

Towards responsible scaling: Incorporating gender and social differentiation in scaling initiatives

Extended Abstract, Authors: Erin McGuire, Cees Leeuwis, Anne Rietveld, Bela Teeken, Vanya Slavchevska

1. Introduction and Objectives: This paper reports on the development and testing of a new scaling support method, GenderUp. As Agriculture Research for Development (AR4D) organizations and others aim to scale innovation for social transformation, practical attention must be given to gender and its intersectionality with other relevant diversity. If not, scaling initiatives risk evoking unintended consequences that exacerbate social marginalization. Scaling and gender research has demonstrated the consequences of not acknowledging or overlooking social differentiation – highlighting unintended outcomes such as loss of income, increased labor, or exacerbated community and household power dynamics (Bullock & Tegbaru, 2019; Farnworth et al., 2020). The objective of GenderUp is to provide guidance to innovation teams to address these unintended consequences.

2. Concepts and principles: Scaling: To achieve social transformation innovation in the form of (e.g.) new technologies, institutional arrangements, or management practices, must be introduced to disrupt or transform current agricultural and food landscapes (Campos, 2021; Klerxx and Rose, 2020). To do this, there is increased attention given to “scaling” innovation. Scaling refers to the use of an innovation outside its original design team (Sartas et al., 2020). Scaling initiatives must engage with multiple scaling processes and partners simultaneously, and consider both the ‘up-scaling’ of novel technologies, practices and arrangements, as well as the ‘down-scaling’ of the currently dominant ones (Wigboldus et al., 2020; Schut et al., 2002). In addition, scaling initiatives must always consider the cultural context, landscape, and temporal and scale factors (Glover et al., 2019 & 2016; Petesch, et al., 2018).

In order to manage these complex challenges, several scaling support approaches and methods have been developed to assist researchers and practitioners in their scaling ambitions (Sartas et al., 2020; Jacobs et al., 2018; USAID, 2018). These tools focus on how the use of a core innovation can be made possible for a focus population within a limiting environment. While there has been an increased focus on Responsible Research and Innovation (RRI), these efforts have mostly been upstream with little attention for practical downstream scaling support and gender (RRI; Owen et al, 2012; Stilgoe et al, 2013).

-Gender and social differentiation: The ability to use and benefit from innovations differs for diverse groups and categories of people (Rietveld and van der Burg 2021; Glover 2019; Badstue et al., 2018). Thus when innovation promoters aim to scale with greater social equity, understanding how gender and other forms of social differentiation may affect the distribution of benefits and risks associated with scaling processes is critically important. Women and men’s opportunity structures, cultural roles, decision making power, and among others, social networks can be very different and influence how they interact with innovation (Polar et al., 2017; Kawarazuka and Prain 2019; Rola-Rubzen et al., 2020). However, women experience diversity differently (they are not a homogenous category of people), and it is therefore important to understand how the dimension of diversity ‘gender’ intersects and is shaped by other **relevant dimensions of diversity**. Some examples of relevant diversity are age, wealth, occupation, ethnicity, land tenure, and religion. Research shows that tailoring scaling initiatives to different segments in society is critically important in the context of facilitating responsible scaling (Glover et al., 2019; Sartas et al. 2020; Teeken et al. 2021).

-Anticipatory Questions: Gender responsible scaling must consider relevant diversity and social differentiation in society, and consider possible and/or likely consequences and implications of scaling for different segments of people over time. The GenderUp uses a conversational approach to ask

anticipatory questions about the likely or possible consequences of an innovation teams' scaling initiatives and offers practical guidance on how to thoughtfully answer these questions. Relevant questions regarding responsible scaling have been identified through literature reviews on the relation between gender, social differentiation and agricultural innovation (McGuire et al. 2021, forthcoming). These questions are linked to discussions regarding how the composition of innovation packages and choices with regard to other elements of a scaling strategy may be amended to avoid negative consequences and make scaling more gender responsive.

3. GenderUp, a conversational method for gender responsible scaling: GenderUp guides a scaling team to: i) identify diversity and intersectionality among intended innovation users from a social and gender perspective; and ii) to create a scaling strategy which anticipates unintended (negative) consequences for specific social categories and allows for their adequate mitigation. It includes five distinct stages: Stage 1: Introducing GenderUp approach; Stage 2: Defining the innovation and scaling ambition; Stage 3: Exploring relevant dimensions of diversity; Stage 4: Implications of intersectionality; Stage 5: Mitigating consequences and embracing opportunities

During each stage, the scaling team engages in guided conversations that are intended to help them discover diversity relevant to the scaling of their innovation and brainstorm on how to adapt their scaling strategy to be more inclusive and at least anticipatory to unintended negative consequence for specific social categories. GenderUp encourages the innovation team to clearly document the initial scaling strategy. This serves as the baseline against which the final, more socially inclusive and gender responsible strategy is evaluated. After that, GenderUp guides the innovation team to systematically explore and analyse how gender and other dimensions of social differentiation are likely to shape the distribution of benefits and risks associated with the innovation. It then continues to help identify categories of people relevant for more intentionally gender responsible scaling activities. Finally, the tool encourages the team to re-design the scaling strategy for different key focus groups in order to prevent or mitigate negative consequences of scaling.

4. Initial Testing and Results: In the initial pilot phase, there were two questions of importance to the testing: 1. How does GenderUp drive change in the scaling strategy and what kind of change? 2. How was the individual capacity of participating project team members for gender responsible scaling affected? We used pre and post surveys, observation of scaling strategies, and discussion with innovation teams in two case studies to understand this. Each case-study involved a three half day workshop within a two-week period. The first case study was an innovation team focused on the "DryCard," a simple tool used to determine whether agriculture products have been dried enough for long-term storage. This scaling team of entrepreneurs was producing and selling the DryCard for profit. The second case study was based at the CGIAR and was piloting a cassava "flash dryer", a more elaborate innovation that is meant to dry large quantities of cassava relatively quickly.

We found that after the workshops, both innovation teams considered different types of users, other than standard community archetypes and specifically focused on marginalized users. Marginalized and indirect users had originally been left out of the initial scaling initiatives of both teams, risking to exacerbate inequities within the cultural landscape. When innovation teams realized this, it resulted in more gender responsible scaling strategies that incorporated mitigating activities and more user specific complimentary innovations (see attached table).

5. Analysis and Discussion: Discussions, observation of changed scaling strategies, and pre-post surveys indicate that GenderUp supports the development of more inclusive scaling strategies, through

discussion and sensitivity modules. Through more awareness and acknowledgment of differentiated experiences in access to innovations and distribution of benefits, innovation teams were able to identify vulnerable groups and unintended outcomes and develop complementary innovations and mitigating strategies towards more responsible scaling strategies. Pre and post surveys also showed greater individual awareness to how their innovation might be more sensitive to social differentiation than they previously thought.

We observe that GenderUp has eye-opening effects, but may not necessarily lead to actual implementation of adapted scaling strategies. One of the more prominent and challenging realizations for innovation teams was that their innovation, which may scale well within a certain context for certain people, may unintentionally underscore or exacerbate social inequities. This is often true as those with power and resources within a community can afford take on risk and ultimately benefit from innovation. Developing complementary innovation or mitigating activities to undo the systematic and structural inequities within the contextual landscape is daunting – and potentially not feasible within the boundaries, mandates, and available budgets that innovation teams are confronted with. Our experiences indicate that teams found it difficult to determine who should be responsible for mitigating activities. Some stakeholders may feel they are not responsible for this, such as the private sector, and socially motivated groups, such as NGOs, may not have the resources, while those with the most resources, such as policy makers, have a myriad of competing interests. Thus innovating with the intention of social transformation, instead of introducing one-off innovations, may be a more direct path to meaningful social change. This path will however need restructuration and outcome priority setting at higher level.

What we see is that GenderUp pushes boundaries in the sense that innovation teams become aware of the limitations of their current ambition and strategy, but it cannot immediately alter the logic within which such teams work. The moment that GenderUp is applied with the scaling teams trajectory therefore has a large influence on its success. GenderUp needs also to be tested from the onset, in the initial scaling phase where aspirational and desired outcomes and corresponding innovations are defined, chosen and created in order to foster more socially equitable landscapes. In addition, there is reason for broadening the scope of the conversational method. GenderUp is currently tailored to teams that already have a specific innovation that they feel is worth scaling. In future work, we want to expand the method to include agenda setting for research and innovation design. Additionally, while we have so far tested in projects that involved outside intervention and funding, more testing should be done in the field and with community-led- grassroots innovation development.

6. Conclusion: GenderUp assists innovation teams in shifting their scaling strategies to be more gender responsible and inclusive. However, challenges remain in acting upon such changes and assigning resources and responsibilities. Further research should be conducted to understand the usefulness of GenderUp in the development of innovations for social equity and within grassroots organizations.

Fit for special issue: This body of work emerged from ethical innovation issues, including the distribution of benefits and unintended negative consequences of innovation in marginalized populations. While current research has focused on upstream equity issues, GenderUp uses this research to provide a novel approach to equity in scaling innovation downstream. In this paper we provide a responsible innovation literature and concept review, present the new approach, and provide empirical evidence for its usefulness in creating more gender responsible scaling strategies.

Works Cited

- Campos, H. (2021). The Innovation Revolution in Agriculture. In *The Innovation Revolution in Agriculture*. Springer. <https://doi.org/10.1007/978-3-030-50991-0>
- Bullock, R., & Tegbaru, A. (2019). Women's agency in changing contexts: A case study of innovation processes in Western Kenya. *Geoforum*, 105(July), 78–88. <https://doi.org/10.1016/j.geoforum.2019.07.007>
- Farnworth, C. R., Badstue, L., Williams, G. J., Tegbaru, A., & Gaya, H. I. M. (2020). Unequal partners: associations between power, agency and benefits among women and men maize farmers in Nigeria. *Gender, Technology and Development*, 24(3), 271–296. <https://doi.org/10.1080/09718524.2020.1794607>
- Geels, F.W (2011) The multi-level perspective on sustainability transitions: Responses to seven criticisms. *Environmental Innovation and Societal Transitions* 1, 24–40
- Glover, D., Sumberg, J. & Andersson, J.A. (2016), The adoption problem; or why we still understand so little about technological change in African agriculture. *Outlook on AGRICULTURE* 45 (1): 3–6
- Glover, D., Sumberg, J., Ton, G., Andersson, J., and Badstue, L. (2019). Rethinking technological change in smallholder agriculture. *Outlook Agric.* 48, 169–180. doi: 10.1177/0030727019864978
- Jacobs, F., Ubels, J., Woltering, L., 2018. The Scaling Scan - A Practical Tool to Determine the Strengths and Weaknesses of Your Scaling Ambition. Published by the PPPlab and CIMMYT Available at. <https://ppplab.org/2018/11/3223/>.
- Klerkx, L. & Rose, D. (2020). Dealing with the game-changing technologies of Agriculture 4.0: How do we manage diversity and responsibility in food system transition pathways? *Global Food Security* 24: 100347, 1-7. <https://doi.org/10.1016/j.gfs.2019.100347>
- Leeuwis, C. (with contributions by A. Van den Ban) (2004). *Communication for rural innovation. Rethinking agricultural extension*. Blackwell Science / CTA, Oxford / Wageningen. 412 p.
- Leeuwis, C. & M.N.C. Aarts (2020), Rethinking adoption and diffusion as a collective social process. Towards an interactional perspective. In: Campos, H, (ed.) (2021) *The Innovation revolution in agriculture - A roadmap to value creation*. pp 95-116. Springer press, Cham, Switzerland.
- McGuire, E. et al. *Anticipating gender impacts in scaling agriculture for development technologies: Insights from the literature*. Submitted to *World Development Perspectives*.
- Owen, Richard; Macnaghten, Phil; Stilgoe, Jack (2012). Responsible research and innovation: from science in society to science for society, with society. *Science and Public Policy*. 39 (6): 751–760. doi:10.1093/scipol/scs093
- Petes, P., Bullock, R., Feldman, S., Badstue, L., Rietveld, A., Bauchspies, W., Kamanzi, A., Tegbaru, A., & Yila, J. (2018). Local normative climate shaping agency and agricultural livelihoods in sub-Saharan Africa. *Journal of Gender, Agriculture and Food Security*, 3(1), 108–130. <https://doi.org/10.19268/JGAFS.312018.5>
- Polar, V., Babini, C., Velasco, C., & Fonseca, P. F. C. (2017). *Technology Is Not Gender Neutral* : 1–42.
- Rietveld A.M.** and van der Burg M., (2021) Separate and joint interests: understanding gendered innovation processes in Ugandan Farm systems. *Frontiers in Sustainable Food systems* 5:666051. DOI: 10.3389/fsufs.2021.666051
- Rola-Rubzen, M. F., Paris, T., Hawkins, J., & Sapkota, B. (2020). Improving Gender Participation in Agricultural Technology Adoption in Asia: From Rhetoric to Practical Action. *Applied Economic Perspectives and Policy*, 42(1), 113–125. <https://doi.org/10.1002/aepp.13011>

- Sartas, M., Schut, M., Thiele, G., Proietti, C. & Leeuwis, C. (2020). Scaling Readiness: Science and practice of an approach to enhance impact or research for development. *Agricultural Systems*, 183, 102874.
- Schut, M., Leeuwis, C. & Thiele, G., (2020). Science of Scaling: Understanding and guiding the scaling of innovation for societal outcomes *Agricultural Systems*. 184, 102908.
- Stilgoe, J., Owen, R. and Macnaghten, P. (2013). Developing a Framework of Responsible Innovation. *Research Policy* 42 (9): 1568–1580.
- Teeken, B., Garner, E., Agbona, A., Balogun, I., Olaosebikan, O., Bello, A., Madu, T., Okoye, B., Egesi, C., Kulakow, P., Tufan, H. (2021). Beyond “women’s traits”: Exploring how gender, social difference and household characteristics influence trait preferences. *Frontiers in Sustainable Food Systems, land livelihood and food security*, 5, 740926 doi:10.3389/fsufs.2021.740926
<https://www.frontiersin.org/articles/10.3389/fsufs.2021.740926/abstract>
- Wigboldus, S. A., Klerkx, L. W. A. & Leeuwis, C., 2020, Making Scale Work for Sustainable Development: A Framework for Responsible Scaling of Agricultural Innovations. In: Adenle, A. A., Chertow, M. R., Moors, E. H. M. & Pannell, D. J. (eds.) (2020). *Science, Technology, and Innovation for Sustainable Development Goals: Insights From Agriculture, Health, Environment, and Energy*. 1 ed. New York: Oxford University Press, p. 518-543
- USAID. (2018). *Guide To the Agricultural Scalability Assessment Tool for Assessing and Improving the Scaling Potential of Agricultural Technologies*.

Table 1: Shift in scaling initiatives from baseline to mitigated scaling strategy

Elements of the scaling strategy	DryCard baseline scaling strategy	DryCard mitigated scaling strategy	Flash Dryer baseline scaling strategy	Flash Dryer mitigated scaling Strategy
Development outcome	Improved nutrition, increased revenue	Equitable distribution of net increased income	Yield and income increase	Equitable access to the benefits of the flash dryer.
Innovation User	Farmers that produce for the market	rural, low-income women who may not have decision making power in their homes.	Engineers and cassava aggregators	Producers who are rural, low-income women who may not have high-level of cassava expertise
Resources	Hermetic storage bags, glass jars	Pictural dry card instead of written text.	Credit system to purchase necessary inputs	Increase awareness about available government subsidies for inputs; increase awareness about the distribution of improved varieties; access to credit through innovative means (contract farming)
Training	Benefits of the Innovation and why is it important.	Trainings for men and women on household dynamics, build confidence of both parties to use DryCard; Trainings in mother-tongue language	Engineering/technical training needed to ensure smooth running of machine/factory.	Training when women are available and in an accessible location (in terms of care work, space, and proximity); Training focused on skills necessary to understand and implement quality standards. (E.g. don't just teach quality standards, teach how to use moisture measurements, how to store appropriately, etc.)
Communication	Printing of training materials; Extension officers; agro-dealers	Use (relevant) cooperatives, who can help recruit relevant diversity	Virtual workshop in Oct. 2021 with general public (stakeholders/decision-makers) to discuss the cassava value chain in general to discuss how this technology can improve the VC	radio ads, using existing trade and media outlets, partnering with micro-finance institutions and other NGOS.
Other complementary innovations	Bundle innovation with other dry chain technologies.	Decision trees for farmers; Evaluation of curriculum and success of training for women.	Marketing products as socially inclusive/ building communities	Women farmer-to-women farmer training; Include quality standards certificates of completion; Subsidies for complementary inputs through gov't programs; connect/partner with local NGOs that have experience working with some of the poorest households, and particularly women