The contribution of AIS approaches to achieving impact at scale – intentions, realities and outlooks

By Seerp Wigboldus, Solveig Danielsen, Iddo Dror, Carolina Camacho Villa, Magdalena Blum, Dan Kisauzi, Stefan Fett, Mariana Wongtschowski

Agricultural innovation systems (AIS) approaches contribute to achieving impact at scale: this is still a statement which is questioned and not yet a widely accepted fact. Any claims supporting it are based on circumstantial evidence at best. This chapter discusses why this is the case, examining how AIS approaches primarily create a relevant context perspective in support of learning and partnership processes, rather than leading to targeted strategies for achieving impact at scale. The Working Paper also explains how AIS approaches are adapted to common traditional approaches, which are often still limiting and linear, instead of developing new, complexity aware ways to scaling based on an AIS perspective. These considerations translate to a need for new steps in AIS thinking and practice to enhance the effectiveness of AIS approaches. This should include AIS-based theories of change, which are better articulated in relation to capacities to innovate and in relation to achieving impact at scale.

Photo: Remco Mur

Field day at a demonstration plot, Western Kenya

KIT | Sustainable Economic Development & Gender

Introduction

The purpose of agricultural innovation systems (AIS) thinking is to approach innovation from a systemic perspective by paying due attention to the way in which innovation emerges from a (complex) interactive dynamic, between a range of actors within particular social, economic, and environmental conditions. Such an approach is meant and expected to enhance the capacity to innovate and the ability to achieve more impact at scale, by enabling the creation of a more complete picture of the factors involved. The seemingly obvious utility of AIS thinking, as well as the increase in AIS-inspired development work over the last decade, do not appear to translate to an enhanced capacity to innovate and achieve impact at scale in ways that one would expect.

There could be a variety of reasons for this:
- Perhaps there are inherent limitations in AIS thinking, which would mean that further development is required.
- Perhaps AIS thinking focuses too much on multi-stakeholder arrangements, neither paying due attention to the dynamics involved in collective capabilities to innovate, nor to the complex dynamics involved in scaling processes (e.g. Wigboldus et al., 2016). In other words, AIS thinking may still need to shed some of the limitations of its preceding approaches, such as Transfer of Technology thinking. In this case, AIS thinking needs to come to terms with topics that it hasn't previously taken on board, for example, governance and politics.
- Perhaps the readiness to apply AIS thinking is constrained because it is insufficiently incorporated into the development of theories of change, in relation to innovation and scaling initiatives. In an earlier chapter this has been discussed in more detail. Here we may ask the question of whether a lack of tools to guide AIS perspectives on the 'theory of scaling' (how scaling is expected to happen, see Wigboldus et al., 2016) is limiting the effectiveness of AIS thinking in the context of scaling initiatives. In this case, additional practical guidance needs to be developed.
- Perhaps the principles of AIS thinking have simply not been embraced as widely as hoped. It may be considered a nice idea, which many support in principle, but when it comes to putting it into practice, perhaps AIS thinking is found to be difficult to work with, or requires a change (e.g. of paradigm), which many still shy away from. In this case, communication about AIS thinking needs to be improved, while also continuing engagement in discourses about drivers of innovation, in view of achieving inclusive impact at scale.

Perhaps it is a combination of these reasons which needs to be considered. Whatever the case, the promise of AIS thinking, in terms of understanding what improves the capacity to innovate and to achieve impact at scale, has not come to full fruition yet. If indeed there is such a promise, there is all the reason in the world to si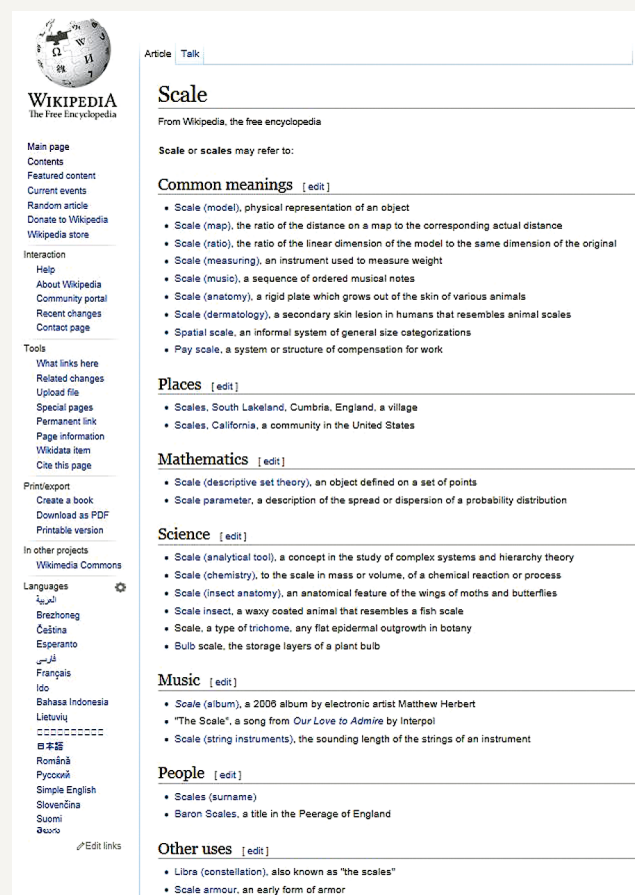t down and consider what would be involved in seeing that promise translate to reality. This chapter concerns a brief exploration of related issues which emerged during the AIS stock-taking seminar in Amsterdam, October 2016.

What do AIS approaches have to do with the capacity to innovate and achieve impact at scale?

AIS approaches tend to focus on a more holistic, 'bottom-up' and inclusive consultation process, which has several implications for their suitability for achieving impact at scale. 'Scale' can mean many different things to different people. A quick glance at a dictionary will show many entries for the term, and the Wikipedia landing page for 'scale' lists over 30 concepts that use the term (Figure 1). It would therefore be useful to explain what is meant by 'scale' in the context of AIS, and Agricultural Research for Development (AR4D) more generally. In development circles, scaling is often broken down into at least two components: 'scaling up' and 'scaling out'.

Scale up – the original term – suggests that a process, technology or programme becomes available to more people. Geography can be an influencing factor in this process, but it is not as important as how many goods are produced or services are provided.

Figure 1: Wikipedia on 'scale'

Scale out – a variation on the historic approach – predominantly focuses on the geographic spread, i.e. the spreading of ideas, often through expanding theories or organizations geographically. This does not require as much central control as scaling up (Koenig, 2015).

In either case, the basic premise being promoted is that 'scaling,' as in reaching more people with a social intervention, is an important pathway towards the achievement of global goals, such as the alleviation of poverty etc. One can often map the scaling of social interventions to global goals, such as the current SDGs, and the MDGs before them etc., (see, for instance, Hartmann and Johannes, 2007). Many organizations set up their own goals to align with these larger goals – for instance, the CGIAR Strategy and Results (http://www.cgiar.org/our-strategy/), which refer to three 'System Level Objectives,' namely 'Reduce poverty,' 'Improve food and nutrition security,' and 'Improve natural resources and ecosystems,' mapping them to the SDGs.

It is important to note that the question of what is scalable is crucial, not only for AIS, but also for other approaches across the development sector. For instance, in the early days of the so-called 'Technology Transfer' approach, the focus has been on scaling the application of a technology (or product), and the 'Farming Systems Research' aimed to scale its packages, consisting of a combination of technologies and practices. Likewise, the AIS approach focuses on scaling processes that can lead to technological and institutional changes. Not surprisingly, lessons on how to facilitate functional multi-stakeholder platforms in specific contexts, have become a distinctive element of AIS. This AIS approach, of trying to spread good processes that have worked well in one location, successfully and sustainably to another, with local customization, has its advantages. However, from a scaling perspective, it also offers some challenges.

Let us take the case of MasAgro hubs to illustrate this. A MasAgro hub is a network of value chain stakeholders, from a particular agro-ecological region, working together on sustainable solutions for maize and wheat-based farming systems (Hellin et al., 2014). These hubs cover different regions and have been developed in response to the specific challenges and opportunities of each region (Camacho-Villa et al., 2016). Each hub has developed a particular technological portfolio, adapting to local conditions and expectations, and as a result of its own learning process (ibid). The hubs also promote different forms of multi-stakeholder networks, responding to their region's institutional landscape and acting on opportunities that appear (ibid). The hub approach has been scaled, from two in 2007 to seven hubs in 2015, using 'adaptive management' (Klerkx, Aarts, and Leeuwis, 2010) as a core element of the approach, which allows the hubs to respond to the highly heterogeneous and dynamic Mexican contexts. This level of scaling, namely increasing the number of hubs from low single digits to high single digits, or the number of farmers from a few hundred to a few thousand (or even into the low tens of thousands), is not atypical in AIS. Dror et al., (2016), looked at over two dozen cases of so-called 'mature' innovation platforms, across three continents, and found the scale to be consistent with such numbers. On the surface, such growth percentages – often well over a hundred percent increase – look promising. However, high growth numbers almost invariably start from a very low base (often near zero) and plateau at relatively low numbers by the time the projects funding these initiatives come to an end, which often results in the end of the initiative, or at least its scaling phase.

In contrast to the scaling that tends to make news in the corporate sector – for instance many of the tech start-ups (Facebook, Uber, Airbnb etc.) and their ability to rapidly grow the number of users they reach – the extent of the scaling of initiatives in the development sector appears minimal. See, for instance, the graph of Facebook users from 2008-2016 (Figure 2), which grew
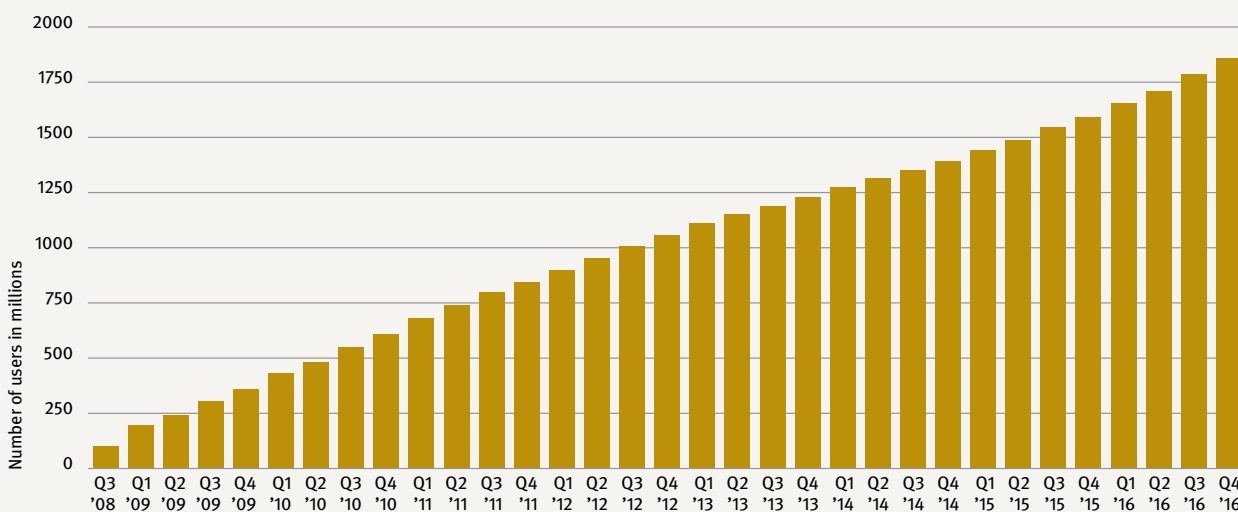
Figure 2: Facebook users from 2008 – 2016

Image source: https://www.statista.com/statistics/264810/number-of-monthly-active-facebook-users-worldwide

its users from around 100 million to around 1.8 billion in that period; or Airbnb, who grew from around 300 nights in 2008 to around 78 million in 2016, and are projected to reach 500 million nights by 2025 (Dillow, 2016).

Clearly, AR4D has a very different setup to a tech start-up. However, there is a danger of missing an opportunity by ignoring the fact that rapid scaling can take place in similar arenas to AR4D. For instance, consider the rapid scaling up of insecticide-treated bed net coverage in Africa. In 44 African countries with large populations at risk of malaria, bed net ownership increased from an average of 2.2% of the at-risk population in 1999, to 32.8% by 2008. The use of bed nets by children under age 5 was an average of 1.5% of the at-risk population in 1999, this increased to 26.6% by 2008 (Flaxman et al., 2010). Against such benchmarks, the 'scaling' often referred to by AIS initiatives seems very modest, and perhaps even a misuse of the term.

The scaling of a process usually requires considerable investment (both in terms of money and time) in trust building. A local level multi-stakeholder process (which can be slow and expensive to grow and manage), cannot easily be transferred to other geographies, or even to a larger scale within the same locality, without replicating those investments. Therefore, the richness of the process seems to be directly correlated to its (in)ability to rapidly scale its benefits to other populations, who are also in need of similar solutions. Therein lies the AIS scaling dilemma: how can AIS be used to develop, not only processes and lessons, but also products, technologies and packages that are attractive enough to convince large populations to take up the innovation?

The application of AIS approaches

The AIS approach appeared in the mid-to-late 1990s in response to the inadequacies of approaches which revolved around extension services as the primary driver for scaling innovations. This new approach was meant to help actors to better understand, and engage with, the realities of how agricultural innovation occurs. The AIS perspective was put into practice in many different ways across the globe, and cannot be viewed as isolated from the development of other lines of thinking, most notably, the participatory rural development approaches that preceded it. AIS responded to the questions of researchers, development actors and donors. Researchers were looking for ways to improve the uptake of the outputs of their work – a review of early experiences from a research perspective is outlined in Box 1. Development actors, including NGOs, wanted to better understand and respond to realities regarding how innovation and change occurs. Donors were interested in seeing the outputs generated from the research that they funded go to scale, in the sense that they were being taken up and used by many people, thus contributing to the development impact.

The implementation of AIS as an approach necessitated a recognition of the changing roles that different actors have to play in innovation and scaling processes. Most notably, researchers have to reorient towards responding to concrete problems in the system, while the agricultural advisory service providers have to switch from 'extending' research outputs to users, to facilitating actors in the AIS to collaborate as multi-stakeholder partners, and make informed and collaborative choices.

Box 1: Early experiences in the application of innovation systems approaches to support the use of research outputs

An early review of attempts to introduce innovation systems, concepts and approaches into agricultural research processes was made by Rath and Barnett (2005). The review focused on ten research programmes of the DFID-funded Renewable Natural Resources Research Strategy (RNRRS), which was implemented between 1995 and 2005. The programme had over 1,600 research projects. The review showed that many of the elements that make up the 'innovation systems (IS) approach' had been increasingly incorporated within the different RNRRS programmes as they evolved. However, the review suggested that the developments of these elements were largely unsystematic across the programmes as a whole, while individual programmes developed and incorporated many elements on their own, with some taking a more deliberate and formal approach. The main lessons from these early experiences, which the review crystallised, were that: (a) the IS framework provides a useful tool to guide research managers wishing to achieve innovation, (b) an initial 'system diagnosis' is crucial and can be either simple or complex (depending on the resources available), and (c) innovation projects can contribute to poverty reduction. To learn from these experiences to extract a higher level of understanding, it is necessary to invest explicitly in reflection both on the programme management and innovation process, and on the actual content of the process.

Members of the Bumula Maize and Legume Innovation Platform, Western Kenya

Following the recognition of the changes to these roles, AIS principles were translated into practice by strengthening and developing partnerships as part of the development and research programmes. Innovation platforms, hubs and national innovation coalitions are all names for multi-stakeholder groups that are coming together to learn from each other's experiences and collaborate in change processes. New key roles for the actors involved have emerged, such as 'facilitators' or 'brokers' of interaction, and have become increasingly recognized. One of the first challenges was to bring the discussions taking place at these levels into practice. Agricultural Innovation Platforms (AIPs) were conceptualized and piloted as a way of addressing this challenge. The utility of AIPs in particular, and AIS in general, was quickly discovered by those working on (inclusive) value chain approaches, who also conceive dialogue between actors as key to value chain development and, thereby, to strengthening the role of farmers.

A central principle to the way AIS approaches are implemented is by fostering the development and strengthening of partnerships. Particularly partnerships related to collaboration, such as new contractual arrangements or the active involvement of private sector providers (e.g. by reducing risks). Partnerships are also seen as crucial to AIS because they promote social relations that build trust between the actors, which can continue after projects finish. The other principles that are fostered as integral features of AIS programmes are reflection and learning. More emphasis, in this regard, has been placed on developing tools for building feedback loops and strengthening the integration of capacity developing institutions in the AIS approach.

How has AIS thinking and practice contributed to capacities to innovate and achieve impact at scale?

AIS experiences have introduced new ways of engaging with scaling processes. In this section we discuss two examples; the first brings us to the question of what is scalable in the context of AIS? The second is related to the principle of innovation processes as collective endeavours undertaken by different stakeholders. Both examples have elements which point to the need to rethink scaling in the context of AIS.

Understanding what is scalable is crucial, not only for AIS, but also for other approaches. In the diffusion of innovations approach (also known as Transfer of Technology), the main element to scale is the application of a technology. The Farming Systems Research approach aims to scale packages (of mixed technologies and practices) for specific recommendation domains. In contrast, an AIS approach looks to scale learning processes on technological and institutional changes. Lessons on how to facilitate functional multi-stakeholder networks, in specific contexts, have become a distinctive element of AIS. This means that the approaches scaled are regarding how to foster these learning processes. In this way, scaling is more focused on the process of increasing access to interventions and products, rather than on the interventions/products that are to be scaled.

The case of MasAgro hubs illustrates this well. As explained above, MasAgro hubs are networks of value chain stakeholders from particular regions working together on sustainable solutions for maize and wheat-based farming systems (Hellin

extension agents). In some regions, like Bajio, the history of this practice began in the 1990s with Conservation Tillage (CT). Taking into account this timeframe, there have been several actors who have contributed to the CA trajectory. CIMMYT was involved in the initial promotion of CT in some areas in the 1990s, but later other actors, such as FIRA – a financial governmental organization – began to take over. Currently, in some cases, CA is promoted by MasAgro and other national, regional and local programmes and projects acting in the same region at the same time. However, issues of ownership and accountability have made it difficult to coordinate efforts in some regions. In this way AIS partnerships also bring new challenges to scaling, as each hub has a different partnership configuration which responds to the specific regional institutional landscape.

The above discussion briefly illustrates the need to rethink scaling processes in the context of AIS approaches and to consider what issues and challenges must be addressed. An AIS perspective helps to illuminate the broader timescales of technological trajectories compared to other trajectories that are normally used in projects or programmes. The collectiveness of technological trajectories, not only involves current partners, but also actors who have previously participated in the trajectory. This is especially relevant since innovation processes do not follow linear pathways, and are more contingent and 'messier' than the processes involved in a Technology-Transfer approach. Consequently, it is challenging to define the ownership and accountability of scaling efforts. The case of MasAgro hubs serves as a good illustration of these challenges.

et al., 2014). Each hub has learnt from its own individual experiences and adapted to local conditions and expectations (ibid). The hubs respond to the institutional landscape in their region and act on the opportunities that arise to promote different forms of their multi-stakeholder networks (ibid). The hub approach has been scaled using 'adaptive management' (Klerkx, et al., 2010), which allows the hubs to respond to their different Mexican contexts. The hub approach has been 'reinterpreted' (de Sardan, 2005) in each region, illustrating how scaling can be understood as increasing the number of choices that people have, rather than simply scaling one particular choice/intervention.

The second AIS approach to scaling relates to the principle of understanding innovation processes as collective endeavours undertaken by different stakeholders. Partnerships have become a key element to the integrated process of innovation-scaling. Different actors are involved in creating innovations and ensuring enabling conditions, which allow these innovations to go to scale. However, it is difficult (if not impossible) to control what exactly will go to scale, considering that actors will pick up whatever they like, or see fit, from a partnership, which is why it is necessary to reinterpret scaling. Partners bring their own experiences and histories into collaborations, some of which are related to new technological trajectories, others which are linked to technology trajectories that started decades earlier, like Conservation Agriculture (CA). CA has been adapted to local conditions with a broad range of reinterpretation from hub partners (i.e. farmers and

Challenges to be overcome in order to enhance the effectiveness of AIS approaches

Following the discussions in the previous sections, there are a number of challenges which need to be addressed in order to enhance the effectiveness of AIS approaches, in view of improving capacities to innovate and achieve impact at scale. A few are briefly discussed below.

The clash of ideas on progress and development

There is a mismatch between the nature of AIS and the way many development programmes are designed, managed and evaluated. The donors' emphasis on impact and management-by-results is often translated into results frameworks with quantitative targets (e.g. number of farmers reached, number of livelihoods improved, percentage increase in income). This does not comply with the way that innovation processes work, which involves ongoing navigation of multiple drivers and blockages that affect the progress and outcomes. Appropriate time frames and budgets for engaging meaningfully in innovation processes, understanding the actors and contexts, and planning and

decision processes with AIS stakeholders, are often not catered to. As a result, actors may resort to 'business as usual' with piece-meal, short-term interventions, which lead to fragmentation and stay within their comfort zones. This can be further exacerbated by the pressure to deliver on quantitative indicators, which tends to limit creativity, undermine learning processes, and 'force' programme implementers to focus on quick, easy-to-measure wins, rather than engaging in change processes. Finally, rigorous results-frameworks tend to create an illusion of 'being in control' and may, in the worst cases, undermine the very goals that a programme aims to achieve.

Demonstrating the value of AIS

A programme that aims to reach poor farmers must, in some way, be able to demonstrate that it is actually achieving this aim, otherwise decision-makers may want to use the money on an unconditional cash transfer programme instead. Questions that need addressing in order to establish indicators which effectively relay the real impact of programmes, include:
- What can and should be quantified in a meaningful way?
- How can impact be measured? How can returns on investments be calculated?
- How can monitoring and evaluation (M & E)/learning systems ensure stronger accountability for farmers, whose voices are often very weak?
- There are ways to measure changes in knowledge, attitudes and behaviours. How can the extent that this translates into changes for the target group, and the strengthening of the system at large, be assessed?
- How can the collective ownership of the processes and results be ensured?

Understanding the bigger picture of innovation

Global agendas and global business models, such as large-scale investments in agriculture, have an impact on AIS practice, while having a dynamic of their own in terms of innovation agendas. Market forces affect capacities to innovate, for example, an increased integration in the world market would affect capacities by imposing a global market 'agenda' on local and regional realities. Supermarket-led value chains also have an impact at a local level, again, by imposing the supermarket's own innovation agenda on local and regional realities. Much of the above may conflict with the principles which underpin the AIS approach, regarding capacities to innovate, by leaving pertinent aspects (e.g. social, environmental, cultural) outside the scope of what informs decision making.

Understanding the real decision making process

Politics and politicization, nepotism and corruption all impact choices regarding innovation programmes, for example, decisions over the areas to invest in and who should benefit

from the investment. In many cases, farmers have little, if any, influence over politics or high-level agendas deciding what is to be promoted (e.g. extension). AIS needs to face the implications that power differences have on innovation processes, by acknowledging the limitations that farmers' voices have to influence what emerges from AIS interactions and processes, for example.

The above illustrates the many challenges and questions that directly affect issues regarding capacities to innovate and achieve impact at scale, which AIS must come to terms with. However, the list is longer than the issues highlighted above, but there is not space here to discuss the other challenges and related questions, which include:
- Who makes the decisions in AIS-oriented programmes and who is merely invited to complete the group picture? This also relates to the question of co-ownership of the processes.
- Ensuring enabling conditions for flourishing AIS, such as developing skill sets, system linkages, partnerships, etc., without losing the integrative perspective.
- Engaging effectively and responsibly in diversity and inclusiveness in decisions over who gains, who loses, and who is excluded from programmes.
- Building trust while working at scale is difficult due to the distance between actors. AIS programmes need to consider how to create and maintain trust in systems and situations where legal systems and their enforcement are notoriously weak.
- Scaling processes require careful monitoring of the trade-offs, which demands a better understanding of the theory of change underpinning scaling initiatives.

Suggested reading on the emergence of organizational innovation inspired by AIS principles and some results and lessons from Nicaragua and Uganda:

Danielsen, S., Centeno, J., López, J., Lezama, L., Varela, G., Castillo, P., Narváez, C., Zeledón, I., Pavón, F., and Boa, E., 2013. *Innovations in plant health services in Nicaragua: From grassroots experiment to a systems approach.* Journal of International Development, 25(7), 968–986.

Danielsen, S., and Matsiko, F. B., 2016. *Using a plant health system framework to assess plant clinic performance in Uganda.* Food Security, 8(2), 345–359.

Mur, R., Williams, F., Danielsen, S., Audet-Bélanger, G., Mulema, J., (eds.), 2015. *Listening to the silent patients – Uganda's journey towards institutionalising inclusive plant health services.* CABI Publishing, Wallingford.

Romney, D., Day, R., Faheem, M., Cambria, F., LaMontagne-Godwin, J., Negussie, E., 2013. *Plantwise: Putting innovation systems principles into practice. Agriculture for Development,* 18, 27–31.

The introduction of local plant clinics as a new extension method in Uganda has strengthened the links between agricultural extension providers and the ministry, and stimulated organizational innovation.

Box 2: Absorptive capacity and the limits of scale

Uganda has taken up plant clinics at scale, in recent years, as an innovation in agricultural extension service delivery and plant health information management. The initiative is driven by the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), District Local Governments (DLG) and NGOs, with support from CABI's global programme, Plantwise. Currently, more than 100 plant clinics (see Figure 3) operate in dozens of districts. The dual purpose of the plant clinics has made them attractive for both government regulatory bodies and extension service providers:

On the one hand, the plant clinics allow extension service providers (DLGs and NGOs) to enhance their reach and respond to a broad demand for plant health advice. Plant clinics help to make farmer demands explicit.

On the other hand, the plant clinics systematically collect data on their clients' plant health problems, which is of utmost value to the MAAIF. The Department of Crop Protection of the MAAIF is the official government body responsible for pest and disease surveillance and for keeping the official pests lists up to date. Yet, the MAAIF has limited capacity and resources to fulfil this mandate. The alliance with extension providers around plant clinics has given the MAAIF access to a unique source of, almost real-time, information about pests and diseases in farmers' fields, a sort of community-based disease vigilance mechanism.

Yet, the organizational and governance issues around managing and sharing plant clinic data constitute a considerable challenge, which for the time being limits the capitalization of the benefits that the data can bring. In Uganda the DLGs have far-reaching autonomy and they are responsible for the provision of agricultural extension. The MAAIF has no authority over the districts regarding extension, and reporting lines do not include the Department of Crop Protection (an ongoing extension reform presumably aims to change that). This means that channelling data from the plant clinics to the Department of Crop Protection is not straight forward, but requires bi-lateral agreements with each district on the roles and procedures.

Over the last two years, the MAAIF and some DLGs have made good progress in regards to defining procedures for data management and use. Yet, there is a long way to go before the Department of Crop Protection will be able to effectively manage data arrangements with the, more than 70, districts that now operate, or intend to operate, plant clinics.

The MAAIF suffers from decades of consistent under-staffing and under-funding, which affects its capacity to absorb organizational innovations at scale. The scaling out of the plant clinics in Uganda is creating new value for farmers, extension providers and regulatory bodies. Yet, the full potential can only be reached once the organizational capacity is in place, both in the MAAIF and in the districts.

Opportunities for moving AIS thinking and practice forward

As discussed in the previous section, there are plenty of challenges to address. This section will briefly explore the opportunities for addressing those challenges in order to improve AIS thinking and practice, and, by doing so, contribute to an enhanced capacity to innovate and achieve inclusive impact at scale.

Enhancing primary stakeholder involvement and ownership

Involvement in and engagement with AIS processes can enhance advisory services and the private sector, from the very beginning, by encouraging a broader representation of society – which means including primary stakeholders, such as farmers or farmer organizations (FOs). This goes beyond the mere participation of (primary) stakeholders, their representation in AIS processes needs to become meaningful through the joint ownership of aims and objectives, business models, theories of change, activities, results and impact. This involves enabling FOs to be the drivers of innovation and related scaling processes. In effect, farmers will first of all be partners in the processes and not merely the beneficiaries or targets. Enabling less dominant stakeholders to play an effective role in the AIS process may require an adjustment to the dominance of particular stakeholders. In most cases, this will need to be complemented by supporting the capacity development of producer organizations towards improved access to and influence over policy, and other decision-making processes.

Enhancing benefit sharing

Related to the need for improved involvement and ownership, is the demand for better anticipation of the outcomes and impacts of innovation and scaling processes. For example, a consideration of how smallholders and other poor or disadvantaged groups – including women and youth – can benefit better from the outcomes and impacts related to AIS processes. This also involves anticipating the consequences of processes achieving scale, which can have positive but also potentially negative impacts. Articulating theories of scaling (i.e. theories of change) which focus on envisaged scaling processes, can help enhance the readiness of AIS initiatives to engage more effectively and responsibly with scaling processes. A theory of scaling, as a process and framework (Wigboldus, 2016), may then inform improved (inclusive) business models, for example, which perform better in view of the interests of smallholders, and poor or otherwise disadvantaged groups. Additionally, theories of scaling could help to build the capacity of smallholders and their organizations to articulate their demands more systematically, including through the use of innovative financing mechanisms (e.g. service funds to support FOs to pay for services).

Photo: Remco Mur

Enhancing conditions for AIS performance

The above two areas of potential enhancement of AIS performance, rely on conducive conditions to get the best out of AIS process interactions. This involves dedicating sufficient time and resources to reinforcing understanding between each of the stakeholders, agreeing on joint objectives and actions, and communicating and networking to reflect on progress throughout the AIS process (M & E and learning processes). Such M & E needs to build on quantitative and qualitative assessment, which requires flexibility of the processes, as well as institutional flexibility of the actors involved. This demands less rigid programme frameworks in order to allow room for manoeuver and enable programmes to respond to current events and developments. Another area in need of attention, concerns the need to define and unpack what the capacity to innovate is all about to help strategize the strengthening of capacities better (e.g. through the Tropical Agriculture Platform's (TAP) Capacity Development Framework (FAO, 2016b), or the 5-Capabilities framework (Baser and Morgan, 2008). Additional conditions demanding change include, more meaningful accountability of donors to primary stakeholders and greater flexibility of donors towards new ways of investing and experimentation in innovative investments or financing, for example.

Enhancing strategic guidance and reflective practice in AIS initiatives

AIS initiatives connect to systemic change, but there is still much to be learnt about how this can be achieved. The same goes for partnerships, which are central to AIS initiatives. Appropriate research and assessment methods

can enhance the readiness of AIS initiatives to engage with change processes from a more systemic, integrative, and inclusive perspective. Since partnerships are central in AIS, research and assessment methods can then be translated into the articulation of a theory of (capacity) change/scaling, and from there, to policy and planning. The next step is to define strategic questions for M & E, not only in relation to set objectives or targets, but also to critical change factors (such as, the particular roles to be played by stakeholders), critical uncertainties, and unplanned influences and effects. Such factors relate to specific capacities and conditions, for example, relationships and collaboration between stakeholders, and assumed causal relationships (including, which actors are expected to benefit and how). Such strategic questions need to translate to defined information needs, including smart indicators on what makes for effective and responsible scaling.

Enhancing synergies through AIS initiatives

Finally, much can be achieved by interconnecting innovation 'islands' to capitalize on synergies for achieving inclusive impact at scale. This involves the reinforcement of linkages, networks and team work within and between institutions. The benefits of this include task and experience sharing, which form the building blocks of partnerships and other forms of multi-stakeholder collaboration. This means taking relationships, and relationship building, seriously (e.g. through the role of Rural Advisory Services (RAS) as brokers within the innovation system, collaboration at local level, and RAS platforms at national level). The growing access to smart phones, ICT technologies and information sources, and the increased use of social media, enables AIS actors to connect in an unprecedented way. These developments are still relatively new and the results/added value of using them is still largely unexplored. ICT technologies and social media may change (maybe even revolutionize) AIS dynamics, if they indeed lead to more inclusive access to information and contacts.

Discussion and conclusions

We started the reality check on AIS thinking and practices by saying that little thought has been given to the mechanisms and dynamics involved in scaling processes. Despite this, AIS principles have informed and inspired a number of changes in the mechanisms used for scaling. They may not have become mainstream in certain fields, but AIS principles have certainly contributed to change in others. The issue with scaling and AIS is that we try to sell it as a 'package', but the AIS approach needs to be unravelled/unpacked in terms of what it can offer in relation to improving the capacity to innovate and achieving inclusive impact at scale.

As an approach, AIS has clear limitations when it comes to informing scaling efforts: it does not sufficiently recognize the role of power relations in the interactions between individuals and organizations. It may even be considered to be somewhat naïve in that respect, blaming too many issues on limitations caused by other difficulties, such as institutional constraints, politics, and donor approaches. AIS approaches and their application need to become more explicit in addressing the realities encountered in aiming to enhance capacities to innovate and achieve inclusive impact at scale. This includes the need to provide better guidance on how to catalyze reinterpretation processes involving a large number of individuals, as well as how to monitor such processes.

Those putting AIS approaches into practice appear to have largely failed to convince primary donors of its robustness in supporting development efforts and contributing to making a difference at scale. The fact that AIS thinking and practice has been presented as an alternative way to approach agricultural innovation, without developing it further and increasing its utility, may also be to blame for this failure. AIS thinking and practice may have continued to incorporate part of the legacy of previous approaches to agricultural innovation (such as field of scaling processes), without updating them on the basis of AIS principles. The potential of AIS, in the field of enhancing capacity to innovate and achieve impact at scale, has therefore not been (fully) harnessed yet.

Driving AIS towards effective contributions in the field of capacities to innovate and achieve inclusive impact at scale, must place reinterpretation (in view of context diversities) at the centre of innovation and scaling processes. It needs to focus on the processes happening at different levels and how changing institutions allow or constrain further reinterpretation to take place. It also requires practitioners, policy makers and researchers to be more explicit in relation to situation-specific innovation and scaling initiatives, about assumptions on 'how the capacity to innovate can be improved' and 'how scaling happens,' and how this contributes to achieving inclusive impact at scale.

Rather than continuing to advocate AIS approaches and blaming conditions for limiting AIS potential, work needs to be done to better articulate AIS-related theories of change, which includes articulating how AIS principles and practices can support the capacity to innovate and achieve inclusive impact at scale. This will need to include the development of practical decision-making support tools in the same field. Conditions for working from an integrative perspective, which is the strength of AIS, will remain challenging, but rather than putting greater effort into convincing the, as yet, unconvinced, work should focus on upgrading and extending the utility of AIS thinking and practice. As this chapter has explored, many opportunities and potential for doing so exist.

References

Baser, H., and Morgan, P., 2008. Capacity, change and performance. Study report, ECDPM, Maastricht, the Netherlands.

Camacho-Villa, T. C., Almekinders, C. J. M., Hellin, J., Martinez-Cruz, T. E., Rendon-Medel, R., Guevara-Hernández, F., Beuchelt, T. D., and Govaerts, B., 2016. *'The Evolution of the MasAgro Hubs: Responsiveness and Serendipity as Drivers of Agricultural Innovation in a Dynamic and Heterogeneous Context.'* Journal of Agricultural Education and Extension, 22(5), 455–470.

de Sardan J. P. O., 2005. *Is an Anthropology of Innovation Possible? In: Anthropology and development, Understanding contemporary social change.* Zed Books, London, 89–109.

Dillow, C., 2016. *'Can Airbnb Book a Billion Nights a Year By 2025?'* Fortune, http://fortune.com/2016/04/11/airbnb-bookings-one-billion-a-year/, accessed 1 Dec 2016

Dror, I., Cadilhon, J. J., Schut, M., Misiko, M., and Maheshwari, S., 2016. *Innovation platforms for agricultural development: Evaluating the mature innovation platforms landscape.* Routledge, UK.

Flaxman, A. D., Fullman, N., Otten Jr, M. W., Menon, M., Cibulskis, R. E., Ng, M., et al., 2010. *Rapid Scaling Up of Insecticide-Treated Bed Net Coverage in Africa and Its Relationship with Development Assistance for Health: A Systematic Synthesis of Supply, Distribution, and Household Survey Data.* PLoS Med 7(8): e1000328.

Hartmann, A., and Linn, J. F., 2007. *Scaling Up: A Path to Effective Development.* 2020 Focus Brief on the World's Poor and Hungry People. IFPRI, Washington DC.

Hellin, J., Beuchelt, T. D., Camacho-Villa, T. C., Govaerts, B., Donnet, L., and Riis-Jacobsen, J., 2014. *An Innovation Systems Approach to Enhanced Farmer Adoption of Climate-Ready Germplasm and Agronomic Practices.* CAPRi Working Paper, 116. IFPRI, Washington DC.

Klerkx, L., Aarts, N., and Leeuwis, C., 2010. *'Adaptive Management in Agricultural Innovation Systems: The Interactions between Innovation Networks and Their Environment.'* Agricultural Systems 103(6), 390–400.

Koenig, B., 2015. *'Scaling for Impact by Scaling Deep'*, Ci2i Global, http://ci2iglobal.com/scaling-for-impact-by-scaling-deep/, accessed 1 Dec 2016

FAO, 2016. *The case of Canino – Agricultural research in Europe.* Video, Rome https://www.youtube.com/watch?v=m3bzkSTtDUo&feature=youtu.be or http://www.fao.org/nr/research-extension-systems/res-home/news/detail/en/c/425771/

FAO, 2014. *Apple-producing family farms in South Tyrol - An agricultural innovative case study.* Occasional paper, Rome http://www.fao.org/documents/card/en/c/2927b768-aa16-4d17-8a36-4967b212090d/

FAO, 2014. *Approaches to strengthening agricultural innovation systems (AIS) in Central Asia, South Caucasus and Turkey.* Occasional paper, Rome http://www.fao.org/3/a-i4310e.pdf

FAO, 2016. *Common Framework on Capacity Development for Agricultural Innovation Systems.* http://www.cabi.org/Uploads/CABI/news/Tap%20Cf%20Flyer.pdf, accessed 1 December 2016.
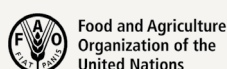
Wigboldus, S., Klerkx, L., Leeuwis, C., Schut, M., Muilerman, S., and Jochemsen, H., 2016. *Systemic perspectives on scaling agricultural innovations: A review.* Agronomy for Sustainable Development 36:46.

Wigboldus, S., with Brouwers, J., 2016. *Using a Theory of Scaling to guide decision making – Towards a structured approach to support responsible scaling of innovations in the context of agrifood systems.* Wageningen University and Research, Wageningen, and CGIAR Research Program on Integrated Systems for the Humid Tropics, Ibadan, Nigeria.

Authors' contacts

Seerp Wigboldus	Wageningen University and Research (WUR)	seerp.wigboldus@wur.nl
Solveig Danielsen	Centre for Agriculture and Biosciences International (CABI)	s.danielsen@cabi.org
Iddo Dror	International Livestock research Institute (ILRI)	I.Dror@cgiar.org
Carolina Camacho Villa	International Maize and Wheat Improvement Center (CIMMYT)	C.Camacho@cgiar.org
Magdalena Blum	Food and Agriculture Organization of the United Nations (FAO)	magdalena.blum@fao.org
Dan Kisauzi	African Forum for Agricultural Advisory Services (AFAAS)	dkisauzi@afaas-africa.org
Stefan Fett	Gesellschaft für Internationale Zusammenarbeit (GiZ)	stefan.fett@giz.de
Mariana Wongtschowski	Royal Tropical Institute (KIT)	

KIT | Sustainable Economic Development & Gender

Design : Anita Simons, www.symsign.nl