PLANNING FOR SCALE

SCALING SEED SYSTEMS TO IMPACT SMALLHOLDER FARMERS

Felicienne Soton, cassava flour producer from Adjegounle, Benin. *Photo: World Bank*

AN AGPARTNERXCHANGE REPORT

apxc Ag Partner XChange

SPONSORED BY

syngenta foundation for sustainable agriculture

USAID FROM THE AMERICAN PEOPLE

INTRODUCTION

Sara Boettiger and Stephanie Haile

1 – How do we plan for scale?

Scaling up technologies that impact smallholder farmers is a long-term goal of the international development field. Improved varieties of seed, post-harvest technologies, extension information and many other products and services have enormous potential to reduce poverty if we can get them out to large numbers of people. But scale is notoriously hard to achieve in the rural markets of developing and emerging economies. Scaling requires the ability to serve dispersed, highly heterogeneous communities that are characterized by complex technology adoption constraints. Those implementing scaling strategies grapple with limited information on which to base decisions, expensive logistics for reaching remote communities, as well as diverse policy and legal environments. These challenges are exacerbated by the fact that we are often scaling the wrong technologies. In international development we tend to select technologies for *push-scaling* based on the criteria of experts, rather than integrating the needs of the market and fostering a *pull*. Consequently, products and services may be poorly designed for scale or the selection process may produce technologies that do not have the right characteristics for successful scale.

These *Planning for Scale* materials are intended to introduce current thinking across diverse aspects of scale. They have been created to assist donors and practitioners in agricultural development who are wrestling with issues of scaling agricultural technologies for widespread adoption among smallholder farmers. The work should be helpful in the design of programs and partnerships, offering a framework in which to consider opportunities to strategically invest in scale.

While the framework presented in this set of briefs will be useful across a wide range of agricultural technologies, our focus is primarily on scaling the adoption of improved varieties of seed. Similarly, there are elements of this work that can be applied across many parts of the world, but we principally examine scaling issues in sub-Saharan African seed systems.

In trying to distill such a complex goal into practical, manageable topics, we have identified three pillars of successful scaling:

- How do you create products and services that large numbers of farmers will value?
- How can you foster widespread adoption by shifting incentives and barriers?
- What does it take to produce and distribute products and services at scale in rural markets?

These are big questions, with complicated answers that are highly dependent on context. Mechanisms that work for scaling drip irrigation are wildly different than those for scaling livestock vaccines; strategies that work for scaling fertilizer use in Ethiopia might not work for scaling the same technology in Malawi. But there are commonalities that can be drawn out to at least provide an initial framework.

The three pillars above provide a good framework for making progress on scaling, but they also underplay the components of scaling related to *knowledge*. Framing scale solely through the lens of products and services misses the critical role of knowledge in scaling agricultural technologies. Creating and disseminating useful and timely information, for instance, can be the determining factor in whether a new product delivers value to a farmer. Know-how about flushing the lines of a drip irrigation system impacts the performance of the system over time. Agronomic knowledge can make all the difference in how seed delivers value to farmers, and the old adage holds true that impact requires an essential mix of improvements in: seed, agronomy and policy. While we focus on a framework of scaling products and services, any scaling strategy will fail unless it considers the types of knowledge needed, the value of that knowledge, how it is created, and how it is conveyed at scale.

Planning for Scale resources

The *Planning for Scale* project includes the following resources:

- *Crowd-Sourced Lessons About Scaling Seed Systems*, summarizing key advice
- *Planning for Scale Briefs*, providing analysis of scale in a range of topics
- Short case studies, highlighting examples of scaling seed from around the world
- Annotated bibliography, providing a set of readings about scale seed systems

All materials can be found online at AgPartnerXChange (www.apxc.org).

Acknowledgements and authorship

Planning for Scale is co-sponsored by the Syngenta Foundation for Sustainable Agriculture (SFSA) and the United States Agency for International Development (USAID), with leadership from SFSA staff.

In this body of work, you will recognize many familiar ideas that speak to one aspect or another of scale. Authors have been writing for many decades about the adoption of agricultural technologies among smallholder farmers and about improving seed systems, but not many have written specifically about *scaling up*. Our work builds on the scholarship of experts and the acumen of practitioners to create a framework specifically focused on *scale*. The findings and analyses on these pages would not have been possible without the insights derived from speaking to more than 100 interviewees and reading the work of hundreds of authors.

The *Planning for Scale* project was led by Sara Boettiger and includes contributions from a number of authors, including: Vivienne Anthony, Ian Barker, Partha Dasgupta, Robert M. Goodman, Stephanie Haile, Katrin Kuhlman, Lloyd Le Page, Ed Mabaya, Aline O'Connor, Jonathan Shoham, Hilary Soldati and Louise Sperling.

2 – Scaling the adoption of improved varieties of seed

Good seed can be transformational in international development. Widespread adoption of improved varieties radically changes rural poverty, creating opportunities to increase income, reduce hunger and improve nutrition. Seed also plays a central role in the resilience of rural communities in the face of climate change; a well-functioning seed system can provide households with the varieties they need to adapt to challenges such as droughts, floods, pests and diseases. However, despite well-documented potential impacts and many decades of funding, we have had limited success in scaling up access to improved varieties of seed.

» Seed is often the cheapest input available. Improved varieties, therefore, are frequently the only modernized input used by African farmers. They are the first step in securing the harvest. «

Joe DeVries, AGRA

Adoption data measuring improved variety use by smallholder farmers are, by their nature, always very rough estimates, but the one thing we do know is that the figures can be troublingly low. One percent of Tanzania's rice-growing land, for example, was planted under improved varieties in 2010 (World Bank, Forthcoming). Maize is a particular crop for which the numbers are often higher (Walker et al., 2013); however, even in maize there are populations and areas with very low rates of adoption of improved varieties. Figure 1 shows the percentage of land planted under improved varieties for Mozamique (MZ), Ethiopia (ET), Ghana (GH) and Tanzania (TZ).[1,2]

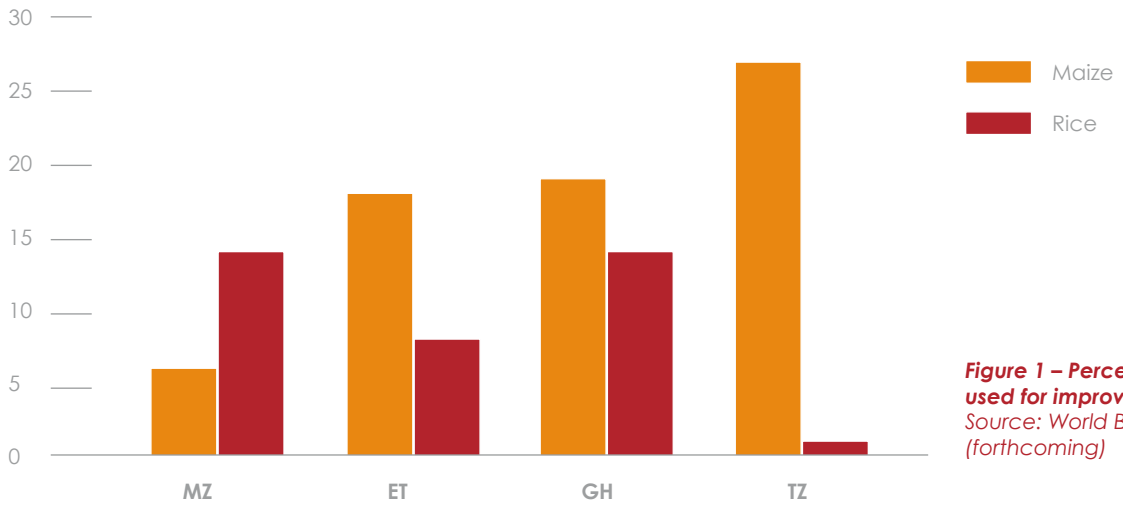

Figure 1 – Percentage of land used for improved varieties. *Source: World Bank (forthcoming)*

These low adoption figures for improved seed reflect a broader reality that is recognized by practitioners in every area of international development: *it is incredibly difficult to scale the adoption of products and services in rural markets*. However, seed turns out to be even harder than most agricultural technologies in this respect. Long production times, anti-cyclical demand and supply, diverse agro-ecological zones, quality control issues, and perish-ability are just a few of the challenges that make seed one of the toughest technologies to scale.

We have a very sound foundation of knowledge about seed systems, though, on which to build. Scholarship in this field is excellent. From system-level analyses of the developmental stages of seed systems, to the very

1 Percentages indicate how much of the land planted to rice (maize) in a country is planted to improved varieties of that crop.

2 Although the Planning for Scale project is focused broadly across many countries in sub-Saharan Africa, it uses data and examples where possible from six New Alliance countries: Ethiopia, Ghana, Malawi, Mozambique, Senegal and Tanzania.

granular understanding of a farmer's decision about whether to adopt a new variety, the empirical literature is full of valuable insights. We also benefit from an increasing volume of publications aimed at practitioners rather than the academic community. These resources codify basic business acumen and practical knowledge related to working with seed in these markets. What has been missing, however, is a work that weaves our current knowledge about seed systems into a framework specifically about scaling up the adoption of improved varieties of seed. With this set of briefs, we have taken a few first steps toward integrating the venerable work of experts in this field into considerations about *how to scale*.

Unfortunately, there is no recipe for scale. Each agricultural technology, in each country needs a different strategy. These briefs highlight the tremendous number of variables that inform good scaling strategies, including: legal and regulatory frameworks; private sector landscapes; road conditions and transportation costs; alternative technologies available; assets owned by customers; credit or savings available to customers; distance of smallholder farmers from markets; and many more. There is a danger, therefore, in writing prescriptively about scale. What works in one country or one agro-ecological area may not work in another. In seed, a strategy that works for one crop, may not work for others. Even where successes are found, it is difficult to replicate them or adapt them to different applications.

Given the limitations of breadth in this work on *how to scale*, we believe there is immense value in the development of additional resources that can inform decision-makers in a more in-depth and specific manner. Beyond our broad mandate that covers multiple audiences, countries, crops and varieties, there is a clear need for more targeted materials. Donors, for instance, would benefit from specific guidelines on: improving pilot programs to anticipate scaling issues; designing metrics frameworks that define and support scaling; targeting investments to catalyze scale; incentivizing their grantees to plan for scale. Similarly, other resources could be targeted to policy makers with recommendations for scaling agricultural technologies, or to academics improving research on scaling issues. In order to develop these more detailed resources, though, we first needed a foundation from which to build. We needed some common language and clarifying discussions of the complex components of scaling. This is what the *Planning for Scale* project set out to achieve.

3 – Summary of the planning for scale briefs

Brief #1: Tools for Scaling starts with the basics. It provides concepts and language that are referenced throughout this work, discussing important elements of scaling adoption, scaling at the organizational level (including business models for scaling), and scaling at the industry level. Then, Brief #1

turns toward more specific characteristics of seed and seed markets that are essential for understanding scale. We illustrate the large physiological differences among crops, including sowing rate, bulk and weight, and we include implications for scaling decisions. We also provide a snapshot of the landscape of seed companies in sub-Saharan Africa. Although this information will soon be outdated, it provides important background for other briefs.

Brief #2: Scaling Demand examines what we mean by demand-driven. Our premise is that supply-driven scale is expensive, inefficient and ultimately unsustainable. However, like 'scale,' the term 'demand-driven' has been a buzzword for a long time without much analysis on *how* to move systems in international development to be more demand-driven. Past initiatives described as demand-driven, like participatory varietal selection (PVS) or participatory plant breeding (PPB), have often been un-scalable. Therefore, we look at investments that can foster a more demand-driven seed system, but through the lens of the cost and efficiency rubric inherent in the lens of cost and efficiency concerns necessary for working at scale.

Brief #3: Integrating Seed Systems presents an analysis of scale in integrated seed systems. In our view, the commercial actors in a seed system that can be incentivized to scale include not only seed companies, but also the many entrepreneurs that comprise the informal seed system. Of the seed planted by smallholder farmers, an estimated 85% does not come from the formal seed system. It is not all 'saved seed,' however. Recent analysis estimates that 45% of seed in the informal system in sub-Saharan Africa is *purchased* (Sperling and McGuire, 2013). These figures indicate missed opportunities in the use of informal commercial seed channels to get improved varieties to smallholder farmers, as well as pointing to the obvious danger of distorting existing markets through seed handouts.

This brief, perhaps more than others, may challenge current wisdom in the seed sector, so we include here a few explanatory notes. In our interviews for this project we heard the view that informal markets are in competition with, and constraining the growth of, the formal sector. In response to this, we put forward a few ideas. The first relates to market segmentation and logistics. Realistically, there is a large segment of the market that formal sector seed companies cannot profitably serve. Many farmers are dispersed and far from distribution points, making logistics prohibitively expensive for a company. Also, some segment of the market will demand particular varieties, and a range of crops, that do not make business sense for a seed company to market. Second, we found more evidence of competition within the formal sector between public and private enterprises than between informal and formal sectors. We highlight this as a constraint to scale. Lastly, we include a note on market expansion. Investments to improve informal markets will eventually foster an expanding market for the formal seed system. We have seen this occur in the evolution of other seed systems. We know

that part of the market for seed in sub-Saharan African countries currently consists of farmers for which the value derived from certified seed offered through formal channels is not sufficient to warrant its purchase (due to their lack of market access, storage, access to fertilizer, or other constraints). That segment of the market, however, can be shifted. Investments that result in smallholder farmers getting improved seed through informal channels are a critical part of an evolving seed system, with a dynamic interface between formal and informal systems.

From a different set of experts, we were advised that the extraordinary heterogeneity in informal seed systems makes interventions comparatively un-scalable. With this view, we also beg to differ. If new investments in informal seed systems are made as they have been historically, we will have failed in our responsibilities. The past was characterized by small, expensive projects with local impacts that often evaporated when the donor money came to an end. Instead, with every intervention in the informal system, we should be planning for scale by finding commonalities, asking hard questions about cost and sustainability, and leveraging new advances in technology (for example, using mobile phones, remote sensing and wireless sensors). In our discussion of integrated seed systems, we hope our readers appreciate that our mandate was not to promote one method or another of getting better seed to farmers, but to look as agnostically as possible at how to reach very large numbers of farmers.

Brief #4: Scaling Foundation Seed provides an essential overview of major models in the production of foundation seed. Perhaps more than any other, the supply of foundation seed has been cited as a principle constraint to progress in scaling a seed system.

Brief #5: Access to Finance provides an overview of the financing needs of smallholder farmers, agro-dealers and seed companies and how improving access to finance can promote scale. The brief discusses opportunities for the public sector to catalyze greater availability and use of financial services that are tailored to the specific needs of the seed sector.

Brief #6: Enabling Environment discusses the laws, regulations and policies that are so critical to scaling seed. In every example where seed systems have developed over time to serve smallholder farmers, evolution has depended on an enabling environment that is not only conducive to scale, but expressly catalyzes it. Perhaps even more so than the other briefs, the level of scholarship in this field is particularly high. We try to provide a synthesis of the issues relevant to scale. Our analysis here differs from that which is usually written, in that our focus is on *implementation*. Moving beyond a discussion of whether or not laws, regulations and policies are on the books, we discuss enforcement, capacity, and process issues in the institutions charged with implementation.

Brief #7: Conclusions provides a summary of the important themes and messages we have developed throughout the project. We also include an analysis of the process that may be necessary for moving from this set of materials to more detailed scaling strategies. We promised, in taking on the writing of these briefs, to consciously avoid conclusions that include the phrase 'more research is needed.' This work has been about strategically thinking through how to scale agricultural technologies – in the hopes that we can spur action, rather than more analysis. We fully acknowledge that there is much more to learn, but it is high time we took the knowledge and data we already have about scaling and put it into practice.

References

Sperling, L., and S. McGuire. 'Evidence for the Central Role of Informal Seed Markets in Farmers' Management of Risk.' Global Food Security Conference. The Netherlands, Noordwijk. 29 Sept. 2013.

Walker, T., A. Alene, J. Ndjeunga, and R. Labarta. 'Measuring the Effectiveness of Crop Improvement Research in Sub-Saharan Africa from the Perspectives of Varietal Output, Adoption, and Change: 20 Crops, 30 Countries, and 1150 Cultivars in Farmers' Fields.' *Synthesis Report for Objectives 1 and 2 of Bill and Melinda Gates Foundation's Diffusion and Impact of Improved Varieties in Africa (DIIVA) Project* (Draft 31 May 2013).

World Bank. 'Agribusiness Indicators: Synthesis Report for Sub-Saharan Africa.' (Forthcoming).