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Technology and innovation, climate resilience, monitoring and evaluation (M&E)

Policy pointers

Researchers must establish a comprehensive evidence base that connects agri-food systems, gender, household resilience and innovation to establish what 'bundles' of interventions work, where, and how.

Practitioners in agri-food systems should implement interventions with agile yet robust monitoring, evaluation and learning processes, using the individual as the unit of analysis to track key outcomes.

Donors must fund rigorous, longitudinal studies to understand key factors that can strengthen household resilience and gender equality in agri-food systems across different contexts.

Governments must embed socio-technical innovation bundles within wider local planning and support initiatives for agri-food systems to strengthen resilience measures and mitigate farmer risk.

Can innovations in agri-food systems deliver gender equity and resilience?

Agri-food systems constitute a huge proportion of global jobs and economies, but are failing to provide healthy diets, equitable livelihoods and sustainable practices. Women in rural areas are highly prominent in the sector and most vulnerable to climate impacts. Co-designing and bundling innovations could offer significant opportunities to achieve better outcomes. We reviewed the evidence base to explore how social and technical innovations can contribute to household resilience and gender equality. The findings suggest that combining different types of sociocultural and technical innovations into bundles (STIBs) offer a promising way forward, if they are appropriate for the context. This briefing provides a framework for agri-food practitioners to implement STIBs across contexts, stressing the importance of participative processes and understanding the contextual gender dynamics to build household resilience. Highlighting a huge evidence gap, the study calls for stronger evaluation and learning mechanisms and greater investment in rigorous, longitudinal studies.

Agri-food systems — the range of actors and activities involved in all food products, from production to consumption — make up a huge proportion of jobs and economies globally, and are especially important in rural areas. Women are prominent: agri-food systems constitute 66% of women's employment in sub-Saharan Africa and 71% in Asia.¹ As a result, innovations within these systems offer enormous potential for socioeconomic development and the achievement of outcomes such as gender equality and household resilience.

Over the last century, massive investments in innovation and technology have increased production around the globe. The 'Green Revolution' in India rapidly transformed the lives of millions of people, though not always sustainably or equitably. Indeed, today, agri-food systems are

failing to provide healthy diets and equitable livelihood opportunities for everyone, while unsustainable practices wreak enormous ecological damage.² Climate change is exacerbating these failings, resulting in the people least equipped and responsible for it experiencing the brunt of impacts.

In this briefing we suggest why and how focus should be placed on combining socio-technical innovations (so-called 'bundling') that are able to both support agri-food systems and establish better outcomes like household resilience and gender equality, among others.

Opportunities and challenges

Our initial research on what kinds of social and technical innovations can achieve household resilience and gender equity (see Box 1) supports

Donors must recognise the value of tests and trials — and patience

the idea that combining different types of STIBs is a promising way forward. STIBs offer a fresh perspective on integrated development that incorporates sociocultural and technical

innovations and drivers with institutions and policies, channelled into contextualised activities and interventions. For example, the combining of food assistance funds, school meals,

industrial fortification rules, nutrition education, biofortification, solar drying and cold chain applications, which when applied together, lead to a reduction in micronutrient deficiencies.²

Public policy support is critical to ensuring innovations receive the institutional framing and resources needed for longer-term success. This may include proven resilience-building measures such as public safety nets, particularly for groups experiencing marginalisation.

A major challenge is the heterogeneity of agri-food systems; what works in one place may not work in another. This calls for a tailored approach; bundles will need to vary as climate impacts and sociocultural contexts also vary widely. This may reduce scope for scaling up, but this is unavoidable. The dearth of evidence highlights the need for more rigorous evaluation of interventions. Efforts should be placed on identifying common success factors between contexts to help aggregate solutions. For example, land ownership is a common constraint for women — unlocking ownership can ease access to productive land and finance.

Could STIBs push gender equality and resilience forwards?

Despite the huge evidence gaps, we have identified a few studies that unpack bundles of innovations with gender equality in mind. For example, evidence from rural Tanzania in 2022 found that bundling Farmer Field Business Schools with Village Savings and Loans Associations and empowerment activities gave

women the confidence, resources and agency to adopt climate-smart agricultural practices. This led to outcomes such as higher productivity, nutrition, empowerment and household resilience. The study explicitly notes that the activities applied independently would not have led to the desired outcomes, but their combination was the key to their achievement.³

Another study from Tanzania in 2020 found that integrating health and nutrition education with agricultural trainings and providing nutritious seeds encouraged proaction, inspiring the confidence to establish home gardens. This led to people adopting more diverse diets, and this even cascaded to neighbours. The study claims to be the first to “find statistically significant impacts of a home gardening programme on women’s dietary diversity.”⁴

Finally, a 2017 study from Vietnam on introducing new methods of rice growing highlights the critical importance of understanding dynamics within households when trying to bring change while implementing bundles of innovations.⁵ Women had been excluded from agricultural trainings for years, and consequently internalised the misconception that men were intrinsically ‘better at learning’. The Women’s Union challenged these assumptions through trainings for women on rice production, which gave them greater confidence. Information sharing through informal networks was pivotal in reinforcing this self-confidence.⁵ The new rice-growing methods required fewer farm inputs but achieved higher production, thus saving costs. This proved critical for convincing male and female farmers to adopt the new techniques and boosted household resilience.

A framework for inclusive STIB implementation

We drew out these and other learnings from our review and consulted with agri-food systems practitioners to establish a framework for

Box 1. The evidence base supporting a socio-technical innovation approach

Agri-food systems of the future must be healthy, equitable, resilient and sustainable — the opposite of what they currently are.² Not achieving these critical outcomes arguably “risks catastrophic failure, even existential threats, under business-as-usual scenarios.”² IIED worked with CGIAR to review available evidence on what kinds of social and technical innovations can be combined (‘bundled’) to achieve those outcomes in different contexts.¹⁵ The 613 studies we analysed in our systematic review mostly focus on discrete activities and do not adequately describe the interventions, or they focus on outputs such as deployed or adopted technologies rather than outcomes. They usually look at technical innovation and much less at critical yet more-complex-to-implement sociocultural innovations and processes. But these are what make or break technical innovations, as innovations interact with people in complicated sociocultural contexts.

Our research underscores a huge evidence gap in sociocultural innovations within agri-food systems, particularly when it comes to gender and other overlapping forms of marginalisation. Women often lack decision-making power, control of resources and agency to set priorities. More variable adverse weather events are increasing the importance of household resilience: to prepare, cope and recover from impacts; and women tend to be more vulnerable to climate change, making resilience particularly important. Gender is only recently being integrated into the body of literature and not yet in a systematic way within agri-food systems. Gender is also used mostly as a binary concept; applying an intersectional lens is still rare.

implementing STIBs for those working in agri-food systems. We emphasise that any processes should be participative and inclusive. Figure 1 shows that framework, starting from (1) the importance of co-understanding with communities the contextual gender dynamics — both within and between households — to bundle appropriately, leading to (2) co-designing the sociocultural, technical, and technology bundles, including critical policy and regulatory support, which can affect (3) the mechanism — the change in varying drivers of confidence, belief, and conviction — that compels people to interact with the bundled innovations so they can achieve (4) their desired outcomes, and looping back again.

We recognise that self-determination (so-called ‘empowerment’ in the blue line) is an essential element that powers the process throughout. But choices are often determined by gender norms, and these may also undermine self-determination to act on meaningful choices. For example, one study in Tanzania found that some women who achieved self-determination became ostracised and worse off because the act of securing an independent income threatened husbands’ agreed roles within the community.⁶ So in some contexts, empowerment may mean fitting innovations within agreed gender norms, and in other contexts, innovations may allow for shifts or even transformations to gender norms.

Recommendations

These recommendations draw on our work with the aim of swaying investments in agri-food systems towards using appropriate STIBs to achieve better outcomes, like resilience and gender equity, in different contexts.

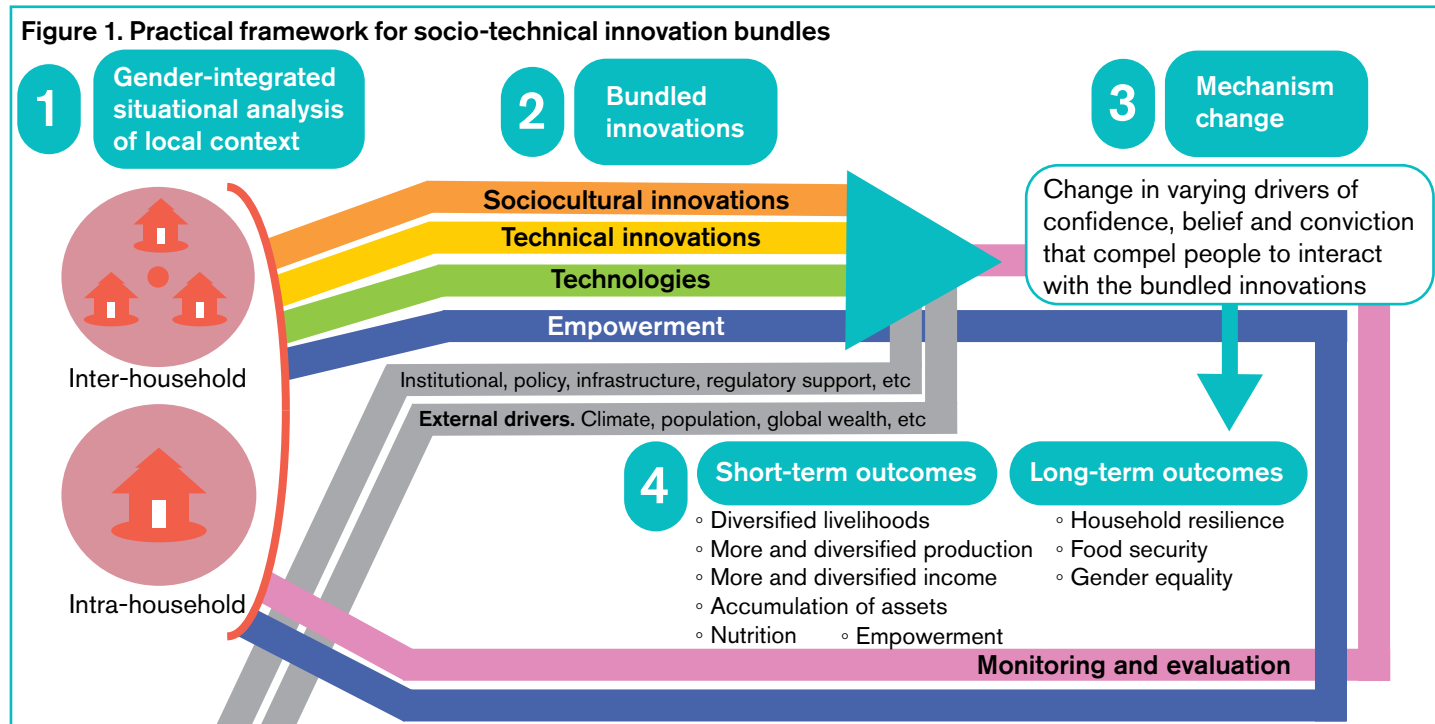
1. Researchers must establish a comprehensive evidence base that builds on itself, connecting agri-food systems, gender, resilience and innovation, to establish what bundles of interventions work, where, and how.

We believe STIBs are a promising avenue to explore, but we need to know more. The current literature base is limited and does not build on itself in a systematic way. For example, one study focusing on Kenya and Burkina Faso found a lack of rigorous experimental designs and evidence on the value of bundled interventions for establishing home gardens on nutrition and food security.⁷ Linking bundles to outcomes will be critical in channelling scarce resources and building the evidence base.

Projects must also explore the effects of contextual drivers. For example, a study in Zimbabwe found that drought, male outmigration, deteriorating economic conditions and politicisation of food aid all contributed to motivating women to engage with Conservation Agriculture.⁸ To this end, research should identify the success factors across contexts, so innovation bundles can be brought to scale.

A more comprehensive evidence base will help channel scarce money and resources to the most promising bundles of innovations that can achieve the healthy, equitable, resilient and sustainable agri-food systems required.

2. Practitioners in agri-food systems should implement interventions with robust monitoring, evaluation and learning processes, using the individual as the unit of analysis to track key outcomes.



Many of the studies we reviewed do not adequately record critical elements such as the intervention being studied, which is a common challenge in evaluation studies.⁹ Further, many used the 'household' as the starting unit, when in fact, men and women within a household often set different priorities and use different strategies for increasing climate resilience. For example, in Northern Mali, men migrated for jobs in the cities to mitigate household vulnerability, but their absence required women to take on the men's workload and even take children out of school to compensate — therefore increasing their vulnerability.¹⁰

Programmes must consider and capture these types of intrahousehold dynamics in addition to inter-household dynamics — recording characteristics like gender, age and disability — through which people may experience differing levels of marginalisation. This will help in selecting appropriate innovations. Programmes should always disaggregate data by gender and other characteristics to understand and remove specific barriers. The fact that they do not despite years of awareness raising underlines the challenge ahead. Donors have a vital role to play — see recommendation 3 below.

We recommend a realist-synthesis approach that can identify the 'mechanism' — the change in cognitive triggers in people such as thoughts, beliefs, confidence, reasoning and so forth — that result in them using or interacting with the STIBs, which can then lead to better outcomes.¹¹

3. Donors must fund rigorous, longitudinal studies to understand the common threads between contexts that can strengthen household resilience and gender equality in agri-food systems.

We need more evidence, but we also need donors to fund the right interventions. Many projects focus on outputs like numbers of people trained or technologies deployed. This is tempting as these interventions are easier and cheaper to fund, and can be measured over shorter timescales. However, technologies and innovations do not

generate outcomes; it is the people using and interacting with them over time — within the confines of their context — that support or prevent household resilience, gender equality, more income and so on. And for agri-food systems, this usually means incremental changes over many harvest seasons. Donors must recognise the value of tests and trials — and patience.

Philanthropic funders like the Rockefeller and Bill and Melinda Gates Foundations have spent enormous sums investing in agri-food systems, giving them agenda-setting influence in the space.¹² If they want to identify viable pathways to scale in different contexts, they can steer the design of interventions and push for longer funding timelines of five to ten years with longitudinal cohorts. As climate impacts also evolve, more and longer timescales for research are needed.

4. Governments must embed STIBs within a wider set of local planning and support initiatives for agri-food systems, to strengthen resilience measures and mitigate farmer risk.

Social safety nets are critical in supporting the rollout of STIBs. While researchers and practitioners experiment with different types of bundles, stakeholders within agri-food systems are taking on immense risk, especially those already experiencing marginalisation. To help mitigate this risk, bundles must include supporting mechanisms like government social safety nets, direct cash transfers, or insurance coverage. A recent study in Nigeria has already underlined the importance of anticipatory cash transfers for climate resilience.¹³ Bangladeshi development NGO BRAC's 'Graduation' approach highlights the potential for supporting people living in extreme poverty, for example, with cash transfers among other bundled support.¹⁴

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Knowledge Products

The International Institute for Environment and Development (IIED) promotes sustainable development, linking local priorities to global challenges.

The CGIAR Gender Equality Initiative promotes research to change the harmful gender norms for gender equality by bundling socio-technical innovations, leveraging social protection, and by promoting inclusive governance and policies. It is one of 32 initiatives of CGIAR, a global research partnership for a food-secure future, dedicated to transforming food, land, and water systems in a climate crisis.

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Notes

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