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Scaling – from "reaching many" to sustainable systems change at scale: A critical shift in mindset

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ABSTRACT

Countless development projects have piloted solutions that could make a difference if only applied at scale. The reality is that these pilot projects hardly ever reach the intended scale to contribute significantly to achieving the UN Sustainable Development Goals (SDGs). In this paper, we argue that two major problems undermine efforts to achieve scale in development projects. First, pilot projects are usually set up and managed in very controlled environments that make it very difficult to transition to the real world at scale. Second, poor conceptual and methodological clarity on what scaling is and how it can be pursued often results in a narrow focus on reaching numbers. Counting household adoption at the end of a grant project is a poor metric of whether these people can and will sustain adoption after the project closes, let alone if adoption will reach others and actually contributes to improved livelihoods. We advocate for a broader view on scaling that more accurately reflects the transformational change agenda of the SDGs: from reaching many to a process aiming to achieve sustainable systems change at scale. Sustainable systems change alters a sufficient number of key drivers (incentives, rules, etc.) such that the system that once perpetuated a "problem" now instead perpetuates a "solution." This has implications on the way projects are designed and implemented. Rather than focusing on changing conditions within the project context, projects should serve as vehicles for societal change. This means that projects make most sense if designed as part of a multisector, long-term programmatic approach. Treating scaling as a transformation process helps deal with the necessary coevolution of organizational and institutional arrangements, along with the innovations in a technology or practice. To help address scaling, we present a number of frameworks that guide users to assess the scalability of innovations, design for scale from the onset of projects, and systematically think through key elements, ingredients, or success factors. We conclude that scaling requires different skills, approaches, and ways of collaborating than those required for successful implementation of pilot projects. It calls for development actors to have a mindset that allows them to creatively navigate multiple overlapping systems; likewise, they must develop a clear vision about which elements in the system the actors can and cannot address, and about where they need to collaborate strategically to exert influence. Although it is tempting to hope for the silver bullet solution that changes the world, we argue for an approach that takes scaling serious in its own right and recognizes the complexities involved in facilitating a transition to a new "normal."

1. Introduction: perspectives on scaling

1.1. Ambitious goals

The eradication of poverty, the elimination of hunger, and the construction of peaceful, inclusive societies by 2030 are fundamental targets of the Sustainable Development Goals (SDG) United Nations (2015). Although strong progress has been made to end extreme poverty, Nicolai et al. (2015) argue that meeting the goal of eliminating hunger requires "a revolution" in which current rates of progress accelerate significantly. Reaching the SDGs in developing countries is especially ambitious considering the $2.5 trillion USD investment gap

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of which only about 5% is covered by Official Development Assistance (ODA) (Niculescu, 2017). Research and development organizations working on poverty alleviation and food security face growing scrutiny (Easterly and Pfutze, 2008; Hurst et al., 2017; Moyo, 2010) to demonstrate the return on investment of their work.

1.2. Projects as vehicles for scaling innovations in agriculture

Since a majority of the rural poor depend on agriculture, most solutions are expected to come from innovations within the agricultural sector. Agricultural innovations, such as improved seeds, better farm practices, and new ways of collaborating, are tested in pilot environments and, if deemed successful, are expected to scale to a level matching the size of the problem. Cooley (2018) observes that over the last two decades, while the number of donors and projects has doubled, project durations and budgets have been cut in half. This trend towards a larger number of smaller and shorter projects has increased emphasis on efforts that aspire to "new technologies," "prototypes," and "pilot projects." However, most pilot projects do not scale up to achieve wider impact, cease to exist after a (subsidized) demonstration phase, and fade out after initial funding ends (Billé, 2010; Deiglmeier and Greco, 2018; Monitor Deloitte, 2015; Spicer et al., 2018; van Winden and van den Buuse, 2017; Cooley and Howard, 2019).

1.3. Demand for and limitations to scaling

Despite the central importance of scaling to development outcomes, research on (un)successful transitions from pilot to scale are scarce, and the few existing studies have had little influence on the research agenda and design of development projects. Rather than being seen as a challenge in and of itself, scaling has been treated as something that occurs spontaneously and organically when successful development interventions are identified (Chandy et al., 2013; Wigboldus and Brouwers, 2016). The popularity of the term "scaling" is not matched by conceptual clarity on what it actually means, which harbors a major risk for superficial use, disillusionment (Ubels and Jacobs, 2018), and doing more harm than good (Wigboldus, 2018). For example, an internal evaluation of the *Gesellschaft fuer Internationale Zusammenarbeit GmbH* (GIZ) in 2013 (referred to in GIZ, 2016) concluded that "there is still no consensus on what key strategies we should be using to achieve scaling up and broad impact," "there is little incentive to implement scaling up," and "lessons learned are not being systematically shared." Similarly, in the business (Monitor Deloitte, 2015), urban development (van Winden and van den Buuse, 2017), environmental management (Billé, 2010), nutrition (Gillespie et al., 2015), and health sectors (Spicer et al., 2018), there is strong consensus that the ability to transition from pilots to larger scale projects is markedly limited. Hall and Dijkman (2019) call for breaking the path dependencies of development pathways rooted in twentieth century values and priorities, and transitioning to more sustainable and inclusive trajectories to reach the SDGs.

In this paper, we argue that two major problems undermine efforts to achieve scale in development projects. First, pilot projects are set up and managed in very controlled environments that do not reflect the reality at scale. Second, poor conceptual clarity on what scaling is often results in a narrow focus on technical replication and reaching numbers of end-user beneficiaries. We begin the paper by describing the origin and nature of these problems, and in the second part of the article, we propose a better way forward.

2. Transitioning from pilots to scale

2.1. The problem: Pilots never fail, pilots never scale

According to Cambridge Dictionary (2018), a project is a "piece of planned work or activity that is completed over a period of time and intended to achieve a particular aim." Turner and Müller (2003) call projects "a temporary organization." Unlike stand-alone projects, which are relatively small scale and not specifically designed for future scaling, pilot projects are implemented to determine whether something is worth supporting over time and/or at a larger scale. In this paper, we argue that most pilot projects do not mature to the intended scale because they are set up and managed as stand-alone projects, rather than as true pilot projects aimed to test performance at scale. For example, while most pilots test if an innovation works in a particular context, they overlook other factors critical for success at scale, such as testing for ways to improve collaboration or implementing alternative methods to access market finance without project support. Transitioning from the very controlled environments of projects to the "real world" at scale comes with the following challenges:

1. **Reliance on external resources**: Projects rely mostly on grants from one donor without significant and effective co-financing from other donors and the local financial market (KPMG, 2016; Ton et al., 2015). In addition, budgets are designed to cover the costs required to show that an innovation works in the pilot context, rather than to understand what it would cost to shape an enabling environment, reach large numbers, and sustain outcomes at scale (Spicer et al., 2014; Gillespie et al., 2015).
2. **Fixed time horizons**: Projects usually start long after they are designed and last for a fixed period of time. These project timelines may or may not coincide with the intrinsic timelines of transformational processes (Olsson et al., 2017; Leland, 2017). In addition, people (e.g. project team members and collaborators) are willing to endure many things for a limited, known duration that they would not do permanently.
3. **Reliance on external leadership**: Well-paid, highly educated, and motivated project management teams are hired to drive the pilot project to success (Lamers et al., 2017). However, they can be slow, unable, or unwilling to collaborate with existing local systems (Spicer et al., 2014).
4. **Biased collaboration**: Partnerships are generally based on a collection of transactions to help the project achieve its objective and use its resources, rather than on building strategic collaborations to tackle a social problem (Jeevan, 2017; KPMG, 2016). Billé (2010) states that stakeholders often have to be persuaded to participate because the ones calling for change are rarely those able to implement it. He further states that it helps to classify a project as low-stake and "just an experiment" and to provide financial resources (e.g. travel expenses and per diem) to support participation of those implementers. Pilot projects also tend to work with the most progressive farmers/beneficiaries who may not be representative of the entire target population (Rogers, 2003). Furthermore, project beneficiaries can suffer from the "Hawthorne effect" where "people react positively to the fact that they are being taken care of in order to improve their situation, particularly when they are in a position of weakness" (Bernoux, 1990). This effect can severely bias the conclusions from a project intervention.
5. **Limited incentives to scale**: For project implementers, the reward for a successful project is often another project (Cooley, 2018). As a result, their incentives emphasize direct and attributable benefits (Leeuwis et al., 2017) rather than systemic changes, reductions in unit cost, or transfer of responsibility to permanent players or platforms.
6. **Shielding from the "real" world**: Pilot projects are shielded from politics, regulations, market forces, and finance in various ways. This can be due to the experimental/small character of pilot projects, or the strong desire of donors and implementers to make pilots successful (Billé, 2010). Billé (2010) finds that pilot experiments that promote cultural change, change of practices, and innovative organization modes tend to be tolerated by stakeholders who are the bearers of the "traditional" and dominant modus operandi as long as they remain pilot ventures. Therefore, they do not have to face the

opposition that usually appears in the latter stages, at least not at its full strength or diversity. Or, as Deaton (2010) describes, corrupt officials may be more likely to steal from programs once they reach a certain size.

7. **Excessively narrow scope**: The lack of cross-sectoral collaboration up to the highest administrative levels influences project design and activities and feeds the misconception that the solution for the adoption of agricultural innovations lies in the agriculture sector alone and comes from your "own" organization. Interviews by Spicer et al. (2014) reveal an important challenge to scaling to be the poor harmonization among development agencies and implementers, fueled by competing interests and priorities, competition for donor funding, and pressure to attribute outcomes to programmatic efforts. Project steering committees, teams, and partnerships stay within their disciplinary silos, thus ignoring the complexity of adoption and scaling processes (Olsson et al., 2017; Schut et al., 2016). In addition, "western" values such as profit maximization, gender, and equity govern project objectives with little regard for local values such as "least-regret," risk reduction, and the cultural value of agriculture (FAO, WFP, IFAD, and UNSO, 1995).

2.2. Inadequate conceptions of going to scale

It is as if the first thing a project does is build a glasshouse (controlled environment) in a landscape (real environment), and the above pitfalls represent the foundation, the walls, and roof of that glasshouse. Once the project team "finishes" the innovation and ensures it is adopted by direct beneficiaries, the project is regarded as a success and ready to scale. There are two common ways that pilots can scale that are convincing in the eyes of many decision makers and which are often winning arguments in grant applications:

- First, by making a bigger glasshouse, or expanding the controlled environment and doing more of the same with more money. The underlying assumption here is that "best practices" from one area can be simply transferred to another area. While project implementers and (sometimes) donors like this approach because it keeps funds flowing, this is a very expensive (Spicer et al., 2014) and probably unsustainable strategy, especially if the scale of the solution is expected to match with the scale of the problem.
- Second, by removing the glasshouse altogether. The underlying assumption here is that the innovation is so good that it will scale itself. This yields an analogy to a tomato plant that will not survive in the "real" conditions after the glasshouse is removed. Nevertheless, this has been a very common strategy, especially in international agricultural research where a "proof of concept" is delivered and the funding, shielding, and experts disappear. National extension services or the private sector are left to take over scaling regardless of whether they are actually interested in, fit to, and enabled to scale the project results.

Scaling is complex; simply transferring "best practices" from one context to another is overly simplistic. Both approaches are very technology- and product-focused, neglecting the softer elements (people, [power] relationships, history, incentives, etc.) that create the (dis) enabling environment surrounding that technology. Scaling an innovation requires attention to the organizational and institutional processes intertwined with that particular technology or practice. Supply chains, markets, financing mechanisms, policies and regulations, professional knowledge, and so forth need to scale in a sufficiently coherent and interrelated way to make the scaling of a technology possible (Jacobs et al., 2018; Koh et al., 2017; Sartas et al., 2017). They cannot just be extrapolated linearly into another context. Hence, irrespective of the technology, practice, or process that is to be scaled, the likelihood of reaching that scale is strongly influenced by the way it is piloted (Hartmann and Linn, 2008; Spicer et al., 2014).

3. Strengthening conceptual clarity on scaling

3.1. The problem: A narrow focus on adoption by many project beneficiaries

There is no single or agreed upon definition of scaling (Frake and Messina, 2018). But, in agricultural development projects, it is often interpreted as reaching maximum adoption of a particular technology or practice by as many smallholder farmers as possible (Gonsalves, 2000). In their literature review of 36 sources, Gillespie et al. (2015) found that most scaling frameworks focus on the quantitative dimension of scaling, or expansion of coverage. A key metric for "successful" or "scaled" development efforts is the number of end-user households adopting a particular innovation by the closing date of the project. Despite the adoption itself being poorly defined in time and space (Andersson and D'Souza, 2014), it is often directly linked to impact on global development indicators through linear cause-effect chains in project Theories of Change (Abercrombie et al., 2018; Hall and Dijkman, 2019). Buntaine et al. (2013) state that donor impatience to see on-ground results that directly link adoption to impact has negative effects on projects, leading to a focus on what is simple and visible (inputs and outputs), on direct rather than indirect beneficiaries, and on form rather than function (Spicer et al., 2014; Maru et al., 2018). With funding justification tied so tightly to the number of "direct" beneficiaries attributable to the project, project implementation teams tend to chase the numbers of end users to please donors. Ubels and Jacobs (2018) found from interviews with 24 project implementers that in many instances the use of scarce resources to reach large numbers of people within limited timeframes was to the detriment of meaningful "systems work" (people and relationships). They observed that although strong numbers may be gained through temporary project efforts and outside support, these quantitative outputs do not necessarily build sustainability and ownership (and in the worst cases undermine them). Hall and Dijkman (2019) state that the current narrative is stuck in a productionist and technology-centric perspective determined by linear and component change logics, leading to piecemeal innovation. They call for a new scaling narrative that more accurately reflects the system innovation nature of the transformational change agenda of the SDGs.

3.2. From reaching many to sustainable system change

ODA-funded projects should work towards sustainable solutions for global challenges (poverty, food insecurity, climate change, etc.) at large scale and should always support host-country activities, involving a handover sooner or later. These societal outcomes require considerable shifts in social, political, technical, institutional, and policy configurations. In practice, however, scaling efforts often involve a group of external experts improving the efficiency of a particular, mostly technical, innovation so that it can be "pushed" to a maximum number of beneficiaries until the last day of the project. In this paper, we propose a perspective that brings the theory and practice closer together, thus creating the conditions for continued achievement of large numbers and sustainability of a solution or practice beyond the project through a shift in system conditions. We therefore propose to engage with scaling as a process that aims to achieve sustainable systems change at scale. Below, we describe three important dimensions: * reaching many people ("the scale"), * sustainability, and * system change and how they relate to each other.

3.2.1. Reaching many people

Despite the challenges associated with too narrow a focus on numbers, ultimately an enormous amount of people is to be lifted out of poverty or hunger. However, they will not be reached through an ODA-funded project, but through initiatives by the public and/or private

sector. ODA funds are only a fraction of the finance available from private capital and remittances, government, and market finance, which are more suitable for financing scaling programs capable of achieving transformative impact (KPMG, 2016; Niculescu, 2017). Cooley and Howard (2019) state that governments and the private sector are the only platforms predicated on operating at scale—that is, delivering services at "population level" and sustaining delivery of services over time. Projects can, at best, expose a limited number of direct beneficiaries to an innovation for a short period of time. Enabling intermediaries to (continue to) provide services to the poor increases the number of ultimate beneficiaries reached within and beyond the project context, as for example in projects where service providers for agricultural mechanization are targeted (Baudron et al., 2015; Mottaleb et al., 2016). Although adoption by indirect beneficiaries is more difficult to measure and attribute, it serves as a much better indicator for successful scaling because adoption takes place beyond the project context, in the "real world."

3.2.2. Sustainability

Scale can be reached, for example, by giving free handouts of seeds or other inputs to a large number of people. But in the absence of local delivery mechanisms with self-generating and/or perpetual financing, this is not sustainable. The International Development Innovation Alliance (IDIA, 2017) defines sustainable scaling as "the wide-scale adoption or operation of an innovation at the desired level of scale (exponential growth), sustained by an ecosystem of actors." Spicer et al. (2018) frame scaling up as "the adoption of donor-funded innovations beyond their original project settings and time periods." Hence, in the scaling discourse, sustainability refers to a change that perpetuates itself as the "new normal" sustained by local actors beyond the project. The scale could then refer to the number of clients required to incentivize suppliers to invest in businesses to respond to long term-demand. Assigning such meaning to the numbers requires a good understanding of the context of the target group, and to appreciate farmers as clients and businesses rather than as beneficiaries (Cooley and Howard, 2019). This calls for projects to use tools for targeting, client segmentation, and demand creation, and to have a solid understanding of actor incentives along the value chains. Management Systems International (MSI) (Cooley and Kohl, 2016) estimates that the average time for scaling a successful pilot to national application is 15 years. With average project durations of two to four years, it is imperative that the development industry shift from seeing projects as complete efforts to framing them as building blocks to achieve long-term change (Linn and Cooley, 2014). To achieve this, projects should be much more explicit about exit strategies and better clarify the gradual transition from externally run efforts to locally adopted ones. This means catalyzing engagement of local stakeholders from the onset, sourcing local financing, facilitating collaborations between actors, and institutionalizing change into routine systems.

3.2.3. Systems change

We define a system as a set of practices, relationships, values, and rules of the game interconnected in such a way that they produce their own patterns of behavior over time (adapted from Meadows, 1999). Systems change aims to bring about lasting change by altering underlying structures and supporting mechanisms that make the system operate in a particular way (Abercrombie et al., 2015). Many of today's food security and development challenges, like those reflected in the SDGs, are systemic in their causes; so too must be their solutions. Introducing a new practice or technology at the individual farmer or household level requires the surrounding system to operate differently. For example, if certain products and services need to be available and accessible, this requires producers, supply chains, demand functions, data and information mechanisms, and enabling policies and regulation that support or accommodate adoption by individual households. Addressing such systemic elements entails a different mindset, one that can creatively navigate multiple overlapping systems—economic, social, ecological, and political (Mang and Haggard, 2016). As challenged earlier in this paper, it is not advisable to use a project to "push an innovation through the throat of a system" such that the system is the necessary evil to deliver at scale and where the success of the intervention/project matters most (Jeevan et al., 2019). When taking system success as a starting point—for example, overcoming the root causes of food security in a particular region—one tries to invoke change that stimulates the emergence of innovations that can make the system work better. Change occurs when different developments from distinct sources "meet" to gradually shape a new configuration that brings the innovation a step forward. These changes are hardly captured by monitoring things like "adoption by x farm households." Rather, they involve a range of stakeholders across different disciplines (political, financial, sector governance, etc.) willing to change the way they work to shift the status quo keeping the "bad" system in place. Muehlenbein (2018) finds that ambitious system change goals (e.g. end poverty, food security) instill a sense of purpose, but that these goals need to be broken down into strategies for targeted system change around a set of innovations (e.g. access to mechanization) to make that vision actionable and provide a sense of focus. In most cases, projects take the promotion of an innovation as a starting point (push) and address the enabling environment for uptake of appropriate innovations (pull) at the same time. This may be a stepwise progression where innovations are adjusted in response to changing system dynamics, scale further, and respond to new system dynamics at a different scale. Many scaling initiatives fail to understand that system sufficiently well, which limits the effectiveness of their efforts (Ubels and Jacobs, 2018). Scaling implies a sufficient number of key drivers and relations such that the system that once perpetuated a "problem" now instead perpetuates a solution. Interventions designed to do so need to pay attention to the following:

A. **Common understanding of the scaling ambition:** Project teams and collaborators will have to negotiate where the boundaries of the system lie to come up with a clear and common understanding of the context and boundaries of the scaling ambition. What should be scaled, where, when, how much, for whom, by whom, and why? What is the "new normal" that we aim for? It is also important to clarify what lies within the project's sphere of control, influence, and interest.

B. **Transformation:** While Nicolai et al. (2015) suggest that a revolution is required to achieve the SDG goals, one can also speak somewhat more modestly of the need to transform the current "normal" to a new, more desirable one. Implied is an approach significantly less linear than the staged approach (discovery, proof of concept, piloting, and scaling) used by most research organizations (CGIAR, 2018). Sector transformation frameworks, as applied by Ubels and Jacobs (2018) and NewForesight (2016), for example, that move from incubation of the proof of concept, demonstration of viability by first movers, crowding in of a critical mass, and finally, to institutionalization help to establish the improved solution/practice as the "new normal." Each stage requires some form of piloting and maturation towards tipping points to move forward. Furthermore, each of these four stages requires different skills, different financing (from subsidies and grants to market finance), and also a different type of leadership (Deiglmeier and Greco, 2018).

C. **Scaling is an art as well as a science**: Doing scaling is complex because one intervenes into a range of systems (social, economic, etc.) that interact with each other. Only to a certain extent can these interactions be captured by linear cause-effects between tangibles in technical dimensions, as most of the interaction is determined by more concrete relational factors such as motivation, norms, and (power) relations, though such factors may appear to be less

tangible to technical professionals (Spicer et al., 2014). The roles and relationships, rules and norms, flows of information, system borders, and mindsets that led to the social problem in the first place have to be dealt with (Muehlenbein, 2018). Addressing these requires insights from social, economic, organizational, and applied technical disciplines to understand and/or influence drivers of change of farm households, local leaders, businesses, researchers, and policymakers. Understanding dynamics of how behaviors and relationships between people can change is thus essential.

D. **Responsible scaling**: Scaling calls for large changes that may have unintended consequences for the population, geography/landscape, value chain, or society concerned, both positive and negative. For example, while an irrigation project may benefit specific farmers, others in the community might suffer from lower water availability or higher pollution levels in the long term. Successful scaling is not necessarily quantitative, and bigger is not always better. Qualitative indicators such as sustainability, satisfaction, and quality of life are also key metrics for success (IDRC, 2018). We need to shift from "maximum potential scale" for a few to "optimal, or responsible scale" for many (Gargani and McLean, 2017; IDRC, 2018; Wigboldus, 2018). It is therefore important to anticipate the impact of reaching the scaling ambition and the associated risks beyond the geographic, social, and time boundaries set by the project. With these considerations in mind, Jacobs et al. (2018) propose a "responsibility check" of scaling's potentially negative side effects on social (gender and age equality, inclusiveness, power equity, resilience) and environmental (use and quality of natural resources and climate change) indicators.

4. Way forward

4.1. Role of development actors

As illustrated above, a successful pilot project is no guarantee for success at scale. Given that sustainability and system change are integral parts of scaling, true progress towards food security and poverty may be too complex for any one project to achieve. ODA-supported projects should not try to "make" things go to scale, but they can "help" things go to scale (Wigboldus and Brouwers, 2016). That is, they can "help" the private sector and/or government position themselves to intervene at a large scale. For example, ODA projects can absorb the initial costs associated with awareness building, creating a critical mass of demand, providing training and technical support to early adopters, and introducing financial innovations to improve producers' ability to pay (Kohl and Foy, 2018). A donor project may also work to improve the scalability of the innovation package itself, such as through simplification, bundling it with other products or services, or converting it to a service (Kohl and Foy, 2018).

4.2. Designing for scale

One of the first lessons for successful scaling is to design for scale from the beginning (Cooley and Kohl, 2016; ExpandNet, 2011; GIZ, 2016; Gonsalves, 2000). In practice, this means that key factors necessary for a scaling up decision—with what dimensions, using which approach, along which paths, etc.—should be explored during the pilot phase (Hartmann and Linn, 2008). Based on an analysis of successful scaling cases, frameworks to plan scaling (Gonsalves, 2000) and identify strategies (Gündel et al., 2001), as well as key elements for effective scaling (Menter et al., 2004), have been developed. However, only in 2006 (Cooley and Kohl, 2016) was the first toolkit for practitioners made available; called the Scaling Up Management (SUM) Framework, it was subsequently refined and expanded in Editions 2 and 3, both of which include the MSI Scalability Assessment Tool. USAID adapted the latter in 2018 to the Agricultural Scalability Assessment Tool (ASAT) (Kohl and Foy, 2018). Other donors such as the International Fund for Agricultural Development (IFAD), the World Health Organization (WHO) (ExpandNet, 2011), and GIZ (2016) have also developed toolkits. Most recently, the International Maize and Wheat Improvement Center (CIMMYT) and the PPPLab[1] developed the Scaling Scan (Jacobs et al., 2018). All these frameworks assign the difficulty of scaling innovations to a lack of clarity about what is required to achieve sustained results beyond smaller pilot programs. The tools help simplify and explain the complexities of scaling and guide users to systematically think through key elements, ingredients, or success factors. Or, as McHugh, team leader of the Cereal Systems Initiative for South Asia (CSISA) program, described his teams' experience with the Scaling Scan (personal communication, 2019): "Breaking down scaling in ingredients helped each member of the project team see aspects affecting reaching our scaling ambition from different perspectives which helped to bring in ideas from many backgrounds and disciplines from the grassroots rather than a top-down, know-it-all perspective." The frameworks also rely on management principles, such as clarity of the vision, or scaling ambition, and whether it is matched by available resources, both now and in the future; and they draw attention to the need for the organizations driving the scaling process to be "fit for scale." Table 1 shows the structure and key scalability factors of the MSI, ASAT, IFAD, GIZ, and PPPLab/CIMMYT tools. The SUM, ASAT, and Scaling Scan ask users to address and score scaling elements in terms of a series of questions intended to highlight likely scaling challenges, bottlenecks, and operational priorities. This allows for comparing the views of different stakeholders and for richer and more deliberate choices on what needs to be addressed and done to realize scaling.

According to Linn and Cooley (2014), the IFAD Framework is intended primarily for policy and institutional analysis, while the SUM Framework mainly serves as guidance for the design and implementation of specific scaling up strategies and pathways. Following the technology adoption paradigm of Rogers (2003), the SUM Framework and the ASAT tool place strong emphasis on how a technology can be adapted to fit better in an environment. The USAID Bureau for Food Security (BFS) has used the SUM Framework (Kohl et al., 2017) to assess and compare the scaling pathways of five different innovations, each in a different country. In 2018 Kohl, 2018, the BFS tested the ASAT tool as a method to inform decisions on the most "scalable" innovations that USAID should invest in. The GIZ and ASAT tools were designed for GIZ and USAID staff but have applicability for a wider range of users. The Scaling Scan can be applied in distinct settings by development practitioners and with stakeholders from different professional backgrounds and levels. It deliberately asks simple but important questions and offers a method to weigh different elements and develop a rich and balanced approach. By testing an early version of the Scaling Scan with 328 extension agents in Mexico, Camacho et al. (forthcoming) were able to identify the lack of knowledge and awareness of innovations as the major bottleneck impeding the scaling of sustainable intensification practices in the Mexican context, which led them to recommend a shift in resources from technology fine-tuning to better communication.

5. Discussion and conclusion

The term "scaling" is heartily welcomed by development organizations as a new terminology and ambition that reflects the need to address the massive problems of poverty and food insecurity. However, expanding pilot projects to reach more beneficiaries is often unsuccessful, expensive, and unsustainable. Counting households that

[1] The Public Private Partnership Lab is a consortium of SNV Netherlands, Erasmus University, the Wageningen Centre for Development Innovation, and Aqua4All.

Table 1
Overview of selected tools that help frame scaling.

	SUM = Scaling Up management framework	IFAD Framework	Agricultural scalability assessment tool (ASAT)	GIZ Guidelines	The scaling scan
Developed by	MSI international in 2006	Brookings institute and IFAD in 2015	USAID and MSI in 2018	GIZ in 2016	PPPLab and CIMMYT in 2018
Availability	https://www.agrilinks.org/library/scaling-vision-large-scale-change-msi-framework-and-toolkit	https://www.ifad.org/documents/38711624/40280512/IFAD%27s+operational+framework+for+scaling+up+results.pdf/43f3baee-d7bf-4e32-8e7d-bbcfe5eb488e	https://www.agrilinks.org/post/agricultural-scalability-assessment-tool-assessing-and-improving-scaling-potential-agricultural	https://mia.giz.de/qlink/ID=244571000	https://www.cimmyt.org/project-profile/scaling/ https://ppplab.org/topic/scaling/
Designed to	"…improve the track record of taking solutions to scale by offering practical advice for effective scaling up"	"… shift from a project-centric approach to one that spurs change in the institutional, policy, and economic environment in which rural poverty exists" (page 1)	"… provide a qualitative appraisal of an innovations scalability" (page 1)	"… boost the quality and impact of GIZ" (page 9)	"… formulate a realistic and responsible scaling ambition and to prioritize bottlenecks and opportunities that should be addressed to achieve that scale"
Layout	Guidelines (29 pp.)	Guiding framework (32 pp.)	Guide (49 pp.) and Excel Sheet for scoring and automatic generation of scalability assessment results	Guidelines (36 pp.) with case studies	Workbook (35 pp.) and Excel Sheet for scoring and automatic generation of scalability assessment results
Structure	It describes three strategic management steps and 10 tasks for effective scaling up. Steps: 1. Develop a plan 2. Establish preconditions 3. Implement scaling up process + Step 1 includes a scalability assessment tool with 32 items over seven model categories + Step 1	Seven basic components of the conceptual framework: 1. Definition of scaling up 2. The innovation-learning scaling up process 3. Pathways for scaling up 4. Drivers (ideas and models, vision and leadership, external catalysts, incentives, accountability) 5. Spaces (fiscal/	ASAT consists of two components: 1. ASDT- Agriculture Scaling Decision Tree that provides guidance to determine the best scaling pathway (public/private/public-private partnerships) 2. ASAM- Agricultural Scalability Assessment Matrix that works through the factors that	Eight success factors for scaling up are defined, and the role they played in case studies is explained. Requires familiarity with GIZ's management tool Capacity WORKS	Users answer tactical questions along three steps: 1. Defining a scaling ambition (including a system and responsibility check) 2. Check scaling ingredients 3. Select and balance ingredients that need to be addressed in the scaling strategy/

(*continued on next page*)

Table 1 (*continued*)

	SUM = Scaling Up management framework	IFAD Framework	Agricultural scalability assessment tool (ASAT)	GIZ Guidelines	The scaling scan
	distinguishes four pathways to scale (expansion, replication, collaboration, and field building)	financial, natural resources/ environmental, policy, institutional/ organizational/staff capacity, political space) 6. Learning 7. Systemic approach to sustainable scale up	influence scalability with a given pathway in mind		implementation and loop back to check if the scaling ambition (Step 1) is realistic, as well as links to more specific tools that can help on specific elements/ ingredients.
Key scalability factors	32 tactical questions over seven model categories: 1. How convincing the scaling strategy is 2. Observability 3. Level of support for change 4. Relative advantage 5. Ease of adoption 6. Fit between intervention and adopting organization 7. Sustainable funding	15 framing questions over six categories: 1. Ideas 2. Vision 3. Drivers 4. Spaces 5. Pathways 6. IFAD's role	39 criteria over six sections (A-F) that are essential for scaling: 1. Importance of the issue the innovation addresses 2. Credibility and observability of the innovation with key stakeholders and adopters 3. Ease of use 4. Potential benefit or business case for adopters 5. Business case for value chain actors and strength of market system (commercial path) 6. Public sector environment supports commercial pathways	Key success factors: 1. Incorporate scaling up into planning 2. Ownership by the key actors 3. Multilevel approach 4. Verification of results 5. Standards and manuals 6. Replication structures and incentive mechanisms 7.Communication and networking 8. Scheduling and budgeting	40 tactical questions divided evenly over 10 “scaling ingredients” Ubels and Jacobs, 2016 for an innovation to scale, including: 1. Technology/ practice 2. Awareness and demand 3. Business cases 4. Value chain 5. Finance 6. Knowledge and skills 7. Collaboration 8. Evidence and learning 9. Leadership and management 10. Public sector governance

have changed a practice at the end of a project while they get project support is a poor metric or predictor of whether these people *can* and *will* sustain adoption after the project closes, let alone whether others will also adopt the practice.

In this paper, we show that the more projects try to control the environment they operate in, the harder it is to transition to scale. Shielded from reality and relying on over-proportional external resources, projects often indulge in the changes they provoked within the project context, rather than what the project changed in the real world. Furthermore, we advocate for a broader view and approach towards scaling: from reaching many to a process aimed at achieving sustainable systems change at scale. A systems perspective of scaling requires projects to understand the actor dynamics that determine the present situation, including social norms and technical regulations, market dynamics and the role of service providers, financing mechanisms and conditions, public policy, and the gains with keeping the status quo. Understanding key drivers and rules of the game and finding levers to influence these then becomes essential for pursuing successful scaling.

However, scaling in projects is dominated by a "technology transfer mindset" that is product, end-user and number focused. This mindset is anchored in processes where donors request project implementers to deliver a certain number of outputs at a particular time, and hold the implementing organizations accountable for their distinct contribution. Project implementers present solutions as relatively straightforward fixes that their organization can provide in a few years. Keeping things clear and simple feeds the systematic resistance to embracing scaling as something more complex and upholds a preference to implement projects in "glasshouses" and as stand-alone interventions. In reality, change occurs when different developments from a range of distinct sources and interventions "meet" to gradually shape a new configuration that brings the innovation a step forward. Such developments are hardly ever within the scope of one project. Although beyond the scope of this paper, we suspect that projects tend to focus at output level because sustainability and system change are much more difficult to measure, monitor, and attribute. Hence, we question whether "scaling projects" really exist and if instead we should refer to projects that pilot certain dimensions required for scaling.

We conclude that scaling requires different skills, approaches, and ways of collaborating than those required for successful implementation of a pilot project. Dealing with the complexities of scaling has implications for individuals and institutions. First of all, project designers and implementers need to adopt a mindset that allows them to simultaneously navigate multiple overlapping systems—economic, social, technical, and political. Second, that different mindset goes beyond asking, "Does the (pilot) project work?" to asking, "What happens beyond the (pilot) project, if it works?" Hence, projects should be designed with clear entry and exit strategies that focus on the use of time-bounded, external funding to leverage non-ODA financing and leadership that support scaling beyond the project context. Third, implementing institutions need to be realistic about which parts of the system they can influence and strategic about collaborating with others in ways that take advantage of these organizations' comparative advantages. Finally, the project should be conceived as a building block within an ecology of other initiatives and a bigger (more multisectoral) program, such as sector- or country-development strategies. This involves complementing and reinforcing existing initiatives in the same domain and stimulating supportive interventions that help build a bigger dynamic towards systems change. Although we strongly believe that scaling ambitions can only be achieved if a systems change approach is strongly embedded in the intervention, there is yet little evidence to back this up. As the interconnected nature of poverty and hunger becomes more evident, we have witnessed a growing attention for system thinking approaches in international development cooperation. However, systems thinking remains a young discipline, and such approaches are still the exception rather than the rule (Senge et al., 2015). There is a strong need to find practical application of system thinking approaches in research and development interventions. Scaling frameworks and tools, like the ones described in this paper, can help projects and professionals systematically navigate the multiple dimensions involved in tackling scale. They offer a multidimensional view and allow us to be more deliberate about defining key systemic constraints, identifying possible levers and partners to address these, and allocating attention and resources to the (often nontechnical) issues that really matter for broad adoption and a sustainable systems change.

Declarations of interests

None.

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