



Gender in agricultural change: towards more inclusive innovation in farming communities

GENNOVATE report to the CGIAR
Research Programs on Roots, Tubers
and Bananas and Humidtropics



RESEARCH
PROGRAM ON
Roots, Tubers
and Bananas

RTB (<http://www.rtb.cgiar.org/>) is a CGIAR Research Program involving a collaboration of five research centers. It is led by the International Potato Center (CIP), and includes Bioversity International, the International Center for Tropical Agriculture (CIAT), the International Institute of Tropical Agriculture (IITA) and the French Agricultural Research Centre for International Development (CIRAD). More than 300 million people below the poverty line in developing countries depend on root, tuber and banana crops for food and income, particularly in Africa, Asia and the Americas. The CGIAR Research Program on Roots, Tubers and Bananas (RTB) is working globally to harness the untapped potential of those crops in order to improve food security, nutrition, income and climate change resilience of smallholders, especially women and youth.

Humidtropics was a CGIAR Research Program led by IITA that aimed to transform the lives of the rural poor in tropical Americas, Asia and Africa. It used integrated systems research and unique partnership platforms for better impact on poverty and eco-systems integrity. Core program partners were: AVRDC, Bioversity International, CIAT, CIP, FARA, Icipe, ICRAF, IITA, ILRI, IWMI, and WUR.

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Acronyms

Acronyms

AAS	Aquatic Agricultural Systems
A4NH	Agriculture for Nutrition and Health
BXW	Banana Xanthomonas wilt
CRP	CGIAR Research Program
DC	Dryland Cereals
DRC	Democratic Republic of Congo
DS	Dryland Systems
FI	Focal innovations [FI])
FGDs	Focused Group Discussions
FTA	Forests, Trees and Agroforestry
GL	Grain Legumes
GRiSP	Global Rice Science Partnership
HT	Humidtropics
HYVs	High-yielding varieties
LAC	Latin America and Colombia
<i>Manihot esculenta</i>	the scientific name for the cassava species
NGO	Non-Governmental Organization
NRM	Natural Resource Management
NVivo	Software based tool for qualitative data coding
OFSP	Orange fleshed sweet potato
PIs	Prinipal Investigtors
R&D	Research and Development
RTB	Roots, Tubers and Bananas
SSA	Sub Saharan Africa
UGX	Ugandan Shillings
VAD	Vitamin A deficiency (VAD)
“Zea mays” women	Improved variety maize as locally identified by women in Kenya

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Foreword

GENNOVATE, *Enabling Gender Equality in Agricultural and Environmental Innovation*, is a qualitative comparative research initiative which brought together researchers from 11 of the Phase 1 CGIAR Research Programs (CRPs). Together the GENNOVATE research team is advancing a two-track strategy of building an authoritative qualitative portfolio of research results and second, catalyzing gender-transformative change in international agricultural research for development (AR4D).

This report forms part of a set of GENNOVATE research reports which pull together CRP-specific findings about how gender norms influence local level development dynamics, including the ability of individual men, women and young people to learn about and engage in innovation processes in agriculture and natural resource management. The findings presented in this report are primarily targeted to CRP research managers, scientists and research teams, and are meant to inform theories of change and intervention strategies, and to help identify opportunities for enhancing impact of agricultural research and development through the integration of gender transformative approaches.

Across the broad GENNOVATE initiative researchers from different CRPs are working, both independently and collaboratively, on additional in-depth analyses of GENNOVATE results. Please be on the lookout for this follow up work in journal papers, books, briefing notes and other outreach products.

We hope you enjoy the report.



Lone Badstue
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Preface

Gender is important in agricultural research, innovation and development. Gender norms may influence access to technology, resources, information and services and this can affect the extent to which men and women participate in and benefit from agricultural change. The role of agriculture in achieving women's empowerment and the contribution of empowerment and increased gender equality to better agricultural and nutritional outcomes has been explored primarily through small-scale studies that are difficult to generalize and with limited capacity to convince policymakers to support greater gender equality. The work on which this report is based, carried out in Bangladesh, Burundi, Colombia, DRC, Kenya, Malawi, Nigeria, Rwanda, Uganda and Vietnam, seeks to fill this void by using a comparative qualitative case study methodology across different communities, cultures and continents to detect commonalities and differences regarding the way gender norms and agency affect and are affected by agricultural innovation. This will allow us to identify key areas for coalition building across different cultures and to help develop strategies for gender mainstreaming in CRP RTB.

During the development of the report there was always tension over whether to focus on the differences between countries and cultures or to focus on the similarities. In many discussions there was uneasiness, for example, of combining findings from Nigeria with those of Bangladesh because of the different contexts in the two countries related to gender gaps, women's empowerment and levels of physical mobility. To resolve this tension, the report adopts a two-pronged approach using "wide" and "deep" analysis. The wide analysis draws on the commonalities between the different case studies – through coding of all the qualitative data in Nvivo, a software tool to accomplish that –whilst the deeper analysis digs into individual case studies and also seeks to explain differences and even contradictions between cases. This has implications for example on development of CRP gender strategies. It is clear from the wide analysis that a single gender strategy for RTB can be drawn and applied to all regions, but there will also be need to acknowledge and address with specific interventions some regional variations. Another key insight from the wide analysis is the social and institutional as well as technical dimension of agriculture. For example, across all continents family harmony was regarded by women as important for them to benefit from agriculture and agricultural innovation.

This report also has a section on youth which provides insights into how young men and women view agriculture as well as how parents view the acceptability of agriculture as a future option for their children. It also looks at the intergenerational handover of resources. There was some debate in the team regarding the meaning of 'youth'. Is the category 'youth' defined by chronological age or by life's experiences? These are difficult conceptual issues that were not fully resolved during the study precisely because youth is a transitional category and in communities where we were studying the boundaries can be fluid. Additionally, we also realize that the youth we were able to interview are those that still reside in the rural areas whilst those who left were not part of the study and this may introduce some bias in the results. However, what is clear from both youth and parents was that agriculture was not the preferred occupation but rather in most cases an occupation of last resort due to many reasons which are discussed in the report.

Acknowledgements: This research was undertaken through the GENNOVATE project with funding from the CGIAR Research Program on Roots, Tubers and Bananas (RTB) and the CGIAR Research Program on Humid Tropics. Additional support was also received from A4NH. As part of the donor financial support to the CRPs, we especially recognize earmarked DfID support to gender research. Critical additional funds were also provided during data analysis by the Bill and Melinda Gates Foundation. Authors would also like to thank men and women farmers in Malawi, Burundi, Uganda, Bangladesh, Colombia, Vietnam, Rwanda, DRC, Kenya, Nigeria, as well as the young men and women who took part in the studies and were willing to share the stories of their lives. We believe that the different Sections capture the voices, interests and hopes of men and women who participated in this study and hopefully findings will go a long way to improve gender equality as well as strategies to develop opportunities for youth in agriculture. Authors also acknowledge the teams of facilitators and data collectors who conducted many hours of focus groups and individual interviews followed by data processing for this research documentation (their names are listed in Annex 3 of the report). Moving from the large quantities of mostly qualitative information to analyzable datasets was made possible through the development of a coding manual based on the Nvivo software and coding of the interview reports into this software format. We thank Patti Petesch for her leadership and tireless energy in developing the manual and the following individuals who coded the RTB and HT data: Nadezda Amaya Urquiza, Alejandra Huamán Tejo, Speciose Kantengwa, Ana Nugent Manarelli, Lucila Jimena Rozas Urrunaga (Data Manager) and Angela Silva Vega. Special thanks goes to Holger Kirsch, Johanna Bergman Lodin (Principal investigators of case studies in Nigeria), Kayte Meola (Principal Investigator of the Colombia cases), Shawkat Ara Begum (Bangladesh) who led or co-led some of the case studies but are not involved in the write-up of this report.

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Executive Summary

This report examines how innovation processes in locations where the CRPs on Roots, Tubers and Bananas and on Humidtropics (RTB-HT) have conducted R&D activities, both shape and are shaped by gender. It is part of GENNOVATE (“Enabling Gender Equality in Agricultural and Environmental Innovation”), an unprecedented global research collaboration involving 11 CRPs and 9 Centers involved in 137 case studies in 26 countries. GENNOVATE examines the interaction between agricultural and natural resource innovation, the expected behaviors of women and men and their “rules of engagement” – what we refer to as gender norms – and the levels of agency among adult and young women and men. It generates analytical findings about men and women’s capacities to innovate are often differentially shaped by particular norms. RTB-HT undertook 24 case studies between 2014 and early 2016 in ten countries in SSA, Asia and Latin America. The results of case studies derive from a contextually-grounded, comparative and collaborative methodology that are expected to contribute to the CGIAR’s efforts to strengthen ‘systems thinking’ in the new SRF and through the establishment of Agri-food Systems CRPs. The study aims to inform the design of CRP research strategies and interventions for more gender equitable adoption and adaptation of technologies and practices.

The report begins with an introductory section that describes the background and key concepts, summarizes the research and sampling methods and provides the context for the 24 case studies undertaken. The following three sections present the main research findings. Section two discusses what unleashes agricultural innovation among women and men; section three develops a deeper understanding of how norms interact with and condition innovation choices and how they are changing; and section four which looks at the social conditions (the “opportunity structure”) that enable women and men and communities to leverage opportunities for innovation and how innovation processes can be more inclusive. A stand-alone section 5 synthesizes key messages from the preceding sections.

What unleashes innovation

What unleashes agricultural innovation is firstly **about the innovations themselves**. New varieties and better quality seeds of key crops are of major importance for men throughout the sample and for women farmers in Africa. This preference often included RTB crops and improved management of these crops was a priority for women in Africa. **The most important innovations for all women are associated with livestock.** This preference reflects their limited access to agricultural resources and their reproductive responsibilities which, sometimes combined with normative restrictions, limits physical mobility. Contrary to some stereotypes about men and machines, **women in some locations identified equipment as priority innovations.** Women and men **often under- or overestimate the importance of innovations for the opposite sex**, which can lead to misguided agricultural interventions if these are gender blind.

Although many **of women's innovation preferences were driven by concerns for food and nutrition security** their choice of top two innovations also responded strongly **to income opportunities**. This was **the key driver for men, but their preferences also included food security concerns**. This underlines the importance of also engaging and targeting men and young boys in nutritional education. The difference between women and men was the way **gender norms governing access and control strongly influenced women's choice of innovations in terms of what could most realistically provide income, food security and other desirable benefits to them**. These other benefits included greater independence and decision-making – the preference for livestock and innovations related to home gardens responded to this factor – less drudgery and interactions between technologies and practices leading to **whole system benefits**.

Family harmony and positive personal traits were identified as key elements by women across all cases in Africa, Asia and Latin America. These **enabled women to be more economically**

active. However it underlines the power differences between men and women in terms of access to and control of key productive resources. Although in Vietnam women had more independence in some economic spheres than in other case contexts such as Bangladesh, men could withdraw their labor and withhold use of family finances if they were not happy with the woman's choices or behavior. Women had to deploy negotiation and deference as strategies under this normative environment. The results of this study indicate that **those engaged in R&D interventions need to pay more attention to social relations and intra-household decision-making** and not just the technology to achieve successful and equitable innovation and adoption.

This analysis also shows that **targeting women for certain innovations can allow innovation to spread through social networks.** For example in relation to innovations such as small livestock and vegetables, women in Africa and Asia often talked about giving others in their community or their close kin vegetables and poultry in order to cement and build social networks in the community. This allows innovations to more easily spread within and across communities. This contrast with the situation of men who more often relied on networks outside the community, including accessing loans and capital.

Both women and men identified the **availability of assets, especially financial capital and land as primary factors enabling innovation.** Men's greater opportunity to take advantage of sources of credit can be an important advantage and their greater control of access to land has implications for the types of crops men and women grow. Cash crops like banana and coffee are perennial, needing stable use rights over land and are capital intensive, requiring access to credit. In livestock, a similar situation arises with large animals such as new breeds of oxen and dairy cows, which demand large outlays of cash. In the case studies examined, men were predominantly responsible for these crops and animals. The implication is that **not every innovation provides the same kind of opportunities for greater equity and gender transformation. One approach involves developing low cost technologies that require limited capital investment, basically intensifying those agricultural activities where women already have access.** RTB crops are important in this respect. For example, in Bangladesh, Uganda and Malawi women often mentioned OFSP as low cost both in terms of monetary investments and time. Gender training for both men and women farmers could in the long term help to challenge certain gender norms and stereotypes. In these same contexts, it would be important to **strengthen the linkages between crops and small livestock,** through better use of crop byproducts as feed and better use of animal by-products for fertilization and for sale.

A second approach is to challenge the gender norms that promote men's control of cash crops while also working to help women gain access to capital to invest in these crops. This approach could be appropriate in Vietnam where women are already engaged in most aspects of agriculture, including raising large livestock, but are subject to their husband's normative control of assets.

Among factors that women and men identified as hindering innovation, both cited **labor constraints** and the **limitation this presents in the amount of land that can be cultivated and the types of crops that can be grown.** It was a factor in constraining their progress on the "ladder of power and freedom". For poor women, this related to their need to combine domestic with agricultural tasks. It accounted for their interest in harvesting machinery in Bangladesh for example when there is a high demand for their labor. **Labor saving technologies should be a key consideration when developing new interventions.** For RTB and HT, crop related techniques for reducing labor and simple cheap and effective equipment should be prioritized.

Gender norms, agency and innovation

Norms surrounding what is a good man and woman farmer underline the idea that **women have a supporting role in agriculture, that they exist "in men's shadows".** However, this has **different meanings in the African compared to Asian or Latin American contexts.** In Africa, where women are semi-independent managers of their own farms and households, they have a more

clearly defined farming role, especially related to ensuring household food security. In Bangladesh and Vietnam contexts, women are expected to contribute to a family farm run by the male household head. This is strongly expressed in Bangladesh, more nuanced in Vietnam. Yet even in Africa, women are constrained in their own farms because of lack of access to land and through obligations to work on their spouses' farms. The notion that a good woman farmer has a vegetable garden and looks after small animals is a widespread norm in Africa as well as Asia. Nevertheless, there is still a **gap between normative expectations and what happens on farm in practice**. Banana is "a man's crop", but under certain circumstances it is cultivated also by women.

There are wide **differences in the understanding of gender equality, gender difference and what is changing among men and women**. Although many participants focused on biological difference to justify inequality of opportunity, others suggested that greater equality can lead to greater development at all levels, from the household to the country. Greater gender equality can also come from **interventions by external agencies**, many of **which target benefits to women**. This **can sometimes end up being counterproductive, if men are not involved to understand the overall benefits from these kinds of interventions**.

Agency and empowerment were found to be affected by many aspects of the normative environment. **Limitations on physical mobility** directly affects women's agency. Across the sample there was a lot of variation, from highly constrained mobility in Bangladesh to high mobility in Vietnam, even more so than in many African cases. But even in Bangladesh there is evidence of change in the extent of constraints, observed both by young men as well as women. Gender **norms surrounding household leadership in Africa affect agency**. Men "inherit" agency through titles such as **household head**. Women have to earn agency over time through negotiation, use of available spaces and resources and in many cases just by growing older. Compared to ten years ago, both men and women feel more empowered across most of the cases. Some of this can be accounted for by the greater power that comes with growing older, but improvements in family livelihoods was also identified as a factor. This is also linked to improvements in education. A third reason for feeling more empowered was identified as increased support from a changing external environment. New laws against domestic violence in some African countries was an important example, but also the actions of development agencies involving training and specific support to women.

In relation to youth, **young men and women's interest in agriculture can be increased by direct application of knowledge and skills gained through formal education, and by recognition of the knowledge-intensive nature of many aspects of agriculture**. If agriculture is viewed as a low status occupation appropriate for those with limited formal education, it will be stigmatized and will not appeal to youth.

Gender and inter-generational relations curtail the ability of young women and men to catalyze innovation. Once they get married, women are under their husband's authority, and he may feel threatened if she adopts innovations and makes money. When still under their parents' control, both young men and women have curtailed decision making power. This, again, suggests the need to focus on more than just technical aspects of agricultural innovation but also social aspects related to agriculture. If young people view gender equality in a negative light, it can curtail young women's ability to make decisions.

Young men and women are both highly focused on earning an income, albeit for different reasons. If young men and women can seize agricultural entrepreneurship opportunities and make a good living, they may be interested in doing so. Good income prospects from agriculture may also remove the stigma associated with the occupation.

Opportunity structures for inclusive innovation

Previous sections show that men and women have different ways to access the resources on which a particular innovation depends, and therefore have different opportunities of benefitting from it. This means that innovation is not an even process undertaken by targeted households to

help increase production, incomes and nutrition. There is considerable intra-household variability and this section explores the **social conditions that enable women and men and communities to leverage opportunities for innovation**. This section identified four key points that facilitate this process.

First, **the facilitation of interventions that bridge formal institutions and informal social networks** are very helpful, as they can open up new opportunities to those who have had few chances to participate in past interventions. The conventional formal innovation opportunities provided by formal institutions such as extension workers, government institutions and private sectors are more accessible for those who have agency, confidence and social connections. However, while women and men with limited agency have limited access to both formal and informal institutions for learning new agricultural activities, they still learn new technologies from their friends and relatives. Therefore, interventions that provide a bridge between these formal and informal resources should be prioritized.

Second, **innovation processes need to fit well with the context-specific expectations and demands of women farmers** so that they are more likely to participate and benefit. **Innovation can strengthen women's and men's subjective notions of power**, and thereby increase their self-confidence, and hopefully encourage them to seize further opportunities for innovation. However, the **pathways through which they gain power are very different**, being closely associated with social expectations of how women and men should be. Therefore, **if innovation activities do not fit with women's empowerment pathways, only the men benefit from them**. Since across the target sites, men's power is associated with material assets and economic independence, mechanization and intensification of agriculture can directly help strengthen their power and confidence. On the other hand, in some social contexts women feel empowered and confident when they play a supportive instead of a central role in economic activities, as being independent from their husbands is not a socially desirable situation. Innovation is embedded in socially constructed family relations, and only when it satisfies the needs and expectations of women farmers are they likely to adopt the activities, taking the first step to empowerment and thereby stronger agency to seize further opportunities in the future.

Third, despite the persistence of patriarchal structures that limit women's innovation opportunities, **women do have a space for taking up innovation within their own domains in everyday agricultural activities** where they already have autonomy over changing current practices and taking a risk. Identifying their autonomous domain, which may be very small as in Bangladesh, consisting of livestock raising and a small vegetable garden, or larger independent farms run by women in African sites, can be an **entry point** to facilitate women's participation in innovation, even under on-going, restrictive patriarchal structures.

Finally, we emphasize that **families or communities are not homogenous units of innovation**. Without understanding the social power dynamics at play, interventions will tend to support only those who already have significant power. If interventions specifically target the disempowered without awareness of those social dynamics, there is the risk of provoking jealousy and tension within families and communities. Considering the social power dynamics helps us to think about how and to whom new technologies are introduced. **Successful interventions that engage with and support multiple members of communities can strengthen collective capacities for innovation**.

Section 1 Introduction

This report examines how local innovation processes in sites where CRPs on Roots, Tubers and Bananas and on Humidtropics (RTB-HT) R&D has been undertaken or in key tropical agri-food systems where RTB crops are of major importance both shape and are shaped by gender. The report is part of GENNOVATE (“Enabling Gender Equality in Agricultural and Environmental Innovation”), an unprecedented global research collaboration involving 11 CRPs and 9 Centers in the analysis of 137 case studies in 26 countries. The project examines the interaction between agricultural and natural resource innovation and gender norms and agency, concepts which are elaborated further in Box 1 and throughout this report. The approach taken in all case studies involves a contextually-grounded, comparative and collaborative methodology which seeks to inform the design CRP research strategies and interventions for more gender equitable adoption and adaptation of technologies and practices.

Overall, across all of the GENNOVATE village-level case studies, men and women report growing power and freedom to shape their lives as well as declining poverty in their villages. Improvements in rural livelihoods due to agricultural innovation contributes importantly to these promising trends on the ground. Yet, beneath these broad patterns, the GENNOVATE data show strong variability in how men and women—and their communities—experience and benefit from local innovation processes.

The study rests on the understanding that for agricultural innovation to be effective the primary stakeholders – adult and young women and men on the ground – must exercise agency and be active participants in learning about, testing and adapting new technologies, practices and institutional arrangements to their needs and context. Nevertheless, gender norms, or the daily roles and behaviors expected of each gender, differentially shape men’s and women’s capacities to innovate. Across most rural contexts worldwide, it is still more common and acceptable for a man than a woman to exercise the power to be a shaper of beliefs, behaviors and events, including taking the initiative to become knowledgeable about and test new technologies. Yet, if women as well as men could similarly engage with and adapt new agricultural options, innovation processes would be much more efficient. Of special concern is the fact that a growing body of literature is finding that new agricultural technologies and practices which are gender blind risk worsening the poverty, workload, and wellbeing of poor rural women and their families (e.g. Cornwall and Edwards 2010; Okali 2011, 2012; Kumar and Quisumbing 2010). The conditions under which both women and men adopt and benefit from agricultural and NRM advances, however, remain poorly understood.

1.1 GENNOVATE Methodology

To address this knowledge gap, GENNOVATE's primary focus is systematic learning about people's own perceptions and lived experiences about agriculture. The study also examines how local conditions—especially the normative environment governing gender roles—affect and become affected by agricultural innovation processes. In focus groups and semi-structured individual interviews, gender-balanced research teams engage with equal numbers of women and men in reflecting on questions such as:

- What are the most important new agricultural practices and technologies for the men of the village? And for the women?
- What qualities make a woman a good farmer? And a man a good farmer?
- Do young people in this village follow local customs of women doing certain agricultural activities and men others? Why or why not?
- Are there differences between a woman who is innovative and a man who is innovative?

RTB-HT research teams participated in intensive trainings on the study's protocols and standardized package of data collection instruments during 2014 in Uganda, Colombia, Malawi and

Bangladesh. The RTB and HT teams carried out 24 "case studies" during 2014 and 2015 across countries in SSA, Asia and Latin America (see Sampling sub-section below). Each case study was undertaken in a specific community, where field teams conducted two single sex focus groups with young (ages 16 to 24) women and men, and four single-sex focus groups with adult (25 to 55) women and men from poorer and better off households in their communities. In addition, semi-structured individual interviews were conducted with local agricultural innovators (2 women, 2 men) and with individuals representing different trajectories of wellbeing, or movements out of and into poverty according to measures derived from local focus groups (2 women, 2 men). Annex 1 provides an overview of key protocols which guided the study's sampling, data collection, and analysis.

Since the RTB-HT cases target agri-food systems or intervention domains of relevance to the CRPs involved, the quality of the fieldwork is greatly enriched by being able to draw on existing relationships with and knowledge of many of the targeted sites. These relationships, however, may also prompt concerns for bias in the findings due to factors such as an underrepresentation of difficult places, or study participants being too accommodating, overstating benefits of or downplaying difficulties with interventions, or expecting some kind of benefits. These concerns are not unique to these kinds of qualitative samples and we have applied social science techniques of critical self-reflection and triangulation between the different tools to reduce bias in interpretations and findings. GENNOVATE's large comparative dataset, which asks many of the same or similar questions to different population groups within the same community, provides numerous opportunities to cross-check data which may be partial, confusing or contradictory.

It is also important to keep in mind that this RTB-HT report, as with the broader GENNOVATE study, was not designed to assess the performance of or outcomes associated with any particular technology or practice, although study participants do engage in exercises which ask them to identify and assess particular innovations with which they have experience. As will be shown, these testimonies provide a rich and compelling basis for exploring and comparing men's and women's capacities for agricultural innovation and the normative dimensions of these processes.

Box 1. Key Study Concepts: Gender Norms, Agency and Innovation

Gender norms refer to the gender dimensions of social norms. Social norms:

govern social relations and establish expectations as to how we are to act in our everyday affairs. They facilitate continuity across generations and among changing populations, and constitute an ongoing record of the history of social practices in a community. They structure social interactions in ways that allow social actors to gain the benefits of joint activity. And they determine in significant ways the distribution of the benefits of social life. (Knight and Ensminger 1998, page 105).

As Ridgeway (2009, 145) explains, "gender is a primary cultural frame for coordinating behavior and organizing social relations;" and despite technological and institutional change in a society, "gender-framing" persists in shaping social life—e.g. stereotypical beliefs of men's greater authority and competence than women are often "reinscribed into new organization procedures and rules that actors develop through their social relations in that setting" (152).

Agency is "the ability to define one's goals and act upon them" (Kabeer 1999, 438), either independently or jointly with others. GENNOVATE's conceptual framing positions agency as a process which is mainly embedded in and conditioned by local formal and informal institutions, although the agency and empowerment of disadvantaged groups can also transform constraining institutions and their rules.

Innovation in this study is defined expansively to encompass agricultural technologies, natural resource management practices, learning opportunities, relationships, and institutions which are new for the study communities sampled. These innovations may be locally devised or externally introduced. Our understanding of innovations and innovation systems is also informed by Berdegué's (2005:3) helpful

synthesis of thinking on this topic, defining innovation to be “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.”

1.2 Study sampling

For this report, the sample draws on a subset of 24 GENNOVATE case studies which were sponsored by RTB and HT and conducted in 10 countries. The choice of countries was strongly driven by CRP presence and activities, as were the possible sites for the cases themselves. Almost all cases were conducted in sites where RTB and/or HT were active, either the place-based research of HT (DRC, Rwanda, Burundi and one case in Uganda) or commodity-linked research, for example that focused on OFSP in Bangladesh, Uganda and Malawi. Vietnam was an exception, because of lack of RTB activity and cases were selected based on varying role of RTB crops and different types of economic dynamism. In all the target countries, cases were selected purposively to introduce some variance on economic dynamism and extent of gender gap in assets and capacities¹ (Figure 1.1). At the same time, political considerations had to be factored into some of the site selections, for example, the choice of sites with special importance for the CRP.

Following overall methodology, contacts were made with local facilitators to assist in gaining initial approval from the community for conducting the study and with these facilitators, key informants and potential members of FGDs were selected.

Throughout the different sections, when quantitative data are presented, they are based on the number or frequency (as specified) of focus groups in which a specific thematic response was provided.

1.3 The study context

The relation between gender norms and agricultural innovation, which is the focus of this report, is shaped by a range of endogenous patterns and exogenous drivers of change, which manifest themselves in different ways and with variable force in different case contexts.

This study has clearly identified the social structural and cultural variability and patterning across the regions covered by the study which influence the changing relationship between gender and innovation. A key social practice present across many of the African case studies is the relatively independent agricultural production by women. This is part of a broader set of social configurations and cultural patterns involving the control of land, labor and the inheritance of property, attitudes to sexuality and marriage, and the organization of households and reproduction (Tambiah et al 1989). Many of the gender norms surrounding different parts of this complex have emerged in this study and contrast with the situation elsewhere. In Asia and Latin America rural households tend to be single units of agricultural production under different levels of male control. In some locations, especially in the Bangladesh cases, this is related to the control of property and women's sexuality rather than her labor with marriage as the transfer of control over women's sexuality from parents to husbands and in-laws. Whereas women's agricultural labor is a central part of African farming, both on her own plot and on her spouse's plot, women's labor in Bangladesh is more related to domestic responsibilities, with agricultural work seen as a support to, or “in the shadow of” men's agricultural work. In Vietnam, where the household as a single agricultural unit is strongly held,

¹ Maximum diversity or variation sampling maximises 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, 172). See annex 1 for further discussion.

women must also defer to men as household heads, main decision makers and controllers of most agricultural resources. This is the case even if women are in practice more economically active than men. Furthermore, in relation to the control of sexuality, settling of newlyweds in the family of the groom is very common in Vietnam, providing a strong role for parents-in-law in the policing of gender norms in relation to daughters-in-law.

Among exogenous factors which are of importance in the study sites, urbanization is a powerful driver affecting and changing gender relations, agency and innovation processes. It contributes to shifting demand for agricultural products, rural job seeking and resulting migration, and influences rural aspirations, especially among young people. East Africa is one example of growing urban demand for agricultural commodities with importance for gender norms and agency, such as the demand for dairy products in Western Kenya which offers new economic opportunities for women through zero-grazing, and growing urban demand for cooking banana in Uganda, shifting the normative arrangements around this “male” crop. In Nigeria, massive growth of urban centers (African city populations are expected to triple in the next 40 years and Lagos is now the largest) and high levels of rural-urban temporary and permanent migration by both men and women affects inter-generational and gender relations and local agricultural opportunities. In Vietnam, high levels of migration and economic dynamism are distributed unevenly and in complex ways among the majority population and ethnic minorities, but offer greater opportunities for women to be economically dynamic, even though negotiating the persistent presence of patriarchal norms.

The commercialization of agriculture and its industrialization in some countries especially in Asia and Latin America, is a driver of change also related to urban growth and with gender implications. It involves the move to larger scales and the connection with mechanized processing into products in large-scale urban demand. Men and women have differential access to these commercial processes, with better-off men having had privileged access in cassava production and processing in Colombia and Vietnam. Nevertheless, the influence of such processes on both men and women is variable over time due to local factors. For example, in Colombia, other agro-industrial opportunities have resulted in a decline in interest in cassava by women and increased economic involvement in the alternative crop.

Whilst increased economic activities drive changes that affect women and men differently and result in different livelihood opportunities, malnutrition is an insidious, persistent driver of ill-health and weakened future potential affecting many communities and countries and this creates special conditions in some of the case locations. Bangladesh, Malawi and Uganda are all countries still experiencing significant levels of Vitamin A deficiency (VAD) and GENNOVATE cases have been located in these countries where CRP innovations have been targeting VAD. In many instances confronting VAD has opened new opportunities for women to take up nutrition-sensitive agricultural activities with economic benefits. Some of these activities have come into conflict with existing gender norms.

Table 1.1 Location and characteristics of the RTB-HT case sample

Major regions	Country	Number and location of cases	CRP and key innovation focus	Key socio-economic and agricultural characteristics of the cases
LAC	Colombia	4 cases in North-west coastal area in contrasting localities	RTB: Introduction of industrial processing varieties of cassava	Colombia is usually described as an upper-middle income, economically dynamic country which has faced an internal insurgency for many years that has affected the economy. Intermediate level of gender gaps. Formerly an important cassava growing area of northern Colombia, where attention is shifting to a new commercial crop.
SSA	Burundi	2 cases in Cibitoke and Gitega provinces	HT: Tropical agri-food systems	Burundi is a small country with a high population density, high poverty rates and with most of the population dependent on agriculture. With a long history of ethnic and political conflict, the current government is isolated and political violence is common. This is undermining economic and social development. Banana is a very important crop, both from a cultural and livelihood perspective. All other main RTB crops are also cultivated. There is a large gender gap and women are seriously disadvantaged.
	Democratic Republic of the Congo (DRC)	1 case in South-Kivu in the eastern part of DRC	HT: Tropical agri-food systems	The eastern region of DRC is hilly terrain above 2000masl and has a high population density made up of mixed ethnic groups dominated by Swahili and Morsi speakers. Farming is important but the main economic driver is mining and the main social condition warfare and men are actively involved in both. Women are therefore often the main farmers and banana and cassava are the most important crops. Agriculture exists in a situation where political unrest, violence and rebel activity are endemic and there is a virtual absence of government institutions

				and infrastructure. Women farm in a situation where rape is a major part of the violence and is so common as to be almost normalized.
Kenya	2 cases in Western Kenya	HT: Maize and dairy-focused tropical agri-food systems		The major ethnic group in the two case villages is the Luhya and most people cultivate staples and cash crops in maize based cropping systems. The first village of about 1200 people is in a rural location with low population density and poor road infrastructure. The second village of about 2000 people is peri-urban, with good connections to the nearby small town and about 5 minutes to the nearest tarmac road. The area is densely populated and there is high competition for resources. The adoption of hybrid maize was the most frequently identified innovation in both sites but raising of dairy cows for sale of milk to the urban center was increasingly important.
Nigeria	2 cases both in Southwestern Nigeria, in Oyo State and in Osun State	Cassava-based system		The first case community is in a rural part of Oyo State. There is no infrastructural development, not even electric power from the national grid. The local population depends on fuelwood as their main source of energy for heating and cooking. The second community was established in 1809 and became a major destination for migrants from within and outside Nigeria. The community became known for cocoa production and received international support to improve the cocoa and cassava from around 40 years ago. Provision of piped water and electricity between 2006 and 2007 improved the quality of life and standard of living of people in this community.
Rwanda	1 case in Kayonza district in Eastern Rwanda	HT: banana-based systems		Rwanda is the most densely populated country in Africa. After decades of ethnic and political violence culminating in the 'genocide against the tutsi' in

				1994, Rwanda is now politically stable. Although women are traditionally conceived as 'inferior' to men, the government has put in place many policies and law that protect and promote women's rights. Farming is very important in Rwanda but constrained by small land sizes. Important crops are banana, maize, beans and cassava.
	Malawi	2 cases in Ntcheu District in central Malawi, and Phalombe District in south-east region	RTB: Introduction of new potato varieties (Ntcheu) RTB: Introduction of OFSP (Phalombe)	One of the countries in southern Africa with highest levels of poverty and micro-nutrient deficiencies and very high levels of ODA investment, including in combatting VAD. Economy has low dynamism. Gender gap high in Phalombe. Mainly maize economy with key role for root and tuber crops.
	Uganda	4 cases in the eastern, central and western areas, with contrasting.....	RTB 2 cases: Introduction of OFSP RTB 2 cases: Banana disease management	Uganda is a diverse country with significant levels of poverty and micro-nutrient deficiencies. Politically relatively stable. Economy moderately dynamic. High gender gaps but policies and laws put in place which protect and promote women's rights. Food system strongly focused on RTB crops
Asia	Bangladesh	2 cases in economically contrasting districts of southern Bangladesh	RTB: Introduction of OFSP	Very high density, low-income population with high levels of poverty and ongoing malnutrition despite significant improvements. Dynamic garment sector and highly productive agriculture. High level of rural-urban and international migration. A cereal-based food system with important role for potatoes and very limited presence of other RTB crops
	Vietnam	4 cases in economically, ethnically and socially contrasting provinces in northern and central Vietnam	HT 2 cases: Tropical agri-food systems and consumption patterns in ethnic minorities RTB 2 cases: A cereal based food system with important role for root and tuber crops for animal feeding	A former command economy now with a very dynamic capitalist system with multiple economic opportunities in the agricultural sector. High level of rural-urban and international migration. A cereal based food system with important role for root and tuber crops

Section 2: What unleashes agricultural innovation among women and men?

The section describes and discusses the similarities and differences in the agricultural innovations that adult and young women and men consider the most important for them. Livestock emerges as the most important area for women and new varieties and seed, especially of RTB crops is the most important for men and for women in SSA. It also reviews what men and women understand about the innovation priorities of the opposite sex and there are significant over and underestimations of priorities for both men and women. We then look in more detail at the "focal innovations", those new technologies or practices which are part of RTB or HT intervention processes and find that these are commonly among the top two innovations in the case study sites. We try to understand the reasons men and women give for choosing particular innovations and find that both men and women prioritize innovations that raise income, though food security is also important for both. Other gendered reasons include increasing women's independence, reducing drudgery and providing whole system benefits. The final section analyzes the factors that support or hinder innovation processes for men, women and youth and with what implications for development outcomes.

2.1 What agricultural innovations are most important for women and men?

Below we identify some of the stand out innovations which women and men considered important for themselves across all regions (Figure 2.1).

Overall, men rate improved varieties, especially related to RTB crops, and cultivation practices as the most important innovations for their villages. Women instead stress livestock related innovations, although women in Africa also highly rate improved varieties and seed

Improved crop varieties as well as quality seed of those crops was the most frequently cited of top two innovations by men and one of the most commonly cited by women. Within this category, improved varieties of RTB crops, including improved banana, potato, sweetpotato, and cassava were mentioned by 23 out of 144 focus groups. Another 31 groups mentioned new varieties of maize, rice, legumes and vegetables among their top two innovations. Livestock related innovations were most frequently mentioned by women as among their top two. Livestock was less commonly mentioned by men, but when mentioned it usually related to large animals such as new breeds of oxen in Vietnam.

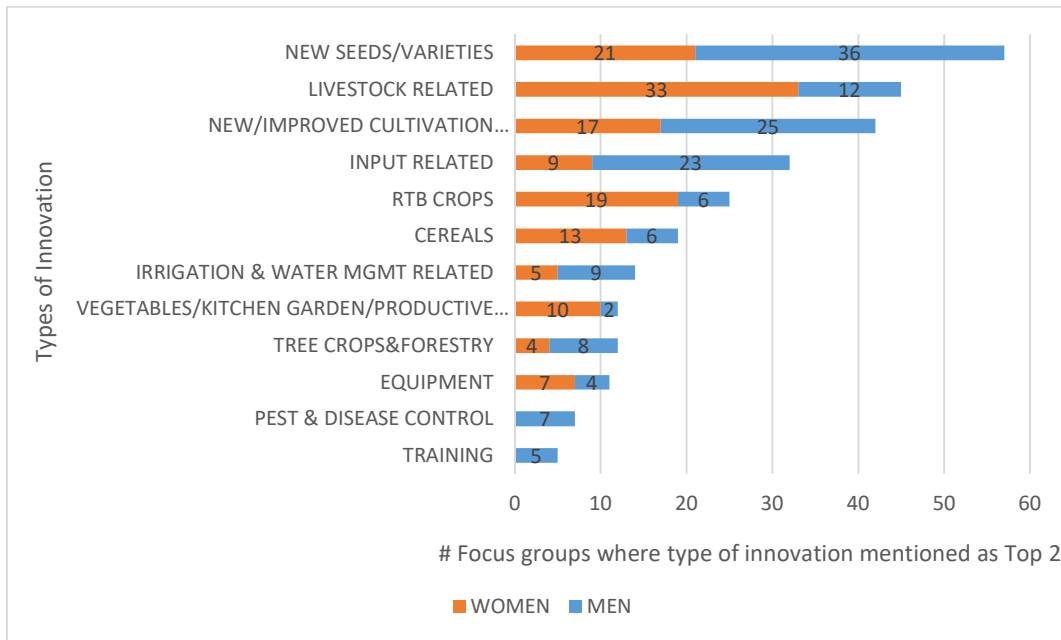
Both men and women's groups frequently considered new and improved cultivation methods in their farming practice to be among their top two innovations and for women improvements in RTB-related practices was especially important. Sixteen men's focus groups mentioned inputs among their top two innovations, usually fertilizer. This was mentioned in only 9 women's groups. Almost twice as many women's groups mentioned equipment compared to men, which goes against stereotypical association of men with machinery. This issue is discussed in more detail below.

We can also look for any significant divergences by region keeping in mind the distribution of RTB-HT cases described in Section 1: 14 cases in SSA, 6 in Asia and 4 in Latin America.

Women's identification of innovations in livestock raising is most marked in Colombia, considering the small number of cases. Almost 100% of women's FGDs mention different kinds of livestock raising as among their top two innovations and in some groups different types of livestock raising were their only top two. Livestock is mentioned by about a third of women's groups in SSA and Asia as among their top two, and in SSA (Uganda and Kenya) there is a higher level of diversity of

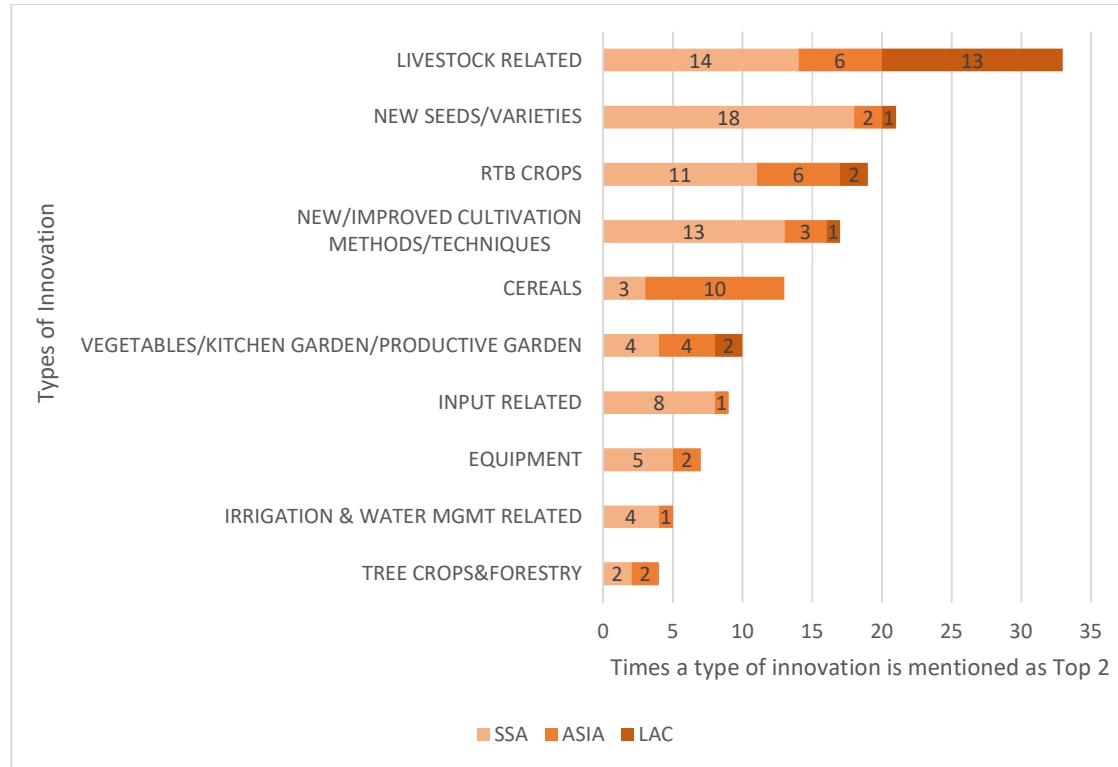
types of animals mentioned than in other regions, including zero-grazed dairy cattle and different small livestock.

Figure 2.1: Top two innovations self-selected by men and women's groups (cited in FGD) in all case sites



Note: Other types of top two innovations were mentioned infrequently by 12 women's groups and 10 men's groups.

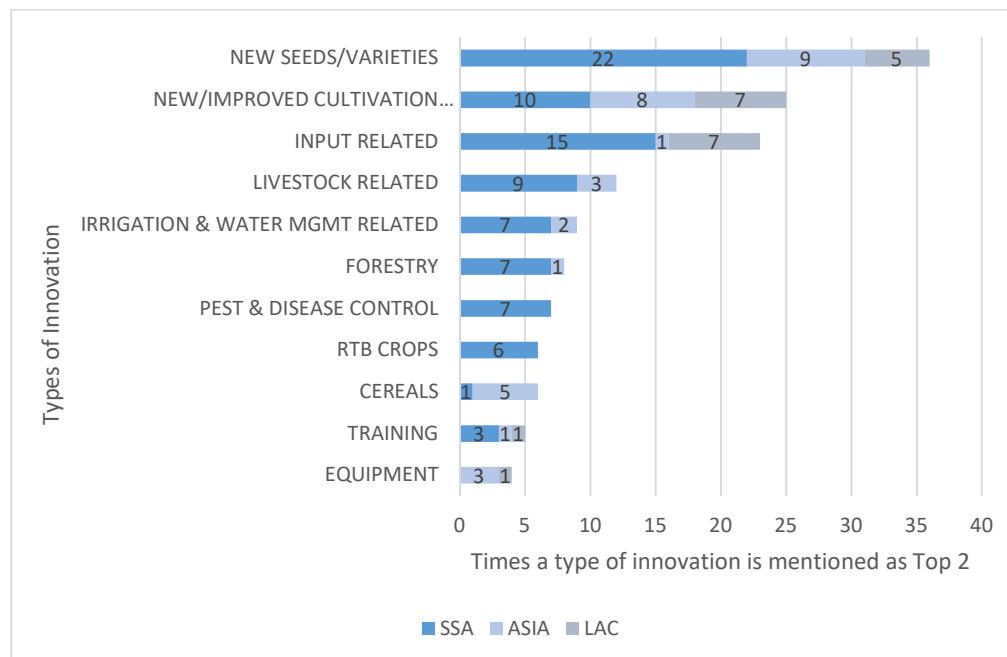
Figure 2.2a Top two innovations self-selected by women's groups (cited in FGD), by regions



Note 1: Other types of top two innovations were mentioned infrequently by 4 groups in SSA, 2 in ASIA and 4 in LAC.

Note 2: There are 42 women FGDs considered in SSA, 18 in Asia and 12 in LAC. Where both top two selections come from the same category, for example animal raising, this counts as two citations, so that in some cases there could be more citations than the number of focus groups. This occurs in Colombia with animal raising.

Figure 2.2b Top two innovations self-selected by men's groups (cited in FGD), by regions



Note 1 Other types of top two innovations were mentioned infrequently by 5 groups in SSA, 2 in ASIA and 3 in LAC.

Note 2: There are 42 men's FGDs considered in SSA, 18 in Asia and 12 in LAC. Where both top two selections come from the same category, for example animal raising, this counts as two citations, so that in some cases there could be more citations than the number of focus groups. This occurs in Colombia with animal raising.

In relation to new varieties and seeds, there is a major divergence between women in SSA compared to Asian or LAC cases, which is due to the different position women have in agriculture in those regions. Women's more autonomous involvement in agricultural activities in the SSA cases reflects a strong interest in varieties and seeds. In contrast in Colombia, women are less involved in cultivation of cassava which is one of the major crops in the location. In the Asian cases in Vietnam and Bangladesh, varietal renewal still seems to occur primarily through men's connections. For men in the three regions, their interest in new varieties and quality seeds is very similar, reinforcing the point just made.

In SSA women mentioned improved cultivation practices more frequently than in other regions, though RTB cultivation methods are mentioned about equally in SSA and in Asia. This is probably due to the importance of sweetpotato as a homegarden crop for women in Bangladesh and as a source of animal feed for women in Vietnam. In SSA, especially in Uganda, women are concerned with cultivation methods for a range of RTB crops, which are key components of food security.

Institutional innovations were very little cited by either men or women or in any regions among their top two innovations. This may be because even among facilitators, innovation was much more strongly understood in technical terms.

Women more frequently identified equipment or machinery as among their top two innovations than men

Though not among the most frequently identified, nevertheless it is significant that more women's groups than men's group identified equipment or machinery as among their top two innovations. Among the five women's groups in SSA who identified equipment, all were in Nigeria, with women's groups prioritizing machinery for oil palm processing and cassava processing. In Asia, Bangladeshi women mentioned threshing machines, rice harvesting equipment and sprays as top two innovations. These findings contradict gender stereotypical ideas about machinery as a male preserve. This will be discussed in the final part of this section.

Women and men under or overestimate each other's priority innovations which may have negative implications if research for development interventions are gender blind

When we look at the data on cross-sex perceptions of highest ranking agricultural innovations, we find that there is some overlap between own innovation priorities and those attributed to the opposite sex. From the 72 focus groups in the sample conducted with women, a little under half (46%) had at least one top rated innovation overlapping between themselves and their perceptions of men's priorities. For men, the overlap was almost the same (47%). In other words about half of the groups considered that the opposite sex had similar priorities to themselves. However, these assessments were not always accurate.

One area where both middle class and low-income men correctly attributed high priority among women was for food security crops and the establishment of household gardens. However, they considerably underestimated the importance for women of innovations in small livestock, despite their ubiquitous presence around rural homesteads.

The women's groups on the other hand were often unable to identify the priorities of men. This was strongly the case with underestimation of the importance of new varieties and use of new inputs. There was also overestimation of the importance of livestock innovation and the use of equipment. There is also an apparent lack of knowledge among women about men's investments in agricultural inputs and also their prioritization of new crop varieties. This especially applies to crops that are managed by men, such as coffee, banana and rice in Africa.

Why are these findings relevant? These results may signal greater segmentation of roles in agriculture with less flow of knowledge than is implied for example in the idea of "the family farm". The consequences of these results for RTB and other agricultural research organizations are far reaching. For example, priority setting exercises that do not seek information from both men and women may end up setting gender blind priorities which may not be able to address the needs of men and women. Thus it is critical to engage both men and women in research exercises and technology design to ensure that they both have a voice in the way research priorities are set and technologies designed.

RTB-HT focal technologies and practices featured importantly as top two innovations

Most of the cases in this study were selected in relation to particular interventions and innovations being undertaken as part of the RTB program (referred to in the study and henceforth as "focal innovations [FI]"). Discussion of these FIs was introduced into FGDs, and there are many questions in the research tools focused on collecting information about them. Though most cases considered just one FI, some listed up to three and some, because of choice of location or for other reasons, did not identify any FI, concentrating instead on innovations mentioned by the community. The latter situation applies to the 4 cases of Vietnam, one case from Rwanda and one from Democratic Republic of Congo and these are excluded from this analysis.

A caveat before considering the data from the remaining 18 cases concerns possible bias in the responses, given that in some situations those facilitating the process were known to be involved in the promotion of the FI. Use of triangulation techniques and confirmatory follow up questions were applied to try to reduce this bias.

While some of the FIs were displaced in importance by other innovations that were internally developed or brought by other external agents, others were well received and adopted in the communities where they were introduced. It is therefore useful to identify the cases where the FIs were ranked as one of the top 2 innovations in the different FGDs. For this exercise, we only consider the first listed FI where more than one was mentioned.

The first listed FIs for the 18 RTB-HT cases are the following: orange fleshed sweetpotato (OFSP), cassava processing varieties, banana Xanthomonas wilt (BXW) control, hybrid maize, new potato seed varieties, cocoa, oil palm, integrated systems (livestock, banana and fodder crops for improved soil productivity) and improved pig breeding. Each of the percentages in Figure 2.3 are calculated taking into account the total number of FGDs in whose communities the particular FI had been introduced. For example, OFSP was introduced into 5 of the 24 cases of the RTB-HT sample, so the total number of FGDs considered to establish the percentage is 30). Hence, the results show the frequency with which the FI is mentioned as one of the top 2 innovations for men and women, in communities where it was introduced.

Figure 2.3 Frequency of inclusion of the Focal Innovation as one of the top two innovations for all FGs in the communities where they were introduced (%)

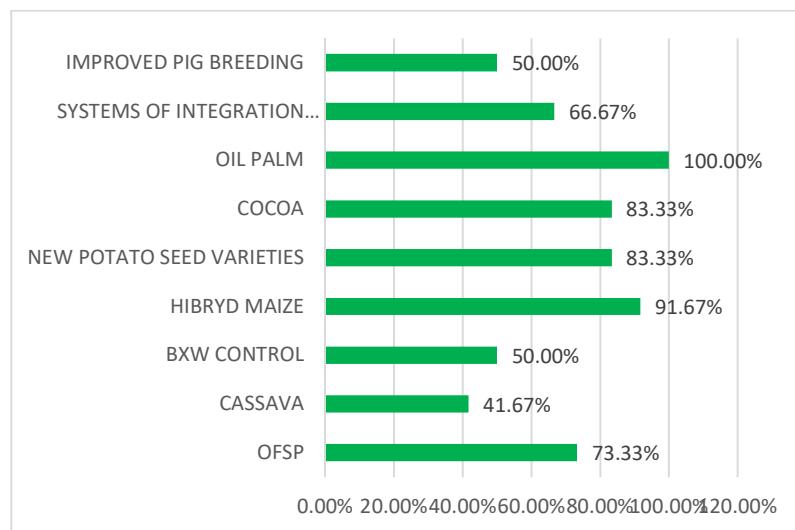


Figure 2.3 indicates that, except for cassava varieties, all the focal innovations were mentioned as top 2 innovations in 50% or more of the FGDs. For example, oil palm is mentioned as one of the top 2 in all of the six FGDs included in one of the cases from Nigeria. OFSP, which was the focal innovation for 5 of the cases in the RTB-HT sample in Malawi, Uganda and Bangladesh, was rated in the top 2 in almost three quarters (73%) of a total of 30 FGDs. Overall, in two thirds of the 108 FGDs (that is, in 72 FGDs), focal innovations were selected by women and men as one of their top 2 innovations.

Even though several of the focal innovations were explicitly targeting women, such as OFSP, there was very little difference overall in the extent to which men and women included focal innovations in their top two. This suggests that in some cases men and women may be recognizing the importance of a focal innovation even though they are not directly benefiting, because of its importance to their spouses. This requires more detailed analysis of particular cases, since there is also evidence of negative reactions from men to innovations targeting women. Disaggregating by class and youth it was found that youth were much less likely to include focal innovations in their top two (young women and men accounted for 13% and 15% respectively of FGDs including focal innovations in their top two). It was also noted that among the low-income FGDs both men and women frequently mentioned improved RTB varieties (banana, potato, sweetpotato, and cassava) together with livestock related innovations among the top two innovations. In the following section

there is a discussion of the importance of the system potential of certain innovations, especially for women.

2.2 Why were the top two innovations selected?

The previous sub-section identified similarities and differences among women and men in both the selection of top two innovations and the extent to which communities included among their most important innovations the new technologies or practices which RTB and Humidtropics have been evaluating and promoting. What explains those similarities and differences? This section explores the question through several key messages that have emerged from the substance of these studies which have different implications for :

- Innovations contributing to increased income were included in top two, but gender norms governing ownership rights determined particular crop or animal preferences
- Technologies contributing to food security and nutrition were favored by both men and women
- Women identify innovations that improve their independence and decision making power
- Women and young men prefer technologies that reduce drudgery
- Top innovations identified by women have stronger whole system benefits

Innovations contributing to increased income were targeted for top two, but gender norms governing ownership rights determined specific crop or animal preferences

Men, women and youth mentioned an increase in income as a reason for ranking some innovations among the top two. The meaning of income has important differences for different groups. For many women's groups, especially in SSA, innovations were identified as a source of personal income, separate from that earned by the spouse and thus a source of increased agency. Overall, there seems little difference between women and men in the importance they give to this reason for selecting an innovation. Using "yield and profitability" as a key proxy for income in the qualitative data analysis, women had 117 references out of a total of 207 references. On the other hand, a simple word search of text about reasons for choice of innovations for the term "income" and derivatives, produced 128 references for men and 112 for women.

Among the RTB case studies, both men and women identified RTB crops among their top ranked innovations because of their potential to earn income. This was especially the case with new crop varieties and both men and women farmers in Uganda for example mentioned OFSP as an important innovation because the varieties were faster maturing than local varieties. It seems to be the case that innovations that give quick returns are more important for poor men and women farmers while better off farmers will be able to wait for a bigger payoff.

Other types of innovations were also identified because of their income-earning potential, especially their capacity to produce income quickly. In Uganda, budding and grafting innovations for citrus leading to more rapid fruit development, were valued by poor men farmers as important because of the quicker returns. Among the low-income men's group in Burundi, men also stated that they ranked hybrid pigs as their top innovation because the pigs reproduce and mature more quickly than local breeds, enabling them to get money quickly back from their investment.

Consistent with the frequency with which women identified new livestock breeds and practices among their top two innovations, they also more commonly recognized livestock as having high potential for income generation. This was especially the case for small livestock across all regions, but also zero-grazed dairy animals in Kenya for milk sales. The involvement of women in the low investment low return business with small livestock and animal by-products contrasts with the more common citation by men of commercial raising and selling of cattle, such as hybrid oxen in Vietnam or cows in Kenya. In both countries women emphasized milk sales. This is related to the fact that the purchase and sale of large livestock involves large investments which men as household heads are able to manage:

We can make decisions on plants. But if we want to buy a cow, we must ask our husbands because “a water buffalo can start a whole fortune”. Women can decide to buy a pig, but a cow costs tens of millions of dongs, so I must ask my husband. In general, if it involves tens of millions of dongs, I must ask my husband; for things below 10 million dongs, I can make decisions myself. (Middle class women FGD, Vietnam)

However, matters such as cows, house, and land are important matters, which are decided by the husband. Even if there's something I know but the husband doesn't know, I still have to ask him. (Middle class women FGD, Vietnam)

Women youth in Uganda stated that OFSP was beneficial to women since they get money from it. Both men (Malawi) and women groups (Uganda) also mentioned selling sweetpotato vines as a source of income and this is also mentioned by women in Bangladesh. But men in these countries also can access cash through this innovation. However there are some technologies that are more clearly gendered in terms of access to cash. For example, some young women's FGDs in Uganda and middle class women in Burundi stated that banana was important for men and not for women as a source of income:

Bananas are important for men because men dominate bananas although women work there most times. Most women do not have banana plantations and even when they hire land they only plant seasonal crops because the land owners do not hire out land for planting bananas (Women Youth FGD participant, Uganda)

The man is responsible for all activities related to banana and rice from planting, crop management, harvesting and selling, and also the use of money from the sales of the 2 crops.(Middle class women, Burundi)

Young women in Uganda say they prefer annual crops such as beans and maize compared to perennial crops such as banana to help them have access to cash and be able to buy clothes for their children. Access to land is also an important factor in determining this crop preference and opportunity. Semi-permanent crops like banana can only be planted land you own, which is not usually the case for women. Widows who inherit land do sometimes plant and sell banana for income. As will be discussed in a later section, crops requiring high financial investment like coffee, tomato and citrus are also often not available for women, despite their high income-earning potential.

These examples of livestock and types of crops as sources of income are related to social considerations about ownership rights and decision-making rights over certain assets, especially finance. As women in Vietnam stated, important things and things that can affect the household wealth either in a positive or negative way have to be decided by men as the household heads. Men in Vietnam put hybrid cows as among their top two innovations because according to them cows have high economic value. In Kenya cattle have both economic and cultural significance. Men use them for bridewealth payments and in other rituals and they are therefore under men's control. Control over the income is a key element in the choice of top ranked innovations. As expressed below by woman belonging to a group that had listed poultry in the top two innovations in Kenya:

Poultry because we can use at home and easily sell. Also, in many families these are not restricted so women can raise and sell without having to ask the man's permission. (Woman Ladder of Life FGD participant, Kenya)

This is also reported in Bangladesh, where low income and middle class women emphasize the cultivation of vegetables next to the house as a small source of personal income.

Closely linked to improved income as a reason for preferring a technology is higher yield. Low-income men's FGDs in particular showed strong interest in high-yielding varieties (HYVs) of key crops, including RTB crops. The same applies to the identification of new breeds of small and large animals, including hybrid oxen in Vietnam. Also linked to increased yield is the choice of improved fertilizer

applications. Decreased soil fertility and small land sizes were often mentioned to explain why fertilizers were needed to increase yield.

In Bangladesh young men mentioned that pre-mixed fertilizers were very important because while farmers do not really know the amount of fertilizer to use for rice, wheat and sweetpotato, the use of premixed fertilizers made application easier, even for women. In Rwanda men mentioned fertilisers as a key innovation since it increases their yield.

Also young men in Rwanda stated that it was easy for them to adopt fertilizer use because of government support and subsidy. In this respect, government support was important for youth to adopt fertilizer because of the high cost involved. None of the women mentioned fertilizers in terms of increased yield and this raises the possibility of their limited access to finance to buy even subsidized fertilizer or access to outlets to buy them or that fertilizer is only applied on cash crops which fall under the control of men rather than food crops which fall under the control of women.

Technologies contributing to food security and nutrition strongly favored by women, but also by men

Both men and women farmers identified the contribution of technologies to food and nutrition security as an important reason for their choice, but women gave this reason more frequently than men. This was the case for women in SSA and in Asia, but was almost absent as a reason for choice of top two for women in Colombia. Women also identified household gardens which are also tied to food security as important to them. One woman from Malawi explained why irrigation was among her top two innovations:

When we irrigate our crops we can grow crops throughout the year. And every woman wants to have a household with enough food.

If there is no food, she suffers because she has to think about what the children will eat.

(Women Innovation FGD Participants, Malawi)

Women in different FGDs often mentioned that technologies that increased food availability were good for them in the event that their husbands were unable or unwilling to provide for the family. In Burundi, middle-class women identified improved cassava varieties (*Manihot esculenta*) because of their ability to last longer in the soil after maturity which made it possible for them to harvest continuously improving the household's food security.

Men also stated that technologies that helped fight malnutrition were good for women because it is their role to ensure good nutrition for the family. For example, the introduction of home gardens were stated by middle class men in Rwanda to be helpful for women to ensure household nutrition. The availability of vegetables from newly established home gardens were also highlighted by poor and middle class women in Bangladesh and the same role was mentioned by men there. In various discussions with low-income and middle class women in Bangladesh and in Malawi, innovations such as OFSP were lauded for their nutritional benefits. Low income women in Bangladesh specifically identified it as a source of vitamin A. women in Kenya, concerned with ensuring food for their home, identified improved varieties of maize (*Zea mays*) as an important part of her provisioning strategy. Women often referred to their role in household food provisioning when discussing their top two innovations.

Malawi women felt that the way the new innovation of OFSP had been introduced was also conducive for creating collaboration between men and women in terms of household nutrition. For instance, some women stated that the nutritional training they received also allowed men to recognize the benefits of OFSP and the importance of vitamin A. This might indicate the necessity of also targeting men in innovations focused on nutrition, in order to have an impact on the entire family.

Women ranked some technologies and innovations among the top 2 because of their production and post-production characteristics which can contribute to food security. For example, women mentioned the benefits of delayed harvesting of cassava and the processing of OFSP into

various products including bread, flour and porridge. In Kenya women preferred maize because it could be stored over long periods of time ensuring food availability.

Some innovations are prioritized for food security, but have a less direct contribution. Men in Burundi and Vietnam, and both women and men in Malawi, stated that long dry spells and unpredictable weather puts irrigation technologies in their top innovations as it ensured food production and food availability throughout the year. Furthermore, it was also stated that smaller land sizes in both Malawi and Burundi meant that food produced during the rainy season was usually not enough to guarantee a family's food security. Irrigation ensured continuous production.

Women identify innovations that improve their independence and decision making power

The importance for women of independent personal income can be seen as part of a broader interest in innovations that increase independence and decision-making, an interest also shared by some men's groups. Whereas men mostly mentioned that cash income helps them to move out of poverty, women frequently emphasize access to personal income. In some cases earning their own income is a protection in case their husband is not responsible and stops contributing income to the family:

We depend on potatoes to take care of our families. If a woman has her own plot, and works hard on it, she will harvest more and be able to stand on her feet.

If her husband is not forth coming with his money, you know you have somewhere to bank on (Low income women FGD, Malawi)

Vegetables and potatoes give little money regularly and the girls always need small amounts continuously money for their daily needs (Young man FGD, Burundi)

Thus women preferred technologies where they could control access to benefits from marketing thus increasing their autonomy in decision making.

Women also referred to the choice of crops that they can easily adopt and cultivate independently and that do not require a lot of space or dependence on men. The frequent high rank of vegetables among women's groups in Bangladesh for example, supports this idea. While high market demand was mentioned by the women's groups as a reason why vegetables were among the top two innovations for them, what was really important for women was also that they could cultivate the vegetables by themselves. As one woman commented: "*Women can do it!*"

In Burundi, women also described their independent cultivation of maize:

Maize, even before maturity the woman can pick fresh cobs without asking permission to the husband.

Even after harvesting she can decide how much to sell, to keep for home consumption and for seed. (Women Innovation FGD participants, Burundi).

Women also referred to irrigation technologies that they can operate alone, making the treadle pump, which were mentioned by men in Malawi as widely used, problematic compared to electric pumps for example. Innovations that do not require extensive movement are also valued, especially in contexts where physical mobility is restricted. So homestead gardens and small animals have an important role in Bangladesh.

Whether an innovation has a ready and easily accessible market is another criterion affecting women's independence which was highlighted by both women and men's groups. For example in Uganda, women noted that there is a ready market for citrus, "*they just come to your garden and harvest and buy from you*" (Low income women FGD, Uganda). In Bangladesh, where gender norms lead to restrictions on women's ability to market their product, for selling women develop social networks for sale of chicken and ducks. Women invite guests to their house and gift the poultry to the visitors.

Women and young men prefer technologies that reduce drudgery

Middle class and low income women and young men most frequently mentioned innovations in terms of their reduction of labor and the most common types of innovation involved equipment and machinery and herbicides. For example, in relation to potato farming men farmers stated that different kinds of water pumps helped since they reduced the labor needed to water the crops manually. But although the treadle pumps common in Malawi are better than manually irrigating, they were not appropriate for women because they still required a lot of energy. Electric pumps are considered much more women friendly.

In Bangladesh out of six women's FGDs, three from low-income, middle class and youth chose equipment as their top two innovations and cited reduction of drudgery as the reason:

At past we had our leg tired. But now we have rice flicking machine

(Middle class women FGD, Bangladesh)

They also noted additional social and economic benefits such as the reduction of quarrels in the home because work is finished on time and the ability to use time saved in other economic activities open to women, like rearing ducks. Bangladeshi low income men also identified sprayers as a key innovation because they saved men's labor in spraying rice fields.

Young men in Vietnam were the only youth that mentioned use of machinery as labor-saving and resulting in high economic benefits. This may be because in Vietnam, through government investment in new industries such as cassava processing, new employment opportunities are opening up.

Where herbicides were mentioned as a top innovation, it was usually as a technology that is important for men. This may be related to the kinds of crops that men cultivate, involving higher investment. However even when stating that herbicides were important for men, women in Uganda stated that use of herbicides promoted an increase in land under cultivation since one will not rely of manual labour for weeding:

The workload in terms of weeding has also greatly reduced, now men grow acres and acres of maize and have increased yields (Low income women FGD, Uganda)

Women were also heavily engaged in weeding thus such technologies as herbicides also drastically reduced their labor burden. Men who listed herbicides as an important innovation also had similar assessments of why it was important to them:

Using herbicide helps you to increase the cropped acreage, resulting into increased yields to feed both people and animals (e.g., maize bran) (Low income men FGD, Uganda)

Through using herbicides, some farmers have earned lots of money they had never dreamt of. For example one can get about UGX 500000 in a season (Young men FGD, Uganda)

Some agricultural innovations are considered less or more labor intensive and are ranked accordingly. OFSP was identified by women in Uganda and young men in Bangladesh as demanding low labor. In Uganda, men considered that women could not be involved in animal grazing because water sources were far away and women had domestic chores to carry out. Thus, women in Uganda and other locations highly rated zero-grazing as a flexible, labor-saving practice.

Top innovations identified by women have stronger whole system benefits

Farming and food production are part of systems, involving interactions between crops and animals and the natural resource base of soils, water and biodiversity. Some of the important innovations that are highly ranked, especially by women's groups, seem aimed at realizing system benefits. Out of 19 instances of groups prioritizing these kinds of benefits, middle class women and young women account for 13. A key area for these whole systems benefits derives from women's consistent selection of innovations in livestock as among their top two. This includes use of maize stalks for animal feed, use of animal manure on small plots and use of agricultural by-products like

maize stalks as mulch. While both men and women mentioned the importance of hybrid maize only women's groups mentioned maize stalk as an important source of manure, animal feed and mulch.

It is only women who have animals who can use own manure, but for others we use it minimally (Women Youth FGD participants, Uganda)

Zero grazing, mentioned by women's groups in Uganda and Kenya as one of their top two innovations, has significant system-wide benefits. In Kenya women mentioned that they could sell milk to get cash to pay for household expenses and children's school fees and could use manure to improve fertility on their farms. In Rwanda men also mentioned that zero grazing was important for women because it complemented their home gardens in their fight against malnutrition. It is also adaptive for enabling women to carry out their role as carers, even involving children who were out of school to look after the cattle. Women in Kenya also stated that they could save money from milk sales using table banking groups and then access loans for other farm activities

Hens also produce very good manure and reproduce well for a good business for eggs and meat. You can sell chickens and their products and buy even a cow (Young woman FGD, Kenya)

Women like breeding and raising animals, they are better at that. "Even when my wife is absent and I stay home, I may not feed the pigs", "Men go watching cock fight, women stay home to feed chicken" (Young men FGD, Vietnam)

Thus women could use money from selling their small livestock to invest, strengthen their social ties as well as get manure for their gardens.

2.3Factors that support innovation for men and women

Having looked at similarities and differences in top ranked innovations between men and women and at the drivers of their decisions, we now look at the way the opportunity structure supports or hinders innovation differentially for men and women.

Assets, especially land and capital, are basic factors supporting innovation for men and women

Just under a third of mentions of top two factors supporting innovation related to assets, especially land and capital (Figure 2.4). Women mention this factor slightly more than men, though men are the predominant owners of key agricultural assets in most of the case studies. Women, like men, recognize the importance of land, and the challenge of accessing it.

"The land is where she cultivates whatever she wants to cultivate. When it rains it is in the land you will cultivate. And when you have the land you can do all the activities on time and you will have high yields and enough food in the home." (Middle class women's FGD, Uganda)

"Land is the primary raw material as such in absence of this no activity will be done" (Men's FGD Malawi)

It seems likely that many men and women considered land an ultimate factor underlying the possibility of innovation, with other factors as proximate factors. Men producing banana in Uganda stated that if you only have access to rented land this limits innovation because the land owner will not rent out for perennial crops like banana. It was also mentioned that those who had land were not poor since they could use their land for income generating purposes.

Both men and women regarded access to money and other financial services and markets as key to innovation. Money supported innovation through the ability to buy land, inputs or pay for labor and generally by increasing a farmer's ability to invest in agriculture. In Vietnam both men and women mentioned access to low interest bank loans as well as access to agricultural inputs on loan as important financial backing that allowed them to be innovative and to adopt new technologies.

Money is so important, that it has a place right under god himself (Middle class women FGD, Bangladesh)

Money is the most important factor because once a farmer has it he can afford to obtain almost everything that is required to support innovation (Men's FGD, Malawi)

For men and women personal/individual traits are major factors in innovation

Behaviors, attitudes and family relations were mentioned repeatedly by both men and women's FGDs as important factors supporting innovation. They account for about 20% of mentions of top factors supporting innovation, with women more frequently citing this factor. Individual traits that helped build trust from other members in the community can help with innovations, especially innovations that require cooperation from other people. Community integration and being a person of good standing in society was regarded as important. Men in Malawi mentioned interest, good conduct in their communities and not being alcoholics which allowed them to cultivate networks which are helpful towards being innovative. Male innovators in Vietnam and Bangladesh also mentioned good community relationship as important for them.

Middle class men and women refer similarly to positive personal traits, like being hard working, cooperative, disciplined, resourceful, committed and having a strong will. Nonetheless, men were more likely to mention traits as disciplined and committed, while women were more likely to mention resourcefulness as a good trait that allows them to be innovative in the absence of land. They talking about dedication and hard work included knowledge, labor commitment and "daring". Men also included "bravery" along with the other factors mentioned above.

The most important thing is I have is a great passion to work. I was born into poverty so I was determined to work and gain success. Success will come only when we dare to think, dare to do. We will never be successful if we are frustrated and give up right after we see some difficulties (Middle class men FGD, Vietnam)

Thus while personal traits were important for both men and women, some times there are differences in the type of traits considered as important

In the Democratic Republic of Congo and Burundi women also mentioned peace and security as promoters of innovation among women. These two countries have suffered from decades of conflict and civil strife which could explain why women mentioned these as key facilitators

Harmonious family relations are key in supporting women's innovation particularly support from husbands or in-laws

Women referred more than men to family relations supporting innovation. A supportive husband was mentioned in many women's groups as a key factor that supports innovation among women. Some women in Bangladesh regarded their husband's support and help or the help of parents in law as the most important factor to support innovation. Some women were also able to get land from their husbands to implement various new activities. In Uganda women innovators stated that with a supportive husband it was easy to be innovative since a wife could discuss with such a husband and reach an agreement. Supportive husbands could also help the wife with some tasks such as clearing the land and weeding which could be useful in a successful innovation experience. In Vietnam women stated that even if the husband does not agree they could go ahead and plant what they want but they would have to invest more on hired labour since the husband could withdraw his labor if not happy.

A supportive husband facilitates a wife's access to training and to acquire the knowledge and also access the land they need to be innovative as stated by the woman innovator below:

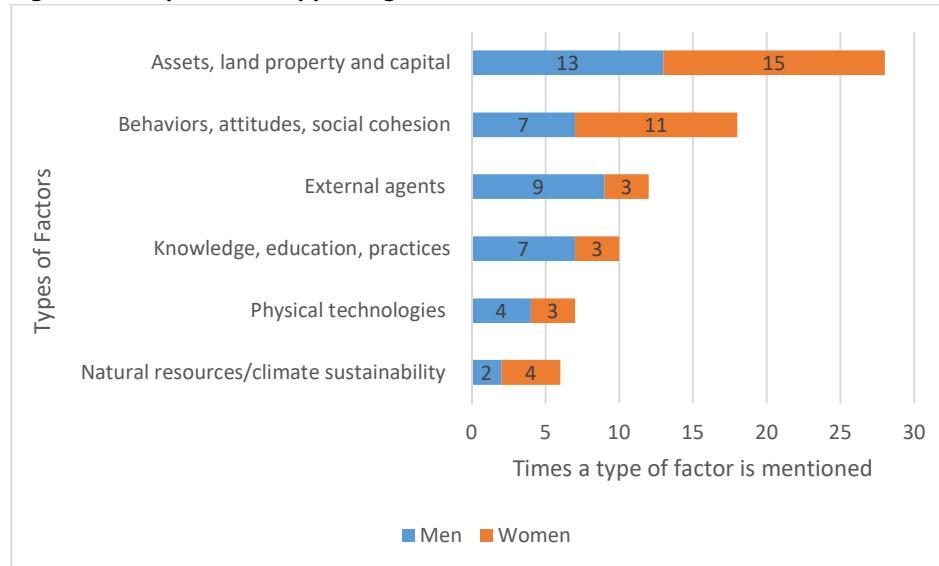
It is because I was living in harmony with my husband – he allowed me to go for trainings, he allowed me to handle income from sales. Without this, I would not have been able to adopt OFSP and benefit from it (Middle class women FGD, Uganda)

Husband's encouragement (1): Happiness in the family is the most important. If the husband doesn't feel comfortable, the work won't go well. (Middle class women FGD, Vietnam)

Some men also demonstrated understanding of this reality, and how women may need to negotiate to strengthen their ability to innovate:

[good relations in the household are] important for women because the men are the owners of the land and make the last decisions on what to be done on their land. It is important for a woman to have a common understanding with the man if she is to introduce something new in the household (Middle class men FGD, Uganda)

Figure 2.4: Top factors supporting innovation mentioned in better off FGDs



In specific contexts, the support from external partners and services is recognized as a key contributor to innovation for men more than women

Men's groups identified more strongly than women the importance of different kinds of institutional support from external actors as a contribution to innovation. This probably reflects the lower access of women to external agencies demonstrated in the study.

However, among individual innovators in some countries more women than men mentioned access to extension services and information as key support for innovation. Women regarded extension as important because they learn how to do things.

Knowledge and skills are important factors supporting innovation

Agricultural knowledge, education and skilled application of practices was also seen by men in particular as an important factor in innovation.

Knowledge is a must. Without knowledge one couldn't know when to sow, irrigate or apply fertilizer (Men's FGD, Bangladesh)

Being able to acquire knowledge and to apply it in the field is regarded as the key factor for large numbers of men and women in agricultural innovation. The men and women's groups included in this factor the importance of receiving formal education so as to better understand new technologies ("Well educated people can study, innovate and apply technological advances in practice" – Men-s FGD Vietnam), but also participation in trainings on specific innovations.

Knowledge is also seen as offering opportunities to strengthen other aspects of livelihoods:

I learned many things while cultivating sweet potato that will help me in different ways. For example, I can now give advice to others about agricultural activity. From training my status got increased, I can now start any new cultivation easily. (Women's FGD, Bangladesh)

Knowledge can also be shared, benefitting relatives and neighbors and building up an important type of human capital – prestige.

Technologies underpin innovation for both men and women

Both men and women recognized physical technologies as their top factors for innovation, especially in the sense of obtaining agricultural products that increase yields (new varieties, quality seed, fertilizers etc).

Some groups linked the availability of technologies to reaching a market and earning money and that contributes to innovation:

If resources are available, and we see profits in the work we do, we are encouraged. Women need good profit so that they are able to become independent...If it is not profitable, you leave it like we left growing wheat. We adopted the wheat and grew it on a large scale only to be disappointed that there were no markets for this crop. (Women innovation FGD participants, Malawi)

2.4 Factors that hinder innovation

Many of the factors hindering innovation are the reverse of those that were identified as supporting it. So the most common hindrance is seen as lack of assets, especially land, and lack of capital. This is not just about not being able to purchase inputs, but of creating a situation where men and women are unable to apply the personal characteristics of drive and determination referred to in Section 2.3, because of the negative effects of poverty. Slightly more men than women mentioned this as the top hindrance, but clearly women recognize the need for access to land and also access to finance, even though they are likely to invest in less capital-intensive innovations than men, as mentioned above:

Lack of funds like if you need money for fertilizer will make one to use manure instead hence poor results (Middle income women FGD, Kenya)

Lack of financial support [is the biggest hindrance] because without money you cannot do anything. (Middle income women FGD, Kenya)

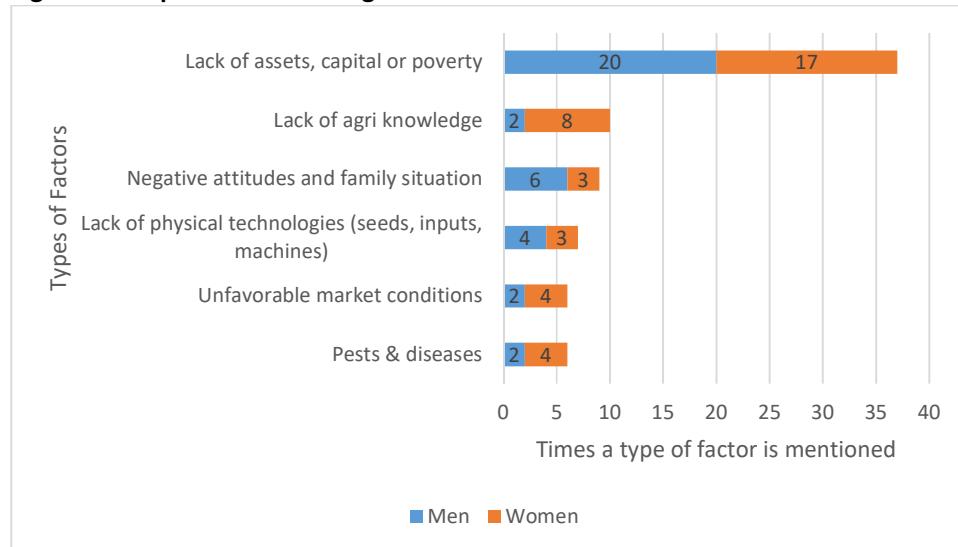
Another factor clearly identified as an obstacle to innovation were negative attitudes and an unhelpful family situation. Women mention the consequence of this reality in terms of lack of autonomy in decision making and restrictive gender norms creating stress and conflict in the household limited access to resources and sometimes restrictions on physical mobility:

Women can contribute to the household development, but when they want to bring in new varieties for example of beans, the husband can refuse her to try the new variety. (Middle class women FGD, Burundi)

The biggest challenge is husband's objection because he is head of household, every decision depends on him (Middle class women FGD, Vietnam)

The women may ask the husband for a portion of land to grow something he will just keep quiet and not reply and the woman goes ahead to grow the crops on that piece, later on the men will come and plant their bananas in that same plot (Middle class women FGD, Uganda)

Figure 2.5 Top factors hindering innovation mentioned in better off FGDs



Finally, though not identified by many as a top factor hindering innovation, both women and men commented on the constraint women faced through lack of formal education or of having the chance to attend trainings. Some men commented that women may be less innovative or less able to understand new innovations through lack of access to formal education.

If one is not intelligent enough she will not be able to go further. So [education] is needed (Middle-income woman's FGD, Bangladesh)

[Main hindrance is] lack of the skills and ability. Sometimes you want to see how one farmer will succeed first so you lack the initiative and have fear (Middle-income women's FGD, Kenya)

2.5 Section summary and conclusion

For both men and women livestock related innovations and improved crop varieties were consistently ranked as top two innovations, with RTB crop improvement especially important in African case studies. Women had a strong interest in better equipment in some locations. Those innovations that increase food security and income are most likely to be chosen by both men and women as their top innovations. However, there were some significant differences among regions and also between men and women. Women in Africa mentioned a greater diversity of livestock related innovations compared to women in Asia, but women in Colombian groups were most consistent in identifying the importance of livestock. Women in Asia, especially Bangladesh, were more likely to mention family relations as being most supportive of innovation compared to African case studies. This underlines the need to consider place-based issues related to specific innovations because different environmental, social and political contexts affect how innovations are socialised or which innovations are prioritized.

The main factors supporting women's and men's opportunities for being innovative are access to resources. Lack of access to resources leads to a vicious cycle of poverty, indebtedness and more marginalisation. Access to money was clearly important for both men and women, but land use was repeatedly mentioned and this is subject to gender norms. For instance, while men talked about ownership and control of land women tended to talk mostly about being able to gain access and use land. Men are more in control of financial and physical assets than women. Poverty and lack of money for men and women thus can have different causes and mean different things. It is critical to unpack these causes and implications if meaningful innovations that respond to men and women's needs are to be developed.

Personal characteristics and family relations were cited by all groups, but especially by women as crucial for successful innovation. For women, access to resources are often mediated through their dependence on male relatives, mostly spouses. An uncooperative spouse or stresses and tensions in the family can prevent access to resources and agricultural innovation. To achieve a positive personal and family environment for innovation women often require negotiation and skillful management.

Section 3 Gender norms, agency and innovation

The previous section explored the key question of "what unleashes innovation" for women and men and we looked at similarities and differences in prioritized innovations, motivations surrounding the RTB-HT innovations and then at factors which support and hinder innovative behavior by men and women. In this section, we seek a deeper understanding of the norms underlying choice and motivation for choosing innovations. The analysis also explores in more detail levels of agency which are linked to the normative setting and which help to explain the supporting and hindering factors for being innovative.

3.1 Farming roles in RTB and HT systems: what constitutes a good farmer according to women and men?

In this sub-section we provide evidence on the diverse ways in which women and men engage in RTB agriculture and humid tropical production systems and how they perceive their own agricultural roles and the normative expectations of the society. What does it mean for women and men to be a 'good farmer'? How do they perceive themselves in this role and how do they perceive the opposite sex?

Perceptions on what constitutes a 'good man farmer' and a 'good women farmer' reflect commonly held norms that refer to character, skills and knowledge and asset endowments. Such information provides an understanding of feminine and masculine identities and socially acceptable behaviors that directly and indirectly affect an individual's ability to innovate in agriculture. We identify similarities and differences in gender-specific patterns and trends across countries. Perceptions were grouped into five emergent, key categories: 1) Knowledge and skills related to crop management, 2) Behavior, attitude and community interactions, 3) household interactions in relation to decision-making and work, 4) responsibilities to the household, and 5) Resource endowments.

Men farmers should be knowledgeable and skilled and share with the community

In all regions, both women and men judge a male farmer primarily on his knowledge and skills (cat 1) and on his position in the community (cat 2). It is for instance good for a man to share his farming knowledge with other people in the community and he should not have conflicts. Only women in Africa mention that a 'man who is a good farmer' makes decisions concerning farm management, sales and expenditure together with his wife (cat. 3). The role of men as provider to the family is emphasized only in Africa by both women and men (Cat. 4). And also only in Africa resource endowments of men are mentioned respondents often expect male farmers to own farming equipment and livestock (cat. 5). Specifically in Uganda, men are expected to own land (Cat. 5).

Table 3.1 Good male farmer characteristics, source: Poor and middle income Adult FGDs

'The good man farmer'		
Category of statement	Mentioned by men in:	Mentioned by women in:
1) Knowledge and skills related to crop management	Bangladesh, Burundi, Kenya, Malawi, Nigeria, Rwanda, Uganda, Vietnam	Bangladesh, Burundi, Congo DR, Kenya, Malawi, Nigeria, Rwanda, Uganda, Vietnam
2) Behaviour, attitude and community interactions	Burundi, Kenya, Congo DR, Malawi, Nigeria, Rwanda, Uganda, Vietnam	Bangladesh, Congo DR, Rwanda, Malawi, Nigeria, Uganda, Vietnam
3) Household interactions in relation to decision-making and work		Burundi, Congo DR, Kenya, Rwanda, Uganda
4) Responsibilities to the household	Burundi, Congo DR, Kenya, Malawi, Nigeria, Uganda	Burundi, Malawi, Uganda, Vietnam
5) Resource endowments	Burundi, Rwanda, Kenya, Malawi, Nigeria, Uganda,	Malawi, Uganda

Women farmers should support their husband in farming and farm independently

There is a stark difference between ‘African’ views about the position of women in farming and the views expressed by men and women in Vietnam, Colombia and Bangladesh. Though there are many differences among those three countries, married women are hardly ever conceived as independent managers in the farm or the household. Rather, they play a supportive role to their husbands that might include working in the field with the husband on his plot, to assist him (Table 3.2, cat 3). Their ‘caring’ role is emphasized for instance by taking care of the husband when he returns from a day of work. In Central Vietnam a woman farmer is expected to be able to replace her husband in his absence and should therefore have knowledge and skills on common farming practices (Table 3.1, cat 1).

In Africa married women also have an obligation to their husband to work on his plot and crops. These crops can be either staple or cash crops and can be destined for both sales and household consumption. Women and children’s labor is often prioritized for husbands’ plots and crops over their own plots and crops (Table 3.2,cat 3) (Nigeria and Uganda). But although married women are expected to contribute to their husband’s farm enterprises, they usually farm independently on a plot they primarily manage themselves as well.

A good woman can sell some food and encourages entrepreneurship to supplement the man’s income; does not just depend on the man for food. She should not be lazy and her work should speak for itself. (Low income women’s FGD, Kenya)

This does not mean they own the land they farm, land ownership is generally in hands of men. In some African countries, women gave accounts of their husband supporting them on their plots, indicating that there are mechanisms for intra-household reciprocity and negotiation.

Table 3.2 Good Female farmer characteristics, source: Poor and middle income Adult FGDs

‘The good woman farmer’		
Category of statement	Mentioned by men in:	Mentioned by women in:
1) Knowledge and skills related to crop management	Bangladesh, Burundi, Congo, Colombia, Kenya, Malawi, Nigeria, Rwanda, Uganda, Vietnam	Bangladesh, Burundi, Congo, Colombia, Kenya, Malawi, Nigeria, Rwanda, Vietnam
2) Behavior, attitude and community interactions	Colombia, Kenya, Vietnam	Burundi, Colombia, Kenya, Malawi, Rwanda, Uganda, Vietnam
3) Household interactions in relation to decision-making and work	Bangladesh, Colombia, Nigeria, Rwanda, Uganda, Vietnam	Bangladesh, Colombia, Vietnam
4) Responsibilities to the household	Burundi, Colombia, Kenya, Malawi, Nigeria, Rwanda, Uganda, Vietnam	Burundi, Congo, Kenya, Rwanda, Uganda
5) Resource endowments	Burundi, Congo, Kenya, Uganda	Colombia, Kenya, Malawi

Women farmers tend to exist in men’s shadow

Men farmers are judged in their communities primarily on basis of their skills, knowledge and position in the community. Men that share knowledge and resources have improved social status in the community, valued by men and women alike. For women it is often seen as more important to provide support to the husband in farming then to take a leading role in agricultural production themselves. But, especially African, women also employ farm activities independently and therewith contribute to household food consumption in addition to selling surplus for personal or household’s expenditure. This is often not accompanied with concomitant ability in decision-making power or

resources control however and therefore likely to result in compromises in farming activities as time and resources are limited.

A woman farmer always has a vegetable garden

Women frequently manage and grow vegetables in a home garden, while men focus their efforts on staple and cash crop production. The notion of what is a 'vegetable' is quite broad and can often include non-staple starchy crops such as sweetpotato grown on small scale in or around the home compound. The intensity of vegetable cultivation varies for women across the different sites but was described as important for women in almost all regions. It was usually described as a specific 'female practice' with limited or no involvement of men. Three main reasons were provided to explain this gender division:

A good farmer

Woman 1) "I don't think there is a big difference between a good man farmer and good woman farmer"

Woman 2) "No, there is a difference; a good male farmer should have a big and well maintained garden while a female farmer should at least have a vegetable garden."

Woman 3) "A woman farmer's main concern is food for the household but the man's concern is selling and they mostly grow maize while women grow beans and other crops"

Focus group discussion – Central Uganda

ingredients: vegetables, such as leafy greens, egg plants and condiments [See box 1].

Women emphasize the importance of vegetables for family high-quality and nutritious meals in Kenya and Rwanda;

- There are social norms that restrict female mobility. Social norms prohibit women to go to the field for farming in Bangladesh. The home-garden is an accessible farming site for them;
- Vegetable gardens offer women opportunities to sell part of the yield. Vegetable sales are specifically mentioned as women's business in various African countries. The mode of production is small-scale with limited use of inputs. Men do not have much interest in this activity precisely because it is small-scale and with limited returns. Where there are restrictions on women's physical mobility this also influences how women sell their vegetables.

Clearly not all residential locations have land for a vegetable garden. However the constraining factor of land was not mentioned specifically in discussions of this issue.

Normative ideas about crops and farming practices associated with crops do not always coincide

We describe women and men's diverse roles in RTB farming and tropical agricultural systems compared to the normative and cultural narratives of their participation in these systems and the normative roles RTB crops play in providing food and income to households for a few selected countries in our sample.

Root, tuber and banana (RTB) crops are important crops in most of the sampled sites. Cassava is listed as an important crop in 17 out of 24 sites, sweetpotato in 12, banana in 8 and potato in two and yam in one site. Especially in East and Central Africa, it is common to find at least two but often three or four RTB crops on the same farm.

In both sites in Burundi (Cibitoke and Gitega districts) banana and cassava are very important crops and sweetpotato is also cultivated, though in these sites it is of lesser significance. Banana is considered by women and men as the most important crop for men in both sites. Banana is important for all social ceremonies, for which banana is consumed either in the form of cooked food or beer. One man from Gitega says "banana is our life and a family without banana is vulnerable". In terms of volume produced, banana is much more important in Cibitoke however. The banana and its products

[banana-beer] are strongly associated with men and masculinity and men are expected to cultivate banana and own a plantation. Women in Cibitoke said they [women] don't know anything about banana management and in Gitega women mention that a woman can never harvest a banana-bunch or the husband should have migrated away or be dead. Individual accounts of women however do speak of themselves managing the banana crop, investing in banana [beer] business or sometimes harvesting a bunch to cover for their own expenses. Individual men also mention that their wives contribute labour to banana management. Actual practice in banana farming seems to be inconsistent with the normative ideas women and men express with regards to banana.

In Cibitoke, cassava is primarily a food crop whereas in Gitega it is also grown for sales. In Cibitoke cassava is mainly grown by women. It's a key crop for household food security and preferred over maize for eating. In Gitega, cassava is grown for household consumption and for sale by both men and women.

In the Kenya sites (Busia and Vihiga country in the western region) RTB crops are of secondary importance after the staple maize crop and key-income generating activities such as dairy farming. Cassava is likely the most important of RTBs here, grown in both sites on a small scale. The norm around cassava in Vihiga is that it is a crop grown by women for household consumption. In Busia cassava is also considered to secure household food security because available year-round and additionally it is considered a crop appropriate for poor people because it is not necessary to take a loan to start cultivating cassava as is needed for (hybrid) maize. But these norms are shifting in the younger generation. Young women describe it as 'traditional' and no longer interesting for the new generation.

In Rwanda, both men and women consider banana as the most important crop for the community in Kayonza. Both also agree that banana is especially important for men. Like in Burundi and parts of Uganda, having a banana plantation is associated with livelihood security. In reality however, maize is emerging as a main food security crop in this site because of the increasing pressure on banana production from diseases. This is a new development and maize clearly does not equal the cultural significance of banana.

Banana is important for food and income; cooking varieties being cultivated mainly for household consumption and controlled more by women and beer-varieties either sold raw or processed into beer with income belonging mostly to men. Although beer-banana is considered as men's business, quite a number of women report banana-beer sales as a (secondary) income generating activity.

Cassava is produced mainly for household consumption. Young men consider cassava cultivation as men's business. Individual women however also describe how their cassava production and sales were essential for livelihood improvements because it provides both food security to the household and income. So in practice, cassava is a key food security for women as well as men.

RTB crops in Uganda play major roles in the farming systems of all the four sites in Uganda (Mukono and Kiboga district in central Uganda, Isingiro district in Western Uganda and Serere district in Eastern Uganda). In Isingiro in Western Uganda cooking-banana is the main cash crop occupying most of the cultivable land. Ownership of a banana plantation is a strong normative indicator of male status in the community and is therefore perceived as very desirable by poor and young men. In this site, the reality is that cooking banana is indeed mainly controlled by men who also own the land and thus the banana plantation. There is no rule that women cannot produce banana though, widows who have inherited banana plantations from their late husbands for example can and do control banana plantations. But banana is also important for land-ownership issues; as a perennial crop planting banana is a way of claiming ownership of a plot of land. Because of this, women with mere access to land via their husbands or via renting arrangements, cannot plant banana – the land does not belong to them! Commercial banana production is labor-intensive so men rely heavily on unpaid female labor. Women contribute labor, mainly for hand-weeding. It is expected that women will provide labor to their husband's (banana) plot before working on their own plot.

Brewing banana is considered more important for men and cooking varieties are more important for women and these are the preferred food crop. Although there are normative restrictions around who produces banana, this does not seem to be the case with processing of brewing banana, especially in Kiboga where trade in banana-beer and gin is common and involves both men and women.

In Central, Western and Eastern Uganda there are few normative ideas around cassava production, except for its association with poorer families. Both women and men grow the crop mainly for household food security but sometimes also for sales. Nevertheless, in Eastern Uganda cassava does seem to be rather more important for men and the importance of cassava vis-à-vis other crops such as millet is increasing. The gender division of labor in this site is as follows: Land preparation and harvesting are primarily done by men. Both men and women do planting and weeding. Processing is almost exclusively the domain of women. Men are only involved in chipping and drying when machines are used. Both men and women can sell but it is noted that women usually sell small quantities whereas men are responsible for sales of large volumes. Women mention earning income also from selling cassava chips or for working on cassava for other people (weeding, peeling) or from selling cassava cuttings. They also use cassava flour to make chapattis and bread for sale. In this site it is possible to produce cassava on rented land.

Sweetpotato, which is grown in all four sites, sometimes as an important staple (Serere, eastern Uganda), is frequently described as a "woman's crop". This narrative seems to be shared by both men and women in Mukono in Central Uganda, where the crop is especially important. In Isingiro it is mainly men who mention sweetpotato as important for women instead of women themselves. Young men in Isingiro elaborate how sweetpotato doesn't provide enough income for men to be worth their time and also the seasonality is considered a disadvantage (in comparison to banana and cassava). The reality appears to be that in all locations sweetpotato is primarily grown on a small-scale by women, mainly for household consumption, but with some small sales of surpluses. Despite being normatively considered a woman's crop, men do conduct specific tasks in crop management such as clearing the land and making ridges and mounds. Women are responsible for planting, weeding, harvesting and cutting vines in addition to processing, for example into flour in Eastern Uganda, and marketing.

In particular locations and sub-regions, some crops carry much greater cultural significance than other crops. This is the case of banana in most of the East-African highlands. The cultural significance or value of such as crop can persist even if the economic significance or the value for food security is decreasing, as in the case discussed above of Kayonza, Rwanda where maize was replacing banana as the main food and cash crop. The social and gender norms associated with such a crop, equally tend to be more explicit and strict than those for other crops. Changes in cropping patterns and specifically switches to other, 'new' crops can therefore considerably change gender dynamics and possibly create opportunities for either gender.

3.2 Gender Norms: change is occurring

Perceptions about the meaning of gender equality, gender difference and changes in gender relations is vary variable

Gender equality and women's empowerment are high on the agenda of many governments, national and international organizations and in many countries and regions policies and strategies are developed to promote these. It is relevant to know how people on the ground or the 'target population' think about these concepts in order to develop policies and strategies that are relevant and suitable.

We found that perceptions strongly diverge on what gender equality means. Many men and women emphasize the ‘differentness’ of men and women, referring mainly to biological differences and how this inevitably makes men and women do different things. For instance, a young man says that “There is no point in comparing a horse with a sheep because the two animals are not comparable.” (Burundi). Gender inequality is often presented as something natural and unavoidable, resulting from biological differences. In some regions (notably East-Africa and Bangladesh) religion is used to support the idea that gender inequality is natural – and the superiority of men is emphasized by both men and women – and sometimes religious arguments are also used to illustrate how women and men ‘are the same’ (Kenya).

When talking about gender equality people often raised concerns about its effect on the integrity of the family. They felt that it could lead to diminished respect between spouses, leading in turn to conflict. It’s a common perception, especially in Africa, that a household cannot have two heads.

On the other hand, many men and women felt that greater gender equality can lead to development at the household, farm, community and country levels. Men expressed a sense that work can be accomplished faster because it is shared, that planning together can make family affairs (education, agriculture, business) easier, that finances can improve when spouses contribute to family income, and that equality can reduce tensions and disagreements. Women, also perceived gender equality as a decrease in domestic violence (Uganda and Vietnam), as more considerate husbands (Malawi, Vietnam, Kenya), and as greater freedom and independence for women (Kenya, Vietnam, Malawi). In Kenya, a young women defined gender equality as “a situation where the man can be housekeeper and the woman bread winner and vice versa. Both can take care of the family and when it comes to the kids both boys and girls receive equal education”. This response demonstrates an understanding that gender equality is not only about women accomplishing certain normatively defined male roles, but also about men also taking up normatively ‘female’ tasks within the household. It is also not only about the adult generation, but also about equal opportunities for girls and boys.

Institutional interventions can offer new opportunities for women, but can also be a source of gender conflict

When women were seen to have equal or even greater opportunities than men, women-specific projects and programs were cited as an explanation. This was particularly the case in Africa, where women-specific opportunities are channeled through the state, NGOs and farmers’ collectives. At the same time, however, women mentioned organizations and projects in which women are most active. In Rwanda, young men but not women mentioned state-led programs for women that ‘exclude’ men. In DRC, young men mentioned receiving instructions on the advantage of spouses working together and disapprovingly reported that women are now milking cows even though their culture forbids it. In Nigeria, men in one village mentioned mixed gender membership in the farmers’ union, stating that this gives men and women equal opportunities. These examples demonstrate how interventions can catalyze change in the gendered farming landscape, not only by targeting women but by making their involvement in certain income generating activities more acceptable in the community. This is not always the case. There are also challenges from men that accompany such changes, including a hardening of the gender gap in some cases. There are also interventions, such as mentioned by men in Kenya, where NGOs prefer involving boys rather than girls, thus consolidating gender

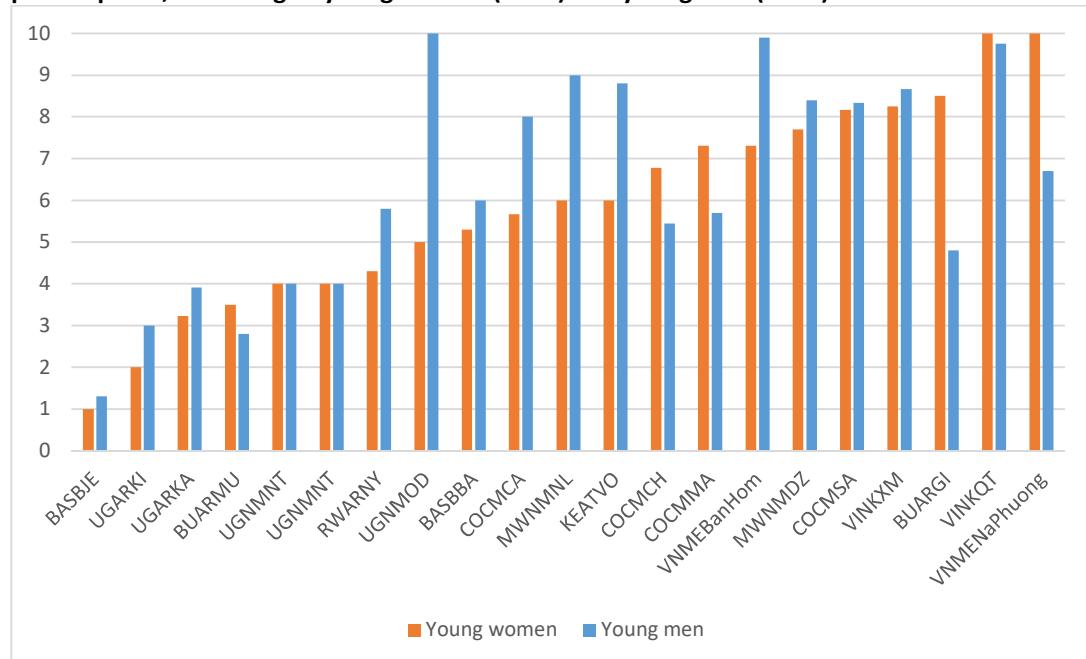
Norms surrounding women’s physical mobility provide insights into women’s agency

Many social norms surround the extent of women's physical mobility within and beyond the home and this has implications about their freedom to engage in daily livelihood and social activities. Across the case studies in RTB, the situation is highly variable.

In just under a third of study villages women felt that a majority of women were constrained in their physical movements (more than 5/10 women in the exercise). In another third or so of villages, women judged that between a half and 70% of women did have freedom of movement. The information provided by young men and women showed little difference about physical mobility of women, estimating 65% and 60% respectively having freedom of movement. However as Figure 5 indicates, there is a lot of variability around these averages.

The highest mobility reported was among the Kinh in central Vietnam, where youth of both genders believed that nearly all women could move freely on their own. The lowest reported mobility was in one Bangladeshi village, where both young women and men believed that only about 10% of women can move freely (Figure 3.1). This is in line with the practice of female seclusion (*purdah*) present as a norm throughout Bangladesh. Textual comments by young women in particular confirm that this norm continues to be widely practiced and is especially practiced in relation to visiting markets and more strongly enforced against women selling than against them buying. Young men more than women commented that things were changing, that some families do allow daughters to go out.

Figure 3.1 Number of women out of 10 who can move freely on their own within their village's public spaces, according to young women (n=20) and young men (n=20)



Even within a given village, norms may vary across religious or socio-economic groups, with poorer women sometimes being able to move around more freely than those better off economically due to the necessity of making a living forcing greater flexibility in the interpretation of norms. In a number of countries, young men and women consider that physical mobility is linked to marital status, with unmarried women moving around more easily because they do not have to seek consent from their husband or the pressure of the father-in-law.

Women's reduced mobility limits their development

Women's freedom mobility has clear implications for the ability to learn about (exposure to information and trainings) and adopt new innovations and require careful consideration in the context of AR4D. For instance, innovations requiring women's participation in new markets may be compromised by their mobility constraints. Both men and women across cases perceived limitations on women's ability to travel to the market, and advanced many reasons for this restriction. These include family and community disapproval and risks to women's reputation, husband's jealousy and the fear of seduction by other men, safety, and the risk that she will neglect other (household) duties, as well as the lack of means of transport. In Bangladesh, it is normatively a man's duty to earn money and women's to watch over the house and children. If a woman goes to the market, her husband will be viewed as incapable. In other countries (Uganda, Colombia, Kenya, Vietnam), too, household duties were mentioned both by men and women as a reason why women do not go to the market. In other places, however, women and men were particularly vocal on the importance of the market for women (Malawi and Kenya). Women describe the market as an important social scene and men acknowledge that women know the marketplace and deal with business better than men. Therefore among both genders, in Malawi and Kenya women were described as being allowed to go to the market to conduct business provided they communicated adequately with their family, husband and limited movements to an appropriate time of day.

Norms around mobility are changing in many places. Drivers of change are interventions of NGOs (Malawi), migration of fathers and husbands (Bangladesh and Kenya) and education of girls (Bangladesh). Individual differences can be explained through level of trust in conjugal relations (Nigeria, Uganda), life-cycle – older women can have more mobility than young women – (East-Africa) and individual agency 'being brave' (Bangladesh).

3.3 Empowerment

Norms around property titles and status titles such as head of the household enable men to "inherit" agency

In many case studies men felt empowered to make strategic decisions on behalf of the household, emphasizing their role as 'the head of the household' and 'in charge' in this context of decision-making. This process of "inheriting agency" occurs over time as men transition through life stages. In Nigeria men assert their agency with explanations how they inherited their father's land and are therefore secure in their livelihoods (see also sub-section 3.6 below). Situations where men lack agency despite these supportive norms are mostly explained through poverty and their exclusion from control over resources, sometimes due to actions of external agencies. For instance, in Kenya, men complain about the difficulties and high costs to obtain formal titles to land they have traditionally cultivated: "*We're like squatters*" one exclaims.

Women "earn" agency in their marriages over time

In all regions, the man or husband is described in words to the effect of being in charge of the family. In eastern Africa men are considered to make decisions on all aspects of life. Women report not feeling free and only being able to make minor decisions for instance concerning the content of meals. Women also reflect on the importance of age; elder women can make more decisions than those in the first years of marriage and domestic violence inflicted by their husbands tends to decrease with age. One reason for this is that adult children will protect the mother '*against the violence of the father*' (Burundi). For some of these women, growing older is in itself empowering.

Respect and support from their spouse is important for both men and women in relation to agency. Having support within the household is described as ‘empowering’ by women whereas men refer more often to the situation of people [HH members] looking up to them as empowering. Both men and women emphasize that good intra-household relations are important for the development of the household.

“Those days, life was hard we were still young and poor and he was always in control but when we started developing we also started to work together and listening to each other’s ideas.” (woman, Uganda)

Losing a spouse is also mentioned as a factor that enables women to empower themselves; they describe in similar ways how their freedom increased after the death of their husband (Kenya, Malawi and Uganda). Sometimes agency of widows is dependent on the sex and age of their children; older boys would effectively take the place of their father and become head of the household whereas the widow would be head of the household in case the children are young or all girls (Burundi).

Women and men generally feel more empowered than compared to 10 years ago

According to the “ladder of power and freedom” tool used in this study (see Section 1 and Annexes), the majority of both women and men consider that they have increased their own agency compared to 10 years back. There are several reasons for this 1) aging, becoming older and more developed and respectful 2) improvement of family livelihoods/financial situation and 3) changing external environments, including new policies and the loosening of some social norms. These three reasons largely reflect different scales: the personal or individual scale; the household or family scale; and the wider social environment or institutional landscape

Increased agency for both women and men is often related to improved livelihoods which in turn depends on access to education

Many women paint a picture of being ignorant and invisible 10 years back (Bangladesh, East-Africa, Malawi). In current perspectives, although women often continue to see themselves as controlled by their husband to a greater or lesser degree, they consider that they have more options to gain an income and join in decision-making within the household and the community. In all discussions about empowerment and agency men and women make frequent reference to economic factors: assets, income-generating activities, successes and failures in farming and business. A major driver of livelihood improvement, mentioned over and over again, is education, training and extension. Both women and men mention the importance of education, not only formal education, but also training and learning resulting from engagement with NGOs, farmers’ groups and other local institutions such as extension officers. Both women and men describe how they are increasingly involved in (commercial) farming and income generation in general and have improved their livelihoods. Many women and men express how they feel ‘empowered’ because of this development. But especially women acknowledge that this is quite a difference compared to the situation a decade ago. For instance from western Kenya women explain that *“Ten years ago women were just housewives with nothing to do”[.] “women were restricted by men, even family members like in-laws were not for the idea that a woman should work. In such a case, can one really progress?”* This change is largely attributed to the changing environment.

External institutional changes often drive shifts in gender livelihoods and agency

In different countries men and women make reference to factors behind the livelihood improvements and perceived increases in agency: national policies on inheritance, marriage and domestic violence and representation of women in government; increased exposure to NGOs

advocating for women's rights but also providing training in agricultural technologies among others things; and improved infrastructure and access to its use in education, health services and markets.

In Rwanda women explain how new laws on inheritance and land ownership have given women 'rights'. In several countries it is mentioned that women are now represented in parliament and local government. These changes challenge normative ideas about women held by both men and women. They show that women are capable of speaking in public and making strategic decisions. Laws on domestic violence have also been cited as transformative (Burundi, Rwanda and Uganda). For different reasons, women and men are highly focused on this law and its enforcement, especially in Uganda. Whilst women are generally positive about the changes brought about by the new law, men are ambiguous at best. They express feelings of losing power within their households and complain about the government meddling with their rights as men and husbands.

'Visitors started coming to enlighten us' is the way that Kenyan women describe another key driver, the promotion of new agricultural technologies and the associated training offered by NGOs. Better infrastructure can literally 'open up the world' to men and women. In Vietnam women explain how new roads have increased their mobility: "*Thanks to the road, they can learn how to ride motorbike so that they can go buy things themselves*".

Youth's perceived lack of agency stems primarily from the normative strength of parental authority

The primary reasons given by young men for a low sense of agency was that their parents (and other elders) make important decisions for them. The lack of financial independence and few employment opportunities also curtail their sense of power and freedom. Young Kenyan men cited the lack of land ownership, as land is still held in their fathers' name, and Nigerian men mentioned limited mobility, perhaps due to lack of transport. Those who feel empowered suggest that there are now more opportunities for young people to voice their opinions than a decade ago (Burundi), that they do have some responsibilities and can make certain decisions (including what to wear, eat and where to go—Nigeria) or suggestions at home (Uganda) and that they can participate in village meetings (Vietnam). In Colombia, one young man states that "*As long as you assume responsibility, you can make decisions*".

Young women provide the same primary reason for a lack of agency: they remain under the authority of their parents or elders until marriage. Unlike young men, however, upon marriage they do not become autonomous but must seek permission from their husband (Nigeria, Uganda, Vietnam) or in-laws (Vietnam). Some young women add that they may lack confidence to make decisions for fear that they might make mistakes, and specify that their parents decide on whether they should go to school, which places they can frequent, and who they marry. In contrast, most indicate that they gain a sense of power from being consulted by their parents or able to decide themselves about marriage (who or when they should marry) (Bangladesh, Burundi, DRC, Malawi, Nigeria—although there were some different opinions within the groups), about being to attend school (DRC, Vietnam), and about more minor decisions such as what to wear or purchasing basic necessities. In Vietnam, Uganda and Nigeria, young women mentioned the possibility of making some decisions around what to plant, process or sell, and in Vietnam about farming inputs. Young Vietnamese women also mentioned making joint decisions with their husband about farming and family planning. They specified that if women have money, their husband will be more receptive to their opinion.

3.4 Norms and paid work

Norms about 'working women' are observed to be relaxing in several countries, but relaxation is qualified by norms affecting men, by age and family situation

Both men and women's expectations about men needing to earn are clear. Expectations about women's work are more varied. Men in the Kenyan case studies often mentioned that a "good wife" must assume economic responsibilities. Nevertheless, in most cases women framed their economic activities in raising crops and livestock as supplementing their husband's income. Her money may be shared with her husband, especially to pay school fees.

Women's access to paid work outside the household are almost always circumscribed by norms related to mobility and male headship. In the household, husbands often have the authority to stop a wife from accessing earning opportunities. However, case studies in Uganda, Kenya and Malawi show that growing economic pressure to cover household expenses is leading to a shift in norms that a decade ago prohibited married women from working outside the household. These shifts though are not straightforward and are continuously contested as exemplified by women in Western Uganda:

"Sometimes the men fail the woman like refusing them to go look for work or work in someone's plantation because the village members will talk badly about the men for failing to cater for his home and sending the wife to work in other people's plantations; some women just escape from their homes to go and work on someone's plantation without the consent of the men because they do not allow them." (Poor women's FGD, Uganda)

In some of the East African cases, a man's position in the household as "head" is felt to be threatened by a woman having paid work, or he may feel overpowered. A further aspect of these shifts in norms affecting relative power is that if a woman is able to seek paid work, she is often discouraged from earning more than her husband. This relates to men's desire to maintain the norms around the male provider role, avoid gossip and the potential for conflict in the household. Men also expressed concerns and worry that a woman working outside the home may be planning to leave for another man. Women's increased mobility is frequently associated with suspicions that a woman is being promiscuous.

Norms In Bangladesh are most restrictive in controlling women's physical mobility and possibility of engaging directly in economic activity. Women are discouraged or forbidden from going to the market, with men selling produce off-farm and buying food in markets.

Friends of (the husband) will disgrace (the husband) as well as insult and hate. They will say why you let your wife go to market to sell vegetables even (in) presence of you, are you dumb? (Better off men's FGD, Bangladesh)

In Vietnam, villagers may gossip about those (women) who sell all day. Vietnamese men would not let her sell, if he the husband is found selling, people think there is something wrong with the wife, or with him.

Norms about women's paid work also differ for single, married, and widowed women. It is more common and accepted in many case study locations in Eastern and Southern Africa that young single women perform wage labor. However, as was noted in Kenya, young women often still live with their parents and so do not yet exercise complete economic freedom. Young women have more time than married women with children, who are expected to fulfil most responsibilities associated with childcare and food preparation. Women's paid work activities are often in addition to her household tasks and responsibilities. Married women who have children are criticized if they are seen to prioritize paid work over childcare. At the same time, the FGD discussion showed that women often sympathize and recognize that mothers must work when their husband is ill or to make ends meet in the household. As noted in Vietnam and Malawi, childcare responsibilities often interfere with their time to look for work. Widow's work in wage labor activities is more common since they must often work out of necessity make ends meet.

Men and women often work in informal sectors such as transport and domestic labor. The jobs men take are sometimes considered “men’s work” because women are perceived as not having the appropriate labor or skillset. Women may not perceive that they have the same abilities as men. Men also work as casual laborers, but not in all countries. In Vietnam, woman reported that men “rarely work for others”. They work as traders and often handle money because “they calculate better than women”. Similarly, in Uganda, men are more mobile and herd cattle to remote water sources. Men also work in construction.

Men are not always supportive of women working

Women are often supportive of their husband’s work, since providing for the household is a commonly held expectation of a good husband. Although women are actively earning income in most cases, men do not always support their wife’s enterprises. Reasons for this are that men are often concerned about what community members will think and the reputation of the man. In some cases, a man’s position in the household as “head” is threatened, or he may feel overpowered. Men also expressed concerns and worry that she is planning to leave him for another man. Women’s increased mobility is frequently associated with suspicions that she is being promiscuous.

3.5 Agriculture and economic decision-making

Many decisions surrounding sales and use of income are managed by men. Husbands and wives occasionally make joint decisions about selling crops. Poor women in Bangladesh may help their husbands to make important decisions about crops, such as buying and selling to get the “right” price. More often, however, women have little to no say in selling decisions.

In the majority of adult FGDs it was reported that men frequently make decisions about income. While some amount of consultation may occur, the final decision-maker is often the man in the family, owing to his title of “head of household”. Men take the money, reported by women in Kenya and Uganda, in which case they divert money for their purposes and do not share information on how money is spent with their wives. Further, women are often not financially compensated for their labor contributions; According to young women in Uganda, men will say that *“A woman has no need for money; she should not have money like a man”*.

Men are generally considered to be in charge of household income and expenditures and this is associated with their control over key productive resources, e.g., land.

An individual’s asset ownership influences their bargaining and agency in the household. Men generally are the landholders, and, as such, exercise authority in decisions related to production and sale of harvested products. Men often own larger plots and put more of their land into cash crop production. In the rare cases in which a woman owns her own land, her potential to make autonomous decisions often increases. However, in Uganda and Kenya cases, she is still expected to consult with their husbands.. Whether or not women decide to sell, they often still have an important responsibility to support food provision in the house, often on smaller plots of land.

Although both men and women mention shared decision-making between husband and wife as an option, it is still mostly expected for men to have the final word. Men’s position as the main decision-maker is associated with ‘being the head of the household’ and strengthened by their general larger access or control over land in comparison to women. In some countries such as Uganda, strict norms surround women in relation to money/ income. Increased control over money by women is said to lead to household conflicts, threatens the husband’s position in the household and might lead women to invest in their parent’s household over their own. The situation is especially precarious when women earn more money than men.

3.6 Handing over the torch? Young men's and women's visions for agriculture and innovation²

It is widely held that youth around the world do not aspire to farm. Yet, specific pathways into agriculture for young women and men are poorly understood. As shown below, the 'youth' comprises actors differentiated by gender, culture, capacities and aspirations. Current approaches to addressing the 'youth in agriculture problem' focus on including more 'youth' in farming (much like the 'women in development' approach did with 'women' in the 1980s) rather than examining the social relations and norms that shape their interests in and capacities to participate in agriculture. This study shifts the question from how to engage youth in agriculture to how young women and men perceive their futures and how they can catalyze innovation in agriculture and natural resource management, considering their relations among themselves and with the older generation. Education, communications technologies and migration opportunities, underpinned by gender norms and gender-specific opportunities and constraints, are changing rural landscapes. Young people may catalyze agricultural innovation in ways that extend beyond their direct involvement in farming, through agribusiness, investments and other ways that reflect their aspirations, knowledge, resources, and the enthusiasm they bring to other ways of being and doing. It is not possible or desirable to develop a one-size-fits-all solution to include 'youth' in agriculture, but necessary to expand the range of options and space for this diverse group to gain a sense of agency, opportunity and fulfilment in the rural and urban areas where they make a life for themselves.

In this sub-section, we consider young men's and women's perceptions of the gendered opportunities, constraints and appeal of agriculture and other types of employment as a way of life in the 24 RTB-HT case studies.

In summary, we found that young women and men across the cases aspire to skilled blue collar and white collar occupations and that farming is indeed often stigmatized as an occupation for those who have not done well in school or succeeded professionally. It follows that education is highly valued by both young women and men and there are generic and gender-specific reasons for stopping studying. Poverty is the main reason affecting all young people, but unplanned pregnancy and marriage are also important factors affecting young women. When we compare parental aspirations with those of their children we find they prioritize the pursuit and strengthening of virtuous behaviors and harmonious lives in their children. They also want their daughters and sons to be educated and they see farming as a fallback option. Parents also want their children to enjoy a good livelihood in the village rather than migrating to the cities.

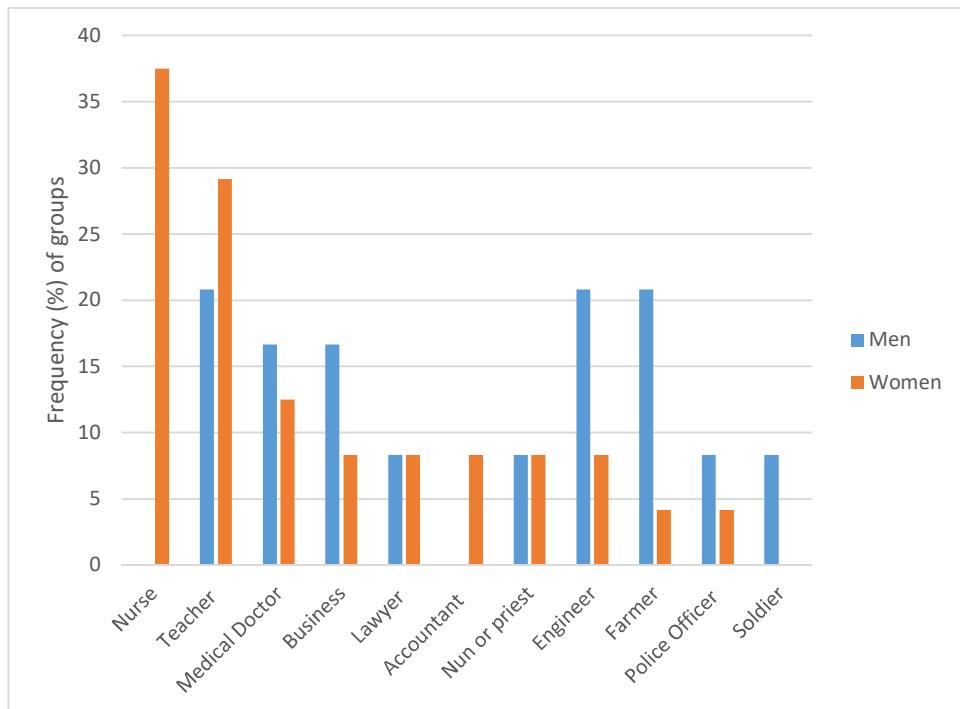
The reality for most young men and women who remain in the village contrasts with their own and their parent's aspirations. Those that are no longer students farm or find an alternative job, often related to farming. Women often appear to 'dive' into family life with marriage curtailing their studies. Dissatisfaction for men and women stems from having to carry out jobs for which their formal education is seen as unnecessary. Farming is perceived as one of those jobs. Repositioning agriculture as an occupation requiring high knowledge and skills can turn it from a job into a more attractive profession for youth.

² The data presented below stem from gender-segregated focus group discussions with young women and men aged 16 to 24 who are mostly engaged in some way in agriculture and/or natural resource-based livelihoods (see Section 1 and Annexes for more details of methods). Other young residents, and the young women and men who were away on migration to pursue other livelihood opportunities, could not participate in the focus groups. Hence, although speaking about the lives of young women or men from their village in general, the views of participants are illustrative of a particular sub-group of youngsters.

Young women and men across the cases aspired to a range of skilled blue collar and white collar occupations.

The number of desired professions mentioned was high, with 28 occupations named in total. Figure 1 displays the top-named occupational aspirations for young men and women. For young men, engineer, farmer, teacher and businessman (merchant) topped the list followed by medical doctor. Beyond the occupations shown in Figure 3.2, the following occupations were cited by young men only once across the focus groups: professor, driver, mechanic, merchant, pastor and even neurosurgeon. Young women's top cited profession was nursing, followed by teaching (Figure 3.2). Out of the approximately 240 young women who participated in the 24 FGDs, only three women aspired to be medical doctors and only two wanted to pursue a business, with other professions such as esthetician, dentist, hairdresser, journalist, lecturer, seamstress, social worker, secretary and magistrate named only by one group. The large number of white collar and skilled blue collar occupations mentioned by both men and women, many of which are found mainly in urban areas, is notable. Yet, young people did not explicitly indicate that they would like to migrate to the cities.

Figure 3.2 Top occupational aspirations cited by young women's (n=24) and young men's (n=24) FGDs



Aside from getting a job, both young men and women desire to help their parents and family with farm work, to improve their socio-economic conditions, and to help them build a home. Others aspire to contribute to the well-being and development of their community by providing community service, helping those less fortunate, building schools, serving as role models and working with youth. In Bangladesh, young men and women expressed a desire to improve their nation.

Farming is often stigmatized as an occupation for those who have not done well in school or succeeded professionally.

When asked if, when they were younger, they had a special goal for their future when they finished their studies, young women's and men's aspirations mainly pertained to obtaining an

education, employment and entrepreneurship, providing service to their parents and communities, and family formation. Young men and women focused on 'getting a job' in white collar professions that require a high level of formal education. In only 12.5% of the focus groups—nearly exclusively young men's—was there interest shown in farming or other agricultural endeavors as a way of life.

In Bangladesh, a young man explained that "Those who can't study far, they usually do agricultural works", suggesting that farming is perceived as an occupation for low scholastic achievers. There was a prevalent sense that farming is one of the only available opportunities in the study villages, especially for those who do not achieve high education qualifications, as this quote from a young men's group in Vietnam illustrates: "[farming] is the only thing I can do when I don't go to school." These quotes reiterate that the sample of youth who participated in the study may not have achieved high educational qualifications. Results are to be understood in this context.

Education is highly valued by young women and men

Education features predominantly in the aspirations of youth, regardless of gender, across all cases. It is considered the main pathway for achieving career goals and gaining financial security, which is also expressed as a main goal in life. Young men and women indicated their desire to continue studying, pursue a college education or even a PhD. Young women recognize the value of education for being better caregivers, farmers, entrepreneurs, leaders, and for improving their marriage prospects. In Malawi, young women perceive that education can help women gain autonomy, even from their husband. Young men were also articulate about why education matters: for improving one's quality of life, creating job opportunities, making joint decisions among spouses, fostering social harmony, gaining new skills and perspectives, stopping early marriages, and avoiding "bad behaviors", such as participation in armed groups. (young men's group, DRC).

There are gender-specific reasons why young women and men stop studying. The top reason among both genders is poverty. Unplanned pregnancies also stand out as a top reason for young women

Across all cases, lack of money is described as one of the two main factors preventing the continuation of girls' and boys' education. For young women across cases, an unplanned pregnancy is a close second. Additional barriers to young women finishing their schooling are early marriage and parents not recognizing the value of their education. In Bangladesh, the fact that young women will leave their parents and marry into another family dissuades parents from investing in their daughters' education.

Young women consider that marriage can be an obstacle to achieving their aspirations.

Marriage was cited as an aspiration in only a few FGDs (17% of young women's and 13% of men's). In some cases, such as in Colombia, marriage was referred to as a factor impeding women's aspirations and scholastic achievements, as "*if the husbands are macho they will ask their wives 'why go to school?' since their duty is to be in the home*". Marriage and pregnancy were also top-cited reasons why young women abandon their studies

Young women and men face bigger constraints in Africa to complete their education, compared to both Asia and Latin America

The level of education achieved varies across countries, villages and genders, and influences options, aspirations and expectations. According to key informants in Bangladesh and Vietnam (in Asia) as well as Colombia (in Latin America), almost all girls and boys complete both elementary and high school. In contrast, in the African case studies, key informants indicate that almost no girls and boys receive a high school education (as in some cases in Malawi) or that it is almost exclusively boys

who attend high school (as in Uganda or Burundi). These differences reinforce the fact that it is inappropriate to talk about ‘the youth’ as a homogeneous group with one common set of skills and interests.

Parents' aspirations for their daughters and sons are related to pursuit and strengthening of virtuous behaviors and harmonious lives

Aspirations of poor mothers and fathers for their sons and daughters reflect the normative environment that conditions the aspirations of young men and women. Parents aspirations are less specifically focused on professions than the younger generation’s, and include more aspects of virtuous behaviors and harmonious lives. For example, women and men want their daughters to be respectable, avoid early marriage as well as domestic violence and prostitution, be good mothers, respect their husbands, dress appropriately, maintain their virginity, be appreciated by society, and be healthy. Some parents simply wish their daughters to be ‘successful’ and to ‘have a better life’. Parents also showed a desire to see certain norms changed, however. For instance, both poor men and women in Bangladesh would like to see the end of the dowry.

Mothers and fathers generally aspired for their daughters and sons to be educated, and perceived farming as a fallback option

Middle-income women and men expressed similar aspirations for their sons. They wished them to find a good wife, avoid vices such as drugs, drinking, gambling and promiscuity, be responsible and good husbands, respect others, work hard to help their parents, and achieve ‘success’. They also hoped their sons would find jobs, earn money, and be entrepreneurial. Poorer adults sought equal opportunities for their daughters and sons, sufficient food, better futures, local development, and especially a life close to God.

Among both parents and youth, education is seen as the first (and most important) step toward achieving a better life. As is the case among the youth, parents do not aspire for their children to farm, but consider it a secondary option for them if all else fails. Agriculture and agri-business and other professional ‘jobs’ were mentioned by only two adult focus groups (one men’s and one women’s).

Parents wish for their children to find good livelihoods in the village rather than migrating to the cities.

Men in Colombia want their children to continue farming so they will not have to migrate to the cities to work, and in Uganda (men) and Bangladesh (women) wish their children to learn good farming skills that will allow them to have better livelihoods. In the migration questions, youth mentioned migration to the cities in search of work as not so much a desire but a fall back given the lack of other opportunities. Parents’ desires not to have their children migrate seems to be in line with this and to also underline their aspirations for the children to lead virtuous and harmonious lives, which urban life is seen to threaten.

Most young men and women who remain in the village and are no longer students farm or find an alternative job, often related to farming

The picture looks different when considering what most young men and women actually do with their lives when they are no longer students. Young women consider that when girls finish their education they typically ‘find a job’, farm or start a business. For their own gender group, most young men’s groups cite farming as the main activity pursued, followed by finding a job. Aside from farming per se, agricultural activities such as rearing livestock and pursuing an agri-business are prevalent

occupations. More than half of the women's groups cited 'starting a business' as a common undertaking, and in 85% of cases indicated that this business would be related to agriculture. Among young men's groups, more than half of those who said young men typically start a business referred specifically to agri-business.

Women 'dive into family life' when they are no longer students, and marriage is a reason for women to abandon their studies.

Aside from agriculture, young men pursue jobs as car or motorcycle taxi driver, or working in 'low profile jobs' such as hotels or restaurants (Bangladesh, Rwanda) and carpentry (Malawi). Young women sew or tailor, or work as housemaids (Kenya, Nigeria, Uganda) and hairdressers. A number of groups mentioned that young men remain 'idle' when finishing their studies, as they have nothing to do (e.g. Kenya, Colombia). Vices such as drinking were mentioned particularly for men (Colombia), and prostitution was cited as an occupation for young women in Malawi and young men in Kenya. It is worth noting the sentiment raised by a Rwandan female participant that young people feel shame in pursuing certain jobs such as construction once they have a certain level of education.

In half of the focus groups, young women discuss getting married and "diving into family life" (Bangladesh) when they stop studying. In fact, marriage is often the impetus for young women to abandon their studies although as mentioned earlier, some young women see abandonment of studies through marriage in a negative light. With marriage comes a great deal of housework (young women's groups Burundi, Colombia). In contrast to women, only 12.5% of young men's groups discuss marriage, in Uganda, Burundi and Vietnam. More young women (25% of the groups) than men (12.5% of the groups) mention migrating to cities or other countries in search of a job, particularly in Kenya, Colombia, Malawi and Nigeria. In general, however, those leaving the village are reportedly a minority, as the majority remains to work on the farm or in day jobs.

Dissatisfaction stems from having to carry out jobs for which a formal education is not perceived as necessary. Farming is perceived as one of those jobs.

When young women and men are asked what young people should do when they stop studying, both stress the importance of finding a job. Finding a job within the sector in which one has studied is considered the ideal, but women and men describe the difficulty of finding such employment. A feeling of dissatisfaction and frustration comes through as a result of having to carry out jobs in which a formal education is not needed; and there is a perception that this is the case for farming. In Burundi, young men state that, "It should not be this way. We would like everyone to find work that matches their competences", but they indicate that due to corruption, only children of the rich can find work. This feeling of injustice in relation to opportunities to access already scarce jobs is reiterated in other cases. Hence, there is a gap between what youth feel they should do (Figure 3.3) and what they actually do (Figure 3.4) due to limited employment opportunities.

Marriage is cited prominently across different cases as something that young women should do, lest they should become "left over ladies" (young women, Vietnam). Marriage is also expected of young men, but only after they have found a job or earned enough money. This helps to explain why farming on their parents' farm, an activity from which they may not earn their own income, may not appeal to young men. As a young man from Vietnam explains, "I will earn money in order to marry a wife, if not who would give me a wife if I cannot offer anything?" So, only 4% of young men's groups mentioned farming as an occupation they should pursue.

Figure 3.3 What young women and men should do once they finish their secondary studies, according to young women's (n=24) and young men's (n=24) FGDs?

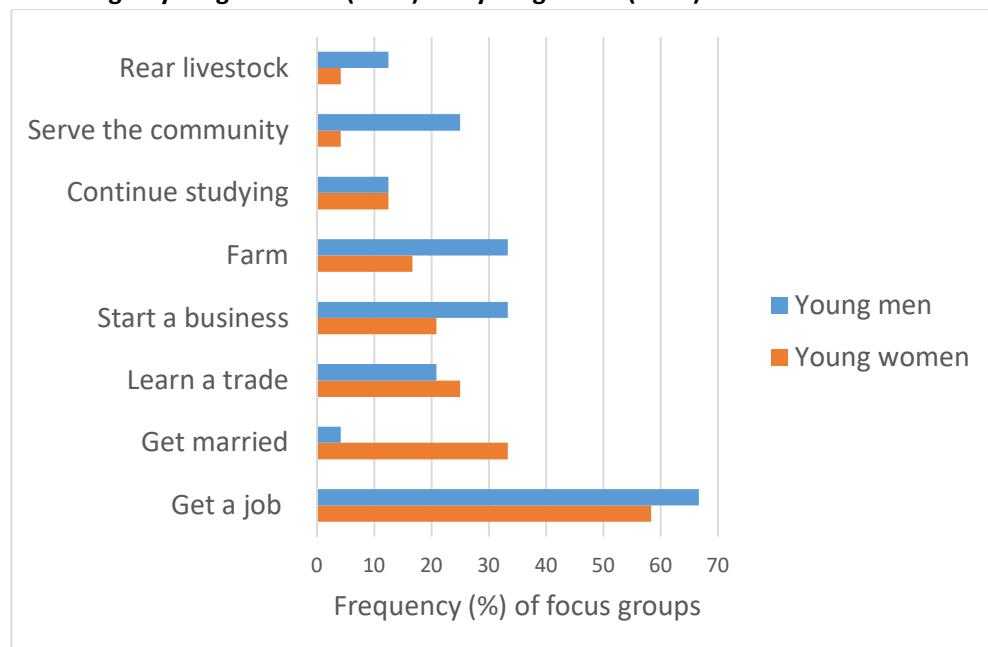
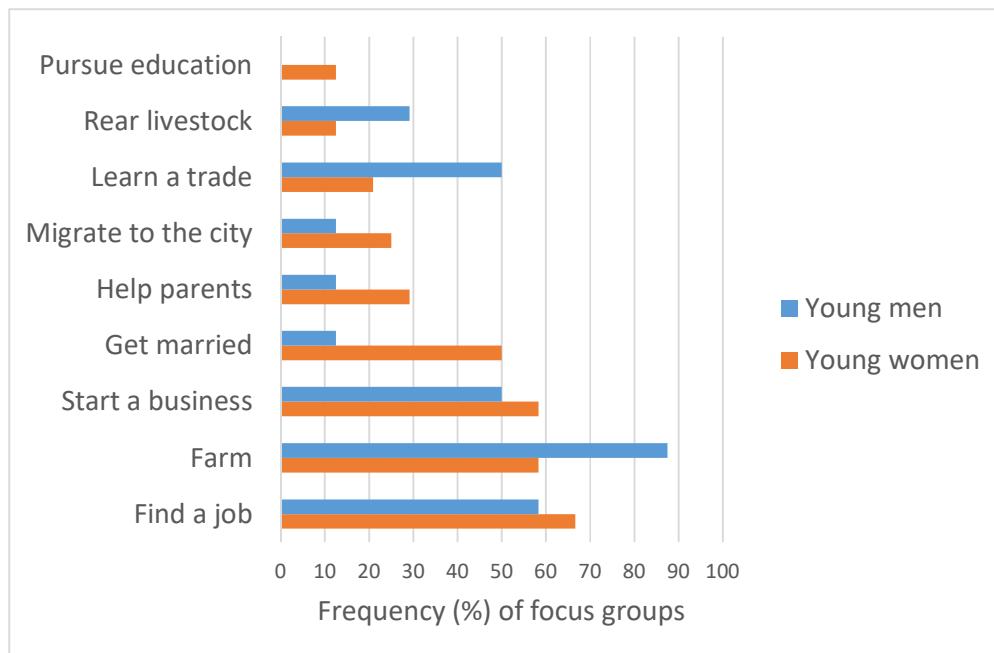


Figure 3.4 What young women and men actually do once they stop studying, according to young women's (n=24) and young men's (n=24) FGDs?



Repositioning agriculture as an occupation requiring high knowledge and skills can render the profession more attractive to youth.

While working in agriculture is described as an option for both men and women, it was only mentioned by 33% of young men's groups and 17% of women's groups as a sector young men and

women, respectively, should engage in. In some cases, such as Burundi, women explicitly state that finding a job outside of the agricultural sector is preferable. In Uganda, however, a young woman explains that, “it is still okay to do farming since most people in the village who have money got it from farming”.

These findings suggest that repositioning agriculture as a knowledge- and skill-intensive occupation, which can be improved with formal education, can render agriculture more attractive to the youth. As shown earlier, a good male or female farmer is highly knowledgeable, and a lack of knowledge is commonly used to explain low productivity in agriculture. Hence, bringing skills acquired through formal education to agricultural endeavors will not only help ‘rebrand’ the profession, but can also improve the success of the farming enterprise.

3.7 Gender Equitable Opportunities for Youth in Farming and Beyond?

Many gender norms hinder young women’s opportunities to learn about and try out new agricultural innovations.

Young men and women were almost equally divided about whether they believe that opportunities for women and men to learn about and try out new farming practices are equal or different. However, there is important variability within these groups and across villages. While in many cases women would state that opportunities were, in theory, equal, they would go on to list reasons why opportunities actually differed. Across most cases, there was a sense that “boys have more freedom and power than girls” (Nigeria, young women’s group) and that “culture favors boys” (Kenya, young men’s group).

Participants identified several factors linked to social norms affecting young people’s and parental attitudes and access to assets that typically favor adult men’s ability to capture opportunities over women’s. Top-cited factors were that:

- 1) In some cases, women do not go to the field to farm (e.g. in Bangladesh); and there are certain specifically male dominated agricultural domains;
- 2) Women have chores to do at home which limits their involvement in farming
- 3) Parents and husbands prevent women from attending trainings;
- 4) Women (specifically) have no money to try out new practices;
- 5) Women have limited access to land;
- 6) Women’s mobility is limited;
- 7) Women do not hear about opportunities because they are at home;
- 8) Women are not decision-makers in their own home.

Normative personal attributes and levels of agency ascribed to women can influence women’s ability to innovate.

Perceptions about attributes limiting women’s opportunities included the belief that girls have less energy and lack physical strength; girls are less organized; and girls are distracted by boyfriends; that girls are less keen to learn. In contrast, men were perceived to have more opportunities because they are “keen to attend agricultural meetings” (men’s group, Kenya), although young women in Uganda also stated that boys may be more concerned with games than with trainings. Young African women stressed that if motivated, women have the ability to tap into opportunities, as: “If you are hard working, there is nothing that can stop you” (Malawi, young women’s group) and “We are also capable to represent our families or parents in meetings and receive knowledge on different practices when the agronomist come to our villages. We can go and explain these things to our parents” (Rwanda, young women’s group). In Vietnam, too, men expressed that

women “can do anything the men can do”, although women felt that they had fewer opportunities than their male counterparts.

The acceptability of migration depends on gender and the ‘success’ of the migrant experience

The study was not primarily focused on understanding the gender dimensions of migration, which is a complex phenomenon with multiple meanings (seasonal, temporary, overseas etc) and contexts. We did try to understand how men and women perceived the option and experience of migration in general and how gender norms affected the uptake of this option because of the importance of migration for agriculture.

When asked about the ease with which women and men can “move away to live and work in a city where there were more opportunities”, young men generally considered it common practice among themselves to migrate and their mobility was not considered to be a problem. He can find transportation relatively easily and can stay with his relatives in town. As a young Bangladeshi man states, “there is nothing to be afraid of with men”. The family will support a male migrant, but he will be welcomed back “if he comes back with money” (young men, Nigeria). Nevertheless, there are challenges for men considering migration: some men may lack confidence to leave, they may not be supported by their parents, they may be received as failures upon their return if they have not made money and there may be suspicion around what they did while they were away. We already identified above the negative parental attitudes to “city life” expressed in many case studies.

Young women considered that although women are migrating to find work, it is less common than for young men, since they considered that they face higher barriers. They identified many of these barriers: girls may lack education, they may lack courage, especially if they do not know anyone or what to expect in the city. They have many responsibilities at home and they risk having a bad reputation when they return and for these and other reasons they may lack their parents’ support. Educated women may find it easier to migrate, and would be more respected for doing a job other than housework (Rwanda). Ultimately, however, and as with men, the acceptability of migration seems to depend on the ‘success’ of women’s experience abroad. In Uganda, a young woman indicates that *“if you are better looking and have money [when you return], you are welcomed but if you are worse off you are blamed and criticized”*.

3.8 Section summary and conclusion

Men and women farmers are subject to a normative framework defining the kinds of agricultural roles that are appropriate, describing the crops or livestock that should be raised and the tasks that should or should not be undertaken. Crops like banana are normatively associated with men, sweetpotato with women in East Africa. Evidence shows however that the reality does not always conform to the norms. The ‘gendered’ production of these crops should therefore never be taken for granted.

In most of the case studies, men are expected to take a lead role in farming and especially in the Asian or Latin American cases, women’s role is to support their husband. In Africa women are often expected both to support their husband in his farming activities and to farm their own plots, though their access to agricultural resources such as land, inputs or even labor is often limited. Restrictive norms were identified that limited women’s options to cultivate cash crops.

As well as sex, wealth and age are also important factors in determining agency. Men are usually considered the ‘head of the household’ and this status enables them to set limits

on the mobility, decision-making and income generation opportunities for women in the household.

Men and women are both expected to make contributions to the household. Working for an income is considered normal and even essential for men. For women, views about if and how women should and can work for an income vary and gender norms tend to be less straightforward and sometimes even contradictory. Norms surrounding working women tend to vary for marital status, age and having (young) children.

Young women and men have aspirations for their future which are mostly outside farming. Both give importance to finishing their education. Farming is perceived as an occupation not requiring education, so there is a perceived contradiction between the desire for finishing their schooling and becoming a farmer. Parents have aspirations for their children which includes living a harmonious life as well as achieving economic success.

Change is occurring in many domains in many of the case sites. Both women and men generally feel more empowered than 10 years ago. Exposure to media, examples of women in powerful positions, increased mobility and interaction with peers through farmers, youth and women's groups and new laws that spell out women's rights, are all mentioned as drivers of change.

Section 4 Opportunity structures for inclusive innovation

Our findings from previous sections show that men and women have different ways to access the resources on which a particular innovation depends, and therefore have different opportunities of benefitting from it. These findings question assumptions that technologies are evenly adopted by targeted households to help increase production, incomes and nutrition intake. This section explores social conditions that enable individuals and/or a community to leverage opportunities for innovation. We identified four key points that facilitate this.

- **Interventions that bridge formal institutions and informal social networks are very helpful.** They can open up new opportunities to those who have had few chances to participate in and benefit from project interventions. Conventional innovation opportunities provided by formal institutions such as government extension systems or private sector input sales networks are more accessible for those with agency, confidence and status. Women and men with limited agency have often been marginalized from group activities associated with these formal systems. However, they still learn new technologies from their friends and relatives. Therefore, interventions that provide support for informal networks are very important. Transforming the dissemination of technologies from using a formal school-like teaching method to embracing informal networks and informal learning practices can be a first step for expanding target populations to the marginalized groups. Monitoring and evaluation tools also need to be redesigned to allow tracing of how far technologies are being disseminated through informal networks.
- **Innovation processes should engage with the context-specific expectations and wishes of women farmers so that they are more likely to adopt them.** Innovation can strengthen women and men's perceptions of their own power, and thereby increase their self-confidence, and hopefully encourage them to seize further opportunities for innovation. However, the pathways through which they gain power are very different, being closely associated with social expectations of how women and men should be and act. Therefore, if innovation processes do not fit with women's empowerment pathways, only the men benefit from them. Since across the case studies men's power is associated with material assets and economic independence, mechanization and intensification of agriculture can often directly help strengthen their power and confidence. On the other hand, in some social contexts such as Vietnam, women feel empowered and confident when they play a supportive instead of a central role in economic activities, as being independent from their husbands is not a socially desirable situation. In these cases innovation is embedded in socially constructed family relations, and only when it satisfies the needs and expectations of women farmers are they likely to adopt the activities, taking the first step to empowerment and thereby stronger agency to seize further opportunities in the future.
- **Women have a space for innovation within their own domains where they already have autonomy over whether to take risks and change current farming practices.** Despite the persistence of patriarchal structures that limit women's innovation opportunities, identifying their autonomous domain can be an entry point to facilitating women's involvement in innovation.

- **Successful innovation that supports more people in the same family and community requires the recognition that a family or community is not a homogenous unit of innovation.**
Without understanding the social power dynamics at play, innovation supports only those who already have significant power, potentially creating jealousy and tension among the family and the community. Considering the social power dynamics helps us to think about how and to whom new technologies are introduced. This can strengthen collective capacities for innovation.

The following sub-sections elaborate further on these four key learning points.

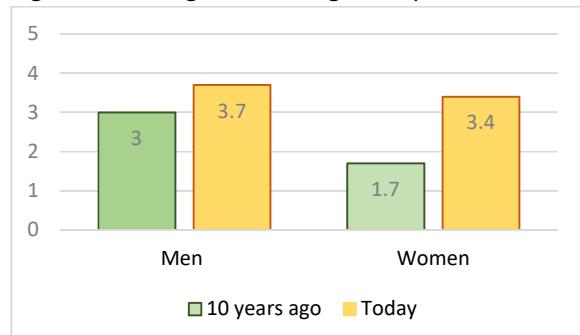
4.1 Agency as a key for individuals to take advantage of opportunities for innovation

Taking up opportunities for agricultural innovation requires agency, and while conventional analyses tend to focus on the economic capacities of individuals as a critical factor for innovation, this study reveals that social factors such as self-confidence and social relationships are also significantly interrelated with individual's capacities for taking a risk with innovation. It is therefore important to understand the social dimensions of opportunity structures that better facilitate innovation. This sub-section discusses how we can expand opportunities for innovation to those who have limited agency. It begins with briefly describing what agency means for men and women and how it changes. It then looks at how men and women with higher and lower agency take up opportunities for innovation, and proposes intervention designs for expanding opportunities to those who have limited agency.

Women's power and freedom has increased more significantly than men's in the past 10 years and this is associated with other changes in their circumstances

The degree of agency, the perception of one's own power and freedom to make major life decisions, is central in individuals' decision-making in agricultural innovation. Many men and women in this study perceive that their degree of power and freedom increased over the decade (Figure 4.1). In particular, women's perceived power and freedom increased significantly in the past ten years, and this change appears to be associated with many other changes in women's situations such as increased physical mobility and more involvement in economic activities.

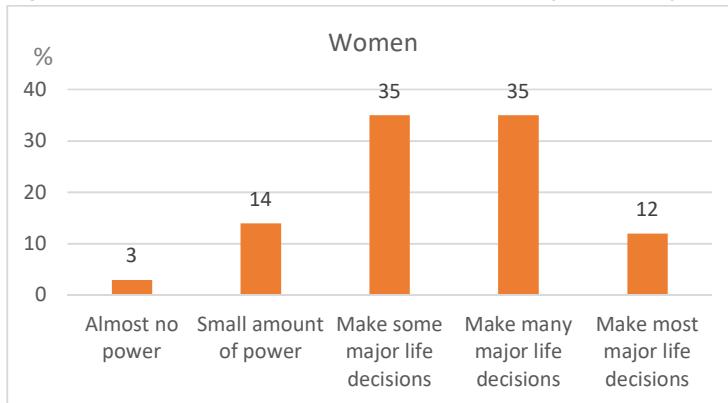
Figure 4.1 Changes in the degree of power and freedom in 10 years*



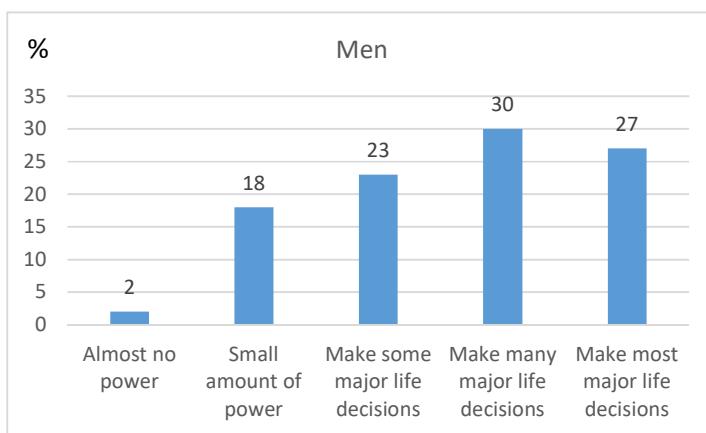
However, average numbers mask the diversity of perceptions of power and freedom among individuals. Figures 4.2a and 4.2b present the distribution of individuals' perceived positions of the

degrees of power and freedom for women and men. It shows that around 20% of men and a slightly smaller percentage of women consider themselves to have very limited decision-making power.

Figures 4.2a The distribution of women in their perceived positions (n=155)



Figures 4.2b The distribution of men in their perceived positions (n=155)



There is a correlation between decision-making power and level of engagement with formal organizations and networks related to agricultural innovation for both women and men

The study found that men and women who have limited decision-making power have also less engagement with formal and high-status organizations and networks related to agricultural innovation than those who have more decision-making power. Current agricultural interventions favor those who already have power and freedom. They are more confident about taking risks and have more opportunities for interacting with other innovative people, thereby having higher agency to seize opportunities for innovation. Expanding opportunities for the 20% of the population who have limited power and agency is a big challenge in current agricultural interventions, but before exploring their challenges and potential, we begin with looking at men and women who can take advantage of innovation opportunities.

Men with more decision-making power have more connections within and outside the village with those who are related to innovation such as traders, factory owners and national and local government agencies such as extension, credit and legal procedures. These people and entities provide information, further useful connections, subsidized inputs and loans for investment such as in irrigation, trading and marketing. More powerful men can also quickly seize new opportunities

offered by access to private sector representatives, especially input and machinery salesmen and advisors.

Women with better connections to civil society organizations and more active social networks also have better decision-making power

While women have less formal and high-status connections than men inside and outside their village, those who are better able to make decisions do tend to be well connected to formal organizations that target women such as women's unions, which are often an entry point for women to participate in agricultural innovation. They are also actively engaged with organizations such as NGOs, churches and self-help groups. In sub-Saharan Africa, for example, membership of churches and/or self-help groups opens up opportunities for innovation because interventions are operated not only through those organizations but also through more informal linkages with friends and relatives who are in the same group. Similarly, in Bangladesh and Vietnam, NGOs and women's unions operated by the local government respectively play a significant role in women's participation in innovation.

While membership in different kinds of social groups is a core of the opportunity structure for innovation, both men and women with lower decision-making power tend to be marginalized even from more informal groups and much more so from more formal institutions. If agricultural innovation aims to be more socially inclusive, we need to understand better the social relations of the less empowered and their ways of learning new practices.

Why do men with limited decision-making power have limited social networks? The findings show that they face more or less similar challenges across the countries. They have limited land and resources and tend to both farm and work as wage laborers for wealthy men who make most decisions for them. Under this social hierarchy, they have less confidence and are socially disconnected from the groups of innovators who facilitate innovation and exchange information and knowledge with each other.

However, when interventions engage with their interests and social network, men with limited power are more likely to take advantage of innovation opportunities. Small-scale innovation and informal social networks with their peers appear to be the keys for expanding opportunities for them. For example, sweetpotatoes require little input and can be harvested within a short time compared to cereals or other rootcrops, and this is attractive for men with limited resources. Selling the produce involves fewer interactions with powerful traders or middlemen from outside the village. In Bangladesh and Uganda, some men grew OFSP after observing the success of their neighbors or friends. Learning from peers in a similar socio-economic situation is very effective for those who are not directly connected to active innovators' social groups. Furthermore, observation of what others are doing is almost as important as participating in a formal training course. It is a powerful means of obtaining knowledge and information, while the success stories of neighbors and relatives are most trusted since they prove the adoptability of new technologies in their economic conditions. Also, those men who have limited power seem to adopt innovations from women. In the above countries, male producers have adopted OFSP innovations from female relatives such as their sisters and married daughters.

Women with limited agency tend to have less confidence and have limited social interactions outside their family and neighbors. Yet they still learn about new agricultural technologies such as new varieties, new planting methods and livestock disease control from their same-gender friends and family members such as sisters. Both new technologies of cassava and sweetpotatoes rapidly spread after the first harvest season through informal networks such as sisters and close friends. In Vietnam, for example, cold-tolerant sweetpotatoes from other villages were brought to the village when female villagers visited their birth homes or relatives' houses. In

Bangladesh, some women tried growing OFSP after learning from their female relatives and close friends. What they learn from their sisters and friends is not simply about the technologies themselves but how it makes sense of everyday productive and reproductive work, as well as gendered norms and relationships. Therefore, the success of farmers with the same gender and a similar socio-economic status could encourage female farmers who do not have enough confidence to participate in innovation through more formalized community-group activities.

In this way, expanding opportunities for innovation to the less empowered 20% of the population requires transforming the dissemination of technologies from reliance on formal extension approaches using conventional teaching methods to embracing social learning approaches that take advantage of informal networks. This implies that not only intervention planning and implementation but also evaluation and monitoring need to be redesigned by moving beyond examining the impact on the primary target to toward tracing how technologies are disseminated through informal networks.

4.2 Understanding diverse empowerment pathways for expanding opportunities

Innovation activities need to fit well with the context-specific social expectations and wishes of farmers of both sexes so that they are more likely to adopt them. To address this, in this sub-section, we look at how their adoption of agricultural innovation is associated with societal understanding of what empowerment means for men and women. The findings show that women's notions of empowerment are more diverse than men's, and only when innovation satisfies women's context-specific expectations for empowerment are they likely to adopt the activities, taking the first step to stronger agency and further opportunities in the future.

Men's and women have different empowerment pathways that shape their interests in innovation

Across the cases in Asia, SSA and Colombia in Latin America, men are interested in innovation that produces high yields, cash incomes and agricultural assets such as land, equipment and livestock. This may be because material wealth represents the masculinities by which they distinguish themselves from women and poorer men. In fact, many men attribute their increased power and freedom to their increased earning, yield and/or material assets.

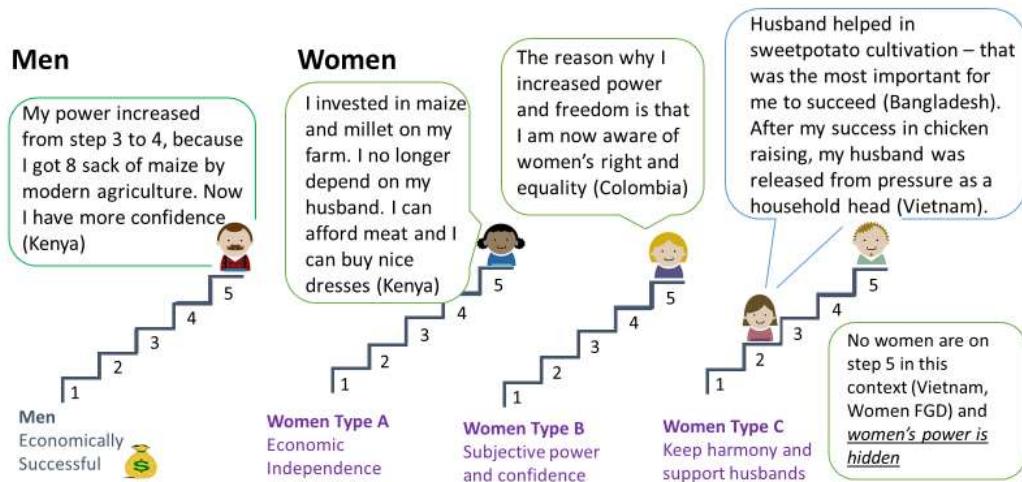
In contrast, women's empowerment pathways are more diverse and complex. For women, gaining material assets and being an economically independent farmer is not the only key to climbing the ladder of power for women. Three types of empowerment pathways were identified among the complex and sometimes contradictory and overlapping individual empowerment pathways (Figure 4.3).

What do these different pathways mean for gendered opportunity structures for agricultural innovation? How does agricultural innovation influence and is influenced by those different pathways? The following sub-sections discuss them in detail.

Women have diverse interests in and strategies for innovation

Women's empowerment pathways are diverse and context-specific, and economic power is not necessarily a route up the ladder. In some contexts, women value family harmony, and their interests in innovation are shaped by their hierachal relationship with their husbands and the gender divisions of labor therein.

Figure 4.3 Men's and women's gendered empowerment pathways



In Asia (Bangladesh and Vietnam), women tend to have a strong sense that resources and labor are shared within the household, although wives and husbands play different roles in farming and non-farming activities. In these case studies, women indicate that they try to contribute to the household within their defined roles by expanding their autonomous domains little by little. In this conjugal relationship, harmony is very important for women in order to have favorable resource redistribution within the household, and therefore they strategically behave modestly and try to avoid directly challenge their husband's patriarchal positions. As such, their interests in agricultural innovation are in those smaller activities which do not affect their restricted gender norms as well as their domestic responsibilities which are central to being a good wife. In Bangladesh, although women's innovation activities are small and limited to within the home garden areas, their contribution to the family is well accepted by their husband, and this helps women to increase their sense of power and freedom however small their income is. In this respect, it is not yield or the scale of production that encourages women to innovate. Women can increase the chances of participating in innovative opportunities only if their husbands support their activities and accept their contribution, which indicates the importance of considering women's interests and strategies under the restricted gender norms.

In contrast, in some parts of sub-Saharan Africa, women are proud of having a certain level of economic independence from their husbands and sometimes able to invest their earnings in innovative activities of interest to them. So women, like men, also move up the power ladder through economic activities, and some women who have their own land and capital are interested in investing in new technologies even if they were originally men's domain and require intensive labor and skills (commercial crops such as banana and maize, and livestock such as dairy cattle). In this situation, opportunity structures for women and men can be very similar, and in some cases, they are competing with the same interests in innovation, and therefore careful attention is needed to the gender divisions of innovation opportunities (see section 4 below).

For some women, their perceptions of their own power and freedom are very subjective, more associated with their own awareness of gender inequality, courage and confidence than the

degree of their own economic power or material assets. This is distinct from men's notions of power in which economic power is central. For example, in Bangladesh, by participating in new agricultural activities through OFSP, women began to believe that they can indeed do new things. Their awareness and courage, rather than income itself, is often the most important achievement for them as it encourages them to seize further opportunities for innovation (Bangladesh, better off FGD). In this case, the impacts of innovation should not be narrowly based on production and income but should include the personal power that generates motivation to take advantage of future opportunities for innovation.

These findings show that women's empowerment processes are diverse and their interests in agricultural innovation are mediated by their livelihood strategies for strengthening their power and freedom. There is therefore no universal model for empowering women via agricultural interventions. In this sense, understanding women's empowerment pathways requires in-depth explorations of what empowerment means for them in a given gender context. This then enriches our understandings of how women's agency plays out in their choices of agricultural innovation. Expanding opportunity structures therefore need to consider those diversities among women across the region.

There is a gap in opportunity structures for poor and young men

While current conventional opportunities for agricultural innovation such as the intensification and industrialization of agriculture favor men rather than women, not all men can use opportunities in the same ways. There is a gap in this opportunity structure for poor and young men.

For example, in Colombia and central Vietnam, moving from traditional cassava varieties to modern varieties more appropriate for industrial processing is an innovation which favors some men as it enables them to earn more income and to increase their own sense of power. In central Vietnam, wealthy men purchase or rent land for large-scale cassava production and invest in processing machines and tractors to provide services for the villagers. They also hire poor farmers as wage laborers, thereby distinguishing their status from other men and justifying their higher level of power and freedom.

However, for a man to take advantage of such innovation opportunities, he must be an independent farmer with his own farm, with social connections outside the village, and sufficient assets to risk investing in new activities. According to life histories of poor men collected as part of the study, it takes many innovative male farmers seven to ten years to be able to seize such opportunities with high investment, thereby achieving the highest levels of a sense of personal power. This all implies that the current focus on intensification and in some cases industrialization of agriculture tend to support only the men who already have power, whilst those who have lower levels of power do not take advantage of opportunities, and remain as small farmers and laborers for the wealthier. Furthermore, when a significant investment fails, the farmer risks falling into poverty, from which it is difficult to escape. Here, we find the gap in the current opportunity structures for agricultural innovation which exclude poor men and young men. As such, their interests are oriented towards non-farming sectors where they can quickly accumulate material assets to become independent farmers in the future. At the same time, however, they are often not interested in agricultural innovation more associated with women (e.g. home vegetable production or small livestock) even though it often requires less investment than the above male-linked types of innovation. If agricultural interventions are aiming at poverty reduction and the sustainability of small-scale farming, we need to create new opportunities which have a better fit with the social needs and circumstances of young men and poor men. This may include support for them to work on their own rather than as dependents of wealthier farmers and with smaller investments, which could offer greater autonomy and stronger self-esteem.

4.3 Threats to norms of male authority as a factor discouraging innovation

Especially in Eastern and Southern African countries, women's economic success can be seen as a threat to norms of male authority, provoking jealousy and sometimes punitive actions among husbands and discouragement among their wives. Women do not have such a reaction when their husbands are successful. Women express their concerns that jealous husbands may jeopardize their innovative business initiatives by taking their capital or threatening divorce. Some women suggest that men's jealousy may come from their assumption that their wives' increased mobility and financial capacity allows them to interact and have relationships with other men.

This implies that a household is not always a cooperative unit of production and women's motivation and strategies for taking advantage of innovation opportunities are shaped by those complex emotional relationships. The reasons why women do not adopt new technologies are not always associated with their lack of skills or financial capacity but can be related to their concerns that innovation causes jealousy in their husbands. In this context, therefore, even if the intervention is intended to target women, providing a parallel intervention for their husbands based on men's interests may be more effective than focusing only on women and their crops.

In other countries, jealous husbands do not appear to be a concern for innovative women. This may be related to context-specific gender relations. In Bangladesh, for example, the scale of women's involvement in agricultural innovation is still much smaller than men's. In Vietnam, both men and women work together in the same field and therefore women's innovation is less distinguishable, or women can make their contribution less visible as a strategy to keep harmony in the family. As a male participant in one of the Central Vietnam case studies commented:

"there are some smart women who are innovative but they gave the honor to their husband. Some women have great ideas but they often tell neighbors that their husbands did it" (Men's FGD, Central Vietnam)

These strategies can help save men's face and thus prevent men feeling envious of their wives. In Colombia, on the other hand, women's economic success is concentrated on non-agricultural sectors and therefore women do not compete with men in agriculture. In post-conflict African countries such as Rwanda, Congo and Burundi, women have been playing significant roles in agriculture and the phenomenon, discussed in the previous section, of "women working like men" has been an accepted gender norm for a long time. This means that their greater involvement and success in agriculture may not cause serious jealousy in men.

Envious neighbors also discourage innovators. They can spread negative rumors or even destroy the innovation. In Uganda, OFSP was a successful technology recognized in newspapers. That made some people in the community jealous, and resulted in rumors that OFSP caused cancer. Similarly, in Nigeria, a cassava processing machine caused jealousy among the villagers and somebody put salt into the engine to destroy the machine.

The above examples underline the fact that communities are not homogenous units that uniformly benefit from new technologies. Even in the study sites where social cohesion in the community is relatively strong, such as Bangladesh and Colombia, some of the people interviewed still worry that their society is changing in a negative way in terms of harmony. Uneven distribution of technologies and subsequent changes in the gaps between poor and rich can easily create tensions among the villagers.

In contrast, in Vietnam where a collective-farming system was adopted until the early 1990s, social cohesion is still very high and incentives remain in place to stimulate cohesion and communal effort. For example, the government rewards the best performing village every year. Villagers often support each other through labor exchange or sharing machines and trucks. Disabled women and men are provided work opportunities through the support of wealthy farmers. In Central Vietnam

men purchased nut-grinding machines which were made available for use by villagers at low cost, resulting in a reduction in women's drudgery. The study found that villagers appreciate such contributions to the community rather than feeling jealous about those who own the machines. It is clear that villagers share the collective achievement of agricultural development with each other. Innovative farmers benefit through the prestige conferred on them and this prestige is a means to demonstrate their power and gain respect from the villagers.

4.4The gender division of labor as an opportunity rather than a constraint

Women have many gender-related constraints on their capacity for innovation, such as limited resources, lack of skills and limited physical mobility. However, as discussed, the underlying causes lie in the gender relationships under the patriarchal structures that shape men and women's agency. Without properly addressing these underlying issues, technological support alone cannot transform opportunity structures. Women who live under restrictive gender norms seek opportunities for innovation within their limited autonomous domains such as their home gardens and small-scale livestock raising, instead of breaking gender norms to take up new opportunities in men's domains. Such deliberate strategies often work well and many women are eventually able to expand their innovation activities. In this sub-section, we consider women's autonomous domains as an entry point for expanding innovation opportunities for those who still live within restrictive gender norms.

The domestic arena can be an opportunity rather than a constraint

Across multiple contexts, women's domestic responsibilities such as cooking and child-rearing are commonly viewed as major causes of their limited time and physical mobility, which prevent them from engaging with agricultural innovation processes. This cannot be underestimated when we develop intervention designs for women. Women often highly value child-rearing and cooking. Children are important assets for their future security, and in fact, many women across the regions escape poverty after receiving financial support from their independent sons or married daughters. Furthermore, in some contexts, cooking for their husbands and children is a primary part of gender identity as wife and mother and by fulfilling this responsibility, women maintain their relationships with their husband and in-laws. In addition, in many countries, nowadays women's domestic responsibility has been extended to animal feeding and growing vegetables in their home garden.

While these domestic responsibilities may constrain women's potential for innovation in agricultural activities, men have little control over women's domestic arenas and women have relative autonomy in trying new practices in their gender domain. The findings from Sections 2 and 3 show that women are highly motivated in exploring new ways of doing things in relation to animal feeding and vegetable cultivation as they have autonomy and decision-making power.

This may be a reason why many women are interested in the role of RTB crops for food and/or livestock rather than for large scale processing such as in the starch industry. In Bangladesh, women can grow OFSP in their home garden because it is a domain where they have full autonomy. In Vietnam, women try to obtain varieties of sweetpotatoes growing in other villages to improve the feed for their pigs and other livestock. In this process, women do not have to get permission from their husbands, as livestock feeding is women's domain. Similarly, in Uganda and Malawi, women's strong interest in sweetpotatoes is derived from livestock feeding, an area in which women already have autonomy and which is a significant source of cash income. Thus interventions that stimulate innovation processes in the areas where women already have decision-making powers can be the start of expanding opportunity structures for women.

Opportunities deriving from being a “good wife”

Across the regions from Vietnam to Uganda, individual innovative women’s stories reveal that living in harmony with their husbands is one of the most important factors that allow women to participate in trainings, risk innovation and handle incomes from it. Without harmony, it is difficult for women to expand their autonomous domains. This means that women do not prioritize engagement with innovation processes if it risks damaging their role as a good wife.

In Bangladesh, for example, growing OFSP in a home plot was an important factor enabling women to be involved in food and nutrition innovation as they can still manage to cultivate OFSP without compromising their domestic responsibilities such as cooking on time for their husbands. Similarly, in Vietnam and Uganda, female innovators attribute their success to their husbands’ understanding and trust. However, being a good wife, such as fulfilling their domestic responsibilities and not overtaking their husband’s economic roles, is the key to gaining this understanding and trust from their husbands, thereby expanding their autonomous domains. Thus, unlike for men, it takes time for women to have full autonomy in their decisions, including to try new things. Innovation firstly needs to fit well with women’s autonomous domains, and activities should be manageable for women without compromising their roles as good wives. This implies that intervention designs, monitoring and evaluation cannot be gender-neutral as pathways for successful innovation differ by gender.

4.5Concluding remarks

These findings provide a number of implications for agricultural interventions. First, while the community or a social group is a way to introduce new technologies, people in the community or group have different levels of agency, with some having greater opportunities for innovation than others. Given that a household is not necessarily a cooperative unit, careful consideration is needed over the selection of innovators by questioning the assumption that a woman or man can simply be a representative of a household. Second, in many study sites, the gaps between poor and rich are expanding and the society is more individualized than before. In this context, agricultural interventions that only support a small number of groups run the risk of increasing the gaps and creating tensions. On the other hand, where social coherence is high such as in Vietnam, men’s masculine identities are linked to collective innovation at a community level, and one’s innovation can support the other community members, and therefore if we can identify respected innovators who could support other people, we may be able to extend opportunities to other people. Thus, intervention approaches can be differentiated in accordance with opportunity structures in each social context.

Section 5 Synthesis of key messages

Key messages: Unleashing innovation

What unleashes agricultural innovation is firstly about the innovations themselves. New varieties and better quality seeds of key crops are of major importance for men throughout the sample and for women farmers in Africa. This preference often included RTB crops and improved management of these crops was a priority for women in Africa. The most important innovations for all women are associated with livestock. This preference reflects their limited access to agricultural resources and their reproductive responsibilities which, sometimes combined with normative restrictions, limits physical mobility. Contrary to some stereotypes about men and machines, women in some locations identified equipment as priority innovations. Women and men often under- or overestimate the importance of innovations for the opposite sex, which can lead to misguided agricultural interventions if these are gender blind.

Although many of women's innovation preferences were driven by concerns for food and nutrition security their choice of top two innovations also responded strongly to income opportunities. This was the key driver for men, but men's top innovation choices by no means ignored their contribution to food security. This was often important. The difference between women and men was the way gender norms governing access and control strongly influenced women's choice of innovations in terms of what could most realistically provide income, food security and other desirable benefits to them. These other benefits included greater independence and decision-making – the preference for livestock and innovations related to home gardens responded to this factor – less drudgery and interactions between technologies and practices leading to whole system benefits.

Family harmony and positive personal traits were identified as key elements by women across all cases in Africa, Asia and Latin America. These enabled women to be more economically active. However it underlines the power differences between men and women in terms of access to and control of key productive resources. Although in Vietnam women had more independence in some economic spheres than in other case contexts such as Bangladesh, men could withdraw their labor and withhold use of family finances if they were not happy with the woman's choices or behavior. Women had to deploy negotiation and deference as strategies under this normative environment. The results of this study indicate that those engaged in R&D interventions need to pay more attention to social relations and intra-household decision-making and not just the technology to achieve successful and equitable innovation and adoption.

This analysis also shows that targeting women for certain innovations can allow innovation to spread through social networks. For example, in relation to innovations such as small livestock and vegetables women in Africa and Asia often talked about giving others in their community or their close kin vegetables and poultry to cement and build social networks in the community. This allows innovations to more easily spread within and across communities. This contrasts with the situation of men who more often relied on networks outside the community, including accessing loans and capital.

Both women and men identified the availability of assets, especially financial capital and land as primary factors enabling innovation. Men's greater opportunity to take advantage of sources of credit can be an important advantage and their greater control of access to land has implications for the types of crops men and women grow. Cash crops like banana and coffee are perennial, needing stable use rights over land and are capital intensive, requiring access to credit. In livestock, a similar situation arises with large animals such as new breeds of oxen and dairy cows, which demand large outlays of cash. In the case studies examined, men were predominantly responsible for these

crops and animals. The implication is that not every innovation provides the same kind of opportunities for greater equity and gender transformation. One approach involves developing low cost technologies that require limited capital investment, basically intensifying those agricultural activities where women already have access. RTB crops are important in this respect. For example, in Bangladesh, Uganda and Malawi women often mentioned OFSP as low cost both in terms of monetary investments and time. Gender training for both men and women farmers could in the long term help to challenge certain gender norms and stereotypes. In these same contexts it would be important to strengthen the linkages between crops and small livestock, through better use of crop byproducts as feed and better use of animal by-products for fertilization and for sale.

A second approach is to challenge the gender norms that promote men's control of cash crops while also working to help women gain access to capital to invest in these crops. This approach could be appropriate in Vietnam where women are already engaged in most aspects of agriculture, including raising large livestock, but are subject to their husband's normative control of assets.

Among factors that women and men identified as hindering innovation, both cited labor constraints and the limitation this presents in the amount of land that can be cultivated and the types of crops that can be grown. It was a factor in constraining their progress on the "ladder of power and freedom". For poor women, this related to their need to combine domestic with agricultural tasks. It accounted for their interest in harvesting machinery in Bangladesh for example when there is a high demand for their labor. Labor saving technologies should be a key consideration when developing new interventions. For RTB and HT crop related techniques for reducing labor and simple cheap and effective equipment should be prioritized.

Key messages: Gender norms, agency and innovation

Normative ideas about what is a good men and women farmer underlines the idea that women have a supporting role in agriculture, that they exist "in men's shadows". However, this has different meanings in the African compared to Asian or Latin American contexts. In Africa, where women are relatively independent managers of their own farms and households, they have a more normatively defined role, especially related to household food security. In Bangladesh and Vietnam contexts, women are expected to contribute to a family farm run by the male household head. This is strongly expressed in Bangladesh, more nuanced in Vietnam. Yet even in Africa, women are constrained in their own farms because of lack of access to land and through obligations to work on their spouses' farms. The notion that a good woman farmer has a vegetable garden and looks after small animals is a widespread norm in Africa as well as Asia. Nevertheless, there is still a gap between normative expectations and what happens on farm in practice. Banana is "a man's crop", but under certain circumstances it is cultivated also by women.

There are wide differences in the understanding of gender equality, gender difference and what is changing among men and women. Although many participants focused on biological difference to justify inequality of opportunity, others suggested that greater equality can lead to greater development at all levels, from the household to the country. Greater gender equality can also come from interventions by external agencies, many of which target benefits to women. This can sometimes end being counterproductive, if men are not involved to understand the overall benefits from these kinds of interventions.

Agency and empowerment were found to be affected by many aspects of the normative environment. Limitations on physical mobility directly affects women's agency. Across the sample there was a lot of variation, from highly constrained mobility in Bangladesh to high mobility in Vietnam, even more so than in many African cases. But even in Bangladesh there is evidence of change in the extent of constraints, observed both by young men as well as women. Gender norms

surrounding household leadership in Africa affect agency. Men “inherit” agency through titles such as household head. Women have to earn agency over time through negotiation, use of available spaces and resources and in many cases just by growing older. Compared to ten years ago, both men and women feel more empowered across most of the cases. Some of this can be accounted for by the greater power that comes with growing older, but improvements in family livelihoods was also identified as a factor. This is also linked to improvements in education. A third reason for feeling more empowered was identified as increased support from a changing external environment. New laws against domestic violence in some African countries was an important example, but also the actions of development agencies involving training and specific support to women.

In relation to youth, young men and women’s interest in agriculture can be increased by direct application of knowledge and skills gained through formal education, and by recognition of the knowledge-intensive nature of many aspects of agriculture. If agriculture is viewed as a low status occupation appropriate for those with limited formal education, it will be stigmatized and will not appeal to youth.

Gender and inter-generational relations curtail the ability of young women and men to catalyze innovation. Once they get married, women are under their husband’s authority, and he may feel threatened if she adopts innovations and makes money. When still under their parents’ control, both young men and women have curtailed decision making power. This suggests the need to focus on more than just technical aspects of agricultural innovation but also social aspects related to agriculture. If young people view gender equality in a negative light, it can limit young women’s ability to make decisions.

Young men and women are both interested in earning an income, albeit for different reasons. If young men and women can seize agricultural entrepreneurship opportunities and make a good living, they may be interested in continuing in this area. Good income prospects from agriculture may also remove the stigma associated with the occupation.

Key messages: Opportunity structures for inclusive innovation

Previous sections show that men and women have different ways to access the resources on which an innovation depends, and therefore have different opportunities of benefitting from it. In other words, innovation is not an even process undertaken by targeted households to help increase production, incomes and nutrition. There is considerable intra-household variability and there are different social conditions that enable women and men and communities to leverage opportunities for innovation.

Four key elements facilitate this process. First, interventions that bridge formal institutions and informal social networks are very helpful, as they can open up new opportunities to those who have had few chances to participate in past interventions. The conventional innovation opportunities provided by formal institutions such as extension workers, government institutions and private sectors are more accessible for those who have agency, confidence and social connections. However, while women and men with limited agency have limited access to formal institutions for learning new agricultural activities, they still learn new technologies from their friends and relatives. Therefore, interventions that provide a bridge between these formal and informal resources should be prioritized.

Second, innovation processes need to fit well with the context-specific expectations and demands of women farmers so that they are more likely to participate and benefit. Innovation can strengthen women’s and men’s subjective notions of power, and thereby increase their self-confidence, and hopefully encourage them to seize further opportunities for innovation. However, the pathways through which they gain power are very different, being closely associated with social

expectations of how women and men should be. Therefore, if innovation activities do not fit with women's empowerment pathways, only the men benefit from them. Since across the target sites, men's power is associated with material assets and economic independence, mechanization and intensification of agriculture can directly help strengthen their power and confidence. On the other hand, in some social contexts women feel empowered and confident when they play a supportive instead of a central role in economic activities, as being independent from their husbands is not a socially desirable situation. Innovation is embedded in socially constructed family relations, and only when it satisfies the needs and expectations of women farmers are they likely to adopt the activities, taking the first step to empowerment and thereby stronger agency to seize further opportunities in the future.

Third, despite the persistence of patriarchal structures that limit women's innovation opportunities, women do have a space for taking up innovation within their own domains in everyday agricultural activities where they already have autonomy over changing current practices and taking a risk. Identifying their autonomous domain, which may be very small as in Bangladesh, consisting of livestock raising and a small vegetable garden, or larger independent farms run by women in African case locations, can be an entry point to facilitate women's participation in innovation, even under on-going, restrictive patriarchal structures.

Finally, we emphasize that families or communities are not homogenous units of innovation. Without understanding the social power dynamics at play, interventions will tend to support only those who already have significant power. If interventions specifically target the disempowered without awareness of those social dynamics, there is the risk of provoking jealousy and tension within families and communities. Considering the social power dynamics helps us to think about how and to whom new technologies are introduced. Successful interventions that engage with and support multiple members of communities can strengthen collective capacities for innovation.

Annex 1. Overview of GENNOVATE Sampling, Data Collection and Analysis Protocols

The development of GENNOVATE's conceptual framework, sampling framework and field instruments began at an October 2013 research design workshop. The final methodology package reflects extensive reviews of literature and lessons and tools from previous field studies³; two rounds of field pilots in February and April 2014 and feedback from experts and study participants on the instruments; ongoing technical advisory support and capacity building for PIs; and strong training and supervision for the field teams. In this note we present highlights of the study approach and protocols.⁴

Study questions and conceptual framework

GENNOVATE's design is guided by the following study questions:

- 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?

To address the study questions, GENNOVATE employs a conceptual framework which is informed by selected discourses on agency and structure interactions in feminist literature (e.g. Wharton 1991, Kabeer 1999, Ridgeway 2009). The study questions require exploring interactions between gender norms, agency and agricultural innovation in specific contexts, or local opportunity structures. The notion of structure refers to the “the rules that shape social actions and the resources that furnish agents with the power that makes it possible (to varying extents) for them to act” (Lane 2001: 297). GENNOVATE pays particular attention to gender norms as an important dimension of the local opportunity structure. Gender norms refer to the socially constituted rules that prescribe men's and women's daily behavior. These norms are upheld across generations by internalized psychological beliefs about men's higher status and competence and appropriate gender behaviors, and by processes of social interaction and sanctions of one's “reference group” through social approval and disapproval (e.g. Ridgeway 2009, Bicchieri 2006).

Depicted in figure 1, GENNOVATE's conceptual framework conceives of empowerment and other dimensions of improved wellbeing (the far right of the figure) as products of the interaction between men's and women's capacities for agency and innovation (in the center), on the one hand, and on the

³ It was, in fact, a presentation of the World Bank's global qualitative studies which sparked the idea for GENNOVATE. These studies include: *On Norms and Agency: Conversations about Gender Equality with Women and Men in 20 Countries* (Muñoz Boudet, Petesch and Turk 2013), *Voices of the Poor* (Narayan and others, three volumes: 2000, 2000a, 2002), and *Moving Out of Poverty* (Narayan and others, four volumes: 2007, 2009, 2009, 2010).

⁴ For a fuller discussion of the study rationale, key questions, conceptual framework, and related literature, please see Badstue et al. (forthcoming); and for fuller discussion of the study sampling and data collection methods and experiences, see Petesch et al (forthcoming).

other, the opportunities for and barriers to innovation in their local opportunity structure (with key dimensions depicted on the left).

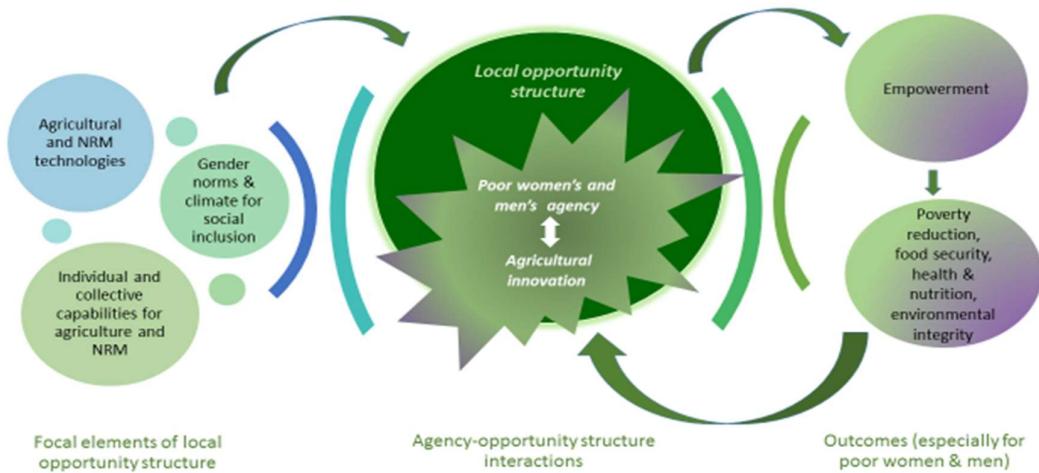


Figure 1. GENNOVATE conceptual framework

Drawing on this conceptual framework, GENNOVATE's methodology addresses concerns for:

- i) *contextual* influences on, or the embeddedness of social action and lived experience;
- ii) *comparative* research strategies which offer cross-site learning and permit cautious generalizations to wider settings while remaining attentive to local specificities; and
- iii) *collaborative* research processes between the researcher and study participants, and among the study's large research team, which strengthen the quality, relevance and reach of the research (also see Badstue and others forthcoming).

Sampling

A GENNOVATE case refers to a social group living in a single locality that the inhabitants call their village, community, neighborhood or hamlet. The cases were selected purposively to introduce variance on two dimensions considered important for understanding gender differences in innovation adoption:

- i. *economic dynamism*, here understood as the existence and nature of competition over agriculture or NRM resources important for livelihoods in the village; infrastructure development that indicates change in the local economy such as penetration of roads or connectivity; changes in the market orientation of small-holder farmers; changes in the sophistication of processing technologies for key commodities; the relative percentages of buyers and sellers (sex-disaggregated if information is available) in local input and output markets; changes in on and off-farm employment opportunities; changes in the local diversification of livelihoods or the potential for this diversification.

- ii. *gender gaps in assets and capacities*, such as the share of girls completing primary school compared to boys; the extent to which women hold important leadership positions (civic and political) in local organizations, and the broadly accepted norms in the village about women's freedom of movement.

The two axes for stratification are similar to those applied in *On Norms and Agency* (Munoz Boudet, Petesch and Turk 2013) and reflect an empirical literature finding associations between countries with greater gender equality and higher levels of economic growth (e.g. World Bank 2011). For substantive as well as practical reasons, the protocols provided PIs with some flexibility in how they stratify their samples along the two dimensions (see Petesch forthcoming for further discussion).

Table A1.1 presents the countries, crops and CGIAR Research Programs spanned by GENNOVATE's fieldwork. Asia contains the largest number of cases (74), followed by Africa (53 cases) and Latin America (10). The regional concentration in Asia and Africa reflects current research priorities in the CGIAR system.

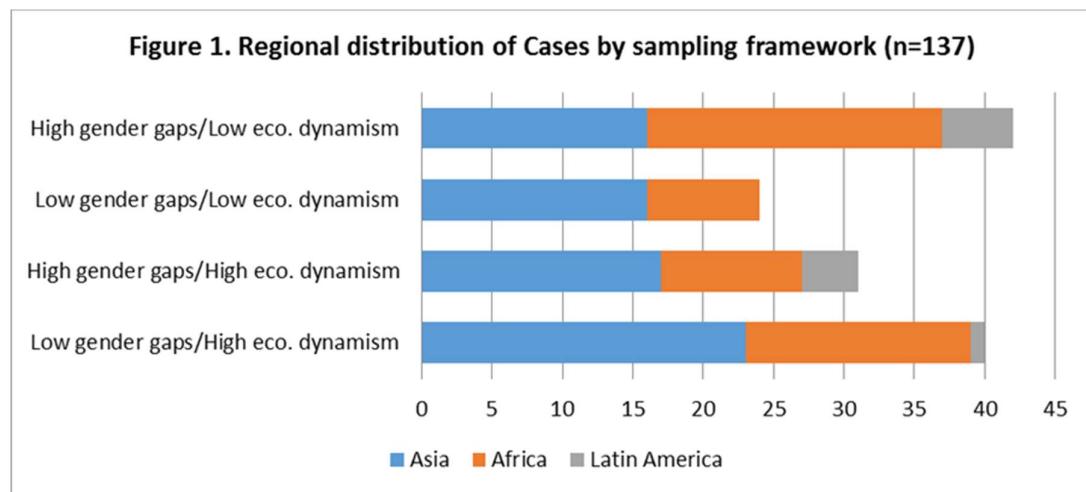
Table A1.1. GENNOVATE countries, target crops and systems, and CRPs

Countries	Target crop & 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	<ul style="list-style-type: none"> • Banana • Cassava • Chickpeas • Groundnuts • Maize • Millet • Pigeonpea
• Africa: Burkina Faso, Burundi, Democratic Republic of the Congo, Ethiopia, Kenya, Malawi, Mali, Morocco, Niger, Nigeria, Rwanda, Tanzania, Uganda, Zimbabwe	<ul style="list-style-type: none"> • Potato • Rice • Sorghum • Sweetpotato • Wheat
• Latin America: Colombia, Mexico	<ul style="list-style-type: none"> • Aquaculture • Tree-based systems • Humid tropical systems

The sample includes major food crops such as rice, wheat, maize, cassava, sweetpotato, banana, millet, sorghum and several grain legume crops. In terms of coverage of different agricultural systems,

the dryland agro-ecosystems of Africa and Asia are well represented in the study, as are the sub-tropical and tropical systems of Asia, which included aquaculture cases. Cases from Indonesia and the Kyrgyz Republic include contexts where tree products and agro-forestry systems are important.

Figure A1.1 presents the broad distribution of cases along the dimensions in the sampling framework, indicating a cross-site sample with good coverage of all four sampling contexts in the priority regions.



Data collection

The methodology package features 15 data collection activities for each research village (table A1.2). The first of three focus group instruments was conducted separately with poor women and men (activity C, table A1.2), the second with middle class women and men (activity D), and the third with young women and men (activity E; and six groups in total). The data collection also includes 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 (one interview requiring key informants of both genders), ii) an innovation pathways interview with successful adopters of a new technology or practice⁵ (two men, two women), and iii) life story interviews (two men, two women).

Table A1.2. Overview of GENNOVATE Data Collection Instruments

Tool	Purpose	Respondents
Activity Literature review	A. – 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)

⁵ 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.

Activity B. Community profile	<ul style="list-style-type: none"> – To provide social, economic, agricultural, and political background information about the community 	<ul style="list-style-type: none"> – 1 or 2 male key informants – 1 or 2 female key informants
Activity C. Focus group: Ladder of Life (with poor adults)	<ul style="list-style-type: none"> – 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 socio-economic mobility, poverty trends—and their gender dimensions – Intimate partner violence 	<ul style="list-style-type: none"> – 1 FGD of 8 to 10 adult females, ages 30 to 55 – 1 FGD of 8 to 10 adult males, ages 30 to 55
Activity D. Focus group: Capacities for innovation (with middle class adults)	<ul style="list-style-type: none"> – 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 	<ul style="list-style-type: none"> – 1 FGD of 8 to 10 adult females, ages 25 to 55 – 1 FGD of 8 to 10 adult males, ages 25 to 55
Activity E. Focus group: Aspirations of youth (with older adolescents and young adults)	<ul style="list-style-type: none"> – 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 	<ul style="list-style-type: none"> – 1 FGD of 8 to 12 female youth, ages 16 to 24 – 1 FGD of 8 to 12 male youth, ages 16 to 24
Activity F. Semi-structured interview: Innovation pathways	<ul style="list-style-type: none"> – 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. 	<ul style="list-style-type: none"> – 2 male innovators – 2 female innovators

Activity G. Semi-structured interview:	<ul style="list-style-type: none"> – 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. 	<ul style="list-style-type: none"> – 2 males – 2 females
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PIs prepared for fieldwork by conducting a review of literature and secondary data from their research villages and regions; mobilizing and training their field team; and refining, translating and validating the data collection instruments. Each field instrument contains a standardized semi-structured interview guide to ensure comparability in the data collection and documentation across the research villages. PIs also tailored sections of the interview guides to address innovations and other issues of importance to their CRPs or the specific case.

The data collection 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. The trainings to prepare for fieldwork engaged team members in long hours reviewing, discussing and practicing—question-by-question—the data collection instruments to ensure common understanding and ease with facilitation. The team also reviewed the quality of the translation of each question, making sure that it not only captured the intent of the English version, but that the phrasing used common, everyday terms rather than a more formal translation. Trainings also required a field practice and clearance by the study's expert advisor of the practice documentation of field notes.

Data analysis

The analysis strategy combines two procedures: i) inductive case-oriented (or thick description) techniques; and ii) deductive variable-oriented (or thematic) techniques (e.g. Miles, Huberman and Saldaña 2014). Case-oriented analytic techniques provide the building blocks for GENNOVATE's major findings and conclusions. These approaches require a focus on a single case to explore the interplay of gender norms, agency and innovation capacities in specific localities, and over time, which can explain these processes in the wider set of cases.

This case-oriented work is complemented with variable-oriented analysis aided by pre-coded questions during data collection (from focus group rating exercises and community profile pre-coded questions) as well as data coding with NVivo using 150 common codes broken into 15 topic areas. This supports systematic triangulation of findings across types of respondents and communities and identification of recurring themes which cut across GENNOVATE's cases and subsamples (for example, the experiences of poor vs. middle class women in cases with different levels of economic dynamism). To ensure sound case study management during the data coding and analysis phase, significant investments were made in capacity building of PIs; in supervision and collaboration among the data coders; and in the preparation of detailed protocols, one elaborating data coding procedures and another analysis (or "query") procedures with the software.

Annex 2 Code Definitions used in this report

1. Innovation types

- a. **New seeds/varieties:** this contains every mention where it is specified by the FGD participants that one of the most important innovations is a new or improved “seed” or crop variety. Unfortunately Mentions of hybrid seeds/varieties are also included. E.g. improved banana variety, improved potato varieties, new potato seed varieties, used of new cassava seed, new IITA cassava, new variety of peanut, improved maize, hybrid maize, etc.
- b. **Livestock related:** it contains every mention where it is specified by the FGD participants that one of the most important innovations any kind of livestock (small or big animals) or animal species. It also refers to practices/technologies related to this activity, like animal raising techniques, building stables or sheds, milking cows, collecting eggs, etc. E.g. Campbell ducks, building breeding stables, hybrid cow raising techniques, etc.
- c. **New/improved cultivation techniques:** it refers to mentions where it is specified by the FGD participants that one of the most important innovations is a cultivation technique that has been improved or has recently started being applied in the community, often securing better yields, profits or quality of the crops. E.g. ploughing, new technique of planting beans, row planting, sowing in line, maize spacing, etc.
- d. **Input related:** it refers to mentions where one of the most important innovations is related to using or obtaining different kinds of inputs like fertilizers, manure or herbicides. E.g. use of organic or mineral fertilizer, new way of using fertilizer, use of chemical fertilizers, using herbicides.
- e. **RTB Crops:** it refers to mentions where one of the most important innovations is a RTB crop, except for the cases where it is clearly specified that this is a new or improved RTB variety or seed. When this happens, the innovation is only coded under the “new seeds/varieties” category and must never be coded into the RTB crops category to avoid double counting. E.g. OFSP, round potato, industrial cassava, bitter cassava, etc.
- f. **Other innovations/crops:** it encompasses all of the top innovations that do not fit in the categories contemplated and all of the categories that have the lowest number of mentions. Some of these mentions are related to erosion control, producers’ associations and savings & credit, but also variate crops that are mentioned only once like peanuts, lentils, watermelon or citrus.
- g. **Irrigation & Water Management related:** it encompasses all of the top 2 innovations related to irrigation and water management, which involves the installation of irrigation systems, the implementation of new irrigation and water management techniques.
- h. **Vegetables/kitchen garden/productive gardens:** it encompasses all of the mentions related to planting vegetables (and sometimes other crops) mostly for family consumption and occasionally for sale, depending on the existence of surplus. The references can refer simply to vegetable planting, but also to “kitchen gardens” or productive gardens or backyards.
- i. **Tree crops & Forestry:** it entails all of the top 2 innovations that refer explicitly to forestry or practices related with tree planting, including specific tree crops like coffee, oil palm and cocoa. Nonetheless, when a new variety or seed is specified, the

mention must not be counted here, but only in the “new seeds/varieties” category to avoid double counting.

- j. **Machines:** this category includes all of the different kinds of machines that are included within the top 2 innovations, from those that help in crop processing, to those that facilitate the labor of applying pesticides and herbicides, as well as those that simplify irrigation. In the last 2 cases, the mention is only counted within this category and not in the “pest & disease control” or the “irrigation & water management related” categories. E.g. wheat threshing machine, spray machine, treadle pump, irrigation engine.
- k. **Pest & Disease control:** this category refers to all of the mentions that consider pesticides and pest and disease control techniques as one of the top 2 innovations. Pesticides are only counted within this category and not in the “input related” category to avoid double counting. E.g. BXW control, spraying pesticides, treatment of plants by pesticides, etc.
- l. **Training:** it refers to mentions where the top 2 innovations explicitly refer to training opportunities provided by external institutions (governmental and not governmental) where farmers have acquired new knowledge on agricultural practices and technologies. E.g. FADU trainings on cocoa, FADAMA activities and trainings.

2. Top factors supporting innovation

- a. **Assets, land property and capital:** this category entails all the mentions to land property, capital, money or other types of assets that are essential to put an innovation into practice, either because it allows farmers to manage the space, time and effort spent in applying an agricultural innovation, or because it allows them to obtain other necessary materials to implement it. The predominant idea is that, without having the availability to manage different kinds of assets that they can destine to carry their agricultural activities, these cannot be implemented, even if there is a strong will to do so.
- b. **Behaviors, attitudes, social cohesion:** it refers to positive emotions, behaviors and attitudes, at a personal, familial and community level, that enable innovations to take place and be successful. Most of the mentions refer to strong will, determination, disposition, eagerness to learn, happiness in the family, as well as peace and unity at the community level.
- c. **External agents:** refers to associations, public and private organizations, government agencies, enterprises and professionals from outside the community, who generally provide training on new agricultural practices, inputs and improved planting materials that allow for the implementation of innovations within the village.
- d. **Knowledge, education, practices:** entails mentions to formal and informal education, as well as mentions to knowledge, or specific agricultural practices. It differentiates to the “external agents” category, because an organization is never referenced here, as the mentions simply refer to “education opportunities”, knowledge (agricultural or otherwise) or different agricultural practices like planting techniques, new planting methods, etc.
- e. **Physical technologies:** refers to the importance of getting access to different kinds of physical technologies used for agriculture, from planting materials to machinery and inputs (fertilizer, manure, herbicides and others). These are usually mentioned as supportive of innovation because it increases the efficiency of agricultural work and

- the productivity of crops, incentivizing farmers to continue implementing new agricultural practices by making the tasks easier and less labor extensive.
- f. **Natural resources/climate sustainability:** it refers to good natural resource availability and favorable climate and weather conditions for an innovation to thrive. Mentions to good soil quality, good rain conditions and access to clean water for irrigation are counted here.
 - g. **Market availability:** refers to the existence of favorable market conditions that allow farmers to commercialize their products at fair prices, allowing them to obtain more resources to invest in their agricultural activities and incentivizing them to continue implementing innovations.
 - h. **Credit and loans:** refers to the possibilities of farmers to access to credit and loans in a formal or informal manner, in order for them to count with enough capital to invest in agricultural innovations. Only mentions that explicitly and primarily refer to credit, loans or credit institutions as factors that support innovation, are counted within this category. Although they can also refer to capital, these mentions are not counted in the “asset, land property and capital” category, to avoid double counting.

3. Top factors hindering innovation

- a. **Lack of assets, capital or poverty:** this category entails all the mentions to poverty, lack of land, capital, money or other types of assets that are essential to put an innovation into practice, either because farmers do not count with their own space to experiment with the innovation, or because they are unable to obtain other necessary materials to implement it. The predominant idea is that, without having the availability to manage different kinds of assets that they can destine to carry their agricultural activities, these cannot be implemented, even if there is a strong will to do so.
- b. **Lack of agricultural knowledge:** this category aims to capture all of the mentions that consider ignorance or lack of agricultural knowledge hinders innovation, as according to farmers, new agricultural practices cannot be implemented without knowing the adequate procedure from the start. Mentions counted here refer explicitly to lack of knowledge as the factor that hinders innovation. If the mention refers mainly to the lack of external institutions that provide agricultural knowledge, they are counted only under the “lack of external support” category.
- c. **Negative attitudes and family situation:** this category captures the references to negative personal attitudes, uncooperative neighbors or tensions between different community members, family members or spouses, as the most hindering factors for innovation.
- d. **Lack of physical technologies (seeds, inputs, machines):** it entails mentions to the lack of access to different physical technologies used for agriculture, from planting materials to machinery and inputs (fertilizer, manure, herbicides and others). This is considered hindering because it tends to increase work burden and affect productivity, as well as impedes the implementation of the innovation.
- e. **Unfavorable market conditions:** it encompasses mentions that refer to the existence of discouraging market conditions for the implementation of innovations, like lack of markets, low product prices, lack of market connectivity, high input prices and increased work burden.

- f. **Pests & diseases:** it includes mentions to pests and plant diseases that affect crop productivity.
- g. **Unfavorable weather conditions:** it refers to deficient natural resource availability and unfavorable climate and weather conditions that impede an innovation to thrive. Mentions to bad soil and water quality, bad or unstable weather conditions and climate problems are counted here.
- h. **Lack of external support:** refers to lack or absence of associations, public and private organizations, government agencies, enterprises and professionals from outside the community, who generally provide training on new agricultural practices, inputs and improved planting materials that allow for the implementation of innovations within the village. It is often mentioned that without their support, new agricultural practices and technologies cannot be disseminated among farmers.
- i. **Deficient job market:** entails mentions to lack of job sources or bad working conditions.
- j. **Health problems:** refers to mentions of having a debilitating or incapacitating health condition that impedes farmers to work or leads to a reduction of the amount of work that is done on their fields.
- k. **Others:** all other types of factors that are mentioned only once or twice and do not fit with the previous categories are included here.

Annex 3. Researchers and institutions involved in case studies

Country	Community	CRP	PI	Institution	Other investigators, institutes and/or field team involved	Coding and data management team
Malawi	Dziganda	RTB	Netsayi Mudege	CIP	Priscilla Matinga; Faiza Ahmed; Eliya Kapalasa; Ted Nyekanyeka, Sarah Mayanja, Chifwiri Nyirongo, James Chilima	Lucila Rozas, Nadezda Amaya
	Nalingura	RTB	Netsayi Mudege	CIP		Lucila Rozas,Carla Pimentel
Burundi	Murayi	Humidtropics	Anne Rietveld	Bioversity	Marie-Ange, Alice Simbare, Francois Irudukunda, Julien Irakoze	Speciose Kantengwa
	Munyika	RTB-HT	Anne Rietveld	Bioversity	Speciose Kantengwa, Alice Simbare, Francois irudukunda, Julien Irakoze	Speciose Kantengwa
Uganda	Ntove	RTB	Netsayi Mudege	CIP	Sarah Mayanja, Babirye Grace, Margaret Ssanyu, Dan Kisitu, Denis Tebuseeke Katende, Faisal Kayizzi	Lucila Rozas
	Odoo Soroti	RTB	Netsayi Mudege	CIP	Sarah Mayanja, Daisy Amusolo, Florence Agoe, Geraldine Tino, Moses Apedel, Joseph Okalebo	Lucila Rozas, Alejandra Huamán
	Kisweeka	RTB-HT	Anne Rietveld	Bioversity	Susan ajambo, Enoch Kikulwe, Samuel Mpiira, Damalie	Lucila Rozas, Angela Silva

Country	Community	CRP	PI	Institution	Other investigators, institutes and/or field team involved	Coding and data management team
	Kabaare	RTB	Anne Rietveld	Bioversity	Susan ajambo, Enoch Kikulwe, Francis Kalongo, Deborah Nabuumma	Lucila Rozas
Bangladesh	Barisal	RTB	Gordon Prain/Shawkat Aran Begum	CIP	Co-researchers: Tajmary Akter, Farhana Ibrahim Female Field Team: Rukshana Begum, (Facilitator) Suborna (Notetaker-BCCP), Male Field Team: Md. Nurujjman (Facilitator) & Md. Rezaul Hoque (Notetaker-BCCP)	Lucila Rozas, Angela Silva
	Jessore	RTB	Gordon Prain/Shawkat Aran Begum	CIP		Lucila Rozas
Colombia	El Salado	RTB	Kayte Meola/Lucila Rozas	CIAT/CIP	Adriana Jimenez Patiño Jorge Pastrana Daniel Arrieta Teonila Aguilar Norelvis Caraballo Elsy Osorio	Lucila Rozas, Angela Silva
	Los Carretos	RTB	Kayte Meola/Lucila Rozas	CIAT/CIP		Lucila Rozas
	Chibolos	RTB	Kayte Meola/Lucila Rozas	CIAT/CIP		Lucila Rozas, Alejandra Huamán
	El Mamón	RTB	Kayte Meola/Lucila Rozas	CIAT/CIP		Lucila Rozas, Ana Nugent

Country	Community	CRP	PI	Institution	Other investigators, institutes and/or field team involved	Coding and data management team
Vietnam	Quang Thach	Not specified	Nozomi Kawarazuka	CIP	Institute for Social Development Studies Khuat Thu Hon Nguyen Thi Van Anh	Lucila Rozas, Angela Silva
	Xuan My	Not specified	Nozomi Kawarazuka	CIP		Lucila Rozas, Carla Pimentel
	Muong Chahn	A4NH/Humid Tropics	Marlene Elias	Bioversity	Khuat Thu Hong , Van Anh Nguyen, Dao Thanh Thai, Nguyen Duy Tien, Pham Thanh Van, Nguyen Thanh Mai	Lucila Rozas, Angela Silva
	Na Phuong	A4NH/Humid Tropics	Marlene Elias	Bioversity	Khuat Thu Hong , Van Anh Nguyen, Dao Thanh Thai, Nguyen Duy Tien, Pham Thanh Van, Nguyen Thanh Mai	Lucila Rozas, Alejandra Huamán
Rwanda	Nyamirama	Humidtropics	Anne Rietveld	Bioversity	Speciose Kantengwa, Solange Zawadi, Pierre NDAYISABA, Tharcisse SEMUGAZA	Speciose Kantengwa
DRC	Madaka	Humidtropics	Anne Rietveld	Bioversity	Muller Kamira, Mariam Bumba, Bonane, Sylvie	Speciose Kantengwa

Country	Community	CRP	PI	Institution	Other investigators, institutes and/or field team involved	Coding and data management team
Kenya	Bumanyi	Humidtropics	Amare Tegbaru/	IITA	Co-Team Leaders: Rene Bullock; Team Members: Grace Bakesia, Caroline Wekulo, Joel Okutoyi, Geoffrey Odhiambo	Lucila Rozas, Angela Silva
	Vumale	Humidtropics	Amare Tegbaru	IITA	Co-Team Leaders: Rene Bullock; Team Members: Grace Bakesia, Caroline Wekulo, Joel Okutoyi, Geoffrey Odhiambo	Lucila Rozas, Alejandra Huamán
Nigeria	Ayepe Apomu	Humidtropics	Holger Kirscht/ Johanna Bergman Lodin	IITA/A4NH	Elizabeth Oladejo Adedayo Ogunade Bola Awotide Pelumi Nathaniel Siji Timothy Adetunji Nicholas Olakunle Fakayode Razaq Bello Abolore	Lucila Rozas, Angela Silva
	Omu Aran Adetola	Humidtropics	Holger Kirscht/ Johanna Bergman Lodin	IITA/A4NH		Lucila Rozas, Carla Pimentel

*Please include here the names of the researchers and of the partner institutions (including the CRPs/CGIAR centers and others outside the CG) involved in the data collection, data coding, and analysis of your cases.

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