networks in which it acts and its precise roles in them. At the same time, a fuller appreciation of complexity in the agri-food system calls for a more inclusive concept and practice of innovation.

### **Inclusion**

The United Nations Food Systems Summit Scientific Group articulated the need to accelerate the promotion of inclusive innovations. Innovation is an important driver of economic growth and social well-being. Yet “*conventional views of innovation (often implicitly) understand development as generalized economic growth. By contrast, inclusive innovation explicitly conceives development in terms of active*

*inclusion of those who are excluded from the mainstream of development*” (Aghion et al., 2019). What is required is a paradigm change away from instrumental inclusion that is designed to address the barriers preventing excluded groups from adopting innovations and toward transformational inclusion in processes of “co-innovation using multi-participant processes and partnerships” (Fielke, 2017).

***Billions of farmers, workers, firms, and food consumers each exercise agency within agri-food systems. Inclusion is essential to move forward highly decentralized systems that lack overarching coordinating institutions.***

Inclusiveness here pertains not only to excluded actors in agri-food systems, such as poorer farmers cultivating more marginal lands, female and younger farmers, and agri-food system entrepreneurs. It also refers to domain expertise, breeds and crops, and innovative research that may lie outside of mainstream attention yet hold strong promise to boost sustainable food and nutrition.

CGIAR and its partners indisputably spur agri-food system technological breakthroughs (Evenson & Gollin, 2003; Walker et al., 2014; SPIA, 2019). However, reinforcing and accelerating bottom-up innovation may take agri-food system transformation even further. Innovation in agriculture must evolve from being researcher driven to being co-created by

### **Framing trade-off debates: breeder and farmer rights**

CGIAR has championed incremental and transformative breeding science for decades. It contributed enormously to the international public goods that were central to the Green Revolution (SPIA 2019, Pingali 2012) and, more recently, dramatically accelerated agricultural breeding including through biotechnology. In recent years, as the private sector has stepped to the fore in the biotech space, untangling the respective roles of CGIAR and the private sector in breeding partnerships reveals one of the fundamental agri-food system trade-off debates CGIAR must negotiate: between plant breeder rights and farmer rights.

Protection of breeders’ intellectual property rights (IPRs) is a key enabler of private investment in breeding and the development of new varieties of plants (Smulders et al., 2021). Since the introduction of the plant variety protection regime under the 1961 International Convention for the Protection of New Varieties of Plants, the number of new plant varieties developed and adopted has increased considerably for the benefit of society (UPOV, 2005, 2020).

Yet IPRs generally forbid seed saving, reuse, exchange, and commercial sale, all of which are strategies that smallholders often use to bolster their seed security. Thus, the challenge in public-private breeding partnerships involving CGIAR is to strike a balance between complementing private investment in developing varieties and supplying quality seed on the one hand and meeting the seed management needs of smallholder farmers on the other.

Addressing this trade-off requires differentiated seed system development and IPR management: a differentiated approach refers to the formal, informal and intermediate seed systems (Mulesa et al, 2021) and ways to manage IPR that “set different levels of protection for different crops in relation to different categories of farmers” (De Jonge and Munyi, 2016). Governments can choose to adopt an intellectual property regime that promotes innovation, catalyzes diffusion, and encourages sharing to foster investment and economic growth. If IPRs apply to food crops, governments can preserve farmers’ rights to save, reuse, exchange, and sell seeds. CGIAR must also consider mechanisms to privilege farmers in its public-private breeding partnerships. Differentiated IPR management for inclusive and equitable innovation systems, such as in the formal seed system, benefits all farmers. CGIAR involvement in public-private breeding efforts, as seen in proposals for Genetic Innovation initiatives, underscores the urgency of addressing this trade-off.

researchers and farmers through partnerships that include farmers' voices.

### **Trade-offs and Risks**

Inclusive innovation recognizes and addresses the trade-offs inherent in complex agri-food systems. Indeed, addressing such trade-offs is both fundamental for establishing the legitimacy of innovations to which CGIAR contributes and essential to sophisticated risk management.

A key task in designing and assessing transformative research and socio-technical innovation efforts is to understand the disruptive and even destructive potential effects of innovation (Schumpeter, 1942; Hart, 2015; Anadon et al., 2016; Barrett et al., 2020). This task thus requires examining trade-offs, identifying and engaging prospective winners and losers from individual innovations, and co-producing, monitoring, and evaluating bundles of innovations customized to specific agri-food systems. When innovations are bundled, one innovation may compensate for the adverse effects of another innovation. Because CGIAR works across agroecosystems, commodities, and agri-food system components, it is especially well positioned to facilitate customized bundling of innovations.

One example of trade-offs related to CGIAR's storied genetic innovation activities concerns potential conflict between the intellectual property rights of plant breeders and farmers (see box, previous page). Because innovations in plant breeding will continue to play a powerful role in addressing threats to food, land, and water systems in a climate crisis, the trade-offs described will require urgent and ongoing attention. Many other examples of trade-offs are ripe for examination, such as the trade-off between inclusion of farmers in global value chains and the preservation of local food systems in pursuit of food sovereignty.

Another set of trade-offs relates to CGIAR's portfolio of activities. Bundling innovations and balancing a focus on areas of successful past research with exploration of new avenues of research are important mechanisms to ensure that innovations lead to impact. In presenting its portfolio, CGIAR has an opportunity to offer an array of investment opportunities, from business-as-usual research and innovation to high-risk/high-payoff activities. The right blend, across multiple investment pathways, will require sustained discussion and co-design among CGIAR and current and potential investors as the new portfolio rolls out.

### **Culture and Capacity**

Institutions create the rules for human exchange not only economically, socially, and politically (North, 1990, 1992, 2005; Erastus, 2014) but also productively. Institutional cultures may foster or thwart innovation and innovative thinking. For instance, incentive systems may inadvertently create outcomes that undermine innovative thinking by, for instance, offering rewards for maintaining the status quo rather than for taking risks and failing fast. CGIAR must commit to undertaking iterative discussions to understand how institutional and cultural constraints hamper transformational change (Conti et al., 2021) and addressing those constraints, towards a culture and mindset, not to mention the institutional infrastructure, of incubating innovation.

***We need bold action and leadership to avoid incentivizing simply doing what works rather than what is needed for transformation.***

The culture of formal and informal institutions affects research outcomes. Within a network of partners, a virtuous cycle might unfold: a culture that fosters innovation at a global scale has the potential to motivate more transparency in local and domestic institutions and promote the pursuit of innovation. Of course, the opposite also applies.

Furthermore, many partners in national agricultural research and extension systems may look to CGIAR as a model for how high-quality agricultural research-for-development institutes generate innovation. By default, then, the operational structure and expressed culture of CGIAR may themselves serve as change agents because they are a point of reference for local and domestic institutions.

***To drive innovation requires an innovation culture and mindset and the investment and patience to see these through.***

The CGIAR System Reference Group underscored the need for a T-shaped profiles among researchers, loosely defined as a deep technical competence coupled by strong cross-disciplinary collaboration skills. Indeed, carrying out CGIAR's mission requires growing and maintaining a pipeline of CGIAR researchers and leaders who exhibit flexible, critical modes of thinking and are able to integrate diverse views of strategic, systemic change. An investment in the formation of early-career researchers that includes multi- and transdisciplinary views will undergird the design and delivery of a realistic and applicable research *and* innovation program.

## WHAT CAN THE SYSTEM COUNCIL DO?

### **Identify and leverage CGIAR's comparative advantage to attract new innovation investors.**

To attract investors, CGIAR must provide a careful articulation of all of its current offerings, including where it is leading the innovation effort, where it is contributing, and where it is an innovation broker. ISDC stands ready to work with CGIAR to advise on an approach to articulating its comparative advantage as a matter of scientific and strategic positioning.

**Foster an enabling environment that bolsters integrative and transdisciplinary skills.** The System Council is encouraged to ask CGIAR leadership how One CGIAR will identify, invest in, and manage the pipeline for sustained capacities across all appropriate disciplines. In particular, what is being done to attract and motivate early-career researchers, particularly in underserved and rising disciplines, and to curate integrative skills profiles?

**Model an institutional culture of inclusion.** Pooled funding Initiatives, as a centerpiece of CGIAR's portfolio, should model a research culture based on co-creation and inclusion. The System Council may want CGIAR to identify how the pooled-funded project reporting system will provide assurance of such a culture.

**Require complexity-aware quality and measurement frameworks.** CGIAR strategy and structure have changed fundamentally. CGIAR's results measurement system must therefore move beyond linearity and incorporate complexity thinking within its metrics.

**Create broad partnership networks built for scaling innovation.** CGIAR has a prime opportunity to build upon the solid, traditional core of national agricultural research and extension system partnerships to include other key partners. These may include, for example, more universities and agri-food system businesses. In addition, building broader networks of universities and advanced research institutes in countries where CGIAR operates will create positive feedback loops in the capacity-strengthening dimension of CGIAR's strategy.

**Take a managed portfolio approach to investment.** The principle of providing inception funding for each Initiative to explore its potential is practical and should be supported. Subsequently, however, dynamic management of the portfolio on the basis of results, rather than parity of funding, is key to success. As the centerpiece of One CGIAR, the 32 Initiatives will need a coherent delivery, demonstrating compatibility with other CGIAR and partner interventions (OECD-DAC, 2021), to produce appropriate innovations and globally contribute to change.

**Be bold. Support a paradigm shift toward sophisticated risk management.** CGIAR has had the privilege of access to patient capital for more than five decades through the strong support of System funders. Under One CGIAR, providing more opportunities for new investors who have a high appetite for riskier ventures may help attract financing to the entire portfolio. Members of the System Council have recently served as champions for new investment in CGIAR, which has been hugely important for attracting support to One CGIAR's agenda. Now, the System Council might consider how these champions can help CGIAR identify and engage investors with an interest in higher-risk/higher-reward innovations, including regional- and country-specific investors where CGIAR works. ISDC suggests that System Council members broker discussions with practices in their agencies (for instance, that fund development ventures) as CGIAR thinks through its approaches to innovative finance.

**Keep the conversations active.** As a neutral convener of discussions, ISDC seeks System Council's endorsement of and participation in ISDC science fora for CGIAR stakeholders. A Science Forum Series would address core innovation topics such as those listed in this brief: complexity, inclusion, trade-offs, risks, innovation capacity, and culture. This series of targeted conversations, to coincide annually with System Council gatherings and crowding-in CGIAR colleagues, partners, and other experts, would promote sustained attention to the strategic transformation that will be the work of many years in CGIAR. Complementary capacity development and policy briefs, and application of the innovation lens in the Quality of Research for Development Frame of Reference may be among the topics of the fora and future ISDC work.



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<sup>i</sup> For example, Herrero et al. (2021) could not identify an emergent agri-food system innovation that did not have both positive and negative impacts on different Sustainable Development Goals (SDGs). Thus, it is critical to bundle multiple innovations (Barrett et al. 2020) to compensate those who might lose and rectify what would otherwise be adverse impacts on some SDG(s) from one or another component of innovation. Bundling the potential gains from multiple innovations to be shared—quite apart from prospective beneficial synergies among them—and goes hand in hand with principles of inclusion. CGIAR, as one of the few organizations in the world that works across agroecosystems, commodities, and agri-food system components upstream and downstream, is exceptionally well positioned to facilitate contextualized bundling, perhaps especially through its regional integration initiatives.