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VIEWPOINT

Emancipatory scaling: Strengthening locally led AR4D innovation processes

Hanna Ewell [a] *
Wageningen University and Research, and International Center for Tropical Agriculture

Inez Dekker [b]
Wageningen University and Research

Jon Hellin [c]
International Rice Research Institute, and Leibniz Centre for Agricultural Landscape Research

Dagmawi Abegaz Melaku [d]
Wageningen University and Research, and International Livestock Research Institute

Esther Milberg Muñiz [e]
Wageningen University and Research

Samuel Mugambi [f]
Wageningen University and Research

Philipp Neudert [g]
RWTH Aachen

Ebenezer Ngissah [h]
Wageningen University and Research, and International Livestock Research Institute

Daphne Schoop [i]
Wageningen University and Research

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Introduction

Agricultural research for development (AR4D) increasingly seeks to scale innovations that can transform food and agricultural systems. Yet scaling is still often framed as a technical exercise of replicating solutions, expanding reach, and delivering measurable outputs. This viewpoint argues that such approaches underestimate the political, relational, and context-dependent nature of systems

[a] * *Corresponding author:* Hanna Ewell, Knowledge, Technology and Innovation Chair Group, Social Sciences Department, Wageningen University and Research, the Netherlands; Hollandseweg 1, Building 20; 6706 KN Wageningen; the Netherlands; and International Center for Tropical Agriculture (CIAT); c/o ICIPE Duduville Campus, off Kasarani Road; P.O. Box 823 – 00621; Nairobi, Kenya; hanna.ewell@wur.nl; https://orcid.org/0009-0003-0304-3874

[b] Inez Dekker, Knowledge, Technology and Innovation Chair Group, Social Sciences Department, Wageningen University and Research, Hollandseweg 1, Building 20, 6706 KN Wageningen, the Netherlands; https://orcid.org/0009-0007-5606-0618

[c] Jon Hellin, International Rice Research Institute (IRRI); Pili Drive; Los Baños, Laguna 4031, the Philippines, and Leibniz Centre for Agricultural Landscape Research, Müncheberg, Germany; https://orcid.org/0000-0002-2686-8065

[d] Dagmawi Abegaz Melaku, Knowledge, Technology and Innovation Chair Group, Social Sciences Department, Wageningen University and Research, Wageningen, the Netherlands; and International Livestock Research Institute, Kenya; Nairobi, Kenya; https://orcid.org/0000-0003-0000-3220

Additional author bios and disclosures on next page

change. They risk privileging funder and institutional priorities, overlooking local realities, and positioning communities primarily as adopters rather than as actors with authority to shape innovation pathways. In response, we introduce the concept of *emancipatory scaling*. Drawing on emancipatory research traditions, responsible innovation, and responsible scaling, the concept shifts attention from scaling solutions to transforming the conditions under which scaling takes place. Emancipatory scaling is characterized by meaningful participation as co-control, reciprocal accountability, community agency over research agendas and outcomes, recognition of diverse knowledge systems, and sensitivity to socio-ecological interdependencies.

Keywords
emancipatory scaling, locally led, AR4D, systems change

[e] Esther Milberg Muñiz, Knowledge, Technology and Innovation Chair Group; Education and Learning Sciences Chair group; Philosophy Chair Group, Social Sciences Department, Wageningen University and Research, the Netherlands; https://orcid.org/0009-0003-5670-1340

[f] Samuel Mugambi, Knowledge, Technology and Innovation Chair Group, Social Sciences Department, Wageningen University and Research, Wageningen, the Netherlands; https://orcid.org/0000-0001-7088-4479

[g] Philipp Neudert, Human Technology Center, RWTH Aachen, Aachen, Germany; https://orcid.org/0000-0001-8005-636X

[h] Ebenezer Ngissah, Knowledge, Technology and Innovation Chair Group, Social Sciences Department, Wageningen University and Research, Wageningen, the Netherlands; and International Livestock Research Institute, Nairobi, Kenya; https://orcid.org/0009-0009-1351-9868

[i] Daphne Schoop, Knowledge, Technology and Innovation Chair Group, Social Sciences Department, Wageningen University and Research, Wageningen, the Netherlands; https://orcid.org/0000-0003-4116-0118

Note
Authors after the lead are listed in alphabetical order.

Rethinking Scaling

Agricultural research for development (AR4D) is increasingly tasked with generating multiple 'game-changing' and 'scalable' innovations in order to transform agricultural systems and ensure that they are climate-resilient, productive, sustainable, and equitable (Hellin et al. 2024).

Yet scaling, often understood in narrow terms of 'scaling out,'[1] is treated as a technical challenge and identified as an end goal, rather than as a process of systems change with often unpredictable and medium- to long-term changes (Woltering et al., 2024). Scaling thus tends to become a 'projectivized' question of identifying what technology or innovation works in one context and replicating it elsewhere, thereby 'engineering' change through delivery pipelines toward aspired goals (Woltering et al., 2019). Such forms of scaling position communities primarily as beneficiaries or adopters rather than as groups of actors with legitimate authority to co-define problems, set priorities, and judge outcomes (McGuire et al., 2025).

Priorities are frequently set through funder and governmental agendas, often with insufficient engagement of socially disenfranchised and local communities (McGuire et al., 2025). Interventions can thus slide into a 'copy-paste' mentality that does not recognize and undervalues local context and the lived realities that shape feasibility, desirability, and risk perceptions (Bogweh Nchanji et al., 2025). Many researchers working on scaling in AR4D shy away from taking responsibility for their roles in the process, emphasizing path

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[1] It is important to distinguish three scaling pathways: scaling out (reaching more people through replication and diffusion), scaling up (changing institutional, policy and legal conditions), and scaling deep (transforming relationships, cultural values and beliefs) (Moore et al., 2015).

dependency and governance constraints that lock scaling trajectories into default patterns (Kihoro et al., 2025).

Critical development research has further argued that scaling is an inherently normative and political process, shaped by power inequalities between actors and by the interests embedded in funding models, institutional incentives, and dominant knowledge systems (Altshul, 2025; Avelino, 2021) that are often still reflected in (post)colonial relationships (Icaza & Vázquez, 2016; Mpofu & Ndlovu-Gatsheni, 2019; Tsing, 2012). As Woltering et al. (2019) write, the interactions embedded in scaling processes are determined less by "linear cause-effects between tangibles in technical dimensions … [and] by more concrete relational factors such as motivation, norms, and (power) relations" (p. 4). When scaling is framed primarily as an implementation problem, the question of whose voices are 'represented' and priorities are being pursued—and on what terms—become secondary or even silenced (Hellin et al., 2024; Kapoor, 2004; Spivak, 1988).

The practice of scaling has thus focused too much on scaling 'ships'–the solutions–and not enough on the diverse 'waters' they operate in–the communities, ecosystems, cultures, and institutions that allow change to endure (Kak, 2026; Stirling 2009).

Responding to these extant critiques, we[2] argue that AR4D needs to move toward *emancipatory scaling*: understanding locally led innovation processes, starting innovation with the voice and realities of people and landscapes, and enabling actors to drive the change they want (Habermann et al., 2023; Spivak, 1988). This implies a shift in who is recognized as having the right over their (own) resources and as holding epistemic authority (whose knowledge and lives count) and in how legitimacy is earned, through accountability to those most affected, not only to funders or peer review (Altshul, 2025; Ludwig et al., 2021).

Defining Emancipatory Scaling

Drawing on Oliver's (1992) foundational criteria for emancipatory research—reciprocity, gain and empowerment—and Barnes's (2004) elaboration of the emancipatory paradigm, emancipatory scaling can be characterized by meaningful participation in the sense of co-production rather than consultation; accountability of researchers to reciprocal benefit; agency of communities over the research agenda and its uses; and connecting research with the everyday realities and knowledge of communities, rather than treating communities as passive recipients or sources of data to ensure legitimacy to funders.

Critically, this new conceptualization is not meant to displace the role of responsible innovation (RI) and responsible scaling (RS) that similarly support *opening up* how research and innovation is pursued, anticipating unintended impacts, reflecting on assumptions and motivations, engaging diverse stakeholders in broader deliberation, and using these processes to influence the direction of innovation itself (Ewell et al., 2026; Kihoro et al., 2025; Stilgoe et al., 2013; Wigboldus and Brouwers, 2016).

Yet emancipatory scaling can be set apart in three ways. First, the deliberative governance processes that RI prescribes remain largely upstream, with researchers and policymakers tasked with applying RI principles during innovation design and testing, yet neglecting downstream conditions and impacts (Ewell et al., 2026; Leeuwis et al., 2026; Stilgoe et al., 2013). Emancipatory scaling positions innovation users and communities not merely as stakeholders to be engaged but as innovators and co-definers of what counts as a good innovation outcome in the first place. It also recognizes nonhuman actors as integral to innovation processes, foregrounding relational interdependencies and advocating for scaling pathways that are interdependent with ecological agencies and more-than-human ethics of care (Seymour & Connelly, 2022; Tsing, 2012). Second, rather than asking how to *innovate* responsibly, emancipatory scaling asks *for*

[2] We are a group of nine PhD students who came together as part of a tailor-made course on "systems thinking–led science and practice for responsible scaling," and also researchers of CGIAR—the global partnership for a food secure future—with hopes of planting constructively disruptive seeds of change in AR4D research practice.

whom and *whether* to scale at all—interrogating the structural conditions, including capitalistic and extractive development models and representational inequities, that shape which innovations get resourced and whose knowledge systems get recognized (Asher & Wainwright, 2019; Stirling, 2009). Third, the locus of agency shifts. In RS, it is often still researchers, funders, and business partners who manage the scaling processes, though with increasing stakeholder input. In emancipatory scaling, communities and local actors hold meaningful decision-making authority over (a) which innovations are pursued, (b) how those innovations are configured and governed, (c) how benefits, burdens, and rights are handled over time, and (d) recognize their internal capacity to innovate (see also Baker et al., 2009). As such, emancipatory scaling allows practitioners and researchers working in AR4D to start to revise existing relationships and recognize 'new' relationships that can support the livelihoods of those to which they matter the most.

Moving from Theory to Practice

Overall, emancipatory scaling rejects the assumption that scaling is inherently good, neutral, or purely technical. The path forward therefore is not simply to pay lip service to concepts such as 'co-production' and its cognates of being 'participatory,' but to adopt locally relevant metrics alongside conventional indicators, strengthen innovation in local change processes, institutionalize justice-oriented questioning, and build transdisciplinary governance arrangements that can meaningfully redirect trajectories when scaling serves narrow interests, sidelines voices, or erodes rights (see also Ewell et al., 2026; Petesch et al., 2024).

Quantitative, output-oriented metrics of success of scaling, such as the number of technologies produced or consumers reached, risk conflating reach and 'quick wins' with impact which actually is determined by underlying pathways of trust and relationship building, and obscuring the complex, multi-actor processes required for adoption and scaling (Independent Advisory and Evaluation Service [IAES], 2026; Leeuwis & Aarts, 2021; Martinez-Baron et al., 2026). While attractive to stakeholders and funders, conventional indicators raise concerns about attribution and tend to shift attention away from community goals. Unfortunately, in many cases this exacerbates power relations, and may result in 'maladaptation,' whereby agricultural innovations benefit the better-off, often male, farmers and lead to growing inequalities (Schipper, 2020; Shawoo et al., 2025). Emancipatory scaling counters this tendency by introducing *emic* metrics: indicators defined from within local spaces that capture what people consider meaningful change (e.g., autonomy in decisions, dignity, safety, reciprocity, trust, and control over resources) (Chang, 2009). For example, Zaremba et al. (2024), examined local, emic definitions of 'empowerment' and note the critical role of perceptions by communities that can hinder the acceptance of empowered women.

Positive deviance offers one route for grounding scaling in endogenous change. Instead of starting from externally designed 'best practices,' positive deviance begins by identifying individuals or groups who are achieving positive outcomes or are 'pioneers' in adopting new practices, then amplifying what they do through peer learning, local organizations, social movements and institutions, and further culturally resonant mechanisms of diffusion (Albanna et al., 2022; Habermann et al., 2025). It shifts the locus of knowledge and agency from external experts to communities themselves, recognizing that solutions and capacities for innovation already exist among individuals despite shared constraints, and enabling others to learn from these locally embedded practices (Bader & Reinbott, 2023). For instance, a study on adaptation to climate change in the Ethiopian highlands found that mutual learning from pioneer farmers during field days "have proven to be effective platforms for … upscaling of farmer-led innovations" (Habermann et al., 2025, p. 170).

Finally, emancipatory scaling requires power-shifting design choices. It challenges entrenched power structures that limit equitable collaboration, prompting ongoing (re-)consideration of who makes decisions and who benefits as contexts change. Emancipatory scaling thus also requires new types of transdisciplinary partnerships. While the "*epistemic promise* of transdisciplinarity is to generate more robust research by bringing the expertise of diverse actors together" (Ludwig & El-Hani,

2025, p. 21), it is critical for more interventions to take the needs, perspectives, and values of heterogenous actors into account and thereby pursue "reciprocAbility" (Kehrer et al., 2020, p. 49), whereby partners can influence (a) the definition and framing of the problem, (b) goals, (c) indicators, (d) means, (e) metrics, and (f) processes pursued.

These solutions will, however, require a substantial shift in how AR4D conceptualizes 'effectiveness' and interacts with diverse scaling partners who, ultimately, are often the ones best positioned and responsible in driving the scaling process. Emancipatory approaches must take politics seriously, not only to understand, but most importantly to be able to challenge current dominant orders (Mouffe, 2005). Innovation processes are inherently driven by interests and worldviews, and 'emancipatory processes' can be captured (un)intentionally by elites, whether local, institutional, or social-political (Taiwo et al., 2022).

Furthermore, the need for emancipatory scaling comes at a taxing time for agricultural researchers. Intense competition for ever-reducing research funds, together with the commensurate pressure to demonstrate impact or "implode" (Reed & Fazey, 2021, p. 2). New ways of doing research are needed to tackle the deep interconnected nature of 21st-century challenges, like climate change, nutrition, and entrenched social and economic inequalities. Yet little is known about how more or less healthy 'impact cultures' might be characterized, or the factors that shape these cultures. Emancipatory scaling provides one critical as well as a constructive way to overcome the gap between grassroots transformations and the structural changes needed for impact at scale.



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