Qualitative, comparative, and collaborative research at large scale: The GENNOVATE field methodology

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•In memoriam

Abstract

We present a field-tested "medium-n" qualitative comparative methodology, which enhances understanding of the strong and fluid influence of gender norms on processes of local agricultural innovation in the Global South. The GENNOVATE approach ("Enabling Gender Equality in Agricultural and Environmental Innovation") weaves together three broad methodological challenges—context, comparison, and collaboration—and highlights how addressing the social context of innovation contributes to applied research. We discuss GENNOVATE's analytic approach, sampling framework, data collection, and analysis procedures, and reflect critically on the research strategies adopted to document and learn from the perspectives and experiences of over 7,000 women and men in 137 villages across 26 low- and middle-income countries.

***Key words**:* qualitative comparative research, gender norms, empowerment, agriculture

Introduction

International agricultural research leverages high economic returns, estimated between $2.8 and $3.8 billion annually for wheat alone (CIMMYT, 2015, p. 2). As impressive as these figures are, further returns could be leveraged from innovations in agriculture and natural resource management (NRM) if women had the same opportunities as men to access, adopt, and benefit from improved technologies and practices. Despite women's significant and, in many countries, expanding roles in agriculture, and despite decades of programs to reverse the gender divides, adoption rates continue to strongly favor men (see, for instance, FAO, 2011; World Bank, 2016; World Bank, FAO, and IFAD, 2009). Such large and persistent gender inequalities matter because they constrain agricultural productivity and its contributions to poverty reduction, gender equality, food security, environmental sustainability, and social inclusion. Moreover, a growing body of literature demonstrates that new agricultural technologies and practices that are not sensitive to gender risk worsening the poverty, workload, and wellbeing of poor rural women and their families (Cleaver, 2003; Cornwall and Edwards, 2010; Kumar and Quisumbing,

2010; Okali, 2011 and 2012). However, the conditions under which both women and men benefit from agricultural and NRM advances are still poorly understood.

We present a qualitative comparative methodology that addresses this important knowledge gap and enhances the toolkit for large-scale agricultural research for development. Entitled "Enabling Gender Equality in Agricultural and Environmental Innovation," or GENNOVATE, the study combines contextually grounded, comparative, and collaborative research strategies to illuminate regularities in how gender norms and agency—concepts that we elaborate below—interact to shape local innovation processes across diverse contexts. This can inform strategies and interventions for more gender-equitable adoption of improved agricultural technologies and practices.

GENNOVATE represents unprecedented research collaboration for the Centers for International Agricultural Research (CGIAR), a global partnership of research institutes advancing agricultural science and innovation. The large study team spans five continents and includes principal investigators (PIs) with nearly all CGIAR Research Programs (CRPs), as well as other academic and independent researchers.[i] GENNOVATE field teams completed data collection in 137 villages across 26 countries in 2016—listening to, learning from, and systematically documenting the views and experiences of over 7,000 adults (ages 25 to 55) and youth (ages 16 to 24) living in agricultural and forest communities in Africa, Asia, and Latin America.

To set the stage for presenting GENNOVATE's qualitative, comparative, and collaborative methodology, we open with a discussion of the emerging field of multisite "medium-n" methodologies which informed our approach. We next quickly highlight GENNOVATE's rationale, key questions, and conceptual framework, as these are examined in our opening paper to this special issue (Badstue et al., 2018). We then explain and reflect on the study's sampling, data collection and analysis protocols, and related literature.

"Medium-n" qualitative field studies

There is a small but growing qualitative comparative literature that is grounded in contextual research strategies and people's own understandings and interpretations of their lives, but which engages with larger samples and more comparative "variable-oriented" analysis procedures than traditionally associated with qualitative research. Known in the field as "medium-n," these approaches refer to field studies that apply a relatively standardized qualitative methodology to sample sizes of, roughly, 10 or more cases. Most of these studies treat an urban or rural "community" as the basic unit of analysis for a case; and many apply maximum diversity sampling frameworks[ii] to identify patterns across diverse contexts. Within GENNOVATE a case is similar to the notion of "site" and refers to a population living in a single locality that the inhabitants call their village, community, neighborhood (barrio), or hamlet. The principle for defining this unit of analysis is propinquity as this increases the probability that most inhabitants share a common language, culture, and history and can be treated as a single case.[iii] Medium-n approaches represent an important contribution within qualitative research because the size and diversity of their samples can generate patterns that have broader relevance for

policies and programs, while their findings remain anchored to local contexts and their complexities (Miles, Huberman, and Saldaña, 2014, p. 314).

GENNOVATE was inspired by the World Bank's medium-n global studies (e.g. Narayan et al., 2000; Narayan and Petesch, 2007; Narayan, Pritchett, and Kapoor, 2009; Muñoz Boudet, Petesch, and Turk, 2013), in which field teams gathered testimonies from thousands of women and men on topics such as wellbeing and ill-being (see World Bank, 1999 for methodology), how a poor man or poor woman escapes from or remains trapped in poverty (Narayan and Petesch, 2005), and what makes a good wife and a good husband (Turk, Petesch, and Muñoz Boudet, 2010). The innovation that GENNOVATE brings to the methodological approach of these projects includes a focus on agriculture and NRM, the social context that supports or inhibits innovation in rural livelihoods, and the unprecedented collaboration among the PIs from independent CGIAR research institutes in their application of common methods of data-gathering, processing, analysis, and dissemination of results.

Ambitious medium-n approaches have previously been employed to probe into the social and institutional dimensions of NRM and other rural development processes. Akter et al. (2017) apply a multidimensional framework for measuring empowerment in agricultural contexts developed by a team at the International Food Policy Research Institute (Alkire et al., 2013) with 37 focus group discussions conducted in 21 villages in diverse agricultural regions of four Southeast Asian countries. The authors reveal dimensions of women's strong agency, such as equitable access to productive agricultural resources and control of household budgets. Colfer (2005) applies participatory tools across 30 community-level case studies in 11 countries to analyze adaptive collaborative management initiatives to sustain local forest resources. Of note, Colfer (2005, p. 186) reports local forest management capacities to be *strongest* in the "chaotic and difficult settings" affected by national and local conflict. In a follow-up 15-community study across five tropical countries, Colfer and Pfund (2011) combine qualitative and quantitative tools to provide finely grained comparative analyses of the often weak and contested interface between national and local governance systems for management of forest landscapes. Barron, Diprose, and Woolcock (2011) use maximum diversity sampling, longitudinal qualitative fieldwork, and newspaper archives in their inquiry into the effects on rural strife of a large governmental community-driven development program in 16 sub-districts of two conflict-affected provinces in Indonesia. The authors identify significantly lower violence levels in the more economically dynamic province, but only for their set of research communities which had been engaged for at least three or four years in the community development program. Hossain et al., (2010) present qualitative longitudinal research that compares impacts of the 2007-8 food and fuel price shocks and financial crisis in a rural and urban community in five developing countries. These comparative community-level studies bring to light dynamics and opportunities and hardships that might escape purely quantitative survey methods.

As with Colfer and Pfund's or Akter's approaches, medium-n methods may be paired with or complement quantitative methods (Kanbur, 2003). Perez et al., (2015) explore factors shaping resilience to climate and other changes among farming households and communities in 11 village-level cases across nine countries in East and West Africa. The authors offer significant evidence from survey and focus group data of large gender

differences in access to resources and institutions that affect the ability to withstand shocks. Quisumbing (2011) corroborates in-depth qualitative work (Baulch and Davis, 2008) on the importance of combinations of shocks in the lives of Bangladeshi villagers, especially dowry and medical expenses, as drivers of falling into and remaining in poverty.

It is not coincidental that many of these pioneering medium-n studies delve into questions of impoverishment or gender inequality, or center on political, economic, or natural resource crises or conflicts—topics which require engaging with fluid and contested power relations and institutional arrangements and thus benefit from processual and contextually grounded research strategies. Nevertheless, these studies have attracted diverse types of criticisms, including weaknesses in design and implementation that limit reliability of their data (e.g. White and Phillips, 2012; Hossain and Scott-Villiers, forthcoming), superficial treatments of context and evidence (e.g. Jackson, 1999, 2002; Brock and McGee, 2002), and associations with existing disciplinary monopolies and paradigms that impede greater research pluralism, collaboration, and learning (e.g. Brock and McGee, 2002; Rao and Woolcock, 2007). As calls continue to be made for contextually sensitive research that can better address the uncertain and contradictory effects of agricultural innovation and other development processes (Kristjanson et al., 2017; Seymour and Peterman, 2017), GENNOVATE's design seeks to carry forward the learning on a methodology that is still at the frontier of new social science methods. While these large-scale approaches have been criticized for the way in which they obscure contextual differences, this flattening out makes it possible to see what is common, and what is not, which is important in understanding processes of globalization (Hossain and Scott-Villiers, forthcoming). Much remains to be understood about contextually specific processes of social change in the face of large-scale development, and thus there is clear need to demonstrate the viability of the approach as a contribution to research communities with similar concerns.

Study rationale and approach

GENNOVATE's methodology combines concerns for context, comparison, and collaboration. The notion that context matters is central to GENNOVATE's conceptual framing and the research questions that guided the research design:

- How do gender norms and agency advance or impede innovation capacity and technology adoption in agriculture and natural resource management across different contexts and social structures?
- How do new agricultural technologies affect gender norms and agency across different contexts? Under what conditions can technologies do harm?
- How are gender norms and women's and men's agency changing, and under what conditions do these changes catalyze innovation and adoption, and lead to desired development outcomes? What contextual factors influence this relationship?

The opening paper to this special issue by Badstue et al., (2018) presents the rationale, concepts, and literatures that informed these study questions, as well as our conceptual

model of the processes raised in the study questions. Here we provide highlights of these crucial guiding elements for our field methodology.

To address the study questions, we draw on feminist literature concerned with the mutually constitutive and contested relations between agency and structure (e.g. Kabeer, 1999; Ridgeway, 2009; Wharton, 1991). The study questions require exploring interactions between gender norms, agency, and agricultural innovation in specific contexts. Gender norms—the socially constituted rules that prescribe men's and women's daily behavior—are an important dimension of context. These norms are maintained by internalized and stereotypical beliefs about men's higher status and competence (Ridgeway, 2009), as well as by mutual expectations—held by one's family and social networks—that individuals should act in gender-appropriate ways (Bicchieri, 2006; Mackie et al., 2012). Norms are underpinned by psychosocial processes that come to define power relations, including women's subjectivity.

The study explores men's and women's perceptions about making important decisions in their lives, and their experiences with innovating in their rural livelihoods. Study participants, women and men of different socioeconomic and age groups, reflect on their engagement with new agricultural technologies, natural resource management practices, learning opportunities, relationships, and institutions in their community. These innovations may be locally devised or externally introduced. Our understanding of innovations and innovation systems is influenced by Berdegue (2005, p. 3), who describes innovations as "social constructs, and as such, they reflect and result from the interplay of different actors, often with conflicting interests and objectives, and certainly with different degrees of economic, social, and political power." Innovation in this sense includes farmer-level experimentation and adaptation, which can be seen as an expression of agency.

GENNOVATE examines how gender norms and other factors in specific localities mediate the capability of men and women to exercise agency, make choices, and innovate in and benefit from their agricultural livelihoods. Fundamentally, *agency* is about "the ability to define one's goals and act upon them" (Kabeer, 1999, p. 438), either independently or jointly with others. GENNOVATE's conceptual framing positions agency as a process that is embedded in and conditioned by local opportunity structures—the particular combinations of resources including infrastructure, institutions, and social organization—but also plays a role in shaping these.

The study's conceptual framework reflects that interaction between men's and women's capacities for agency and innovation, and the opportunities and barriers for innovation in their local opportunity structure, can contribute to a process of empowerment and other dimensions of improved wellbeing. Importantly, the social rules that so often advantage men's capacities over women's to access and benefit from new agricultural opportunities may be questioned or come in conflict in ways that can provide space for agency and social change. Normative change in women's agricultural roles may sometimes emerge from processes that are cooperative, such as through reaching a new mutual understanding in a community that recognizes and supports local women farmers' innovation in soybean production, processing, and sales (e.g. Padmanabhan, 2002). Additionally, normative change may follow more conflictual processes of negotiation and

contestation, involving, for instance, men resisting women's growing participation in commercial rice production (e.g. Fonjong and Athanasia, 2007). The study's framework rests on the understanding that women and men living in farming, forest, and mixed environments are key stakeholders in innovation processes and must be active participants in learning about, testing, and adapting a new technology or practice to their needs. The heterogeneity of local opportunity structures—which may feature more or less restrictive gender norms and be more or less empowering for different genders and social groups in a community—is what makes innovation processes so varied, complex, and uncertain.

A second key element of GENNOVATE's design is its *comparative* approach. The study employs comparative case study methods to address the study questions because they enable "investigators to retain the holistic and meaningful characteristics of real-life events" (Yin, 2003, p. 2) and make cautious generalizations to other settings (Pallares-Burke, 2002, p. 18). The goal is to provide an alternative, "middle way" between the significant time investment and small samples associated with ethnography and the limitations of survey research. As applied research, we move towards the "diagnostic approach" advanced by Ostrom (Basurto and Ostrom, 2009, p. 7) in her groundbreaking work on common property resources. This combines attention to relevant causal processes and a large comparative case study methodology to "identify key variables present or absent in particular settings so as to understand successes and failures." "At a deeper level," explain Miles, Huberman, and Saldaña (2014, p. 101), "the purpose [of multisite approaches] is to see processes and outcomes across many cases, to understand how they are qualified by local conditions, and thus to develop more sophisticated descriptions and more powerful explanations." Indeed, this is the rationale for their use by the World Bank, CGIAR, and other international institutions.

Lastly, GENNOVATE's approach was framed by principles of research *collaboration*, which are emphasized in participatory and feminist traditions and highlight the importance of the subjectivities of study participants and researchers. In the first paper of this volume, Badstue et al., (2018) discuss how participatory approaches place increased emphasis on the social embeddedness of agricultural innovation. This work, including by researchers within the CGIAR, was strongly collaborative, and this has been carried into the gender research out of which GENNOVATE emerged (Cernea and Kassam, 2006; CGIAR-IEA, 2017).

Many feminist inquiries apply inductive research strategies that are sensitive to the diversity of women's experiences as well as to subjects' own representation of their lives (Olesen, 2005, p. 137). Similarly, GENNOVATE's research design is concerned with how, why, and by whom knowledge is obtained. It prioritizes a collaborative research process that can contribute to improving the institutions where the researchers work and, ultimately, the lives of the study participants (Chambers, 1995; Cosgrove and McHugh, 2000; Olesen, 2005).

Sampling and data collection protocols

Data was collected between April 2014 and May 2016 using semi-structured field instruments. These were designed to foment rich reflections and interactions among study participants while also enabling systematic comparative analysis of the many topics discussed and population groups sampled. In focus groups and individual interviews, study participants reflect on questions such as:

- What qualities make a woman a good farmer? And a man a good farmer?
- What are the differences between a woman who is innovative and likes to try out new things and a man who is innovative?

In the following section, we provide an overview of GENNOVATE's protocols for sampling and data collection, and then we reflect on a few challenges with both.

Table 1 presents the countries, crops, and crop research programs reached by GENNOVATE's fieldwork. The sample covers the world's three major food crops: rice, wheat, and maize, and other important food crops, such as groundnuts and pulses. It includes countries in the dryland ecosystems of Africa and Asia and communities practicing agro-forestry and aquaculture in Indonesia and the Kyrgyz Republic.

Table 1. GENNOVATE countries, target crops and systems, and CGIAR Phase 1 Research Programs (CRPs)[iv]

Countries	Target crop & system	CGIAR Research Program (CRP)
• ***Asia***: Afghanistan, Bangladesh, India (Andhra Pradesh, Bihar, Haryana, Madhya Pradesh, Maharashtra, Punjab , Rajasthan, Uttar Pradesh), Indonesia, Kyrgyz Republic, Nepal, Pakistan, Philippines, Uzbekistan, Vietnam • ***Africa***: Burkina Faso, Burundi, Democratic Republic of the Congo, Ethiopia, Kenya, Malawi, Mali, Morocco, Niger, Nigeria, Rwanda, Tanzania, Uganda, Zimbabwe • ***Latin America***: Colombia, Mexico	• Aquaculture • Banana • Cassava • Chickpeas • Groundnuts • Humid tropical systems • Maize • Millet • Pigeonpea • Potato • Rice • Sorghum • Sweet potato • Tree-based systems • Wheat	• Agriculture for Nutrition and Health (A4NH) • Aquatic Agricultural Systems (AAS) • Dryland Cereals (DC) • Dryland Systems (DS) • Forests, Trees and Agroforestry (FTA) • Grain Legumes (GL) • GRISP • Humidtropics • MAIZE • Roots, Tubers and Bananas (RTB) • WHEAT

Sampling principles

GENNOVATE's cases are situated within agri-food systems of relevance to the specific CRPs involved. However, rather than selecting cases in relation to a particular type of

agricultural system or agro-ecology, the communities were selected purposively to introduce variance on two dimensions considered important for understanding gender differences in agricultural innovation:

i. *Economic dynamism*, here understood as competition over agriculture or NRM resources, infrastructure development, changes in the market orientation of smallholder farmers, processing technologies for key commodities, the relative percentages of buyers and sellers in local markets, and livelihood diversification, including on- and off-farm employment.

ii. *Gender gaps in assets and capacities*, such as the percentage of girls completing primary school compared to boys, the extent to which women hold important leadership positions in local organizations, and norms about women's freedom of movement.

The sampling frame's two axes for stratification reflect an empirical literature finding associations between countries with greater gender equality and higher levels of economic growth (e.g. World Bank, 2011). We hypothesized that similar associations are likely to characterize community-level variation, despite the highly variable influences of "local structures of patriarchy" (Kabeer, 2016, p. 315) which dampen the effects of growth on gender equality (Kabeer and Natali, 2013).

With a focus on agricultural innovation, which has potential to contribute strongly to economic growth, the effects of these local structures are precisely what GENNOVATE was designed to investigate. By exploring and comparing our evidence across villages that differ in economic dynamism and gender inequality, our diverse sample enabled us to present nuanced evidence of the fluid ways in which gender norms operate to shape local agricultural innovation processes, even in a context of otherwise similar cultural regions. The heterogeneous case studies also provided a means to compare ways in which local innovation processes can, in turn, contribute to opening or narrowing the scope for women to negotiate and withdraw from local norms which constrain their agency and livelihood initiatives. Additionally, the diverse sampling enabled us to identify broad regularities in the extent to which the normative climate encouraged (or discouraged) exercising agency in a community and, in the final paper to the special issue Petesch et al., (2018b) offer a typology of three types of local social change processes informed by these regularities.

For substantive as well as practical reasons, the protocols provided PIs with some flexibility in the sample selection. For instance, where information on local gender gaps was difficult to obtain or less salient in a particular context, PIs could consider other relevant indicators. This guidance differs from quantitative research protocols that specify standardized measures for stratification to ensure consistency in the comparative units of analysis. We allowed for a more expansive set of indicators to reflect the study's diverse cultural and agro-ecological contexts. This followed George and Bennett's (2005, p. 19, in Locke and Thelen, 1998) guidance that "researchers must carry out 'contextualized comparison,' which self-consciously seeks to address the issue of equivalence by searching for analytically equivalent phenomena—even expressed in substantively different terms—across different contexts."

Case selection

Selection of GENNOVATE's 137 cases in 26 countries was guided by the PIs' classification of the cases on gender gaps and economic dynamism (Figure 1). Asia contains the largest number of cases (74), followed by Africa (53) and Latin America (10). The regional concentration in Asia and Africa reflects current research priorities in the CGIAR system. The sample includes nine of the world's most populous countries: Ethiopia, India, Indonesia, Pakistan, Nigeria, Bangladesh, Mexico, Philippines, and Vietnam.

Figure 1 summarizes the regional distribution, showing good coverage of all four sampling dimensions with the exception of the smaller Latin America set of cases.

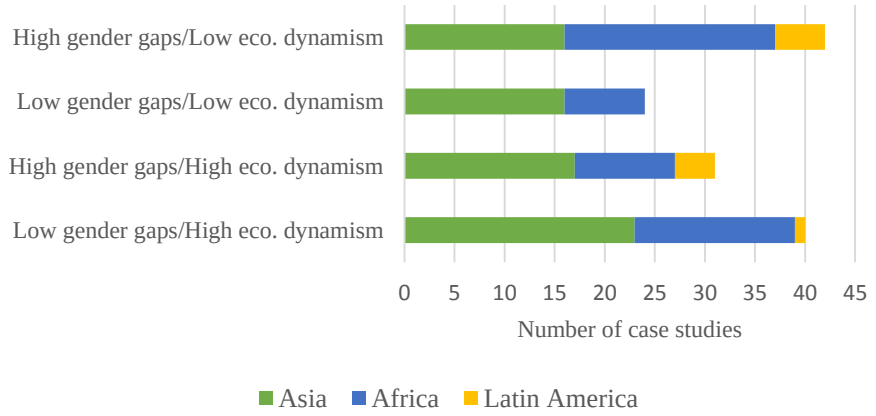

Figure 1. Regional distribution of cases by sampling framework

The classification was challenging as many PIs reported limited or no access to district- or community-level census, survey, or administrative data to inform their sampling. In these cases, community selection had to be informed by CRP scoping studies, other secondary literature, consultations with CRP scientists, and site visits with local authorities (see Table 2 for examples of how this was done). For example, in East Kalimantan in Indonesia, the team drew on its previous field studies and oil palm literature to hypothesize that gender norms would be more restrictive where land leasing and wage labor for large-scale oil palm production were more common than smallholder production.

Most study countries contain two to four cases, although eight countries contain samples ranging from six to 18 cases each, due to the presence of multiple CRPs in the country. The effects of local structures, and therefore the importance of careful sampling, are supported by our initial observations, which indicate strong variance on gender gaps *within* the sampled regions of a country as well as between them. In one of the four cases in Pakistan's northwestern Khyber Pakhtun Khwa province, for instance, less than a third of girls are in primary school, women rarely leave the homestead except on family occasions, and some women found it too unsettling to speak aloud in focus groups and so whispered their responses to nearby companions who then spoke out on their behalf. In

another village in the same province, girls were reaching secondary and tertiary education levels, and some had found jobs as teachers.

Table 2. Examples of case study selection

Study region	CRP	Selection criteria (economic dynamism & gender gaps)	Number of cases
India: Bihar, Haryana, Madhya Pradesh, Punjab, Uttar Pradesh	WHEAT	Census data on livelihood and income sources and farm property and female literacy and share of scheduled caste population	12
Indonesia: East Kalimantan	FTA	Modes of incorporation into oil palm systems and concerns for wage labor, land leasing, and dispossession of independent smallholder (as proxies for economic dynamism and gender gaps)	5
Mexico: Oaxaca and Chiapas	MAIZE	State- and district-level data, as well as previous project monitoring data. Pre-visits with local key informants, including regional hub managers, local partners, and community leaders to gather information on village economic and agricultural conditions and trends; and gender data such as women's age at first pregnancy and participation in local councils	6
Nigeria: Oyo and Kaduna	Humidtropics	International Institute of Tropical Agriculture data and pre-visits with key informants: market infrastructure and education, early marriage.	4
Philippines: Nueva Ecija	GRISP	Survey data on income and local key informant information on women in local elected office and civic leadership	3
Tanzania: Kilosa, Muheza, Meru, Kilombero	MAIZE	Varietal diffusion monitoring data, and pre-visits with district authorities and community development officers to gather information, for instance, on village economic trends and agricultural diversification and productivity and women's representation in local public and civic leadership, asset ownership; and men's and women's farming roles	4
Uzbekistan	WHEAT	Survey data used for provincial selection based on wheat yield and women's participation in farm management	4

The local agricultural economies also vary greatly across the cases. In one of the villages sampled in Oyo State of Nigeria, there is almost no infrastructure and residents cultivate maize, cassava, plantain, kola nut, and cocoa for their own consumption and sell the surplus in a weekly local market. The other village sampled in Oyo shows signs of greater prosperity due to more infrastructure, services, crop diversity, and commerce. The larger sample includes cases that are even more economically dynamic where some

farmers engage in highly mechanized and irrigated commercial farming for distant markets.

Data collection teams and tools

GENNOVATE field teams are comprised of a team leader who in many cases is the PI, or alternatively an experienced national field researcher, and a minimum of one male and one female facilitator and one male and one female note taker. This is to ensure that no member of the opposite sex is present during data collection as required by study protocols. Field team members are typically experienced national researchers who know local languages and cultures; however, teams include translators if needed, and a hired community organizer to support local logistics.

GENNOVATE's package of data collection tools reflects extensive reviews of literature, lessons and tools from previous field studies, two rounds of field pilots and feedback from experts and study participants on the instruments. The first trial of the instruments took one week and was conducted in a rural village in central Mexico by a seven-person team of senior researchers and experienced field staff. Debriefings with study participants followed the data collection to elicit their views about the process and questions asked, and to discuss any confusion. After submitting the revised methodology package for review by PIs and other CGIAR and World Bank researchers, a second and final pilot was conducted during the GENNOVATE "training of trainers" in Kampala and Mukono, Uganda. Additional regional trainings of trainers for PIs followed in Colombia and Bangladesh which reviewed study objectives and concepts, sampling protocols, facilitation and documentation needs for each data collection tool, and good practices for training, fieldwork preparations, and management of field teams and community relations. In classroom exercises, PIs and a local field team rotated in and out of roles as facilitators, note takers, and village members. The regional trainings also provided opportunities for PIs to observe the local team in practice fieldwork with the instruments. *The GENNOVATE Methodology* (Petesch, Badstue, and Prain, 2018) details protocols and recommendations covered during the training.

The methodology package features 15 data collection activities for each research village (Table 3). There were three focus group instruments: the first was conducted separately with poor women and men, the second with middle-class women and men, and the third with young women and men (six groups in total). Every team also conducted nine *semi-structured interviews* guided by three instruments: i) a community profile to gather background demographic, social, economic, agricultural, and political information about the case (requires key informants of both genders); ii) innovation pathway interviews with local people who are known for trying new things in agriculture[v] (two men, two women); and iii) life story interviews (two men, two women). With strong advance coordination and support from a hired community organizer, most teams completed the fieldwork for a case within one week.

Table 3. Overview of GENNOVATE data collection instruments

Instrument	Purpose	Respondents
Activity A. *Literature review*	• To situate the case in a wider context by providing general background information about the case study area and relevant findings from recent studies, particularly about the innovations of interest and their gender dimensions	*(Principal investigator)*
Activity B. Semi-structured interview: *Community profile*	• To provide social, economic, agricultural, and political background information about the community	*Key informants* • 1 or 2 males • 1 or 2 females
Activity C. Focus group: *Ladder of Life*	• Gender norms and household and agricultural roles • Labor market trends and gender dimensions • Enabling and constraining factors for innovation, and their gender dimensions • The culture of inequality in the village, factors shaping socioeconomic mobility and poverty trends, and their gender dimensions • Intimate partner violence	*Poor adults ages 30 to 55* • 1 FGD of 8 to 10 adult females • 1 FGD of 8 to 10 adult males
Activity D. Focus group: *Capacities for innovation*	• Agency • Community trends • Enabling and constraining factors for innovation, and their gender dimensions • Gender norms surrounding household bargaining over livelihoods and assets • The local climate for agriculture and entrepreneurship, and their gender dimensions • Social cohesion and social capital	*Middle-class adults ages 25 to 55* • 1 FGD of 8 to 10 adult females • 1 FGD of 8 to 10 adult males
Activity E. Focus group: *Aspirations of youth*	• Gender norms, practices, and aspirations surrounding education • Enabling and constraining factors for innovation, and their gender dimensions • Women's physical mobility and gender norms shaping access to economic opportunities and household bargaining • Family formation norms and practices	*Older adolescents and young adults ages 16 to 24* • 1 FGD of 8 to 12 females • 1 FGD of 8 to 12 males
Activity F. Semi-structured interview: *Innovation pathways*	• To explore in-depth the trajectory of individual experiences with new agricultural and NRM practices, and the role of gender norms and capacities for innovation in these processes.	*Agricultural and NRM innovators ages 25 to 55* • 2 females • 2 males
Activity G. Semi-structured interview: *Individual life stories*	• To understand the life stories of different men and women in the community who have moved out of poverty, fallen into deeper poverty, or remained trapped in poverty, and how gender norms, assets and capacities for innovation in agriculture/NRM, and other assets and capacities shaped these different poverty dynamics.	*Individuals of varied poverty dynamics ages 30 to 55* • 2 females • 2 males

Each field instrument contains a standardized semi-structured individual or group interview guide to ensure comparability in data collection; however, PIs tailored sections of the interview guides to address other issues of importance to their CRPs or the specific case. For example, the PI from the Aquatic Agricultural Systems CRP who ran nine case studies in Bangladesh and Philippines introduced questions on community problem-solving. To ensure a common understanding of the tools, the trainings engage team members in long hours reviewing, discussing, and practicing the data collection instruments—question-by-question. The team also reviews the quality of the translation of each question, making sure that it not only captures the intent of the English version, but that the phrasing uses common, everyday terms. For example, in the data collection, we explored the concepts of agency and empowerment with a dynamic ladder exercise engaging the terms "power and freedom." Teams worked to ensure that their translation of these terms used everyday words or phrases that would be familiar to the villagers in their case studies.

Facilitators must learn to become comfortable with asking each question as it appears in the interview guide. They must memorize key topics where their probing is essential (also flagged in the guides), such as questions repeated across the tools about local experiences with agricultural and NRM innovations. Note takers, working on laptops, are trained to use the interview guides as a template to document question-by-question individual study participant's responses as fully as possible. Note takers also register silences, gestures, or emotions that accompany responses, and in some cases take voice recordings as backup to ensure they have verbatim quotations. Additional questions asked, or questions skipped, are also noted. To ensure appropriate ethical procedures are followed, before each data collection activity, facilitators read aloud slowly and discuss a prepared statement. This explains the study purpose, assures confidentiality, and alerts study participants that they have the right to not answer questions and are free to end their participation in the study at any time.

The trainings and guide also review procedures for recruitment of study participants, as each instrument specifies a particular age range and socioeconomic status aside from the general requirement that the large majority of study participants be engaged in agricultural or NRM livelihoods. Teams are trained to consult widely with different leaders and sectors of the community as they compile potential lists of study participants for the different tools. The consultation is time consuming but important to ensure recruitment beyond a particular segment of the community. Many teams visited the study communities or hired community organizers to begin the recruitment process in advance of the fieldwork as well as to facilitate the team's entry and other logistics; however, the trainings emphasize a need for close supervision by field team leaders.

The tools draw directly from participatory rural appraisal techniques (PRA) and feature many visual activities and probing questions to support and deepen the study participants' own interpretations and analyses of key study topics and to encourage rich discussion among study participants. In contexts with limited literacy, the visuals were enhanced with symbols. Interview guides also contain a few pre-coded questions that engage focus group participants in private individual rating exercises before discussing the topic. The rating activities provide a useful device to reduce biases that can be introduced by whoever replies first to a focus group question, and the numerical responses are

documented systematically in the field notes to support comparative analytic work later on.[vi] To illustrate, in the focus groups with young men and women, each study participant is asked to estimate and record on a small slip of paper the number out of every 10 women in their village who "move about freely on their own in the public spaces of the community." The slips are collected and results posted anonymously, and the facilitator refers to the pattern of responses to guide a discussion by the group that often elicits reflections on local norms governing women's physical mobility.

With older adults, many rating exercises are repeated, but the reference point is changed from the current period to a decade ago—for instance, on whether it was common or not for a young married woman to work for pay. This data often provided valuable information on perceptions of change in a particular norm over time. The study also relies on a decade-long recall for a rating activity that assesses changes in agency and wellbeing, recognizing that individuals recall more strongly events that are "1) unusual, 2) have relatively greater economic or social costs or benefits, and 3) have more continuing consequences" (Farfan and Zezza, 2014, p. 29). Dempsey (2010) discusses risks of obtaining partial information and recollections that are tailored to explain current circumstances. The study addresses issues with recall in various ways, including by training facilitators to identify, and repeat during focus groups and interviews, an important local or national event a decade ago to strengthen people's memories. Also, many recall questions address consequential events or processes, such as major life decisions, which other studies (e.g. Krishna, 2007) have found to be more accurate. Moreover, focus group members frequently assist one another with recovering information, and key study questions are repeated with different population groups to support triangulation.

Fieldwork issues

Where teams can tap into existing relationships with and knowledge of research sites, this greatly eases fieldwork preparations. Tapping into existing bonds of trust enriches the quality of the data collection process and evidence gathered. The research products are also more likely to be relevant and make a difference. Yet, these relationships may also prompt suggestions of bias if difficult places are underrepresented or study participants are courteous and expect some kind of benefit. More specifically, community members from villages where CRPs or other external partners are active may overstate the advantages and understate the problems with an agricultural innovation. It is important to note that these issues are not unique to qualitative research, and experienced social researchers are equipped with techniques to reflect on how their own history, status, and biases, as well as those of their "subjects," may be affecting the evidence and, in turn, interpretations and findings.

Unquestionably, data collection requiring mere days in a village cannot substitute for the strong relations of trust and deeper insights on gender power relations and contestation of norms provided by skilled ethnographers and extended fieldwork, repeated over time (see, for instance, Collier, 1997; Epstein, Suryanarayana, and Thimmegowda, 1998). Nevertheless, GENNOVATE's tools provide multiple vantage points on these processes;

all six focus groups, for instance, engage in detailed discussions about the most important agricultural innovations for women and for men to have come into their communities over the past five years. In addition to focus group data, semi-structured individual interviews and community profile data also provide nuanced information on the study communities as they relate to the status of and conditions over time for the village men and women in their local labor, agricultural, or land markets. Study participants observe benefits from new agricultural technologies, roads, and other resources, which are increasing their yields and profits; however, they also detail less desirable changes for their rural livelihoods, such as more onerous work profiles, difficulties with accessing new seeds, and inadequate technical support when new technologies and soil management practices fail (Petesch et al., 2017; Badstue et al., 2017; GENNOVATE RTB-HT team, 2017).

Rapid data collection is also limited in its ability to glean hidden meanings of status differences as well as local expressions, silences, and knowledge schemes. Moreover, all transcripts (apart from those in Spanish) are translated by the field teams into English for the data coding, posing additional interpretation challenges. PIs and other team members spend long hours reviewing both original notes and translations. Nevertheless, in all cases of translation, whether in the formulation of questions or interpretation of responses, essential meanings can be lost (Temple, 2005). People also struggle to find the words to convey their understandings and experiences, and it must be recognized that "a very wide area of knowledgeability is simply occluded from view" (Giddens, 1984, p. xxx).

A common criticism of field instruments is that they can be overloaded with questions and drag on too long. Certainly our focus groups with poor women and men cover a multitude of topics, and many teams found it helpful to introduce a break for a shared meal. Another concern is that focus group dynamics almost always mean some participants dominate and others remain silent. There are many ways to nurture inclusion and elicit a range of views in group interviews (Chambers, 2002), and some of these are discussed and practiced during training. In Afghanistan, the team spent many long hours recruiting women because, as the field team leader reported, husbands did not allow wives "to sit with strangers giving information." The team also took breaks in the data collection to repeat explanations about GENNOVATE and to gain trust. While this required additional effort, the team provided some of the study's most insightful and detailed field notes.

The many cases where high-quality facilitation combines with the methods to set off group chemistry provide superb insights into the normative environment that surrounds farming roles and innovation processes. The following exchange from the middle-class women's focus group during our pilot outside Mukono, Uganda serves as an illustration:

Facilitator: *If a woman from this village wants to use improved seeds or other inputs for her plot, but she does not have any money, what would she do?*

Participant 1: *She sells some of her pigs and she gets some money and she goes and buys improved seeds.*

Participant 2: For me, I go to our friend or a neighbor. I talk to that neighbor and tell him or her to lend me some seeds, and when I have some I can bring back some seed. And then I can plant.

Participant 3: The woman goes for these village credit circles and borrows money from them and goes to buy improved seeds and other inputs like fertilizer.

Participant 4: A woman usually doesn't need (to buy) fertilizer because she has some animals.

Participant 5: They go to another farmer and offer cheap labor. And she's given some little money. And she uses that money to buy some input like maybe seed or fertilizer.

Analysis

GENNOVATE's analysis strategy combines two procedures: i) inductive case-oriented "deep" or "thick" description techniques (Geertz, 1973); and ii) deductive variable-oriented "wide" thematic techniques (Patton, 2002; George and Bennett, 2005; Miles, Huberman, and Saldaña, 2014) using NVivo software and other methods. While these procedures revealed many insights, we found comparative analysis of gender norms to be especially challenging due to their highly contingent and fluid qualities. We reflect on how our "ladder" data on empowerment and poverty dynamics provided a helpful bridge across the wide and deep on this key area of concern for the study.

Iterating between deep and wide

The case-oriented "deep" analytic techniques required a focus on a single case study to explore the interplay of gender norms, agency, and innovation processes in that context. The case-oriented research generated a series of background case studies that were prepared by PIs, field team leaders, and research analysts. A general outline was suggested for this background work that drew on secondary literature in addition to the evidence gathered, and provided an overview of the local context that included analysis of gender norms, such as those shaping household and agricultural roles; experiences with agricultural innovations; and women's and men's perspectives on trends in agency and poverty reduction in their villages, and the factors they attribute to these processes. These background case studies proved indispensable for informing and interpreting findings from the comparative work across the case studies and the different population groups reached within them. Evidence of this work can be seen, for instance, in the discussion of specific cases in various papers in this issue.

The variable-oriented "wide" analysis involved two datasets: i) an Excel data file generated by pre-coded questions and/or rating activities during data collection with each instrument; and ii) a coded dataset of all the narrative data, which was generated by systematic content analysis and data coding with NVivo 10 using 150 common codes broken into 15 topic areas. Guidance regarding the numbers of codes is wide ranging,

with some recommending 120 to 300 codes and others 30 to 40 and fewer (Saldaña, 2013, p. 24).

The data coding framework was based on systematic content analysis of field notes from Bangladesh, Mexico, Philippines, and Zimbabwe; two rounds of PI reviews; and further testing during the first coder training. The main themes and examples of subthemes in the coding tree which coders analyzed included:

- *Agricultural innovations and resources*, including factors such as physical technologies, formal and informal agri networks and learning, seasonality, profitability, and yields;
- *Agency and decision making*, such as assessments of levels of and trends in agency, decision-making roles and gender relations in these roles, innovators, and aspirations;
- *Gender norms*, e.g. references to gender-specific or non-gender-specific roles, capacities, or conducts; trends in restrictiveness of norms;
- *Economic agency and provider roles*, such as asset access, use, or control; lack of money or poverty; general references to an income earner;
- *Livelihood types and labor market conditions*, such as "agri work for self or household," "agri work for others," "entrepreneur or trader," and trends in job opportunities;
- *Household roles and relations*, such as housework, parenting, and care roles;
- *Community (and wider) institutions and resources*, such as services and formal and informal non-agri networks;
- *Community poverty and individual wellbeing trends*, and whether trends are improving, static, or deteriorating;
- *Social identities*, such as whether a passage referenced a woman, man, child, in-law, youth, widowed or separated, or different combinations thereof; and
- *Emotions and attitudes*, such as joy, stress, or conflict.[vii]

As is common in comparative studies (Saldana, 2013), we also had (structural) codes dedicated to specific questions in the instruments, such as a code for the "top-two" local innovations. This rating activity, conducted in every focus group, occurs after lengthy discussion of new practices, technologies, learning, or networks in their village over the past five or so years.

As guided by a senior NVivo expert, our coding protocols required the narrative content of each transcript to be systematically analyzed in five waves, with each wave covering a different set of topics.[viii] Coding was carried out by two teams to ensure consistency. Teams were trained for two weeks, and individual coders maintained journals in NVivo within their coded dataset on coding questions and decisions. Coders also interacted in virtual discussion forums, and met weekly to discuss puzzles with data interpretation.

The coded data sometimes yielded striking findings, such as women's frequent but men's scarce reflections about their spouse when assessing their decision making in major affairs of their lives (Petesch et al., 2018a, this issue). This data provided a sort of graphic representation of important theoretical constructs in feminist literatures associated with men's prominent roles in women's pathways for making decisions and controlling resources, while men's reference points for their agency are typically other important men in their lives (e.g. Connell, 1987; Jackson, 1999). The coded data also challenged assumptions and biases, such as an expectation that the young people, because of their

greater education, would find gender norms less restrictive than the older adults in the sample (Petesch et al., 2017).

In this way, the coded data enabled systematic work on focused topics across the different population groups, communities, and countries covered by the study, and supported the identification of recurring themes. An external reviewer, armed with GENNOVATE's written protocols and numerical and coded datasets, will be able to identify links between: the study's key questions and relationships in the conceptual framework, the coding tree, the evidence collected and analyzed systematically, and the conclusions generated (see Yin, 2003, pp. 33-39).

Bridging deep and wide

In both the deeper and cross-case work, some of the most challenging analysis involved interpretation of seemingly contradictory observations about local gender norms. The coding tree enabled examination of the discourse around specific norms as they pertained to initiatives requiring, for instance, physical mobility, asset use or control, or other dimensions of agricultural livelihoods, such as acquiring (or not) skills, accessing others' labor or achieving (or not) profitability. Yet, norms and agency are both highly relational, fuzzy, and moving targets. We fully agree that testimonies cannot be taken at "face value," and rapid approaches and coded data provide a dim "view to the power of speech acts, silences, reflexivity, and research relationships" (Jackson, 1999, p. 139). For example, women often mention constraints on their agency and participation in innovation opportunities, such as an agricultural extension event, due to restrictions on their physical mobility, yet the specificities of and disagreements over local mobility restrictions defied synthesis. Averages of numerical ratings on women's mobility obscured the complex ways in which women work around and flout physical mobility norms in their everyday lives, and how the mobility expectations change with a woman's age, marital status, life stage, socioeconomic position, education, religion, local safety, and so forth.

These analytic challenges for comparative work reflect the fluidity of gender norms on the ground. They also reflect the myriad tactics—ranging from subtle pressure to rarer acts of violence—that men and women continuously deploy to uphold and challenge different types of norms as they impinge on particular interests or circumstances. A cross-case interpretation of the role of a particular norm would have required high levels of assumption and abstraction to account for the myriad contingencies.

Among the ways we addressed these issues, two stand out. First, we reduced the emphasis on insights about the role of any particular norm on interpretations of evidence about women's agency so that we could be more attentive to demonstrating their complexity and how many norms intertwine and operate in continuous tension with poor women's as well as poor men's lived realities. Women's agricultural livelihoods are making vital contributions to the security and wellbeing of their households, but in most of the case studies normative expectations—such as women's deference to men's authority or circumscribed physical mobility, or pressures on them not to claim agriculture-related assets—continue to interact in ways that mainly discourage women from taking initiatives with their livelihood activities.

Second, a breakthrough (slowly!) came in the form of new learning with our two ladder activities, one of which examines questions of agency and major decision making with four of the focus groups, and the other explores local socioeconomic mobility with the remaining two focus groups in each case. What is especially helpful is that the four older adult focus groups in each case rank their community now and 10 years ago on either the general level of agency of their own gender or on household poverty levels (we did not ask the youth groups to assess trends). In this way, the various ladders' numerical ratings signal whether local women and men see the processes of change underway in their community to be mainly beneficial or harmful forces in their lives—and by how much. Additionally, we have women's and men's testimonies explaining their ladder ratings and trends, and these testimonies offer some information on local norms and how they are interacting with the trends identified. The combined numerical and narrative ladder data provided a valuable entry point for assessing the sets of norms shaping a "local normative climate" for women and for men to perceive opportunities, take risks and innovate in their rural livelihood activities (Petesch et al., 2018a). The final paper in this special issue (Petesch et al., 2018b) explores highly beneficial dynamics in a set of villages where the ladder assessments indicated by all six focus groups are significantly favorable—and women and men alike testify to a local normative climate that is fueling greater gender equality. Thus, rather than comparing the effects of a specific normative belief or practice, our move toward a broader concern for how the normative climate was shaping perceptions of trends in agency and poverty reduction enabled us to address more meaningfully the complex fluidity of norms on the ground.

In sum, we iterated between and forged connections across our case- and variable-oriented analyses, with each cycle contributing new and more nuanced insights into our study questions. This cycling back and forth between "deep" and "wide" requires considerable time, focus, and perseverance to gain confidence in and meaningfully present the findings due to the size and complexity of the dataset (Miles, Huberman, and Saldaña, 2014; Saldaña, 2013). The findings point to opportunities to reduce the topics covered by the instruments, but also clear benefits from the study's exploratory scope, which provided us with an opportunity to hear and learn from diverse gender, age, and socioeconomic groups about the innovation processes and other changes unfolding in each case study.

The social embeddedness of our global institutional collaboration in the CGIAR system poses opportunities and challenges. Paula Kantor, who lost her life much too early, considered the principal aim of GENNOVATE's new type of research collaboration to be that of diversifying the kinds of scientific knowledge privileged and employed by the network of CGIAR partner institutions. In this way, additional research and development partnerships and processes could flower in order to buttress poor women's and men's empowerment and self-determination.

For example, in Mexico, the field researchers shared syntheses of the findings with development partners active in the research communities, and convened follow-up dialogues in each of the six communities to share and hear views on what had been learned from their contributions to the study. GENNOVATE researchers also collaborate with other social and biophysical scientists, and PIs and partners are producing deeper analyses of the case studies (e.g. Cohen et al., 2016; Locke et al., 2017) and hands-on

tools for non-gender researchers and practitioners.[ix] Results have been discussed and seeds of change sewn at senior levels, and, despite pressure on budgets, GENNOVATE continues as a vibrant collaboration and experienced Community of Practice.

Concluding reflections

According to Tracy (2010, p. 841, citing Weick, 2007, p. 16), the best qualitative research strives for complexity and richness in its descriptions and explanations, and rests on a "requisite variety" of theoretical contributions, samples, and data sources. GENNOVATE's approach embodies principles of context, comparison, and collaboration. Its contribution to better understanding of the strong and fluid influences of gender norms on local agricultural innovation processes was enabled by a coherent and rigorous research design. This comprised the study's dynamic study questions and conceptual framework, maximum diversity sampling protocols, 15 semi-structured instruments, and application of "deep and wide" analysis procedures.

The collaborative research strategy prioritized local understandings of lived experiences and combines concern for contextual influences on social action with rigorous comparative protocols to identify regularities across diverse cases. The research methodology provides a field-tested approach for large-scale research and intervention programs, within and beyond the CGIAR system. This enables us to better understand and contribute to the evolution of inclusive local institutions, including more equitable gender norms.

Agricultural research and development, though focused in the first instance on technical change, is clearly embedded in social and political processes. These processes make concern for contextual influences on women's and men's decision making relevant to many types of agricultural innovation. We hope that GENNOVATE's multi-institutional and cross-regional collaboration and findings in this special issue can make a contribution to the increasingly urgent need for new models of learning and change that take that reality fully into account to ensure inclusive, equitable development.

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Endnotes

[i] For GENNOVATE team, see https://gender.cgiar.org/collaborative-research/gennovate/research-management/. The team includes a mix of senior, mid-career, and post-doctoral researchers from multiple countries.

[ii] Maximum diversity or variation sampling maximizes variation across the sample to increase generalizability (Miles, Huberman, and Saldaña, 2014) on the basis that: "Any common patterns that emerge from great variation are of particular interest and value in capturing the core experiences and central, shared aspects or impacts of a program" (Patton, 1990, p. 172).

[iii] Where a village was characterized by important social group differences such as ethnicity or migrant status, we recommended repeating data collection with the largest two social groups or selecting an alternative site without these important differences to increase comparability.
[iv] Since 2017, the portfolio of CGIAR Research Programs has changed. Please see http://www.cgiar.org/about-us/our-programs/.

[v] PIs could frame the selection criteria to focus on successful adopters of either a specific CRP innovation, or of one or more innovations of local significance.
[vi] See Chambers (2003) and Holland (2013) for discussion about quantitative data in participatory research.
[vii] The actual "node" labels and sequence differ in the coding tree due to NVivo alphabetization rules, analysis protocols, and organization of instruments. PIs introduced additional nodes for their own analyses.
[viii] The number of waves varied somewhat with each instrument and as the coders became more familiar with a case and the analysis required. The length of the transcripts varied, with each case typically requiring a full workweek to code six focus groups and eight semi-structured interviews.
[ix] https://gender.cgiar.org/themes/gennovate/resources-non-gender-scientists/