



Gender and Innovation Processes in Rice-Based Systems

**GENNOVATE Report
to the CGIAR Research
Program on
GRISP**



GENNOVATE

ENABLING GENDER EQUALITY
IN AGRICULTURAL AND
ENVIRONMENTAL INNOVATION



Research
Program on
Rice
**Global Rice
Science
Partnership**

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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
Chair, GENNOVATE Executive Committee
Strategic Leader for Gender Research, CIMMYT

Preface

Rice is the primary agricultural crop in the Philippines. 19% of the total expenses on food per family is spent on Rice (BAS-FIES, 2000). Usually it is eaten in every meal and contributes 47% of the total caloric intake of Filipinos (Maclean et al, 2011). Rice production is an important source of livelihood and is the main economic activity in the rural areas. It accounts for 17% of the country's agricultural output from 2001-2005, and provided jobs for 4 million rice farmers (BAS, 2000-2005). 6 million women are engaged in agriculture, of which 37% are rice farmers (PPI, 2002 cited by Cantos and Bernabe, 2006). However, women farmers' economic opportunities are constrained by their limited land ownership, access to new knowledge and technical assistance from extension workers. Land ownership by the women is less than that of men (ADB 2013) and this is influenced by the inheritance norms, laws, and land titling systems and their ability to purchase farm lands (USAID 2006; ADB et al 2008).

Previous research on gender disaggregated labor use in rice production in the Philippines showed that women farmers contribute about 35% (Paris 1987 & 1989; Paris & Luis 1990; Paris et al 1992) of the total labor use, and women mostly participate in the crop establishment and crop care activities, particularly in transplanting and hand weeding. Men farmers, on the other hand, are very visible during the land preparation stage and usually use small farm machineries, e.g. diesel operated hand tractor, in plowing, harrowing and furrowing. Research studies on rice labor dynamics (Tish and Paris 1994) showed that the kind of rice farming environments (such as irrigated, rainfed lowland and upland) portray differences in male and female labor interdependence or substitution. Rice farming activities are done traditionally or with small machines and are usually referred to as subsistence farming in the Philippines. The government continues to support the agricultural industry, particularly the rice sector since majority of the rural folks mainly depend on rice production for their livelihoods, employment and income. The Philippine government's rice production policies and programs revolved mainly around meeting the target for rice self-sufficiency (Launio et al, 2015).

The GENNOVATE research activities enabled researchers to understand the technical innovations introduced in the study villages during the five years preceding the study, the engagement of farmers in testing/adapting these innovations and, explore the norms and practices which constrained some of the men and women farmers to adopt the innovations which could have contributed to their own wellbeing and that of their families and the community.

Acknowledgements: This research was undertaken through the GENNOVATE project with funding from the CGIAR Research Program on GRiSP. The authors would like to thank the men and women farmers from Nueva Ecija, Philippines who willingly participated in the study and shared their stories. Recognition is also given to the local officials in the municipalities who provided assistance in reaching out to the men and women farmers and arranging a comfortable venue to conduct the study. The authors would like to acknowledge too the facilitators, note takers and translators who spent several hours in conducting the Focus Group Discussions and individual interviews (their names are listed in Annex 4). We would like to thank the team of Tahseen Jafry, Anuprita Shukla and Paula Kantor, who conducted the training in Nepal on the GENNOVATE methodology . Our appreciation is due to the team who encoded in NVIVO the qualitative information and this made it possible to perform a wide and deep analysis on the datasets. We acknowledge the leadership of Patti Petesch in developing the coding manual and her generosity in giving guidance and framework in the analysis of the data. We would like to extend our gratitude to Gordon Prain, Marlene Elias and Lone Badstue for providing guidance and direction in the preparation and finalizing this report.

Executive Summary

Rice cultivation is the main livelihood strategy in the rural areas of the Philippines. Technological innovations such as high yielding rice varieties, new methods of pest and nutrient management, labor/time saving machines along with irrigation facilities have had significant impacts on improving productivity, food security and livelihood of the rice farmers. However, these impacts are not experienced by all farmers.

This study is part of the cross-CRP GENNOVATE (Enabling Gender Equality in Agricultural and Environmental Innovation) research initiative conducted across 137 communities in 26 countries. The research methodology was designed to address the question of how gender norms and agency influence men, women and youth to adopt innovation in agriculture and natural resource management (NRM). The findings are based on the perspectives and experiences of purposively selected women and men who live and work in three villages in the Nueva Ecija province of the Central region of the Philippines, where rice is a primary crop. Each case village represented a different rice farming environment, 1) with canal irrigation and rice planted during the wet and dry seasons; 2) deep well and pump irrigation and rice-onions/rice-vegetable cropping pattern; and 3) rainfed rice-vegetables cropping pattern.

GENNOVATE methodology features advances in multi-site qualitative comparative research designs. Between mid-2014 and mid-2016, field teams received in-depth training and collected data with a standardized package of instruments which included in each case study: six sex-specific focus groups, eight semi-structured interviews, and a detailed community profile. Equal numbers of women and men from different socio-economic and age groups participated. The data generated allow for contextually grounded analysis, comparison, and identification of patterns across the varied contexts and population groups studied.

Key findings from the GRiSP GENNOVATE Case Study

The three villages with different rice farming ecosystems were categorized based on two dimensions, economic dynamism (based on the presence of institutions and markets, assured source of water, yearly cropping patterns) and gender gaps in assets and capabilities (based on leadership in programs/projects, official in local government, membership in farming organizations). The village with high economic dynamism is with well-developed canal irrigation and located close to a University and a research institution where farmers have access to information about new technologies, shops that sell new agricultural implement/machines. However this village has high gender gaps. Being a Rice-Rice system, men play the central role in farming and many farmers own hand tractors with new implements. Very few women are members of farming organizations and there is only one woman out of seven village counsellors. The second village is also with high economic dynamism but with low gender gaps. This village has spring and water pump irrigation with rice-onion as the common cropping pattern. Onion commands a high market price and women control onion farming, from production to marketing. This village has three women counsellors and a woman leads a project on forest conservations, and there is almost equal number of men and women members in a farming organization. The third village has rainfed rice ecosystem with rice planted in the wet season and vegetables in the dry season only if there is sufficient residual moisture. Women are in charge of vegetable farming but they only plant in a small portion of the farm. The village has a market where most of the goods sold are from the farm produce, unlike the two other villages where merchants come to the village to sell and buy their goods. Like the first village, women's participation in village leadership and farming organizations is very low.

Gender roles in farming systems and value chain. All men and poor women participate in production/cultivation related activities on farm. Men are more visible in the fields throughout the cropping season, while poor women perform specific activities like transplanting (lasts two weeks in a season), weeding (1 to 2 hours per day). Non-poor

women mostly manage farms and hire agricultural laborers or have permanent laborers for farming activities. Men are also engaged in off-farm work within the village. Young men occasionally assist in farm work during vacations. Generally, men make decisions about adoption of technologies, practices and input use.

Both poor and non-poor women are engaged in marketing farm produce, when they have a marketable surplus. Men help with the transportation of the produce to the market.

Social norms and agency. While the young men perceived that young women do not have a problem in going alone to public places in the village, the young women mentioned that there are instances where they cannot move freely in public places after dusk. Women are mostly visible in market places and much less in other public places like parks. The non-poor women reported greater power and freedom to shape important life decisions compared to the non-poor male, while the male youth felt they had more power and freedom than the female youth.

The young women said that men and women have same opportunities to learn new farming or agricultural practices, but some of them felt that farming should be for boys and they should learn how to manage a farm. There are some programs in the communities that target young people to strengthen their involvement in agriculture/NRM. However, the youth aspire to attain a college degree and get employed in non-farm jobs.

Movement out of poverty. In general, the poor men mentioned modest poverty reductions, while the poor women reported growing poverty over the last decade. The poor felt that the gap between them and the non-poor widened during this period.

Dominant innovations. The study villages reside in the heart of rice producing areas of the country and are exposed to many new agricultural opportunities, including new technologies. Men generally seem to be the ones to access and adopt these innovations.

New rice variety: Men and women irrespective of the social class and farming system perceived the new Rice variety (NSIC RC222) to be among the top two most important innovations adopted in the villages because it increased their yields compared to the previous improved variety. The men cited other traits such as tolerance to pests and diseases, adaptability to wet and dry season and, lodging-resistance as key for adoption in addition to the yield. For the poor women, the higher yields enhanced their food security and income. The non-poor women who produce marketable surplus enjoyed higher profits as a result of the higher yields.

Mechanization: The other innovation identified by a majority of farmers is mechanization. Even though it displaced local farm labor, this was generally outweighed by time and labor savings, and greater efficiency. It is the non-poor men and women who own machines. While the former generally own small machines like the hand tractor and implements that could be attached to them, women own bigger machines like combine harvester-thresher and hire labour to operate them. They rent out the machines within and outside the village. The displaced men and women hired laborers who were mainly involved in harvesting are now being engaged in drying the newly threshed paddy. However, we do not know whether this alternative employment is able to provide the labor with the same level of income they earned previously. Some of the better-off households are also footing the bill for their children's education as a token of their gratitude for the long association with the family.

The young men and women perceive that mechanization would reduce drudgery, though they have not operated/used any of the machines. They appear enamored by the big machines like tractors, reapers etc.

Enabling factors and constraints for innovation. All social classes perceive that innovation is hindered by financial constraints (e.g., high cost of machines and chemical inputs) and inaccessibility of information (source of new rice

varieties, proper procedure of applying new chemicals). For the previous ten years or more, the men have obtained farm inputs on loan from private agricultural shops in the village and pay them back in kind after harvest including the interest, in agreement with the farmer and the shop owner. Men access loans from private moneylenders to buy inputs paying an interest rate of about 20%. They do not access formal credit sources like banks.

Both men and women perceive that the former have the adequate knowledge for effective crop management. Women of all economic classes reported that they generally do not have access to knowledge or training as they are not considered as clientele of agricultural technicians nor do they interact with village leaders and village agricultural counselors, who most often are men. This is because women in the villages are more known to market their farm produce than being involved in rice farming activities. The men also reported receiving inaccurate information from the provincial agriculturist regarding the proper timing of chemical application, resulting in wastage of resources.

Women's social networks that support their innovation capacity are mostly limited to family members, while the men's networks are wider and they are members of agricultural organizations and interact with agricultural technicians, and other farmers.

Conclusion

This case study highlights the importance of accounting for intersectionalities like age and economic class in addition to gender to understand the consequences and implications of agricultural innovation. Sharp targeting of the populations based on a systematic understanding of the agro-ecological environments they operate in, their farming systems, socio-economic context is key to defining research priorities and developing knowledge products and technologies that are relevant. Comprehensive evaluation of outcomes of innovation for different social groups is critical for having a wider scale impact.

The benefits of innovation have not been neutral. The poor, who generally hold smaller land holdings or earn their income as agricultural labor have not experienced a significant dent in their poverty levels. In addition, the advent of mechanization might have taken away some of their income earning opportunities. However, that also offers an opportunity for entrepreneurial engagement of the poor and youth as mechanization service providers. This is contingent on their ability to access financial products that they can afford to engage in such activities. Making good quality advisory services accessible is critical for expanding the base of innovation and having a higher impact.

Understanding how the innovations have reduced the many risks these social groups face is also critical. Further analysis to understand the differences in innovation processes and the consequences across the three farming environments for the different social groups would be helpful. This will give insights while designing options for farm diversification and expanding livelihood opportunities.

Section 1. Introduction

Along with other forces, gender norms within a community determine men's and women's ability to improve their livelihoods by taking advantage of agricultural innovations. Rice cultivation is the main livelihood in the rural areas of the Philippines. For more than half a century, rice research for development has catalysed significant progress in rice farming and in other rice-based systems of the developing world. Technological innovations such as high yielding rice varieties, new methods of pest and nutrient management, labor/time saving machines and improved infrastructure resulted in significant development impacts through improving productivity, food security and livelihood of the rice farmers. However, these impacts are not experienced by all farmers.

Adoption of innovations entails processes to take advantage of the gains or benefits assured by the innovations. Technological innovations come in different forms and can be adopted as a single technology or as package of technologies – e.g. new improved variety with corresponding rate of fertilizer application, etc. There are farmers who experience the benefits of using the technologies and move on to adopt newer technologies. The following are life stories of a man and a woman who spent their lives in rice farming.

Rosa, a 53 year old mother of four children started farming at age 15 in Village 2 - Bukal¹, Luzon Central Region, Philippines. She started as an unpaid transplanter in her relative's farm until she acquired proper skills and joined the hired transplanters' group. When she got married, she continued to attend seminars and trainings conducted by the Municipal Department of Agriculture in their village. She is also an active member of the association of farmers and women's group in the village. She initiated the use of new high yielding rice variety, as well as to shift from transplanting to direct seeding on their farm and the purchase and use of agricultural machines. For several years, her family mainly depended on rice farming and was able to educate their three daughters up to college degree. Due to unexpected weather changes, they experienced losses in rice production hence, she and her husband decided to shift to onion-vegetable farming in the dry season. They still incurred losses due to drought in the wet season affecting rice planting and, untimely rain that spoiled the vegetables and onions during the dry season. As a couple they both decided to sell portions of their farm land and left 0.5 hectare for their own rice supply. As an additional source of income, the couple decided to buy a machine and her husband became a service provider of large machines in their village and in neighboring towns. Their farm income now is very small but they receive remittances sent to them by their children.

A 48 year old father of 3 children, Manny lives in Village 1 - Agham, Luzon Central Region, Philippines and shifted from carpentry to farming even if he saw how impoverished his parents who worked as farmers throughout their lives were. He worked in his father's farm till he had his own family and started to lease-in farm land. He cultivated the land for several consecutive seasons and enhanced his farming skills by talking to agricultural technician that visits their village, and attending seminars or demonstrations conducted in the village by a government office or chemical companies. He tried new rice varieties and inputs such as fertilizers and pesticides and aimed at increasing his production to have more quantity of rice for sale. Each time he had extra earnings, he would lease-in a piece of farm land and when he had enough income he started to buy the land leased to him. He engaged in buying and selling of rough rice/palay. He bought farm machineries such as, hand tractor, rotavator power sprayer and combine harvester, which he became the service provider for in their locality. His latest endeavor was to set up a buying station for rough

¹ Pseudo names of the villages are used in the study.

rice where he also invested in storage facilities. He was able to take advantage of the marked price increase of palay in 2010 and considers it as one of his highs in rice farming. Though he experienced several lows in farming, such as financial losses caused by typhoons and insect infestations, these did not disappoint him to acquire more farm lands, machineries and facilities. He narrated that at first it was hard, but his wife supported and helped him with his plans. He has made up his mind that if he keeps on acquiring land and farm machines and adopting new agricultural innovations, they would have a better life and be more successful in farming. Both of them say that life is easier now than before.

Rosa lives in a community where gender norms are relatively less constraining. Women can freely move around the village and, like men can make decisions regarding agriculture. Assets are jointly owned by husband and wife and they also jointly decide on their sale. Rosa can decide what is good for their farm and she had full support of her husband, when she decided to sell a part of their farmland which is jointly owned by them. Manny's goal was to become a very successful farmer owning farm assets such as land and machines acquired from having high marketable rice yields, and he admits that his wife supported him all the way. These are some of the insights from the stories of men and women from the GRISP CRP for GENNOVATE (Enabling Gender Equality in Agricultural and Environmental Innovation). Understanding how and why men and women access and benefit differently from innovations still remains a concern in AR4D.

This report explores the gender dimensions of agricultural innovation and wider social change. The findings are based on the perspectives and experiences of purposively selected women and men who live and work in three villages of the Philippines where rice is a primary crop.

The remainder of this section discusses the research methodology including the study concepts and the description of the samples study site. Section 2 discusses the opportunity structures for inclusive innovation based on the participants perceived men's and women's empowerment and the level of poverty in their villages. Section 3 reveals the top two agricultural innovations identified by men and women participants in the FGDs and key informant interviews, and in addition, the reasons for their choices. This section also discusses the factors that facilitate and hinder the adoption of the innovations. Section 4 presents the changing social context for agricultural innovations and starts with a discussion on views on equality between a man and a woman, then on the description of good male and female farmers, situations of relaxation of gender norms, areas of decision men and women have to make. The last part of the section is on youth and their aspirations. Section 5 discusses priorities for rice R&D emerging through this study and past research.

1.1. Research Methodology

GENNOVATE ("Enabling Gender Equality in Agricultural and Environmental Innovation") explores how local innovation processes both shape and are shaped by gender norms and agency, concepts which we elaborate in box 1 and throughout this report. The approach combines contextually-grounded, comparative and collaborative research strategies to offer findings which can inform strategies and interventions for more gender equitable adoption of improved agricultural technologies and practices.

The study rests on the understanding that for agricultural innovation to be effective the primary stakeholders – women and men on the ground – must exercise agency and be active participants in learning about, testing and adapting a new technology or practice to their needs. Nevertheless, gender norms, or the daily roles and behaviors expected of each gender, differentially shape men's and women's capacities to innovate in their rural livelihoods. Across most rural contexts worldwide, it is still more common and acceptable for a man than a woman to display agentic beliefs and behaviors, including taking the initiative to become knowledgeable about and test a new seed or

soil management practice. Yet, if women as well as men could similarly engage with and adapt agricultural advances, innovation processes would be much more efficient. Of special concern, a growing body of literature is finding that new agricultural technologies and practices which do not incorporate gender objectives 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.

To address this knowledge gap, GENNOVATE prioritizes learning systematically from people's own perceptions and lived experiences with agriculture and the management of natural resources. 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, the study engages 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?

The data collection on these topics represents an unprecedented research collaboration engaging principal investigators from 11 CGIAR Research Programs. After extensive training in the study's protocols and standardized package of data collection instruments, GENNOVATE field teams travelled from mid-2014 to mid-2016 to 137 agricultural and forest communities spread across 26 countries of Asia, Africa and Latin America. In each research community, or "case study," 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.

The GENNOVATE cases target agri-food systems or intervention domains of relevance to the CRPs involved, and they are meant to help inform present and future agricultural research for development in these areas. The quality of the fieldwork is greatly enriched by being able to draw on existing relationships with and knowledge of many of the research 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 courteous, overstating benefits of or downplaying difficulties with interventions, or expecting some kind of benefits. These concerns are not unique to qualitative samples and researchers involved in the GENNOVATE studies have applied social science techniques of critical self-reflection 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 GENNOVATE 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 you will see below, these testimonies provide a rich and compelling basis for exploring and comparing qualitatively men's and women's capacities for innovating in their rural livelihoods, 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 Berdegue’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 purposively selected sample draws on a subset from the list of study sites of a large scale farm household survey conducted by the International Rice Research Institute (IRRI) in 2014². The preliminary findings of the big survey showed that there are several new agricultural innovations adopted by the farmers for the past five years. This makes it an appropriate case site to study the changes in agricultural practices due to the adoption of innovations and its impact on social and gender norms in the villages.

There are three cases selected for this study and a case is synonymous to a village which is the smallest local government unit in the Philippines. The three cases are located in municipality of Nueva Ecija (Annex 3, Figure 1), one of the provinces in the Central Luzon Region, known as the rice bowl region of the Philippines. The purposive

² The title of the project is Metrics and Indicators in Tracking GRISP (MISTIG) which covered 4 out of 7 provinces of the Central Luzon Region known as the rice bowl region of the Philippines. One of the main objectives of MISTIG is to track the adoption of rice innovations/technologies in the areas, hence only the top rice producing provinces were included. The main criteria for the sampling the villages is the extent of the agricultural area planted to rice.

selection is based on the principles of maximum diversity³ (Patton, 2002 cited in the methodology guide for global study) with dimensions of variations on economic dynamism and gender gaps in assets and capacities. The sample municipalities were classified based on the Philippine standard income classification for cities and municipalities within a province. One of the criteria used for classifying cases is high or low economic dynamism and was complemented by discussions with local officials and experts (more information in Annex 3). Village profiles with information on compositions of the local officials, membership in organizations, economic activities, etc were developed, which helped in classifying cases. In terms of gender gaps in assets and capacities, the number of women who occupy key positions in the local government and women lead government or civic groups were considered. The three cases are classified as, Case 1 - high economic dynamism and high gender gap, Case 2 - high economic dynamism and low gender gap, and Case 3 - low economic dynamism and high gender gaps (Annex 3, Figure2).

In the three cases, rice farming is the main crop during the wet season (May to October), while during the dry season (November to April) rice, onions and vegetables are planted in the fields. The wet season and dry season cropping patterns across the study villages are rice-rice in Case 1, rice-onion and rice-vegetable in Case 2, and rice-fallow and rice-vegetable in Case 3. Given the inter-village variations in cropping patterns, there can also be differences in the degree of agricultural involvement of men and women across the study sites. Rice crop is largely a subsistence-oriented crop, men and women farmers individually and jointly do specific tasks in rice production but men tends to do most of the activities, while vegetables and onions are cash crops and tend to be taken care of by the women, and in fallow periods, women are engaged in marketing of farm and non-farm products (more information in Annex 3).

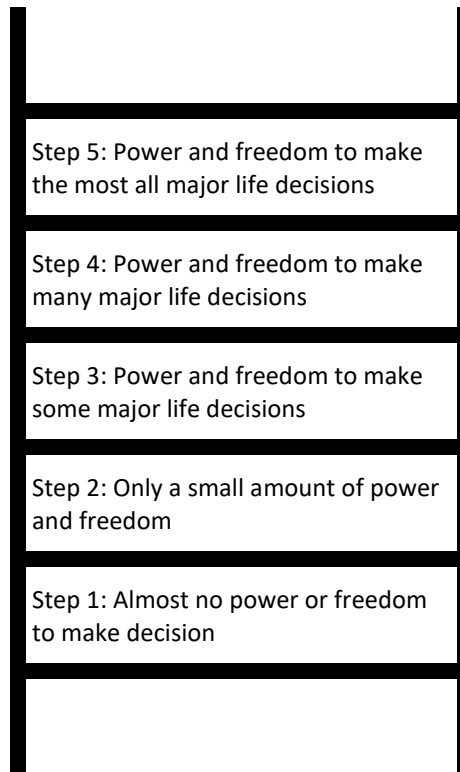
Section 2. Opportunity structures for inclusive innovation

This section presents evidence of growing agency among the men and women participants in the focus groups and individual interviews and, the poverty trends in their villages. The GENNOVATE case studies under the CRP RICE present different rice farming systems that showcase same or different agricultural innovations adopted in the past ten years. To understand better the processes how men and women adopted the innovations, we have to know their ability to make individual or joint decisions of important things in life and know their self-perception of wellbeing and poverty condition.

Two ladder exercises were conducted, the Ladder of Power and Freedom (LOPF) and the Ladder of Life (LOL). The LOPF was a tool used in the FGDs with non-poor adult men and women and the youth groups, and individual interviews with men and women known in the village as adoptors of innovations. Poor adult men and women provided the information for the LOL.

The LOPF was used to determine the gender-disaggregated power and freedom and consists of a five step ladder. Focus group members were asked to consider where the majority of the men in their village (if FGD is with men, or majority of the women if FGD is with women) currently position themselves in the ladder on their ability to make their own decision about important affairs in their life, such as “where they will work or whether they will start or end a relationship with the opposite sex.” The facilitator shows the five-step ladder in a flipchart and discusses what each step signifies, starting at the bottom which is equal to one and the top step is equal to five. The ladder is illustrated below and the facilitator asks the question ‘on which step of the ladder would you position the majority of the [males or females] in the village today?’

³ 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.



The group members are requested to provide their individual rating by writing the number on a stickie given to them. The facilitator collects and sticks the paper on the corresponding number of the ladder and describes the patterns of their responses, then asks for a volunteer to discuss the ratings. This marks the end of the exercise of Ladder of Power and Freedom for focus groups with young men and young women. For the non-poor men and women, the exercise is extended to consider the situation in the village for the past 10 years and the second set of ratings is added to the flipchart. The reasons for the trends are discussed. A summary statistic (Change in agency = Mean step now – Mean step 10 years ago) is generated for comparing perceptions of change on the ladder among the focus groups. A positive rating indicates perceptions of rising agency, which is used as an indicator for empowerment.

The LOL activity provides the general picture of the different wellbeing groups that live in the village and their experiences with moving in and out of poverty. The facilitator asks first the group member to describe the characteristics of people at the top step, the men and women who are the best-off in the village. A blank flipchart is laid on a table/floor and on the upper left portion, the facilitator writes the responses of the men/women focus group members. Next the facilitator asks the group to reflect on people who are at the bottom, the worst off in the village. Additional steps are added upwards until all the levels of wellbeing are captured with their corresponding characteristics. The numbers of steps in the ladder vary depending on how the group members classify the people that live in the village.

If there are no more steps and the participants agree with the descriptions of the people for each step, they are asked to identify a step where people are no longer considered poor which then becomes their community poverty line. After that the participants are asked to distribute 20 seeds to represent the current proportion of households belonging to each step of the ladder. This is repeated for the situation in the past 10 years. This is followed by a discussion about assets and capacities of people on each step, and their experiences moving up, getting stuck or

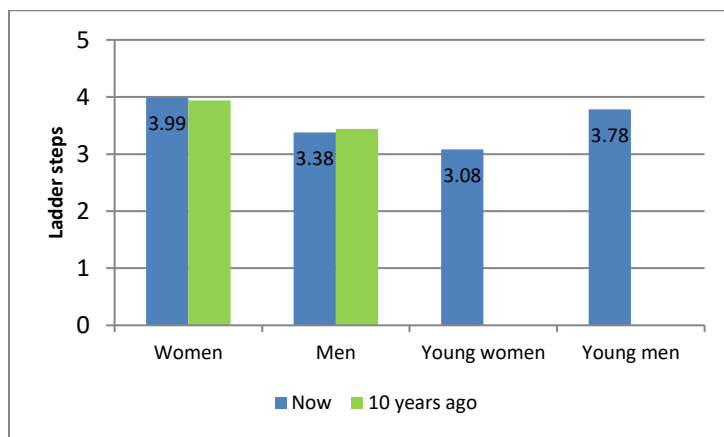
falling down the ladder. A summary statistic [Moving Out of Poverty = (Share of poor 10 years ago – share poor now) ÷ (share poor 10 years ago)] is computed to compare perceptions of local poverty dynamics across the focus groups and case studies. While it is not possible to compare the ladders directly because they differ, it is possible to compare views about change on the Ladders of Life.

2.1. Women’s and men’s agency

When asked about their power and freedom both men and women give reference to their marital status. A widowed woman can make more decisions while a married man consults his wife but still the decision is made by him. Consultations are done to avoid contradictions and putting blame on each other especially if the decision had an unfavorable outcome. More powerful married women admitted that they jointly make the decision but most often she lets her husband follow her decisions. The migration of men allowed women to have greater power and freedom to make decisions.

The findings from the focus groups show that women reported greater power and freedom compared to the men (Figure 1). On average, the women from the non-poor focus group assessed the agency of local women to be quite strong (3.99 on a five-step ladder of power and freedom) compared to the men (3.38) in the current time. This trend was also similar in the past 10 years and men showed disempowerment over time. In contrast, the male youth focus groups (at step 3.78) declared more power and freedom than the female youth (3.08).

Figure 1. Levels of agency for own gender, now and 10 years ago (rating by individual focus group members on five-step Ladder of Power and Freedom, 12 non-poor and youth focus groups)

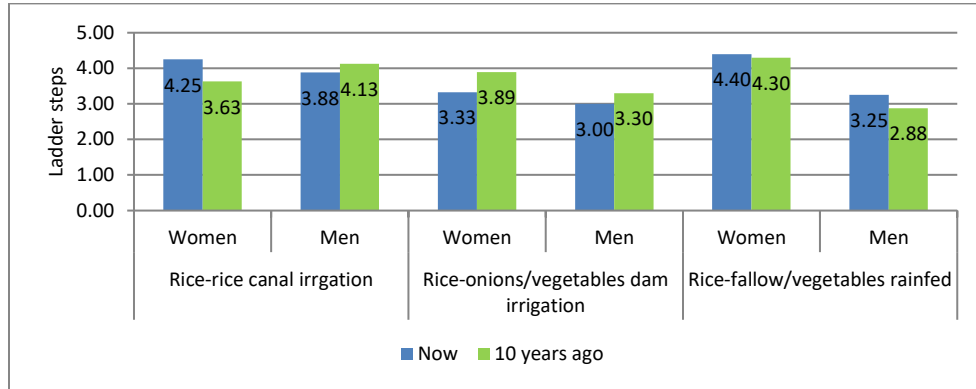


The youths recognize their parents’ authority and they always ask permission on matters that they think their parents “know best.” A young woman revealed that there is a certain age where girls are allowed to make their own decisions. Some parents want their daughters to learn how to become independent and firm with decisions at an early age. Several young men mentioned that they can decide whether to continue schooling or get employment, but they revealed that they are not yet able to decide on money matters.

Comparing the cases in terms of farming environments, in the canal irrigation system women felt they became empowered while the men became disempowered over the 10 years (Figure 2). The spring water irrigated site showed disempowerment of both the men and women. The rainfed site showed more empowerment of women compared to the men for both periods. Past studies on women in rice farming (Tisch and Paris 1994) have documented that women are more visible in less favorable farming environments, e.g. rainfed systems, and most of the activities are done manually. The patterns of empowerment in this study reinforce that women are more actively

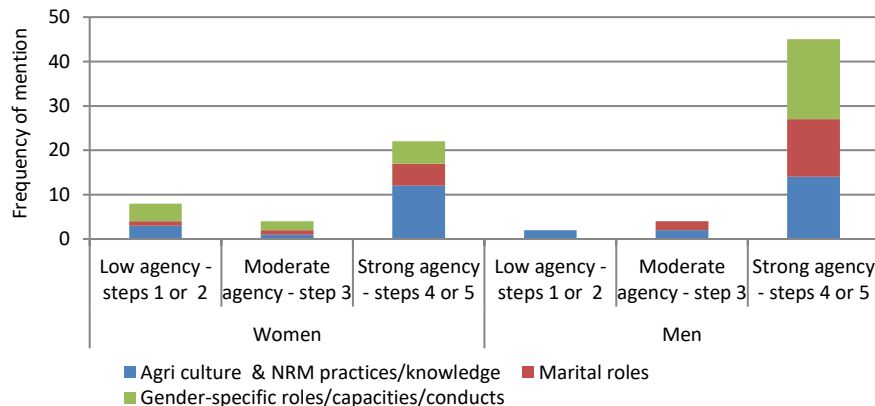
involved in farm work and in making decisions in more stress prone situations. They are highly involved in uplifting their family's standard of living and moving out of poverty. Women tend to work harder in adverse conditions.

Figure 2. Ratings on Ladder of Power and freedom by case studies (median ratings by individual focus group members, 6 non-poor focus groups)



From the coded dataset the most common themes discussed by the participants in the ladder of life are agricultural and NRM practices and knowledge, marital roles and gender specific roles/capacities/conduct (Figure 3). Women relate their low agency in agricultural practices/knowledge to their limited interaction/contact with the agricultural technicians during visits to the village. Some women acknowledge the difficulty in farming and feel the husband should be fully involved in the farm work and wife provides support. Women's moderate agency can be attributed to their involvement by the technicians in training such as mushroom production and vermiculture, consultations and negotiations with husband in making the decisions, and, ability of women to do farm activities, e.g. transplanting, harvesting, etc. manually. Activities that use machines are left with the men. Strong agency of women is most visible in the agricultural domain. Some women believe that they have enough knowledge on farming, hence will not be a problem even in the absence of the husband, which could be due to either severe sickness or death. Women are mostly members of transplanters group which is also headed by a woman and women are more mobile and are able to get agricultural information from institutions near the village, as noted from one case site. Women manage finances in the household especially with regard to activities such as handling loan transactions and, marketing farm produce and other goods.

Figure 3. Overview of key roles associated with agency on different steps of the Ladder of Power and Freedom (6 non-poor focus groups)

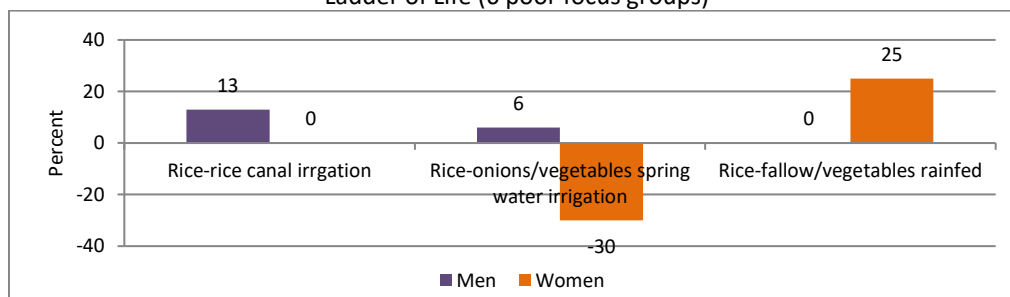


Agency of men is compromised when there is lack of support from the government, particularly in disseminating new innovations such as new rice varieties, as well as insufficient financial capital to adopt modern or improved rice farming technology. Some men’s decisions depend on other people, such as the landlord and/or informal financier. For the non-farm owners, the landlords’ decisions on farming are followed while in some cases, the financier or source of capital for farming decides on the variety of rice to plant. These are just few cases and majority of men have strong agency on the three domains. Men claim that they are the main farmer in the family and do not consult their women counterparts. While men discuss agricultural and non-agricultural matters with men and women in the village, women talk or discuss with few people and most often they prefer to talk to other women. The men make most of the decisions without consulting their wives and in turn, the wives trust their husbands.

2.2. Improving wellbeing

Study participants generally observed little or no progress on the poverty level in their villages, with the poor men’s focus groups observing modest poverty reductions (6.33%) and poor women growing poverty in their villages (-1.67%) compared to ten years ago. Of the three cases, men observed a reduction in poverty in two cases – 13% from irrigated system & 6% from spring water source - while in one case, the rainfed system, where women observed a reduction in poverty and the percentage reduction (25%) was the highest poverty reduction level among the six poor focus groups (Figure 4). Two focus groups, one each from the men and women, observed that no change happened in the level of poverty in their villages.

Figure 4. Movement out of poverty based on men’s and women’s Ladder of Life (6 poor focus groups)

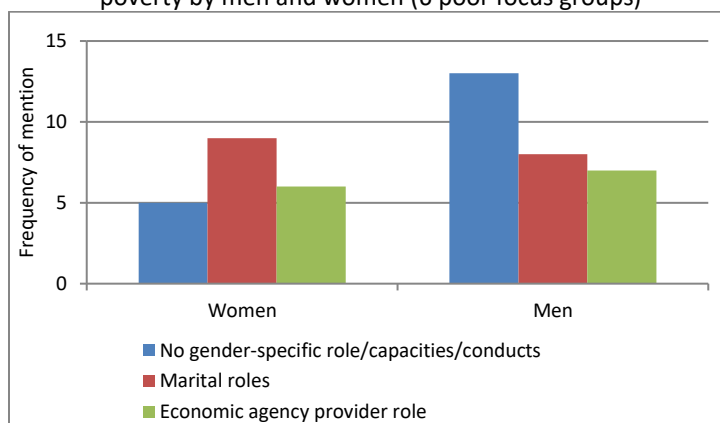


When the observations of both men and women in the study site are taken together, the rainfed system experienced most reduction in the level of poverty, followed by the irrigated system and lastly the spring water irrigation. While the base level of poverty could have been higher in the rainfed system, farmers are also able to plant high value crops such as onions and vegetables which they sell in the local markets. Women in this area cook delicacies from the farm produce and sell these products at a higher price. Most obvious improvement in the cases to facilitate moving out of poverty is to improve farming conditions, particularly the source of water as the main agricultural crop of the case study is rice which is a water loving crop. However, the participants’ responses on moving out of poverty consider themes beyond agricultural activities or aspects but on joint effort of husband and wife to secure income from agricultural as well as non-agricultural work.

Themes (from the coded NVIVO data set) that can have an impact on the level of poverty as identified by the poor focus groups are no specific gender roles/capacities/conduct, marital status roles and economic agency provider role (Figure 5). Poor men and women focus groups accepted that husband and wife support system can support their family’s movement out of poverty. The wife has to fully support the endeavor of her husband for the husband to be encouraged to earn income for the family and also to engage in other earning activities. The husband on the

other hand, should also support the wife in household chores and in taking care of the children, so the wife can also have time to work and earn income for the family. Women also want their husbands to support them if they want to get employment in the farm or in any work opportunity in the village or nearby places. They also mention that the wife should buy only the essential needs in the household saving for the education of the children with the meager income of the husband. Joint activities of husband and wife such as selling onions, vegetables and other farm products can result in more combined income as each one sells at different places or to different customers. As husband and wife, they have the same goal for their children to finish college to be employed in a salaried job. Since the husband is known as the main skilled farmer in the house, the wives have an urge to improve their skills in off-farm activity such as transplanting and to become highly demanded transplanters.

Figure 5. Most prevalent themes associated with movement out of poverty by men and women (6 poor focus groups)



Stepping out of poverty as perceived by men participants requires making most of the opportunities to earn an income and save money for the future. Focus group men participants related determination and resourcefulness as a way of getting ahead while women’s wise use of money and propensity to save helps in expanding assets, e.g. farm land for the future. Another option that takes longer is to prioritize schooling of children which most often is constrained due to finances or other unforeseen circumstances.

People who are well-off in the village are readily described by the focus groups participants as owning big tracts of farm land and large farm machineries, employ many workers in the field, and with established agricultural supply shop. They are also known to have savings in commercial banks and lend money to other people in the village dubbed as the “financiers.” Their children attend reputable schools, usually in the city or other prime schools outside the community and most of them land in well-salaried jobs while others migrate to work abroad. Aside from owning huge and concrete houses, they also have several household durables and at least one car. They are perceived to have a comfortable life.

Those at the bottom on the ladder are landless and are usually hired as agricultural workers/laborers or share-croppers, farm helper, and a better or sure employment is being hired as a permanent laborer. The common non-farm work of the men is construction work while the women look for any kinds of jobs in the village to earn money. They always seek permission from land owners to use a small area of their land, usually in the backyard or on the field bunds, to plant vegetables. Most of them are squatters and their houses look dilapidated. They have many children, most of them having dropped out of school after the government free schooling level. These are people who have to work every day for their daily household sustenance.

The step just above the worst off have more stable source of farm income, they are considered as the marginal farmers with around 0.5 hectares but they do not have enough capital to farm, hence they resort to loans from rich people. Others have built long time relations with the large land owners having been their long time permanent workers. Both the husband and wife are able to earn enough for the needs of the family. The wife puts up a variety store daily earnings from which are enough to feed the whole family and the husband engages in construction work. Children are sent to school for elementary and high school levels. In their modest homes, they own small household durables, e.g. black and white television. The participants describe people belonging to this step as industrious and able to survive in their own way. However, most of the time they resort to loans for farming and setting up a business.

The top and the two bottom steps of the ladder are described in terms of their farm wealth, capacity to earn income, availability of cash on hand, kind of shelter and educational opportunities of the children. Any additional assets or higher qualifications from people in step two makes these people above their community poverty line. People just below the community poverty line are distinguished with their propensity to borrow money to survive, for the farming season or setting up a business. This could push them back to step one if the loans are not paid on due dates and this puts them in the vicious cycle of loans, and become very vulnerable to fall further into poverty. The highest number of steps the focus groups identified were seven for the ladder and some focus groups had four steps. However, all of them peg the poverty line after step two. Table 1 provides an example and is the ladder of life of the women focus groups from the rainfed case site.

Table 1. Ladder of Life, poor women in rainfed farming condition

Step 5	These people have the largest farm area, own farm machineries and can start their farming activity at the start of the season since they have their own capital. They have cash to lend to other farmers in the village. They are able to educate their children until college level to earn a degree to have their own work which is not related to farming. They are creative and farsighted to look beyond what can be done to maintain or improve at this level of their living or well prepared for unforeseen events.
Step 4	Aside from farming the family has other sources of income, e.g., one of the family members is an OFW (overseas Filipino worker) who sends regularly remittances to the family left behind. Their children are able to attend school with better facilities in other cities, and most often the children are able to graduate with a bachelor's degree. Parents are able to provide the allowances and other school needs during the year, aside from the tuition fees fully or partially paid at the start of the school year.
Step 3	These people have their own farm land and continue to lease-in farm lands for a maximum of five consecutive wet seasons for farming. They have enough capital to start farm activities on time. They are very energetic and industrious in marketing activities, particularly selling farm by-products and processed goods, such as rice cakes. Hence, they are able to save money outside of the farming activity.
Community Poverty Line	
Step 2	They have small farmland but they do not have enough capital to start farming. They use machines of other farmers and operate the machines themselves and pay the rent after harvest. Aside from farming their small piece of land, they are hired as agricultural laborers. They engage in small business as sellers, but have to borrow money for capital. They try to pay the loan on time because it is only the way to be able to borrow again from the financiers.
Step 1	These are the landless households living in the outskirts of the village, they are usually considered as farm helpers with no regular work. When there is demand, they are hired as agricultural workers/laborers, more specifically hired transplanters. They live in shanties and are known to have many children.

In all the steps in the ladder of life, the people are engaged in farming, the concern of those above the poverty line is the availability of capital to start of farming while those below is their employment as hired agricultural workers. Other non-farm activities serve as additional source of income, where the better offs are engaged in more stable activity as compared to the worst-offs.

2.3. Characteristics of the case studies

Comparative features of the three cases by irrigation source are presented in Table 2 using selected variables from the key informant interviews and focus groups. Only a handful of the households in the community are women headed households, single women or widows. Migration of men is not common. Only in spring water irrigated case about a quarter of the adult men migrated temporarily and, in none of the cases men migrated permanently. Women sellers in the local market is common in the rainfed village, but very few to almost none in the two other villages. However, the proportion of women who take jobs as agricultural workers is highest in the spring water irrigated case. There is abundance of water during the wet season and less water in the dry season which allows for a non-rice crop to be planted in the fields and women are mostly the workers. The women in Case 1 are involved as managers of hired agricultural workers and in the selling of the paddy rice at harvest season, while the women in Case 3 are hired agricultural workers for transplanting, harvesting and other post-harvest activities.

All the villages have access to electricity which the villagers have enjoyed for several decades through the national electrification program of the government. Health clinics were also established in the past years but the doctor's visit to the clinic is only weekly unless there are disease outbreaks. Public secondary schools in the communities are equally attended by the boys and girls and 100% of them attend school in the more progressive villages with irrigation facilities compared to the rainfed. In addition, the village with irrigation canal has upper secondary school in the village but not the other two villages. Parents in these villages have to look for the nearest school to send the boys and girls for further schooling.

Table 2. Community characteristics by source of water

Source	Pre-coded questions	Source of water		
		Case 1: Canal irrigation	Case 2: Spring water	Case 3: Rainfed
	<i>Demographic characteristics</i>			
Key informant	Proportion of women headed households in community (%)	20%	15%	5%
	Rating of household with men who migrate temporarily (1 = almost none, 2=1/4, 3=1/2, 4=3/4, 5=almost all)	1	2	1
	Rating of household with men who migrate permanently	1	1	1
	<i>Entrepreneurship of women</i>			
	Rating of women sellers in local market (1=almost none, 2=1/4, 3=1/2, 4=3/4; 5=almost all)	1	2	4
	Share of village women who take jobs as agricultural workers	30	75	10
	<i>Infrastructure and economic characteristics</i>			
	Share of community with:			
	Electricity for most villagers (1 –with; 2 – without)	1	1	1
	Health clinic (1 –with; 2 – without)	1	1	1
	Share in % of school girls in public secondary school	100%	100%	75%
	Share in % of school boys in public secondary school	100%	100%	75%
	Share of communities with upper secondary school (1 –with; 2 – without)	1	2	2

Source	Pre-coded questions	Source of water		
		Case 1: Canal irrigation	Case 2: Spring water	Case 3: Rainfed
Poor women	Share of communities where common to work for pay for: (1 = 0 to 1 women; 2 = 2 or more women)			
	Single young women	1	2	2
	Married young women	2	2	2
	Married older women	2	2	2
	Widows	2	2	2
	<i>Physical mobility</i>			
Young women	Out of every 10 local women, # can move freely in public (individual FGD member rating)	6.67	6.33	8.00
Young men	Out of every 10 local women, # can move freely in public (individual FGD member rating)	8.38	8.33	9.00
	<i>Domestic violence: Extent women hit or beaten over past year (individual FGD member ratings (1 = almost never, 2=occasional, 3=regularly, 4=frequently)</i>			
Poor women	In current period	1.33	2.00	1.43
	A decade ago	1.56	2.67	1.71
Poor men	In current period	1.75	2.00	1.63
	A decade ago	2.25	2.44	2.00
	<i>Political and civic participation</i>			
Key informant	Number of female council member	1	3	1
	Proportion of women attending community meetings	15%	40%	35%
	Proportion of women attending discussions in meetings	1%	10%	10%
	Level of activity of groups (0 = not present, 1 = low level of activity, 2 = regular activity, 3 = highly active):			
	Credit groups	2	3	2
	Economic groups (farming, fishing, crafts)	3	3	1
	Health groups	2	3	2
	Education groups	2	3	2
	Youth or sports groups	2	3	2
	<i>Social harmony</i> in village (individual FGD members rating 1 = most villagers very suspicious to 10 very helpful)			
Non-poor women	In current period	3.89	4.67	7.43
	A decade ago	2.56	3.78	7.29
Non-poor men	In current period	5.13	4.67	4.25
	A decade ago	5.00	3.78	4.38

The FGD with the poor women showed the different categories in the communities of women who commonly work for pay. Except for the single young women in Case 1 village, the other groups of women, married young women, married older women and widows commonly work for pay in the 3 case studies. These are the women who engaged in farm work or in the market. With regards to the physical mobility of women when asked from the young men and women, the young men feel women can move more freely in public places in the village compared to the perception of the young women. Higher mobility rating was given by the young men and women in Case 3 which can be explained by the engagement of women in marketing or selling. Domestic violence during the past decade has reduced which can be attributed to the presence of village court to settle various matters within the village and to reprimand untoward activities of villagers to other folks in the village. The women, who are the victims, gave lower ratings on the extent of domestic violence in the current period and a decade ago in case studies 1 and 3, which is

not the pattern in Case 2. Among the three villages, more domestic violence is likely happening occasionally or regularly in Case 2 for both periods under review.

Key informant provided information that village council members are mostly men and women members are assigned to position such as treasurer or head of health/nutrition programs. One village (Case 2) has three female council members and also has the highest share of women attending community meetings. Though women are able to attend meetings, even in the other villages (Case 1 and 3), very few of them contribute to the discussions. The villages have different groups and these groups are highly active in case 2, and moderately active for Cases 1 & 3. The economic group which consists of e.g. farming and crafts has low level of activity in the rainfed site which could be due to one season rice production and the absence of groups for non-rice or non-agricultural activities.

The information on social harmony reflects the degree of suspiciousness to closeness of each individual person in the village. The non-poor men and women focus groups rated the village at current period and a decade ago. The women in the rainfed site rated their village with more social harmony now and the men in the irrigated site also gave similar rating. The other case study (case 2) showed the same ratings of men and women.

Section 3. What unleashes agricultural innovations?

The objective of this section is to elucidate important commonalities and differences in the factors and processes which the study participants themselves identify as supports for and constraints to their innovation capacities. This analysis was done at the community level as well as at the individual level. A gender lens on these dynamics provided a unifying theme across this analysis.

Before the participants were asked to identify the top two ranking innovations in rice farming and natural resource management, they were asked to think back for roughly the past five years on the new cropping or livestock practices or ways of managing local natural resources or organizing agricultural activities that have been tried out or experimented with in the village. Their responses were listed in a flipchart which all the participants could see. The flipchart was divided into three columns, the left most columns are the listings, and in instances where discussion seemed not to flow, participants were prompted about the changes in agricultural activities, such as the “hardware” (e.g. new seed varieties, animal breeds, machines) and “software” changes (new learning, relationships, or organizing). After listing all innovations, the participants were asked to identify the top two innovations as agreed by the members of the focus group. Furthermore, they were asked to rank the top 2 in order of importance and to explain or give their reasons for the rating. These series of questions were asked for both the men and women from the poor, middle class and youth FGDs.

There were 18 FGDs and improved variety, agricultural machinery, knowledge based technology and irrigation facility were ranked by men and women the as top 1st or 2nd most important innovation. The succeeding paragraphs discuss the different top 2 innovations and the reasons why it is ranked as top two for focus groups.

3.1. Top two innovations identified by focus groups

3.1.1. New improved rice variety has more yields than older improved rice varieties

Improved varieties were listed and chosen as one of the top 2 innovations in all the FGDs. The new improved rice and vegetable varieties have higher yield and are more resistant to pests and diseases. The improved varieties include inbred and hybrid rice and vegetable seeds. The most common inbred rice varieties are NSIC RC222 and NSIC RC216, and the hybrid rice variety is SL9. Improved rice varieties were ranked either 1st or 2nd but the vegetable varieties were ranked only as 2nd most important innovation.

The FGDs participants mentioned that the new rice variety gives more yield compared to what they previously planted. They also said that the seeds of the new improved variety are available in the community, hence, they were able to rapidly adopt the new variety. Other related agronomic characteristics are tolerance to pests and diseases, adaptability to wet and dry season and, resistance to lodging. These reasons were mentioned in the men's FGDs from the poor, non-poor and youth groups. The men from the non-poor FGDs mentioned the advantage of using certified inbred seeds as being good quality seeds sure to give good harvest, and at the same time can be assured of good seeds stored for the next planting season.

The women participants from the poor FGD added that rice is one of their basic needs and their major source of income and higher yield would make them more food secure and at the same time have higher household income. Women's choice for the improved vegetable seeds demonstrated their concern about the nutritional status of the household members. With improved varieties of vegetables seeds, women can prepare, cook and serve different kinds of food for the family. Women from the non-poor are grateful for new or improved rice varieties. With rice farming as their primary business, this gives them options to try new varieties that would give higher yields and reaffirm that rice farming is still a promising business. The youth have observed that farmers in their village have direct access to new rice varieties through the agricultural technicians assigned in the village, as they see these technicians distributing the seeds to the farmers in their house or during farmers' meeting.

When asked about the choice of the other group (opposite sex), they replied that they will also choose new variety and also give the same reasons for their choice. This implies that men and women from same or different social groups have similar knowledge and understanding of the characteristics and advantages of new variety. In addition, the mention of new rice varieties as a top two innovation was more in the favorable rice environments. In villages with irrigation canals or spring water rice is grown in both wet and dry seasons, while in the rainfed village, rice is only planted during the wet season.

3.1.2. Agricultural machinery saves time and labor

Agricultural machines identified by the FGD participants include 4-wheel tractors, reaper, combine harvester-thresher, hand tractor, mechanical transplanter, power sprayer, and farm implements such as the plow, rotavator, floater attached to the tractor or hand tractor. The young men and women mentioned machines more than the men and women adults from the poor and non-poor groups. The common reasons for the use of the machines are time saving, labor saving and efficiency.

The women from both the poor and non-poor groups identified 4-wheel tractor as it saves time in land preparation according to them. The non-poor women mentioned that a rotavator is attached to it, and they added that "this is the machine that is used to do the first activity in rice farming, plowing, and the other activities will follow. And this is followed by a hand tractor for harrowing, and until the field is fully prepared with enough water then transplanting of rice seedling can be done manually."

Hand tractor is one of the oldest and first agricultural machines adopted by the rice farmers in the Philippines (Bautista 2008), but still this was identified as an important innovation by the men from both the poor and non-poor groups. The men from the poor group were referring to the attachment at the rear end of the hand tractor, floater, used while the field is being plowed. The floater pulverizes the soil and replaces the harrowing activity. As the men claim "this technology makes plowing and harrowing more efficient and convenient." The non-poor men focus group, on the other hand, considered the changes in the design and capacity of the motor to drive the hand tractor as an innovation. The earlier design of the machine was fueled by gasoline which is more expensive, hence a diesel-fueled hand tractor was fabricated and this type is commonly purchased by the farmers currently. The hand tractor was also popular among the male youth, and they mentioned that hand tractor is the primary farm equipment in

land preparation and they are also familiar with the floater. All the FGDs participants mentioned that the 4-wheel tractor or the hand tractor is used to transport farm produce as well as people within the community and nearby places.

Currently, the young men and women in the FGDs were involved in agricultural activities like pulling of seedlings, transplanting and, weeding. Other machines identified by the young women were reaper and power spray. According to the young women “the use of reaper lessens the time to harvest the rice crop and increases the yield by efficiently harvesting all the crops unlike in manual harvesting where there are portions left unharvest.” The reaper cuts the crop (only one action) and leaves them in windrows in the field for further processing (threshing and cleaning) before getting the rice grains. A participant narrated that the “use of reaper will facilitate harvesting of mature rice crops when there is a typhoon that would landfall and pass in the village direction. This will save the crops from getting wet and not feel bad on the capital inputs used.” The other machine, the power spray replaces the knap sack type and reduces the load of carrying chemical pesticides and has wider coverage.

The biggest machine, the combine harvester-thresher, was identified by the young men. A combine harvester-thresher is able to do three actions - cutting, threshing and cleaning - clean grains can be gathered from the machine, ready for drying and subsequent milling or storing. According to them “with the use of the combine, farmers can earn faster” since there is no time lag in the harvesting and threshing activities and farmers can immediately sell their new produce.

3.2.3. Knowledge based technology for less capital use

Knowledge intensive technology is defined as set of knowledge and skills that a firm/individual is able to use to develop new products and processes, or improve existing ones to be more efficient and or effectively (Nonaka & Takeuchi, 1995). The knowledge based intensive technologies⁴ identified in the focus groups include integrated pest management (IPM) for paddy and vegetables, site-specific nutrient management (SSNM) or simply referred to as nutrient management. There is specific knowledge on the kinds of herbicides and fertilizer which were appropriate to the current field conditions, e.g. use of the best practice. Only the adult focus groups from the poor and non-poor identified these innovations.

The poor women’s focus group identified knowledge related technologies and said that through IPM farmers are able to reduce expenses of chemical inputs, particularly the use of insecticides. They are aware that farmers who were exposed to SSNM are reminded to test the soil for nutrient deficiencies before fertilizer application. This can reduce costs and time in the application of fertilizers. On the other hand, the poor men’s group agreed that the new way of preparing the field before planting or the best practice, made them more confident that they will have high yield.

The non-poor men identified specific herbicide and fertilizer that are new in the market. With the use of the new herbicide, unwanted plants in the field are removed faster and better since the chemical is very effective and reaches the deepest roots of the weeds. The fields become clear and they believe that “having a clean farm can boost the

⁴ The following definitions of IPM and SSNM are from the IRRI knowledge bank (IRRI knowledge bank). IPM is defined as an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Site-specific nutrient management (SSNM) is a set of scientific principles for optimally supplying rice with essential nutrients. It enables rice farmers to tailor nutrients management to the specific conditions of their field and provides a framework for best management practice for rice. It enables farmers to dynamically adjust fertilizer use, by supplying optimum amounts of nutrients at critical time points in the crop's growth to produce high yields. In SSNM, farmers tailor their nutrient management strategy to the specific conditions of their field.

growth of the rice plant and have higher yield.' In addition to clean fields, farmers think that good fertilizer management, such as the application of 17-0-17 fertilizer composition (NPK) will also increase the yield. They believe that poor harvest is often the result of not applying the recommended amount of fertilizer at the proper growth stage of the crop.

When the youth group was about to finalize their identified top 2 innovations, a lone young woman raised her hand and said that she disagrees with the choice of machines in the top 2 but would rather choose the use of inorganic fertilizer for onions. She said that "inorganic fertilizer enhances the growth of onions and other fruit bearing trees." She continued saying that the innovation identified by her group would create social problem since the use of the machine will displace a number of laborers and take away a large portion of laborers' income.

The women admitted that men are more expert in the fertilizers and chemicals application but men reported that women also know about fertilizers and herbicides (chemical inputs) and most often know the brand of the chemicals because they are the ones who purchase the item from agricultural shops. One of the main reasons for the adoption of knowledge based technology is the savings incurred by buying more effective chemical or using less expensive new practices ensuring the production or yield is not compromised. The use knowledge based technology was mentioned in the village where majority of the farmers have low household incomes. They use this technology since it is less expensive.

3.1.4. Irrigation facility for assured source of water

Rice is a water loving crop and an assured source of water during the wet and dry seasons guarantees yield at optimum level given a favorable weather condition. Related issues include unpredictable rainfall due to climate change and multiple use of water sources for domestic and agricultural uses.

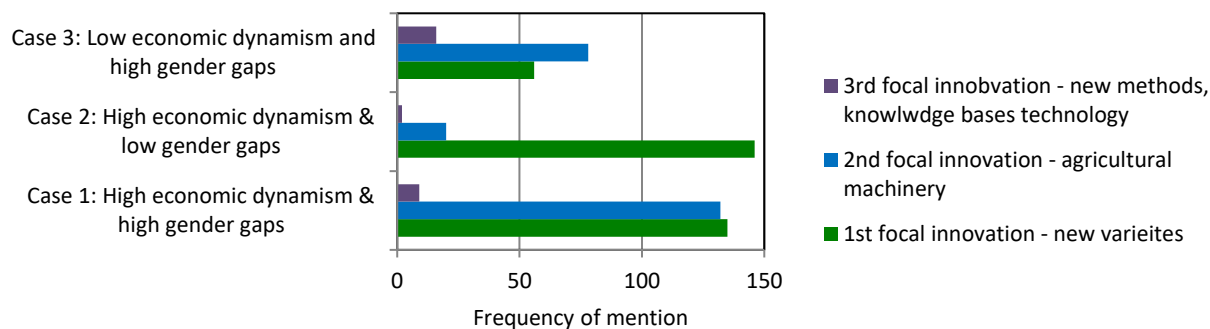
The poor women's group said that water is the basic need for planting. Rice crops require a high volume of water while residual moisture is needed for growing onions. The poor men's group said that irrigation canals provide constant and consistent water supply during the wet and dry seasons for rice farming. They all agreed that with canal irrigation, farmers are able to plant rice on time, and there is a lesser impact during the El Nino (drought).

Non-poor women indicated that in the absence of irrigation canals, they pump water from river, lake or deep well for the field. They also mentioned that it is so impossible to plant without water but possible to plant without the other machines. The non-poor men group added that "if we only rely on rain water and most often rain come late or is very irregular, then all our farm activities will be delayed." The young women said water pump is important for the second crop of rice in the rainfed villages. The young men said that with irrigation canals, farmers can plant rice twice a year, unlike previously when farmers depended on rain for the wet season cropping.

Summary: All the focus groups, men and women from the poor, non-poor and youth identified improved varieties, agricultural machinery and irrigation facility and, knowledge based technology. An analysis of the identified innovations in relation to the rice farming environments particularly by the main irrigation source, and the economic situation of the village provided insights for future R&D activities (Fig 6). Rice farms with irrigation canal (Case 1) has rice-rice cropping pattern (for the wet and dry seasons) and farmers are more willing to use and adopt new innovations for rice. Figure 6 shows that in this kind of village, innovations such as the new rice varieties and agricultural machineries were mostly mentioned by the participants in the FGD. In the village where water is pumped from the source to the rice fields (Case 2), the most frequently mentioned innovation is new rice varieties. The common cropping pattern is rice-onion/vegetables, where the second season crops need only residual moisture. This village is also known to produce onion in large amounts since the fields are uplands and irrigation water is drained faster to maintain enough moisture for the onion bulbs to grow. The third village is a rainfed village (Case

3), and adoptions of innovations is relatively low as shown by few mentions from the FGD's. The cropping pattern is rice-fallow/vegetables and agricultural machines are usually from service providers from neighboring villages. The other source of income is trading of agricultural produce in the village and other neighboring villages. Women are more involved in farming activities and livelihood activities in villages with less favorable rice farming systems.

Figure 6. Patterns of focal innovation adoption by innovation and case description



In the rice-rice farming systems, women have specific activity involvement and they are visible in the field during the transplanting, harvesting and other post-harvest activities, such as winnowing and drying. In the two other villages, women are also visible during those peak labor months but in addition, they dominate most of the activities in onion production as well as the in the marketing of rice and rice by-products.

3. 2. Local factors helping and hindering innovations

In addition to reflections on the agricultural and NRM innovations that have been introduced in their villages, the dataset has information on factors that may have helped or hindered innovation in the village. The non-poor groups had specific discussion on this topic. They were asked to reflect further on the resources available locally that “help people here to be innovative” and “enable men and women to learn about —or possibly create themselves— something novel that could make their livelihoods more productive or improve the wellbeing of their families.” They were also asked to reflect on factors that hinder local people from trying out innovations. Similar to the top two innovations, focus group members repeated a rating exercise, but this time rating the two most important resources in their community which facilitate agricultural innovation by the local women (if a women’s focus group) or by the local men (if men’s). Same procedure was also done in the identification of the factors that hinder innovation. The poor and the youth groups were also able to identify similar factors in the adoption or dis-adoption of focal innovation, new rice varieties.

3.2.1. Non-poor groups’ top two factors that support and hinder innovation

The top two factors that support innovations in agricultural management practices and knowledge that were identified in the women focus groups are presence of government and non-government office/agency in the village, access to information and availability of service providers.

Aside from the regular visits to the village of technicians from the department of agriculture (DA), there are some seminars and trainings, field demonstration/trials of updated materials or knowledge on agriculture. The visits of agents from chemical companies expose the farmers to new products and most often free trial sachets are distributed to those who attend their promotional campaigns. Information is accessed through broadcast and digital media (radio, television and internet) and local networks such as farmer-to-farmer sharing and agricultural shops. Women participants said that if they see for example the agricultural machines on television, “they will have a

concrete idea of what the machine looks like and could encourage them to buy the machine.” A woman participant shared that “if there is information sharing among farmers, we immediately try out what other farmers have used and suggested, since they have already tried it and were able to have a good yield.” One person from another group commented that “it would be good if we have information from the Agricultural shops on the available inputs and which are good quality to guide farmer on what to buy.” Access to information also helps in reducing cost because it minimizes farmers need to experiment on e.g. the response of the plant to new fertilizers. Women focus groups see the need of a service provider in their village instead of contacting from other villages.

For the men focus groups, on the other hand, they also identified the government as well as local support in the adoption of the innovations. Other factors include the availability of improved inputs such as seeds and chemicals, and the affordability of inputs and labor saving machines.

The men focus groups identified the government support at the national level as a way to further promote and disseminate agricultural innovations. They specified the regular visits of the agricultural technician to the village and informing them individually or as a group of the current technologies sponsored by DA and ready for dissemination. The men acknowledge the support from other farmers and friends and said that “there are farmers who are more eager to try innovations and when they succeed they share their success stories with other farmers/friends.” In a way, they help in promoting the innovation, and most of the farmers consider them very credible hence they commented further that “we are more convinced that the innovation is good and most often we adopt it too.” The availability of new seeds and other inputs in nearby agricultural shops helps men to adopt newly released seed or upgraded and effective inputs. They said they prefer early maturing improved rice variety and, they mentioned a new herbicide which is very effective and less costly because only a small amount is used and they had a cleaner field. The men mentioned about the affordability of labor saving machines, particularly the combine harvester-thresher, so they can purchase the machine. They are fully aware of climate change, specifically the unpredictable weather during the harvest season, and they have seen how fast harvesting is with the use of combine.

The non-poor women focus group mentioned high cost of inputs, high machine rental fee, lack of support of local officials and, displacement of farm laborers resulting from the use of the machine and, lack of government scheme to compensate them as the key factors that hinder local people from trying innovations. They specified the high price of fertilizers that are recommended when using new rice varieties and high rental fee for tractor. They showed interest in the use of the machine but they find it expensive to own the machine, hence they need to rent. In addition, the leader of the neighboring village would stop the other villages from having access to the machines in their village, particularly the combine harvester-thresher during the harvest season. A women focus group connected this incident with the issue on who to be first served by the machine and have a good harvest before the others. The other women focus group associated the use of the machine with labor displacement of the harvesters, where majority are women workers.

The non-poor men focus groups mentioned lack of finances, lack of support from the government, and absence of government’s contingency plan for displaced workers as factors hindering innovation. Most often farmers resort to borrowing at the start of the season and use their regular or usual farm practices. But using a new seed variety or practices needs additional capital to buy fertilizer to meet the recommended rate and have the optimum yield. Some of the men in the focus group said that “aside from the fertilizer there are new chemicals introduced to us that can enhance the growth of new rice varieties.’ They revealed that some farmers would choose fertilizer or chemical to use with the new rice variety. Without subsidy or financial support from the government, farmers are not encouraged to purchase and use the combine machine. The men think that the machine is too expensive and, similar to what the women participants noted, the men are aware of the labor displacement issue created with machinery use. They explained that harvesters will lose their job which is their main source of income. The men focus groups,

however, thought that if the government provided alternative work for the displaced laborers then it would be easier for them to adopt the innovation. The men focus groups were thinking of the presence of a government scheme to cater to the displaced agricultural workers.

3.2.2. Poor men and women groups' perspective on the adoption of new variety

Using the coded data sets, an analysis was conducted on the perspectives of poor men and women focus groups on the adoption of new variety. An analysis node was created and was crossed tab with the set for the poor men and women focus groups.

Factors that helped in the adoption of new rice varieties. According to the male and female participants from the poor group, the new rice variety, RC222, was adopted by the farmers because of its high yield compared to the previous seeds they used to plant. The women participants agreed that the high yield made their family more food secure and earn more profit to save to purchase farm lands in future. The male group added that it was readily adopted because an agricultural technician was the one who introduced the variety in the village. At the initial stage, only some farmers planted the variety and when the other farmers saw the harvest was good, almost all the farmers planted the variety in the next season. The new variety has good agronomic characteristics and can be grown both in wet and dry seasons, and has a good economic incentive since the price of the seed is very affordable.

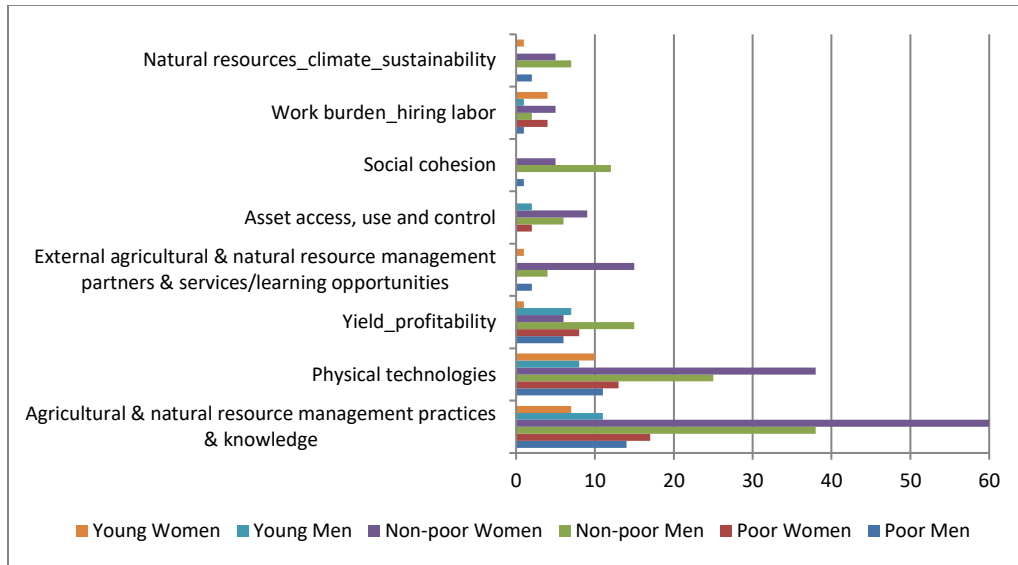
Factors that hindered the adoption of new rice varieties. Both the men and women FGD members mentioned poor cooking quality of the variety and that it becomes hard after storing only for few hours (leftover cooked rice). The women's group expressed their dissatisfaction when they mentioned that the "first users were the male farmers since they were given access to the new seeds." The women were not included as the target group while introducing the new variety. The men also mentioned the presence of a large number of landless households who do not have access to farmland – even as permanent worker or to lease in - hence only few farmers are able to test the new variety.

3.2.3. Factor that helped/hindered the adoption of the new innovations in the village from all the FGDs

This section gives an overview of what factors helped and hindered local people in trying the innovations. The analysis included all the set of focus groups as well as all innovations identified in each focus group.

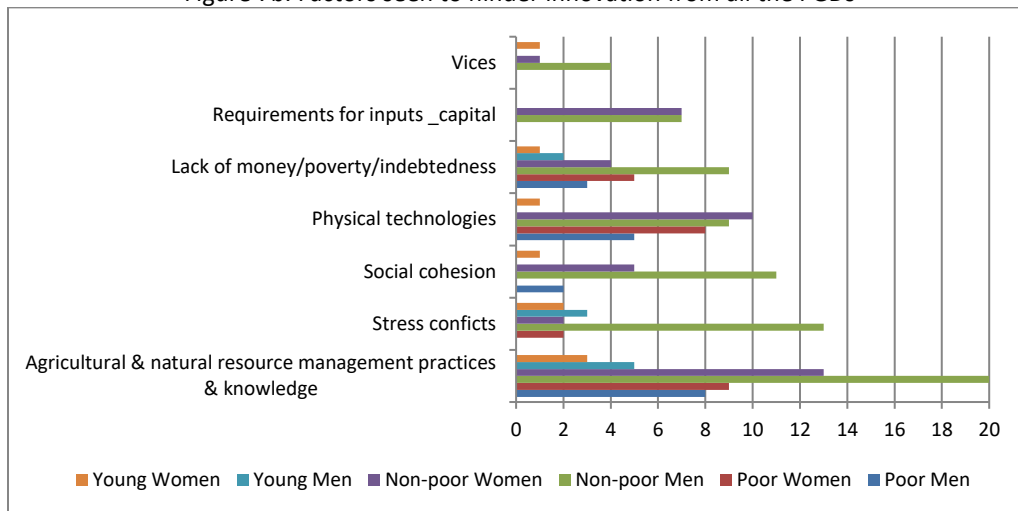
In the FGD's of the poor and non-poor adult men and women, and the men and women youths the physical features of the technology, and the performance in terms of yield and profitability were often mentioned as factors helping innovation (Figure 7a). Other factors mentioned by some groups included presence of external agricultural and natural resource management partners, the access/use and control of assets of the family members, the cohesiveness in the community, reduction in work burden/hiring of labor, and risk aversion of farmers towards climate change.

Figure 7a. Factors seen to helped innovation from all the FGDs (18 FGD)



Factors that hindered adoption of innovation were related to agricultural and natural resource management practices and knowledge, disagreement within the family, low household income due to joblessness of members; marital unfaithfulness, aggression or unreliable spouse, social cohesion, availability of machines and seeds in the village, the appropriateness of the machines compared to the size of the farm, lack of money, additional capital to buy required inputs and use of money to engage in vices. The hindering factors were mostly mentioned by the non-poor male group (Figure 7b.).

Figure 7b. Factors seen to hinder innovation from all the FGDs



3.3. Voices of local innovators

The analysis in this section used the information from the semi-structured individual interviews with male and female innovators. The criteria for selection of innovators included (a) within the age range 25-55 years (b) a land owner and/or prominent person in the village (c) known by villagers to be often adopting new innovations and from it. The aim is to explore individual experiences with new agricultural or natural resource management practices or organization, capacities for innovation in these processes and the role of gender norms.

3.3.1. Female innovators

Female innovators' identified factors that support innovations. Women innovators were encouraged to adopt innovations by their family members, husband, daughters and even son-in-law. The family members were very supportive when the women tried to adopt improved rice varieties and agricultural machineries. The whole family feels happy when the innovation adopted is very successful. In case of improved rice variety, NSIC RC 216, the yield was very high and price of the milled rice was relatively high. The people they have shared the improved variety with had positive reaction and were willing to plant the variety. The women innovators have changed their preferences for rice varieties, they prefer varieties with good cooking quality especially in making rice delicacies. Good cooking quality includes aroma and smoothness of the cooked grains. As a woman innovator confessed "even if we have few kinds of food served on the table, I have the appetite to eat because of the aroma of the cooked rice." Most of the sources of the new variety are the local seed growers in the village.

Women innovators were also impressed by some agronomic characteristics of the new varieties. As narrated by an innovator "with the new variety, we applied the recommended rate of fertilizer and were able to attain the optimum yield, 70 cavans/hectare, as compared to the previous varieties where we apply more fertilizer but only get 40-60 cavans/hectare". Aside the from the fertilizer application, there are no other skills needed for adopting the new variety, only experience in farming is needed.

With the adoption of the improved variety, women innovators were able to have savings because of an increase in their income through increased rice yield. They use the savings to lease-in or purchase farm land, purchase machines and repay previous debts. With the increase in yield, a bigger percentage of the produce was sold resulting in higher income and they were able to meet all the daily needs of the family and things they desired to have.

Agricultural machine tried by women innovators is the combine harvester-thresher. They said that it took only 4 hours to harvest and thresh as compared to manual harvesting which takes 1 to 3 days. Family members' support encouraged them to buy the machine even if it was very costly. Women innovators told us that their children as well as grandchildren were happy and excited to see the big machine operate in their field. But, of course there was a social consequence faced by the adoptor. An innovator said that "the machine itself was of great help to us, but what happened was the loyal laborers we used to hire were displaced from harvesting our paddy. We have given notice to them and told them that they have to get employment with other farm owners in the next cropping season since we plan to buy a machine." With the use of the machine, a women inventor said that her husband is not anymore too tired and spends less time in the field during harvesting period and women were spared from the preparation of snacks for farm workers for 5 days.

Female innovators' identified factors that hinder innovations. The female innovators observed that the grains of new rice variety, RC216, shatter easily. Hence they have to be very alert about the peak maturity period and harvest in time to avoid yield losses. Insufficient water supply at the onset of the rice farming can decrease yield because the optimum number of tillers will not be reached. Inaccurate information on the recommended rate of fertilizer for specific varieties has led to higher unnecessary expenses. As an innovator narrated "I tried adding more fertilizer aside from the recommended rate but I found out later that there is no need for the extra amount of fertilizer." Lack of information about soil and consequent inappropriate application of fertilizer also incurs additional costs. Like an incident with one of the innovators, if she did not know that the type of soil in her farm is appropriate for the rice variety, she could have spent more on fertilizers or other soil additives.

Women respondents revealed that most often they did not know early about the new variety and they do not receive information from agricultural technicians. An Innovator narrated that "I planted RC222 in our field in 2011, it was only after 2 years I knew that it was a new high yielding variety from the seed grower when I was buying the seeds".

Women farmers were not invited during the demonstration of combine in the village. They agreed that they do not need to know how to operate the machine but would have liked to know how the machine works and how long it takes to finish harvesting and threshing of the rice grains in their specific fields. And an innovator further said that “with this information, I will not be cheated by my partners in rice business”.

3.3.2. Male innovators

Male innovators’ identified factors that support innovations. The new improved rice varieties such as RC216 were introduced by Agricultural technicians and other family members (brother-in-law). They convinced farmers that this variety is better than what they are using now and so they tried the variety. The variety commands good market price and has good cooking quality in terms of the aroma and the softness of the cooked rice. These two characteristics were used to encourage other farmers to try the new variety and the first users were trustworthy and they did not fail in promoting the new variety. As a male farmer said that “I think they believed in me and yes, and aside from having those two qualities, they saw the vigor of the standing crop in my field.” There were more grains per panicle. Almost all the farmers in the village tried RC216. The new variety has higher yield and one of the innovators remarked that “most important thing is, my family members loved the taste of the new variety.”

A male innovator stated that their initiative to approach a technician to show their standing crop and to discuss about chemical inputs used made an impression, and hence they are always visited by the technician.

Availability of machines such as threshers and combine harvester-thresher in the village through purchases by large farm owners is appreciated by most of the small farm holders. However, a large farm owner revealed that there could be issues around the machine renting business. A respondent related that “before I was the only farmer who had two threshers in the village, and most farmers in the village and sometimes farmers from nearby villages came to my place and thresh their paddy. Years after, my friend also bought a thresher and this created competition between the two of us in renting out machines. However, it did not take long before combine harvester became popular because of its efficiency in harvesting and threshing. This has encouraged me to buy the machine.” Some male innovators use the money borrowed from the bank to buy a machine or for its repair, and the income from renting out the machine is used to pay the loan.

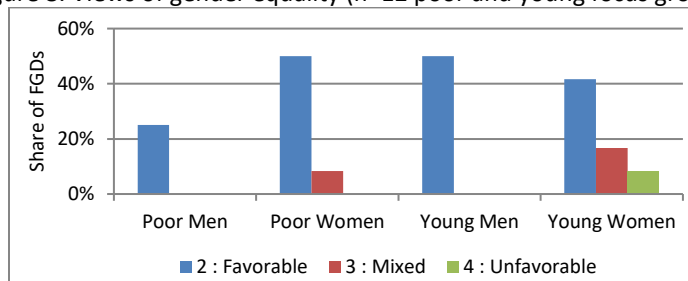
Male innovators’ identified factors that hinder innovations. There was an incident when a farmer received wrong or incomplete information from a private company agent who was keen on the use of biological measures to get rid of rice insects. The respondent was advised to use pulverized leaves of plants named *kakawate* or *madre de cacao* to drive away Korean bugs. But after spreading it in the fields the bugs still remained in the field. The plants are commonly seen along the roads in the villages and has been used for domestic purposes. Absence of agricultural repair shops/mechanics in the village and the neighboring villages often becomes a problem for farmers who purchase agricultural machines. A respondent narrated that the machine was introduced in their villages in 2011 and after three years of observing how the machine operates and how to maintain or repair it, he decided to take a loan from a micro-credit organization to purchase the machine for his own use and also became a service provider in the village. Others have mentioned that it is costly to maintain the machine in good condition especially if major parts get broken and they have to purchase the parts in the metropolitan cities and look for mechanics for agricultural machines in other villages.

A social issue which concerns most of the respondents as well as the FGD participants is the displacement of manual laborers for harvesting and threshing due to the use of reaper/combine harvester-thresher. Farmers are aware of this situation and others would be discouraged to adopt the machines but for the unpredictable rain during harvesting seasons.

Section 4. The changing social context for agricultural innovation

Discussion on what participants understand about gender equality provides insights into the gender norms and factors related to it. The poor and youth focus group participants were asked to share what they understand by equality between a man and a woman, and asked them further if this kind of equality is a good or bad thing. Figure 8 highlights that most of the views on gender equality are favorable particularly from the young and poor men focus groups. In the poor women focus groups, some of the participants had mixed views while in the young women focus groups there were unfavorable views.

Figure 8. Views of gender equality (n=12 poor and young focus groups)



From the poor men focus group, equality between men and women means same decision making power, no bias towards sons/daughters, more understanding and less conflict/fighting and, both husband and wife are humble since they have to consider each other's assets and limits. From the women focus group, it was mentioned that if both are earning they can add more to household income and better provide for the needs of the family. This shows that both agreed to use their incomes for the family and farm needs. Furthermore, both can do same job hence can work in the absence of the other. This displays more understanding and harmony in the house. For the men youth focus group, they associate equality between men and women to less conflict and contradiction. They view gender equality as more in favor of the women, and their reason is that "women can do what they want and employ in jobs generally associated with men." The young women focus groups said that it shows fairness because both men and women can do household chores or income earning jobs, such as in farming as well as office work.

Some of the women focus group participants said "good that there is equal opportunity in working for a living but they should not beat out or compete with each other (that is husband and wife)." A similar remark was also made in the young women's focus group. They wondered whether the husband or wife has more right to philander if both have the same strength.

An unfavorable view arose from the young women focus group. "Gender equality means men and women do not want to be out beaten by each other, they tend to show each one's mastery and be one up on the other. Like in school debates, both men and women do not want to be defeated in the debate. There should always be a winner, and in this sense this is not good."

4.1. Local expectations for farming roles

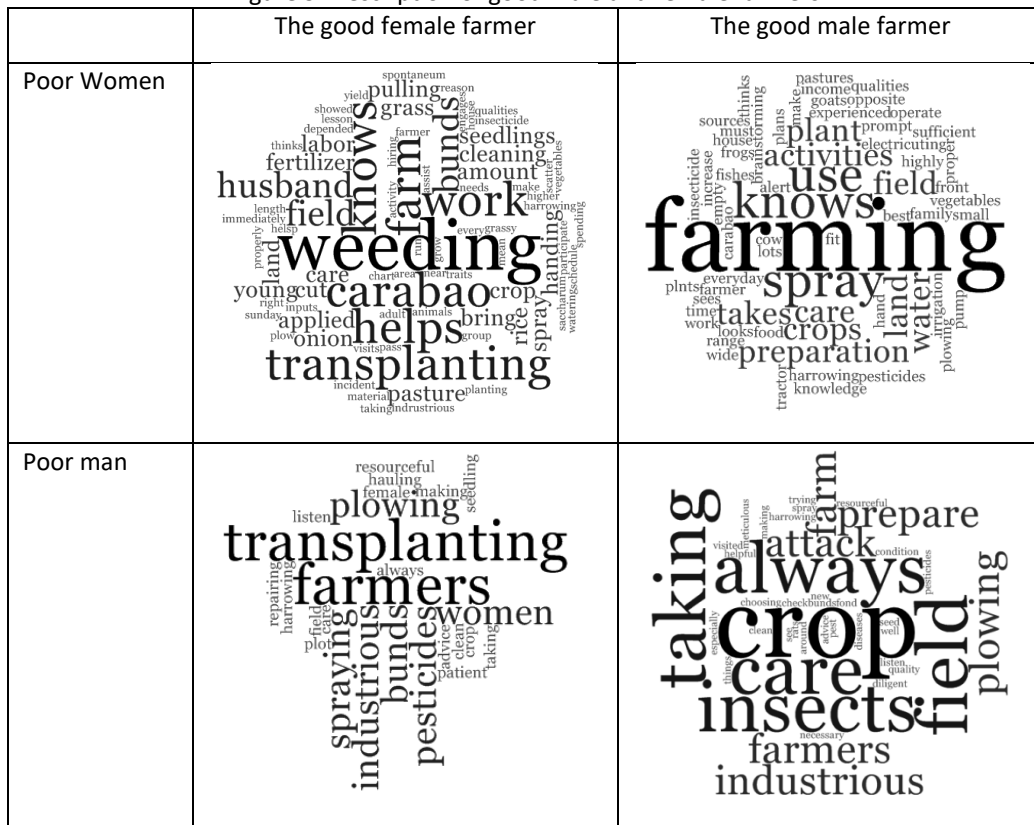
The poor men and women's FGD were asked to characterize a good male and female farmer. The women focus group participants were asked to enumerate the characteristics of a good woman farmer and then that of a good man farmer. Similar method was followed with the men focus groups. The characterization or description is not confined to one word but phrases were allowed. The word clouds generated from this description (Fig 9) used only the first 500 common words including words with the same stem. The font size indicates the frequency of mention of that word.

Most of the words used were mostly related to agricultural practices and knowledge. An analysis of the frequency of occurrence of the words used shows a significant gender differences on how men and women are recognized in the rice farming sector.

Poor women focus groups felt that a good female farmer does mainly weeding of the rice fields and surrounding areas (Figure 9). A woman does the activity almost the whole day and throughout the season. She does it manually using only a small gadget. She does weeding - as family labor - in their own rice farms as well as in the surrounding bunds of their farms, and continues to weed along farm bunds on her way home. A good woman farmer is known to do transplanting and care of the animals. Most often women belong to a group of transplanters who are hired not only in their village but also in nearby villages. She also helps in bringing the carabao to the pasture lands and back to their homestead. The women focus groups represented a good women farmer as one who is knowledgeable about farm activities as well as helping her husband.

The good male farmer, on the other hand, is 'the farmer' as obvious from the figure. Farming is his main income earning activity. He makes plans and schedules for the various farming activities starting with land preparation, irrigation water management, crop care, etc. Land preparation had always been the domain for men farmers, either with draft animals or machines. Men carry on their back and spray insecticides and other chemicals around the rice fields, and most often without any protective gears. The good male farmer decides what methods/approaches or inputs to use in farming, because he is the most knowledgeable among the household members.

Figure 9. Description of good male and female farmers



Note: Number of common words=500 with grouping (include word with the same stem)

Poor men focus groups describe a good female farmer as one who does transplanting. This activity is usually done a week to less than a month. It is done by stooping down to plant the rice into the puddled soil and this is known to be a back breaking activity. Men, women and youths join in transplanting but majority of the transplanters are women. The mention of ‘plowing and spraying’ suggests the presence of women in the farm while these activities are being done, and most often the women bring snacks or food for lunch for their husbands and other hired workers. Men also value women’s handweeding of the field bunds. The men acknowledge that women are familiar with the names of the pesticides since women often are involved in the purchase of farm inputs. And interestingly men recognize women as farmers.

The good male farmer, on the other hand, as described in the men’s focus groups, is one that always protects the crops against attacks or infestations of other pests and diseases. They properly plow the field at the onset of the cropping season and maintain it until crops are well established in the field. The use of the word ‘always’ signifies that it is their main responsibility to take care of the rice plant for the whole cropping season. The poor men’s focus groups described both a good woman and man farmer as industrious aside from the agricultural activities that they perform.

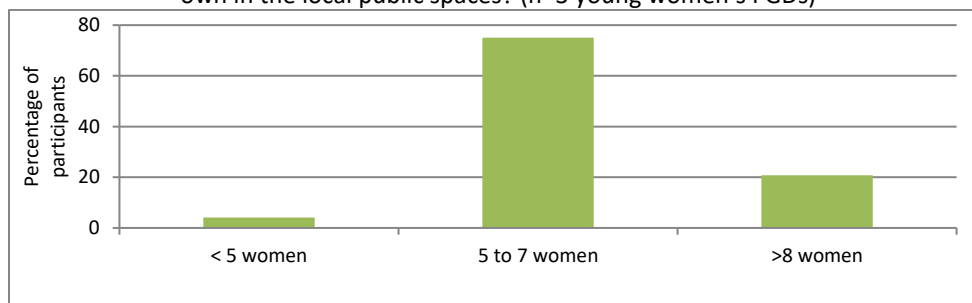
Language both discloses and shapes people’s life and abilities, hence the importance of such definitional exercises that provide a wealth of information for research purposes. In the Philippines, poor areas are still embedded with strong social expectations that cleave agricultural tasks and positions by gender. Acknowledging pernicious gender gaps can lead to short term strategies like adapting machines facilitating agricultural tasks collectively assessed as “feminine”. Nonetheless, influencing collective sub-conscious bias doubting women’s abilities as change makers, innovators and, more generally, as main farmers require long-term strategies such as education. As complex as systemic change can look, a small and gradual change in our wording choices can make a contribution and start challenging deep-rooted perceptions. The right word matters, sometimes beyond actions and figures.

4.2. The uneven relaxation of restrictive gender norms

Physical mobility

Gender norms influence the causes and consequences of mobility for women. Physical mobility of women in public places indicates less restrictive norms. Figure 10 shows that an average of 5 to 7 women out of every ten are able to move freely alone in the public spaces of their village according to the young women’s FGDs. The percentage distribution includes all the young women participants (n=24) in the three FGDs.

Figure 10. Out of every ten women in the case village, how many can move freely on their own in the local public spaces? (n=3 young women’s FGDs)



From the FGDs with women it was revealed that young and adult women can move freely around the village. One of the public places women can freely go to is the market place. In the Philippines, the market place is mostly dominated by female sellers and it is similar in the case villages which have their own market place in the middle of

the village. However, not all women would like to go to the market. It is their choice if they go to the market or to any public places in the village. Most young women do not go to the market yet but they said that when they become older, they can go out either alone or with group of friends. Husbands and wives go together in public places. A woman respondent said that there are women who would like to be accompanied by their husband when they go to public places, so that the husband can defend her in case something happens.

Newly wed women take the responsibility of going to the market to buy the needs for her new family and the same has been practiced during the time of her mother. Young women move around in the village as a group visiting various places. They also sometimes choose to stay in the house of one of their groupmates and they agree that they have to go back to their respective houses before dusk. The parents do not stop them from going to places but require their children to ask permission before going out. However, there are parents who are very strict and would not allow younger daughters to go outside the house even at daytime.

Some FGD participants mentioned about the incidence of migration out of the country of family members. The female adults are usually the migrant members, either the wife or an able bodied adult female child. Most migrants usually come from families who have funds or can raise funds for placement fees, airfare and other fees to be shouldered first by the migrant member. A young participant who intends to migrate to California, USA admits that even though she has a comfortable life in the Philippines, she dreams to go to US where she will stay with her relatives. While still with her family in the village, she is mentally preparing to endure the pain of separation from her family.

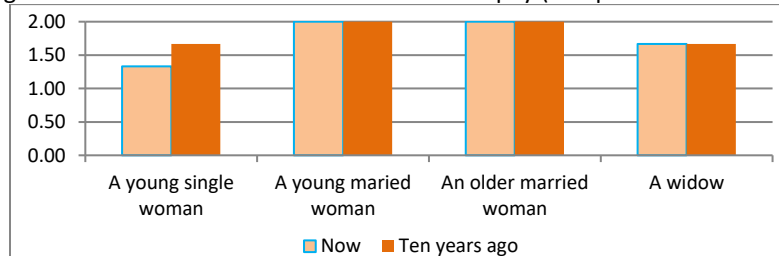
From the men FGDs they are aware that adult and young women can move around freely in the village. They even accepted that women are good in the market since they are good in sale talk and can easily ask to lower the price of goods after negotiation. As shared by a respondent, “aside from being good in sales talk, women have likeable personality and have higher patience unlike men.” However, there are men that would rather be the seller, instead of their wife, of their goods in the market. Other couples would complement each other’s work, while the men do farm activities the women are in-charge of the market, and help each other in doing household work.

Men mentioned that some young women do not want to go out of their house because of sexual harassment or bullying. They also said that some adult women are not allowed to join groups of women because they might neglect their responsibility in the family and become busy attending meetings or gatherings.

Women working for pay

The poor women’s focus group was asked about the local women’s likelihood of working for pay on or off family property, where 1 is rare (with 0 to 2 women in 10 women are working), and 2 is common (with 3 or more women in 11 women are working). Figure 10 shows that it had been a common knowledge that young and older married women had been accessing jobs now similar to the past 10 years compared to young single woman and widow.

Figure 11. Likelihood for of women to work for pay (n=3 poor women’s FGDs)

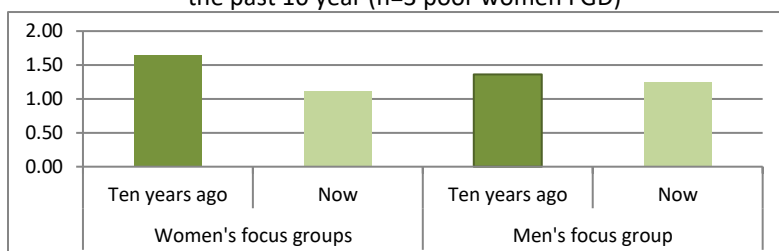


Married young and older women work to earn additional income for their families. They feel it is also their responsibility to work and help the men especially if the men are earning a meager income. The young single and widow women, has less pressure to work and more often they work on voluntary basis. Aside from the farm activities women are involved in, the common work includes small business in selling goods and farm products, salon services and household chores.

Domestic violence against women

Physical violence against women is one of the most evident manifestations of gender inequality and women’s subjugation and powerlessness. Focus groups of both men and women from the poor report decline in physical violence now compared to ten years ago (Figure 12).

Figure 12. Extent women have been hit or beaten in their household over the past 10 year (n=3 poor women FGD)



According to the poor women focus group, domestic violence is in the form of slapping on the face, kicking, strong blow on the face causing black eye, punching on the body which would cause hematoma/blood clots all over the body. The state of drunkenness of man was believed to lead to domestic violence. However, now a days, husband and wife find time to talk together to solve the problem. If they cannot resolve their problem then the incident is elevated to the village court. The village court is composed of the village head, village council, other officials and some teachers from the school or respected elderly members of the community.

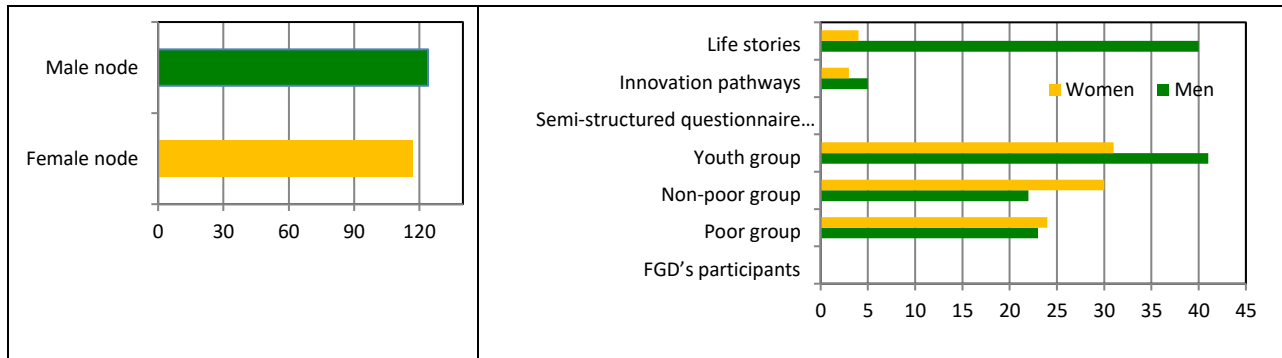
The poor men FGDs discussed how they settle disagreements with their wives. If both have already calmed down, they talk and try to fix their problem. If the problem cannot be immediately solved, husband and wife separate for a while, either one of them would move out of the house and will only come if both are ready to talk and settle their problems. The husband usually leaves the house and stays with his parents or relatives. They said, however, that these incidents seldom happen in the village.

4.3. Norms and enterprise

Entrepreneurial activities are equally important for men and women in the rural areas

Entrepreneurial activities are often closely associated with women, but across the dataset men and women speak about it and in some instances men speak more about it (Figure 13). A more detailed analysis of the data shows the groups where entrepreneurial activities were mentioned often. For the men, youth men group and men respondents from the innovation pathways and life story semi structured interviews, while for the women, the adult women from the poor and non-poor groups (Figure 13). Women are engaged in entrepreneurial activities and informal petty trading, which is a mechanism for them to be exposed to new information and innovate.

Figure 13. Frequencies associated with entrepreneurship coding by data source



The following is a discussion of the normative process of negotiation and decision making around women's entrepreneurship, using the "typical couple" vignettes. These are couples who are busy with their agricultural activities in the village.

Typical couple and women's entrepreneurship

Diana and David are typical couple names, and the focus groups have different views on who should be the sellers of vegetables and who decides how much to sell and how much to keep for the family.

Men and women FGD identified Diana will likely be the seller of the vegetables. Women participants said that since most of the sellers in the market are women, Diana will be freer to move around and can better negotiate with buyers. As a male participant, on the other hand, recounted "I think it is better that Diana will sell the vegetables in the market because women are very articulate and talk more, and have charisma to customers (convincing voice to call buyers), and most of all women are good in handling money".

David will have to take care of their farm. Men participants admitted that David might be carried away by women's physical appearance and might give a lower price of the vegetables. However there are thoughts that David should be the seller and Diana should be left at home to do domestic chores.

From women FGD, the goal of a woman is to have higher profit through sales, while for men it is to sell the goods at once. This statement shows the patient character of women. There are instances where Diana also allows David to sell the vegetables but it is also Diana who decides how much of the produce to sell. And at the end of the day, all the sales of David should be turned over to Diana since she manages the household income.

From women's own experience, they narrated that Diana will be the one to decide how much to sell and to keep to feed the family since she is aware of what had been planted and with her long experience in selling, she knows what the buyers want. Young men FGDs discussed that joint decisions have to be made as a couple and both Diana and David are both highly involved in the vegetable farming as well as selling in the market.

4.4. Agricultural and other economic decision making

This section explores further how men's and women's capacities to innovate in their rural livelihoods are shaped by gender norms and their capacity to use their agency. All FGDs were included and responses related to decision making were coded accordingly. Hence, an exploratory query on the various agency nodes to uncover areas and determine how men and women are using their agency was done first. The three nodes with most responses are 1) agricultural and NRM practices and knowledge, 2) gender specific roles and capacities, and 3) no gender specific roles and capacities, and the agency frequently coded are joint, rising male and rising female.

Joint Agency. The men's and women's focus groups commonly use the phrase 'me and my husband/my wife.' Joint decision is made as they consult each other and after some negotiations the final decision is made. At first, each one would have his/her own views, then they discuss the consequences until they come to an agreement. They usually agree on what to do, refrain from contradicting each other so there will be no misunderstanding or quarreling. For example, both would talk about the advantages and disadvantages of an innovation before making a final decision, and one such decision is if they want to adopt an innovation like a variety to plant. Both agree to test the innovation and to see for themselves the performance of the improved variety. They make a decision together since both are involved in farming and in some cases have conjugal rights on farmlands or machines used as well as residential lots. Men and women focus groups mentioned that ownership and decisions to purchase or sell assets have not changed over the past 10 years.

Decisions are made jointly when both the husband and wife are earning income for the family. They usually decide on household food consumption, sale or purchase or lending of assets, children's education, bank loans etc. They go to the bank together to borrow money and generally use their land title as collateral. If both are present during the loan transaction both will know the amount and due date of the loan, and plan accordingly to repay the loan in time. When they have joint savings, then both decide how to will use it, e.g. to lease-in or purchase farmland.

Rising male agency strong is evident when men are primarily responsible for farm work, and are the head of the household and make decisions for the household. The men focus group said "I decide by myself only since I am the main farmer in the family." They further explain that they started farming by themselves even before they got married. A woman participant said "decisions are made by men since they are the main workers in the farm." Women narrated that the men are often approached by the extension agent and not them. In situations where men often make the decisions, they just inform the women regarding the final decision and this is acceptable to most of the women. Strong male agency is reinforced by the women's trust in them especially if the decision made turns out to be good. A male respondent confided that his wife did not contradict his decision "since my whole family was satisfied with the softness of the cooked RC216" as compared to the previous variety they used for home consumption.

Men are the primary farmer in the family and they are recognized by the women as all-knowing regarding the farming enterprise and the changes they want to make in the farm. Most often, the husband attends agricultural seminars and in field demonstration of the operation of new machines. A participant narrated that "men are very focused during the lecture as they are eager to learn since this is their main source of income." Men are also known as the first users of innovations, e.g. new rice varieties, and they often initiate the adoption of new innovations in the village.

Evidence of strong and rising *female agency strong* was relatively common in some of the focus groups and interviews. Women take charge of the farming when husband dies or when the husband gets sick and becomes immobile. In these cases women make all the decisions and often she would buy the farm inputs from agricultural shops. She also goes to the field during peak labor periods and manages the hired laborers. Some women have their network for agricultural information while other attends seminar and training at a nearby agricultural university and from government research institutions. Wives are consulted regarding farm inputs and machines since most often wives are the ones managing the family budget and husbands need to get approval from his wife. A male participant said that "I should tell my wife since she manages our finances so she needs to know how much should be allotted to chemical fertilizer. Most of the time, she agrees with me, given that we have enough money".

Women are also consulted on the eating quality of new rice varieties. And most often they know how to remedy the cooking quality of high yielding varieties that turns hard after a while. A woman narrated that, "my family

members said that cooked RC222 is not as soft as the previous variety and left over becomes much harder. But I was able to remedy it. I added glutinous rice and the softness became better.”

4.5. Youth and agriculture/NRM

FGDs with male and female youths in the age range of 16-24 years were conducted to explore gender norms, practices and aspirations surrounding education and livelihood, capacities for agricultural innovation, family formation and access to economic opportunities. The composition of the focus groups reflected as much as possible the range of educational experiences, socioeconomic groups, and marital status that are most common in the village for the youth across this age range. Youths who were more educated or wealthier than most in the village were not included as participants in the focus groups. This was purposively done so they did not dominate the discussion.

The young women had a lot to say about their aspirations related to the gender specific roles, capacities and conducts of girls and boys particularly on the levels of education, activities out of school youth are engaged in, opportunities for the agricultural organizations and changes in the village for the girls and boys for a better future.

In the Philippines, there is equal opportunity for boys and girls to attend school at all levels and pursue their desired areas of education. However, in the rural areas, there are families who are beset with financial constraints and hence ask their children to stop schooling for a while and resume again after they have saved some money for enrolment in the school. The young women think that boys and girls should finish college level or at least high school to find proper work. Young women felt that boys are the future breadwinners of the family. They said that “as much as possible boys should finish college since they will be the ones who will give support to the family in the future.” The family referred to is not only the family when the young man marries but also his parents, especially when parents are old and cannot work. Even if the boys are high school graduate, the young women said that it is alright “as long as he is determined to lead and give decent living for his family. Lots of girls believed that as high school graduate boys can start looking for a job and help with the family finances.

The women are also aware that it is not only the boys who will support the family in the future but also themselves and hence, they should also finish their college degree. One of the reasons is also the relationship with the in-laws when the young woman marries. They narrated that “girls should finish college so that they will not be belittled by the in-laws.” An example they gave was when a girl from poor family is married to a boy from a prominent or rich family, the poor girl will be respected in the boy’s family because of her educational attainment. If parents have enough means to send children for college degree, the young women would like that they should be the ones to be sent instead of the boys. Some young women believe that men are more intelligent and can get employment easily, but if the young women pursue higher education they will also get good job at par with the young men. There were young women who disagreed that men are more intelligent than women, stating that “these days women can do what men can do.” They added that “now women are the ones earning income for the family and the men are the ones left behind at home and do household chores.”

Young men and women aspire to pursue higher education to get appropriate work with good pay. Boys can find jobs immediately even after completing high school, but for women it is better to have a college degree. The girls aspire to finish college to be at par with the boys in terms of employment and respect from higher social class. The boys, however young, are looked up to as the breadwinner of the family. But there are girls who have strong convictions and believe that young men and girls have equal opportunities.

Young women of school age but not attending school are reported to spend their lives at home, with other people in the village or earning income for the family. The women youths stay at home and watch television programs, play with gadgets, eat, sleep or just hang out. In few instances, they do household chores or help the mother, and take

care of younger siblings. Others go out of their house and hangout out at friends' house, gossip with neighbors and think of getting married. They work as house helper, sales lady and fast-food chain staff. They work in the farm as transplanter for rice and onions. Some young women agreed to one of the participants when she remarked "I do not want to think of farm work since I did not I would not be finishing college degree."

Opportunities in new farming practices or agricultural organizations. When asked if young women of the village have the same opportunities as the young men to learn about and try new farming practices, all FGDs of the young reported in the affirmative but some had reservations saying "it depends on the kind of girls." The most positive note was that there are equal opportunities since women now can do jobs that were done before by men only. A lot of the participants agreed to the statement that "girls need to learn farming because in the future when a girl gets married and her husband dies, she knows how to manage the farm." If girls take advantage of the equal opportunities, they will not have a problem in the management of inherited farms or managing hired workers and, the permanent workers cannot cheat them. There was a comment that "boys are better off compared to girls in terms of farming since only few girls do farming and most of them are in the house." Young women and men have the same opportunities in engaging in farming or agricultural organization, however, not all girls show same interest in farming.

The young women's focus group recognizes the equal opportunities but not all girls are excited about doing farm work and more so in trying out new things in farming. They knew that there are instances where the family does not have a son and when the parents are too old, then the management of the farm became a problem.

Changes in the village. The young women's FGD listed several changes that they would like to see in the village for the young men and women like changes in the level of educational attainment, age for starting a family, standard of living and community environment. The young women's groups would like to see young men and women studying hard and striving to finish college. They want them to focus on their studies to avoid early marriages for the girls, and to shun off from vices/bad habits/hanging around for the boys. Higher education attainment drives girls and boys to aspire for a better or more comfortable living and extend help/kindness to their parents that made every effort to give them an opportunity to have better education.

The young women would like to see in the village less young men roaming around the village, and more of them searching for a job to help with the household finances. They would like the young women to be careful with themselves and not engage in pre-marital sex. As the participants agreed "they should control their emotions, and not do untoward actions that would put in a situation they are not ready for."

When they finish their education, the young women's special goal for the future is to have good work that will make their life better or improve the standard of living of their family, and for their parents to be proud of them. They would like to return the care and love of their parents as well as their parents' sacrifices for them to pursue their studies. Their help would not only be confined within the family but is also with the relatives who stay in the house and other relatives living in separate houses who need financial help.

A lone young women would like to have a tourist visa to travel to California for a vacation as a reward for finishing her college education. She looked forward to meeting her relatives there. On moving away from the village, some participants commented that "there are many who are hard up with their lives in the village and want to look for a job even as a migrant worker." For the young women, it is quite easy to decide to migrate but what bothers them is the being home sick when they are away. The young women believed that education is an endowment/wealth their parents can give them. They regard their educational attainment highly as they are able to make their own decisions, e.g. with business partners and be influenced by their own decision only.

The young men's FGDs focused on their aspirations for non-agricultural livelihood including the level of education, goals after school, and activities after their education. Like the young women, the young men aspire for a higher educational attainment and a college degree. According to the young men's FGD, young men and women should be college graduate so he/she can find a job with high salary. They are aware that having or carrying a college diploma while applying for a job is an advantage, and the group agreed that "it is easy to find a job if you are a college graduate." The FGD participants gave a list of their ideal courses in college such as computer science, electrical engineering, education, agriculture, hotel and restaurant management, and human resource management. Aside from finishing a degree, the young men added that the graduates should also take and pass the examination to become licensed engineer, teacher, doctor, and other fields that they took.

All the participants agreed that every young man who finished their education has a special goal for their future. They started with their dreams of having a good and regular/stable job to help their parents and future family. Each one in the group shared their ambitions to become a chef, soldier, pilot, civil engineer, veterinarian, call center agent or police. They desire to settle in a job that is related to the course that they took in school. There was only one young male participant who mentioned about going into farming when he becomes a school dropout.

Section 5. Opportunities for rice research for development

The research study on norms and practices enabled researchers to discern rural gender inequality, where women are known to enjoy similar freedom and power like the men. This research provided a closer look at the intra-household dynamics, decision-making and marketing strategies in relation to the adoption of innovations. Equality of opportunity is a strategic interest for rice R4D. Inclusion of all groups implies a wider scope for scaling out innovation to benefit the majority. Men and women from different social classes are impacted differently by innovations. This study showed that non-poor women manage their farm and also decide on the adoption of new rice varieties and machines e.g. harvester-thresher.

Gender-responsive technology development: The new rice variety emerged as one of the most important local innovations across all focus groups sampled—poor, non-poor and young men and women. Developing rice varieties with traits that respond to preferences of both men and women and, other social groups is important. It is also important to develop varieties that can withstand threats posed by climate change and incorporating changing preferences of the rice consumers. Gender and social analysis should be frontloaded while developing breeding programs and determining priorities for investments.

Enhancing women's access to knowledge, information and advisory services: It was obvious from the men's FGDs that they interacted more often with agricultural technicians, private companies and people outside of the village. The women's sources of information were mainly confined to the village including their husband, other family members and other farmers. Revamping the provision of extension and advisory services to be gender-responsive is critical for bridging the gender gaps.

Acknowledging women's identity as farmers: Women's extensive and important role in rice production has been documented, but most rural women themselves feel they are helpers in the field and men are the farmers. Similar is the perspective of research and extension actors and they need to consider women as farmers and their key clientele and target group including providing preferential access where needed.

Enabling participation of young people in local innovation processes: The male and female youths who participated in the study are well educated and aspire for other work outside of farming. They have lived and interacted with the people in their village, and the female youths are not constrained to move around in public places in the village. A conscious effort to include the youths in agricultural R4D can be initiated for engaging boys and girls in agricultural

training and education, along with exploring other opportunities available to them, either in the villages or nearby cities.

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 studies⁵; 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.⁶

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

⁵ 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).

⁶ 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).

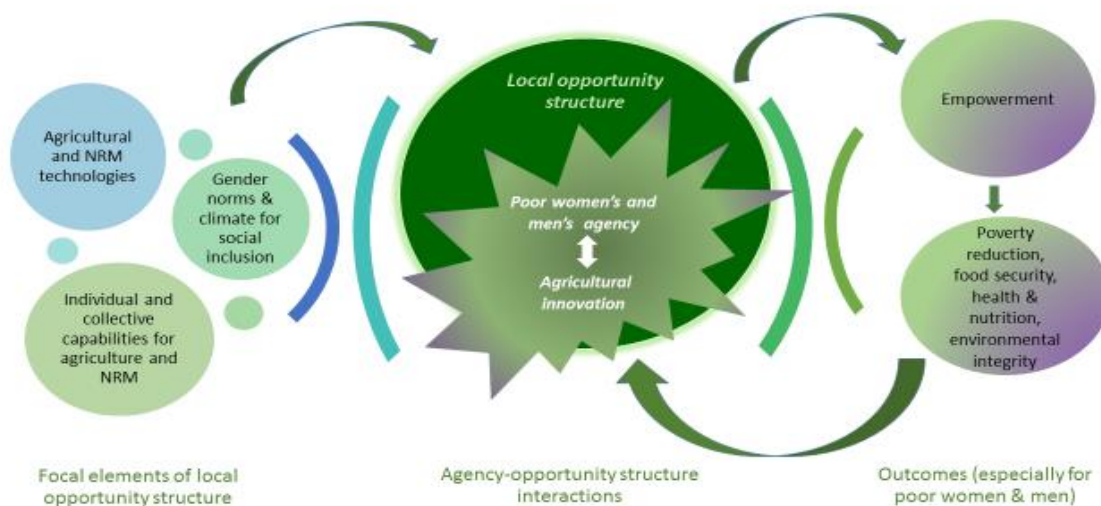


Figure 1. GENNOVATE conceptual framework

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).

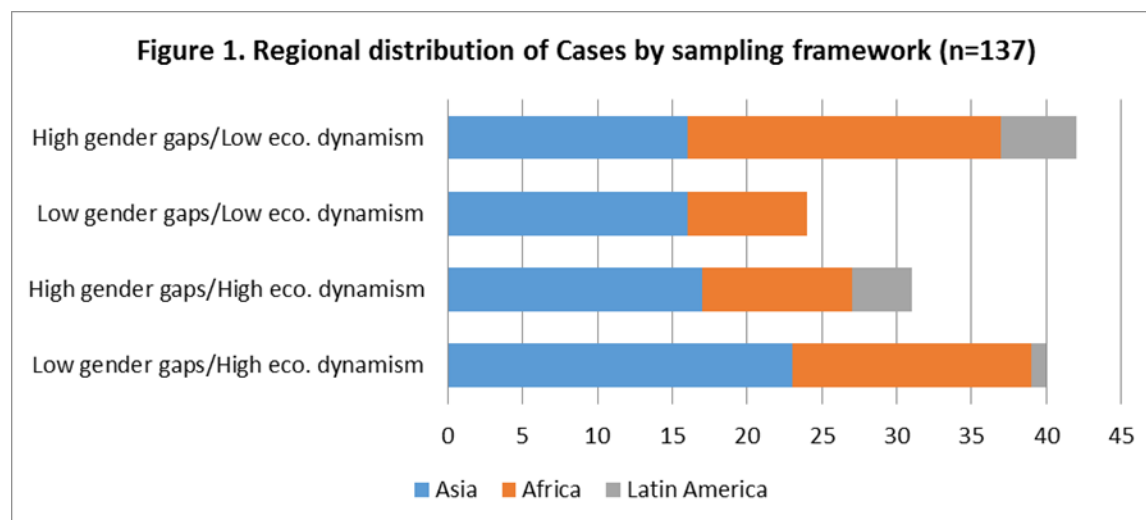
Table A1.1 presents the countries, crops and CGIAR Research Programs spanned by GENNOVATE’s fieldwork. Asia contains the largest number of cases (74), followed by Africa (53 cases) and Latin America (10). The regional concentration in Asia and Africa reflects current research priorities in the CGIAR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

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

Countries	Target crop & system	CGIAR Research Program (CRP)
<ul style="list-style-type: none"> • Asia: Afghanistan, Bangladesh, India (Andhra Pradesh, Bihar, Haryana, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Uttar Pradesh), Indonesia, Kyrgyz Republic, Nepal, Pakistan, Philippines, Uzbekistan, Vietnam • Africa: Burkina Faso, Burundi, Democratic Republic of the Congo, Ethiopia, Kenya, Malawi, Mali, Morocco, Niger, Nigeria, Rwanda, Tanzania, Uganda, Zimbabwe • Latin America: Colombia, Mexico 	<ul style="list-style-type: none"> • Banana • Cassava • Chickpeas • Groundnuts • Maize • Millet • Pigeonpea • Potato • Rice • Sorghum • Sweet potato • Wheat • Aquaculture • Tree-based systems • Humid tropical systems 	<ul style="list-style-type: none"> • Roots, Tubers and Bananas (RTB) • Humidtropics • Agriculture for Nutrition and Health (A4NH) • Grain Legumes (GL) • MAIZE • Dryland Cereals (DC) • GRISP • WHEAT • Aquatic Agricultural Systems (AAS) • Forests, Trees and Agroforestry (FTA) • Dryland Systems (DS)

The sample includes major food crops such as rice, wheat, maize, cassava, sweet potato, 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 practice⁷ (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 A. Literature review	<ul style="list-style-type: none"> – To situate the case in a wider context by providing general background information about the case study area and relevant findings from recent studies, particularly about the innovations of interest and their gender dimensions. 	(Principal investigator)
Activity B. 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: Individual Life Stories	<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

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.

⁷ 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.

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. Overview of case studies*

Country	State or province	Community pseudonym	Pop'n	Economic dynamism	Gender Gaps	CRP Focal Innovation**; main crops & agro ecological conditions***	Social characteristic
Philippines	Nueva Ecija	Agham	2,859	High economic dynamism - the village is very near academic and research institutions daily rolling market and sellers can come from different nearby villages	High gender gaps - only 1 woman hold a position in the local government; less women are members of a farming organization	CRP Focal Innovations: Improved rice variety; Main crops: rice-rice cropping Seed type: Inbred and hybrid Primary crop purpose: Subsistence Mechanization level: Medium Agri conditions: access to irrigation facilities	Ethnic groups: Tagalog and Ilocano Religion: Catholics (40%) Methodist (40%) Born again (7%) Christians “Dating Daan” (6%), “Iglesia ni Cristo” (4%) Mormons (3%).
Philippines	Nueva Ecija	Bukal	1515	High economic dynamism –the village has a weekly market which is visited by various merchants from other places and sell their good in the village	Low gender gaps - 3 women have positions in the local government; a woman leads a civic group that oversee the forest and tree planting; almost equal number of men and women are members of farming organization	CRP Focal Innovations: Improved rice variety Main crops: rice-onion vegetables Seed type: Inbred and hybrid Primary crop purpose: Subsistence Mechanization level: Medium Agri conditions: upland; spring water irrigation	Ethnic groups: Tagalog and Ilocano Religion: Catholics (65%) Church of Christ (3%) 7 th day Adventist (15%), “Iglesia ni Christo” (8%), born again Christian (7%) and Jehovas witness (3%).
Philippines	Nueva Ecija	Mainit	1,300	Low economic dynamism - has a daily market but mostly food items are from the produce in the village or small grocery items	High gender gaps - only 1 woman holds a position in the local government; few women are members of a farming organization	CRP Focal Innovations: Improved rice variety Main crops: rice-rice and rice-vegetables Seed type: Inbred and hybrid Primary crop purpose: Subsistence Mechanization level: Medium Agri conditions: rainfed, depend on rain and water residues for water;	Ethnic groups: Tagalog and Ilocano Religion: Catholics (31%), Church of God (23%) Aglipayan, born again Christians 15% Jehovas witness, 8%,

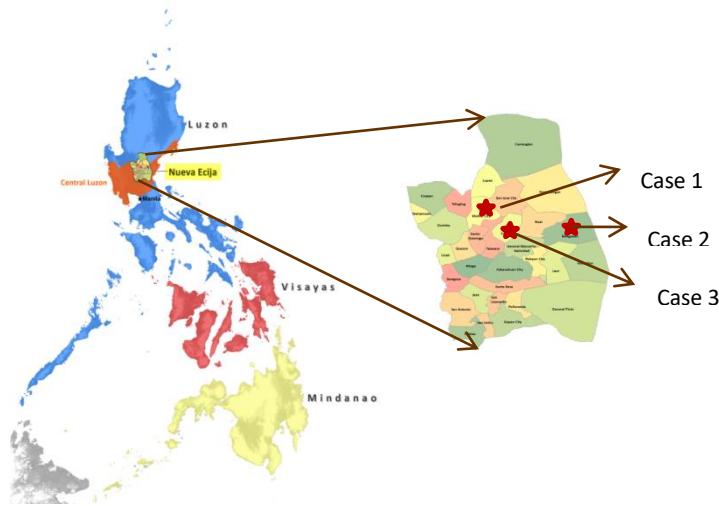
*Information provided is based on reports from local key informants, such as community leaders and teachers, as well as study participants in the research communities.

**“CRP focal innovations” refer to a particular improved technology or practice, or combination of technologies or practices, which were the focus of selected questions that the PIs added to the data collection instruments.

***Modify as makes sense for your cases.

Annex 3. Additional tables and figures

This section provides figures, table and description of the study case. The figure below shows the location of the study sites in the Philippines. The three cases are from one province but from different municipalities which represent different categories based on Philippine standards.



Annex 3, Figure 1. Map of the Philippines and the location of the sample cases.

The selected cases fall under the category of 4th class component city, 2nd class municipality and 4th class municipality⁸, which will be referred to as Village 1, 2 and 3, respectively, in the succeeding paragraphs. The case study villages vary in terms of population density, and level of infrastructure development (Table 1). Village 2 has the biggest land area (286.95 sq. km.), Village 1 has the highest population (75,462 as of May 2010) and most densely populated village (460 per sq.km.) . The case study villages are accessible through good condition concrete roads and public transportation network.

Table 1. Comparison of the case study villages in terms of income, population density and distance from the capital?

Case number/Pseudo names	Income class	Population density*	Distance from Munoz City*
Case 1 – Agham	Component city	460 sq km	0.00 km
Case 2 – Bukal	2 nd class municipality	210 sq km	58.6 km
Case 3 – Mainit	4 th class municipality	320 sq km	28.5 km

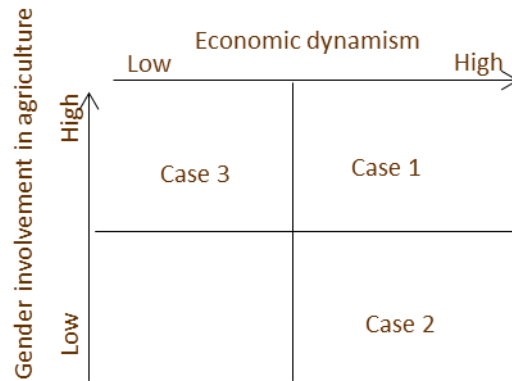
* Province of Nueva Ecija. Philippine Standard Geographic Code (PSGC) interactive. 2015. Philippine Statistics Authority: National Statistical Coordination Board.

Gender gaps are noticeably low in Village 2 and high in Villages 1 and 3. In Village 2, women occupy key positions in the local government and women lead government or civic groups. There are almost an equal number of men and women members of farming organization and some civic groups are led by a woman. On the other hand, in Cases 1 and 3, women have very low participation in the local government positions and also in the farming organizations or groups. In terms of the women’s mobility around the public places, women in Case 2 are more free to move anywhere in the village compared to Cases 1 and 3 where there are more restriction in moving around the village.

⁸ Philippine standard income classification: 4th class component city - P 160M or more but less than P 240M; 2nd class municipality - P 45M or more but less than P 55M; 4th class municipality - P 25M or more but less than P 35M (Income Classification for Provinces, Cities and Municipalities. Philippine Standard Geographic Code (PSGC) interactive. 2015. Philippine Statistics Authority: National Statistical Coordination Board)

Figure 2 shows the position of the cases in a 2x2 matrix. Further characteristics of the cases why they are currently in this position will be discussed in the succeeding paragraphs. In summary, Case 1 is high economic dynamism and high gender gap, Case 2 is high economic dynamism and low gender gap, and Case 3 is low economic dynamism and high gender gaps.

Annex 3, Figure 2. Classification of the villages by economic development and gender gaps.



A village profile was gathered from key informants (the village leaders, elderly men and women) who are knowledgeable of the activities and composition of the village.

Villages 1 and 2 have good accessibility to academic and research institutions⁹ and good farming systems environment and established output market. These two villages also have irrigation canals which assure access to irrigation water during both wet and dry season. Village 3 does not have access to guaranteed irrigation¹⁰. Hence crop production in this village depends on rain water. Existence of domestic market and traders with trucks are only visible in the village during harvest time of the dry season crops, onion and vegetables

Generally, men and women are involved in production activities and in making decisions on the commercial and subsistence uses of the crops/products. Rice production activities where women commonly participate are transplanting, handweeding and harvesting, while for the men, seedbed and land preparation, chemical applications, harvesting and post-harvest activities. In the three cases/villages, men and women farmers attend agricultural trainings conducted in the villages and also, men and women are members of farm organization.

⁹ Research and development institutions located in Palusapis, Case 1: the Central Luzon State University (since 1960), the Philippine Rice Research Institute (1985), Philippine Carabao Center (1992) and the latest include the Philippine Sino-Center for Agricultural Technology (PHILSCAT) 2003 and Philippine Center for Post-Harvest Development and Mechanization (PhilMech) 2004.

¹⁰ There are no mountain ranges in the municipality but most of the lands are uplands, the elevation is much higher than the irrigation canals (conversation with the municipal mayor) but there are few creeks, small dam and a river bisecting plain land areas.

Annex 4. Researchers and institutions involved in case studies

Country	CRP	Principal investigator	Partner Institution	Other researchers and institutions*
Philippines	GRiSP	Joyce S. Luis	Central Luzon State University (CLSU)	<p>Donald Villanueva – Associate Scientist at IRRI, facilitator for male FGDs</p> <p>Thelma Bernardo Estera – Professor III and Division Chief Socio Economics and Development Communications, CLSU, contact person and team leader of the note takers and translators</p> <p>Ronald Castro – private researcher, note taker and translator for men FGDs and SI</p> <p>Arlyn Reyes – private researcher, note taker and translator for women FGDs and SI</p> <p>Frederick Godoy - private researcher, note taker and translator for men FGDs and SI</p> <p>Kath Bernardo - private researcher, note taker and translator for women FGDs and SI</p>

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GENNOVATE's qualitative comparative methodology and large sample mark a first in the CGIAR, as well as, the collaboration of principal investigators from nearly all CGIAR Research Programs worldwide.

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