Info Note

Designing knowledge-matching facilities for scaling climate-smart agriculture

A proposal for accelerating food systems' transformation in a changing climate

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Key messages

- Improving ways of learning and action can accelerate food systems transformation, making innovation and scaling processes more efficient, sustainable and equitable.
- This is a priority discussed in the International Workshop on Scaling up and out of Climate-smart Technologies and Practices for Sustainable Agriculture (an initiative initiating from 2019-MACS-G20), as well as of numerous CCAFS partners in the governments, research, donor, financial and policy institutions, civil society and private sectors.
- CCAFS proposes to join efforts, and outlines a way forward to develop and/or shape knowledge matching facilities for accelerating food systems transformation in a changing climate.

Learning and action for accelerating systems transformation - FAST

We need to accelerate the transformation of food systems with the fast advancing climate change. Examples exist of agricultural innovations with the potential to bring benefits to millions of smallholder farmers. Other examples, within and beyond the CCAFS, show how the concerted action of many different actors and stakeholders can transform food systems, in a sustainable and equitable way.

However, the biggest challenge to achieve the SDGs 2030 still remains in scaling these impacts. Following the review of its scaling activities, CCAFS prioritized its next areas of action: exploring knowledge exchange formats for peer learning, fostering a scaling mindset and entrepreneurial thinking, providing evidence and learnings on scaling (e.g. key questions, milestones and process indicators for the different types of innovations and the different stages of innovation development and scaling), and to leveraging partnerships for addressing structural bottlenecks for scaling climate-smart agriculture (CSA).

Insights from representatives of the public, private and civil society sectors

At the 5th Global Science Conference on Climate-Smart Agriculture in Bali, CCAFS, IFAD and USDA-FAS organized the side event *"Accelerating innovation development and scaling climate-smart agriculture to drive a transformation in food systems"*. High-level representatives of > 20 governments, research, donor, financial and policy institutions, civil society and private sectors, discussed their main bottlenecks for scaling CSA, and what would be needed to benefit from more cooperation. They further agreed to act as an "Insight Group" for further related CCAFS research and action.

Key messages of the CCAFS "Bali Insight Group"

According to this "Bali Insight Group", the biggest challenge is bringing pilots to a scale where it becomes interesting for large investments and/or behavior change:

- Agricultural transformation calls for systemic solutions, which will change the way innovations are developed or prioritized for scaling.
- Currently, one of the biggest challenges is moving from piloting projects to sustaining change at scale.
- Scaling pathways, partners and funding schemes become increasingly diverse.
- One of the biggest common bottlenecks for scaling are the needed time and resources. How to make these processes more efficient?
- Different partners need different knowledge, skills and evidence, for different purposes, at different times, and delivered in different forms.

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Insights of the MACS-G20 initiative for scaling CSA

At the same time, the G20 Meeting of Agricultural Chief Scientists (MACS) had put the scaling of climate-smart technologies and practices on their agenda. The identified key mechanisms, principles, lessons and challenges resonate strongly with CCAFS and its partners' experiences and approaches.

Three main mechanisms to accelerate CSA

In their Concept Paper: "International Collaborative Partnership to Scale Up and Out Climate-smart Technologies through Social Experiment like Approaches", the Japan MACS-G20 team identified three main mechanisms to accelerate CSA innovation development and scaling among its member countries:

- Close cooperation of innovation (and scaling-) case owners of the original countries with the interested and adapting countries, to accelerate the learning and to strengthen the capacities for adaptation;
- Applying the Agroecosystem Living Laboratories (ALL) approach for developing, optimizing and scaling innovations;

Key principles of the Agroecosystem Living Laboratories approach

In the face of complex challenges to the global food systems, the ALL approach can accelerate the uptake of CSA. ALL is based on three key components: co-design and co-development with participants, a transdisciplinary approach, and the use of working landscapes. It emphasizes user-centered innovation, real-life experimental setups, and private-public-people-partnerships. These components allow ALL to

- Navigate complex systems effectively;
- Recognize the need for multi-pronged approaches and the existence of multiple dynamics;
- Promote transdisciplinary teams (or at least, interdisciplinary ones).
- Highlight the importance of trust-building among partners-, and empower different stakeholders;
- Recognize the need to balance interests and reduce conflicts among partners;

In 2018, an international ALL working group co-led by Canada and the United States was initiated at the G20 Meeting of Agricultural Chief Scientists. The Working Group was created to foster international dialogue on ALL, share knowledge and data, and to develop a framework for standardizing, promoting, and collaborating on ALL initiatives (International ALL Working Group, 2019).

Textbox 1: Key principles of the ALL approach

- Strengthen cooperation at all steps with all relevant partners, especially with the international development and policy institutions.

MACS-G20 initiative's key lessons for scaling CSA

Further, at the MACS-G20 initiative Workshop "Scaling up and out of climate-smart technologies and practices for sustainable agriculture", organized by the Ministry of Agriculture, Forestry and Fisheries of Japan in Tokyo in November 2019, members identified the following key lessons:

- Research institutes can facilitate scaling up and out of climate-smart technologies and practices by collaboration with national/local agricultural policy, co-designing business models with the private sector, and engaging farmers in the center of development.
- International and inter-regional research collaboration can facilitate scaling up and out of climate-smart technologies and practices, by constructing effective policies or support systems through research collaboration with international research organizations, and by designing efficient policies or measures, learning from experiences and lessons in other countries.
- Collaborative partnerships on the above can be mutually complementing and cross-disciplinary.

MACS-G20 initiative's challenges for scaling CSA

However, the same group also identified challenges that need to be overcome to accelerate the scaling of CSA, that strongly correspond to the experiences of the CCAFS and the "Bali Insight Group":

- Approaches for scaling up and out climate-smart technologies and practices must take into account the specific environmental, cultural, historical and political background of the target area which are largely variable according to national circumstances
- Activities for scaling up and out of climate-smart technologies and practices must be implemented covering the entire landscape, as it relates to food security, dietary habitats, health and other social concerns. Introduction of climate-smart technologies and practices also have side effects to other aspects including soil health, water quality and biodiversity, which must be considered in an integrated manner.

Shared priorities to address joint knowledge needs to scale CSA

"Matching" had been one of the most prominent expressions in the Scaling Sessions of the 5th Global Science Conference on CSA, 2020. This referred to matching resources to the right partners, matching the right partners in the right initiatives, and providing these with the

respective necessary knowledge, evidence and expertise for scaling.

At the same time, the MACS-G20 initiative emphasized that "public mechanisms which support development and introduction of technologies, such as a stepwise funding scheme for research, can promote developing and scaling up and out of innovative technologies by reducing risks related to innovative challenges." Knowledge transfer between countries would include big data and precise scientific evidence as well as the approaches, know-how, lessons learned, etc. obtained through trial and error in the initial area.

Hypothesis: "Knowledge" at the heart of sustainable change processes

The present concept note parts from the hypothesis that improving ways of learning and action can play a crucial role in accelerating food systems transformation, by making innovation and scaling processes more efficient, sustainable and equitable. What knowledge is needed, in which form, by whom, when, how, and for which purpose? Assuming that knowledge can be factual and evidence-based, as well as tacit and know-how based, soft knowledge can also be translated into social capital (e.g. trust, relationships). Further, both the contents as well as forms of knowledge exchange are decisive for the translation from learning to action.

With this hypothesis and working definition of "knowledge", CCAFS proposes to develop and test the most relevant (elements of a) knowledge matching facility for scaling CSA, not only for and with its partners of the MACS-G20 initiative and "Bali Insight Group" members, but also for the benefit of the wider community for food systems' transformation in a changing climate.

Designing a knowledge matching facility for accelerating food systems transformation in a changing climate

In February 2020, with initial funding of ACIAR and the Ministry of Nature, Agriculture and Food Quality of the Netherlands, CCAFS, the Ministry of Agriculture, Forestry and Fisheries of Japan, and the "Bali Insight Group" start with the first steps towards shaping knowledge matching facilities for accelerating food systems transformation in a changing climate.

Note that this undertaking is like a puzzle, its different pieces being guided and shaped by the groups' members' demand and opportunities along the way. Also, it is an open initiative, which every interested member or stakeholder is invited to enrich with their own studies and initiatives, and or to contribute with complementing ideas.

Preparation phase

The first phase aims to build some basic assumptions on the possible scope, form and function of this knowledge matching facility. First scoping studies will be undertaken among initiatives that already maintain multi-stakeholder platforms and knowledge exchange formats, and among stakeholders that have articulated a need for such. A theory of change will be developed from these results, which will help structure the later action research phase.

Suggested framework

As suggested by Pugh and Prusak (2013), the goals of most knowledge networks can be found in one or more of the following categories:

- **Coordination:** Members' existing knowledge activities are leveraged through the knowledge network's structures, incentives and norms.
- **Learning/innovation:** This aims at co-producing, commissioning, accumulating and/or distributing knowledge for members or as public good.
- **Translation/local adaptation**: Enables teams to identify and adapt knowledge to their specific local challenges.
- **Support of individual members:** Serves individuals to develop, accumulate and adapt knowledge, usually to do their job better.

The ways how knowledge networks are designed will influence their dynamics and consequently their members' or users' behavior, which finally will entice a certain outcome. Therefore, it is important to well define the goal

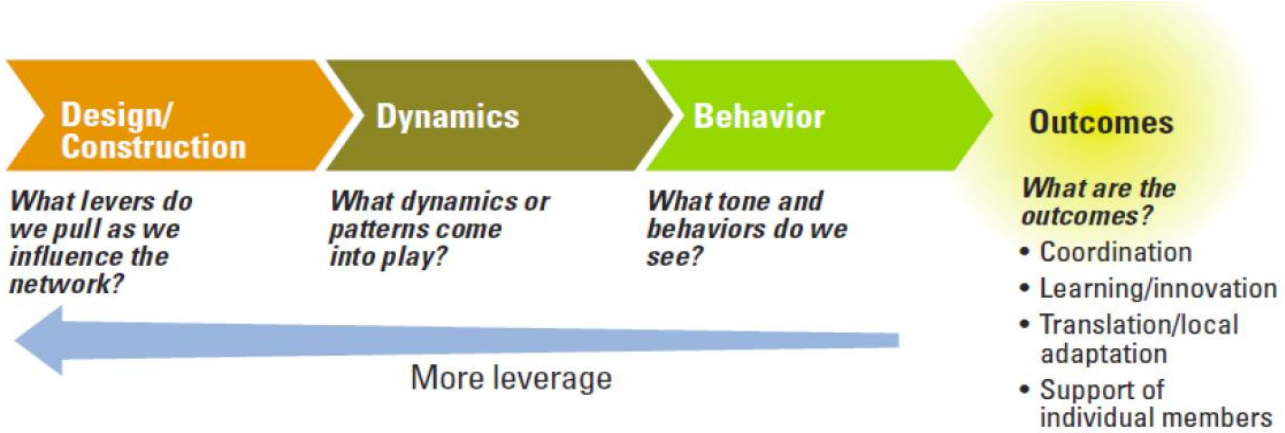

Figure: Pugh, K. and Prusak, L., 2013. Designing effective knowledge networks. *MIT Sloan Management Review, 55*(1), p.82.

of the knowledge networks, to be able to design it in the best possible way(s) for achieving the aspired outcome.

The design challenge

The "Bali Insight Group" formulated ten principles for accelerating innovation development and scaling, which, combined with the insights of the MACS-G20 initiative, serve as elements for the knowledge-matching facility's theory of change:

- **Goals:** Main goal is to accelerate the transformation of agricultural food systems, by coordinating multi-stakeholder initiatives and/or facilitating cross-country knowledge transfers, while enabling fast learning through experimentation and failing, and fostering capacity building across all actors and levels.
- **Desired behavior:** All activities shall be farmer-centered and enhance empowerment and ownership at all levels, with emphasis on communities and governments. Social norms shall foster cooperation and sharing, based on the notion of "contribution" rather than "attribution". Transparency and accountability are crucial and include realistic expectations and communication of outcomes.
- **Underlying patters**: Both groups emphasized system approaches with sustainable pathways (reducing donor-dependency). Processes need to allow for staged, iterative phases and co-design with multi-stakeholder groups. Partners need to share a vision and have complementing functions. Structures need to cater for stakeholders' different time requirements and language. The needed content of the knowledge-matching facility would range from robust scientific evidence to know how, skills and lessons learnt. Contextualization needs to cover the entire landscape (including ecological, socio-economic and cultural factors) and needs to include risks and unintended consequences.

  The "Bali Insight Group" put more focus on "situation-driven" initiatives, like collective action to solve a shared problem, while the MACS G-20 Initiative focused more on "case-driven" situations, like transferring successful scaling cases across countries.
- **Design requirement:** Both groups already formulated some design parameters that would bring about the desired patterns and behaviors: e.g., tailoring programs with stronger components for human-centered social learning processes and change management capacities, dedicating resources for building relationships, using pre-competitive spaces, incentivizing open reflection, employing mechanisms for failure-friendly testing, documenting and sharing the learnings.

Scoping studies

The framework of Pugh & Prusak (2013) further suggests eight design dimensions with a sub-set of basic questions each, which cover the strategic, structural and tactical orientation of the emerging knowledge networks.

Eight design dimensions of knowledge networks

Strategic dimensions

- **Leaders' shared theory of change**: This aims at having clarity about the mechanisms that lead to the desired impacts of the knowledge networks.
- **Objectives/outcomes/purpose**: These can be one or more of the four knowledge networks goals, e.g. solving specific problems, or combining forces and knowledge.
- **Role of expertise and experimental learning:** This aims at creating safe spaces for participants to be both experts and learners (the "expert-learner duality").
- **Inclusion and participation**: This aims at actively managing or influencing the (desired) diversity of members, providing open or closed spaces for each vote and voice.

Structural dimensions

- **Operating model:** This aims at governance of the knowledge network: roles, responsibilities, decision processes, and resources. The choice of the best operating model will depend its purpose.
- **Convening structures and infrastructures**: Also the best channels for members' interaction (e.g. online, real-time, face-to-face…), and their frequency/intensity will depend on the respective purposes.
- **Facilitation and social norm development**: Social norms are embedded in and can be conveyed by the forms of facilitation, e.g. setting the scene, tone and language.

Tactical dimensions

- **Measurement, feedback and incentives**: Evidence of the knowledge network's success or failure will motivate both members as well as supporters to commit their time and resources. Feedback and incentive mechanisms will accompany the network's life cycle.

Textbox 2: Pugh and Prusak. 2013. Designing effective knowledge networks. MIT Sloan Management Review, 55(1), p 82

CCAFS will undertake scoping studies with questions derived from these eight design dimensions, with:

- members of the "Bali Insight Group" and the MACS-G20 initiative; and their existing multi-stakeholder networks; and
- external organizations and their networks.

Depending on the interviewee, scoping studies can have two parts:

- learning from the set-up of existing knowledge networks (inter- and intra-organizational); and
- going more into detail for assessing stakeholders needs and expectations towards a knowledge sharing facility designed explicitly for scaling CSA.

Action research phase

This phase aims to put previous research results into use, by testing and obtaining quick feedback from the intended users. This phase can take place in different forms at different moments.

Design phase

CCAFS will organize a design thinking workshop with selected representatives of the "Bali Insight Group and the MACS-G20 initiative's participants as well as scaling case owners, to design and prototype the most relevant features and functions of an improved "Knowledge matching facility(s) for accelerating food systems transformation in a changing climate".

Design thinking as methodology to develop scalable innovations, tailored to the users

Design Thinking is an iterative process and a methodology in which we seek to understand the user, challenge assumptions, and redefine problems in an attempt to identify alternative strategies and solutions that might not be instantly apparent with our initial level of understanding. At the same time, Design Thinking provides a solution-based approach to solving problems.

Albeit a structured approach, the different steps or phases of design thinking processes can differ, depending on the respective context. Generally, however, they follow the main six steps of innovation workflows:

- Creativity and brainstorming;
- Validation;
- Evaluation;
- Iteration and incubation; and
- Commercialization and launch.

Textbox 3: Design thinking as methodology

During this workshop, participants will form and stay in groups of 4-5 people each. These small groups will work on different sub-themes, e.g. starting with the different purposes of CSA knowledge-matching facilities, and designing backwards from there. The teams will be guided through the design process by a professional design thinking coach and facilitator. At the end of the workshop, participants will vote for the best prototype, or select the most effective and efficient elements for merging into one facility.

Criteria for the selection of participants for the design thinking workshop

Participants should reflect as much as possible the diversity of the intended users/stakeholders of the envisaged knowledge matching facilities for accelerating food systems transformation in a changing climate.

It is further recommended that participants are well aware of their/their organizations' needs and potentials for cooperation. They should have some decision power to commit e.g. to future follow up activities. At the same time, they need to be aware that the workshop constantly requires both physical and mental attendance. Leaving in during the sessions or taking time-outs for doing individual urgent daily work aside will recuperate strongly on the groups' process.

Textbox 4: Recommendations for selecting participants for the design thinking workshop

Activity: Design thinking workshop
Aim: To develop and test the most important features of a "Knowledge matching facility(s) for accelerating food systems transformation in a changing climate"
Participants: Members of the "Bali Insight Group" and the MACS-G20 initiative (participants and case study owners of the MAFF-organized workshop)
Time and location: September 2020, location tbd.

Iteration phase *(depending on funding)*

Depending on the progress and outcome of the design thinking workshop in May 2020, the identified most relevant features and functions of the "Knowledge matching facility(s) for accelerating food systems transformation in a changing climate" can further be iteratively tested and improved in real life scenarios. Scope and intensity will depend on further opportunities, e.g. piggy-backed on regional or sectoral events. Learnings will continuously be shared with the interested stakeholders.

Accompanying studies

During the whole process, further studies and activities can and likely will be undertaken, to deepen on the content, to answer questions that were still open or arouse from the design thinking workshop, and/or to further test hypotheses/elements of the knowledge sharing facility. In the following, only already known studies are mentioned.

MACS-G20 initiative's full case studies and analysis

While scoping studies and the design thinking workshop will look basically into the most effective and efficient form and features of "Knowledge matching facility(s) for accelerating food systems transformation in a changing climate", the MACS-G20 case studies can also provide learnings about the needed content. E.g., which knowledge is needed when wanting to transfer a successful scaling case to another context?

CCAFS proposes to develop a framework for undertaking full case studies, based on the insights/needed requirements as elaborated during the preparation and action research phases.

Proposed scoping study of MACS-G20 scaling cases (draft)

The MACS-G20 have already identified and collected information and learnings from >20 cases of their member countries. These cases are highly diverse in their topics (e.g. adaptation and mitigation), approaches, geographical scope, and the main driving actors (e.g. scientists or policy makers).

The analysis of the approaches used for scaling up and out climate-smart technologies and practices in the case studies will assess factors that will be of importance when transferring results to succeeding countries/regions. These will probably include:

- Social and economic background
- Institutional framework regarding agriculture
- Challenges faced how they were overcome, lessons learned etc.

Textbox 5: Proposed scoping study of MACS-G20 scaling cases

Further reading

- Koerner J, Dinesh D, Firmian I, Corner-Dolloff C. 2020. *Accelerating innovation development and scaling processes for agricultural transformation - Insights from the Side Event on Scaling, 5th Global Science Conference on CSA, 2020*. CCAFS Info Note Series. https://cgspace.cgiar.org/handle/10568/106949
- MACS-G20. 2019. *Concept Paper: International Collaborative Partnership to Scale Up and Out Climate smart Technologies through Social Experiment-like Approaches*. https://www.macs-g20.org/fileadmin/macs/Annual_Meetings/2019_Japan/Concept_Paper_Climate-smart_Technologies.pdf

  MACS-G20 ALL Working Group. 2019. *Agroecosystem Living Laboratories. Executive Report*. https://www.macs-g20.org/fileadmin/macs/Annual_Meetings/2019_Japan/ALL_Executive_Report.pdf
- MAFF. 2019. *International workshop on Scaling up and out of climate-smart technologies and practices for sustainable agriculture*. Report. https://www.maff.go.jp/e/policies/env/attach/pdf/climate_smart_ws_2019-35.pdf

  Other information and documents of the workshop are also available: https://www.maff.go.jp/e/policies/env/climate_smart_ws_2019.html
- Pugh K, Prusak L. 2013. Designing effective knowledge networks. *MIT Sloan Management Review*, 55(1), p 82

This Concept Note is intended to be a living document that informs members and interested stakeholders about intermediate results and the planned or next steps.

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