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Engendered promises, gendered challenges

Changing patterns of labor, control and benefits among smallholder households growing NERICA in Uganda

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EKONOMISK GEOGRAFI VID LUNDS UNIVERSITET
AVHANDLINGAR 1

ENGENDERED PROMISES, GENDERED CHALLENGES

Changing patterns of labor, control and benefits among
smallholder households growing NERICA in Uganda

Johanna Bergman Lodin



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TO HONEST

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LIST OF ABBREVIATIONS AND ACRONYMS

The exchange rate used in this thesis is: 1000 Ugandan Shilling (UGX) = 0,509 US Dollars (USD), and refers to 28 January 2010 (as available on www.oanda.com).

Afrint	Africa Intensification
AfricaRice	Africa Rice Center
AGRA	Alliance for a Green Revolution in Africa
APEP	Agricultural Productivity Enhancement Program
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
CAADP	Comprehensive Africa Agriculture Development Programme
CGIAR	Consultative Group on International Agricultural Research
Danida	Denmark's Development Cooperation
DSIP	Development Strategy and Investment Plan
DRC	Democratic Republic of Congo
GAD	Gender and Development
GDP	Gross Domestic Product
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus group discussion
FICA	Farm Inputs Care Centre
HYV	High-yielding variety
IDEA	Investment in Developing Export Agriculture Project
IFAD	International Fund for Agricultural Development
JICA	Japan International Cooperation Agency
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
mc	Missing case
MOFA Japan	Ministry of Foreign Affairs, Japan
MoFPED	Ministry of Finance, Planning and Economic Development
MOH	Ministry of Health
NaCRRRI	National Crops Resources Research Institute
NAADS	National Agricultural Advisory Services
NAP	National Agricultural Policy
NARO	National Agricultural Research Organization
NASECO	Nalweyo Seed Company

NDP	National development plan
NEMA	National Environment Management Authority
NEPAD	New Partnership for Africa's Development
NERICA	New Rice for Africa
NGO	Non-governmental organization
NRM	National Resistance Movement
NTAE	Non-traditional agricultural export
OECD	Organisation for Economic Co-operation and Development
PEAP	Poverty eradication action plan
PFA	Prosperity for All (Bonna Baggaggawale) agenda for action
PLA	Participatory Learning and Action
PMA	Plan for the modernization of agriculture
PRA	Participatory Rural Appraisal
RDS	Rural Development Strategy
RRA	Rapid Rural Appraisal
SAA	Sasakawa Africa Association
SAREC	Sida – Department for Research Cooperation
S/C	Sub-county
Sida	Swedish International Development Cooperation Agency
UBOS	Uganda Bureau of Statistics
UFNP	Uganda Food and Nutrition Policy
UN	United Nations
UNRDS	Uganda National Rice Development Strategy
USAID	Unites States
WAD	Women and Development
WARDA	West Africa Rice Development Association
WID	Women in Development

LIST OF ARTICLES

This PhD thesis consists of the following three articles:

1. Bergman Lodin, J. with M. Jirström and S. Paulson. 2012. '*The New Rice for Africa – a new commercial opportunity for female-headed households in Hoima District, Uganda.*' Submitted to a peer reviewed journal March 2012.
2. Bergman Lodin, J. 2012. 'Intrahousehold bargaining and distributional outcomes regarding NERICA upland rice proceeds in Hoima District, Uganda.' Forthcoming in *Gender, Technology and Development*, Vol. 16, No. 3.
3. Bergman Lodin, J. with S. Paulson and M.S. Mugenyi (2012). 'New seeds, gender norms and labor dynamics in Hoima District, Uganda.' Forthcoming in *Journal of Eastern African Studies*.*

Co-author declarations are found in Appendix.

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*Johanna Bergman Lodin
Lund in March, 2012*

1 INTRODUCTION

BEGINNINGS

When I initially defined the objectives and considered the design of this PhD research project, my general intentions included exploring, describing and explaining wellbeing impacts of new agricultural technologies among smallholder farmers in Sub-Saharan Africa.¹ To be able to empirically study this phenomenon to achieve specificity, I needed to select both a concrete object of study as well as a field that offered, in the words of Hamel et al. (1993, p. 42), ‘an ideal place to observe it’. My previous work on new crop technology, where I had been researching specific smallholder livelihood impacts related to TMS cassava in Nigeria,² NERICA upland rice in Uganda, and improved cassava and groundnut varieties in Sierra Leone, guided me in this endeavor in that these projects had raised many new and important questions regarding the interface of smallholder wellbeing and agricultural intensification processes in African development that I now wished to address.

I decided once more to focus my research on NERICA in Uganda. NERICA (New Rice for Africa) is an example of a new seed technology developed by the Africa Rice Center as a response to increasing continental rice deficits, smallholder poverty and food insecurity (Africa Rice Center (WARDA)/FAO/SAA 2008). The fact that NERICA has been identified having the potential of becoming a locomotive in Africa’s Green Revolution (Afrol News 2002; MOFA Japan 2002; Diagne 2006; Mohapatra 2006; Olembo et al. 2010) motivated my choice. My focus on Uganda is underpinned primarily by the fact that it provides a particularly interesting real-life context for researching the impacts of NERICA, given that the country is becoming one of the leading

¹ I use the concepts ‘smallholder’ and ‘smallholder farmer’ interchangeably in this thesis to refer to small-scale farmers. I also use ‘small farms’ and ‘smallholder farms’ interchangeably to refer to small-scale farms where production and domestic relations intersect.

² The Tropical Manioc Selection; a group of new high-yielding, early-bulking, stress tolerant and disease resistant cassava varieties developed by the International Institute of Tropical Agriculture (IITA).

producers (Maseruka & Kalyango 2010) – commentators (Kijima et al. 2006) even talk about a *NERICA Revolution* unfolding there – yet most NERICA-related research to date has been confined to documenting and exploring the West African experience (Diagne 2006, 2007; Africa Rice Center 2008a, 2008b; Agboh-Noameshie et al. 2008; Diagne et al. 2009).

Following my initial research efforts in Uganda in early 2008 (elaborated in Chapter 5), it became very clear to me that not only did NERICA impact smallholder farmers, but it did so in specific ways along lines of gender and age. This became a real eye opener to me and my project took a new turn. Indeed, the paucity of gender-informed research on NERICA is striking, a lacuna I now address in this project.

To be able to carry out an intensive, detailed examination of these aspects in order to arrive at a deeper understanding, I had to zoom in on a specific region in Uganda. As one of the first and by now major upland rice hubs in the country, I identified Hoima District as offering an appropriate canvas. In 2005, I had spent two months in the district interviewing 50 NERICA grower households regarding how the introduction of NERICA had impacted their financial and food security (Bergman Lodin 2005). This provided an additional motivation for my current choice, since my former work offered a solid platform to depart from as well as I now was given a chance to follow up on and expand my previous study and analysis.

Before presenting to the reader the aim and research questions, some points are worth making that connect this thesis to certain debates and intellectual conversations I wish to engage with. Hence, in the following I spell out my propositions in relation to agricultural development.

PROPOSITIONS

Agricultural intensification processes are needed to enable millions of poor people in Africa to improve their lives...

In this thesis, I begin by asserting the importance of technology-driven agricultural intensification and commercialization for broad-based development in Sub-Saharan Africa.³ As I return to in Chapter 3, I follow the ‘small farms and food crops’ proponents in that the many smallholder farmers of the continent growing food crops hold a major potential for good change.⁴ This has also been increasingly recognized since the signing of the Maputo Declaration in 2003. But many smallholder farmers still do not have access to improved technology and farm management practices, which leads to low yields and an overall poor production performance of the sector (Nkamleu 2004; Diao et al. 2010; Hazell et al. 2010). Also, with many markets continuing to be characterized by uncertainty, depressed prices, atomism and high transaction costs (Dorward et al. 2003, 2005; Johnson 2005), farmers often have few favorable incentives to adopt the new technology.

...but these processes are social and gendered...

I also argue that processes of agricultural intensification and development are social and gendered; they are inextricably bound up in larger social and gendered processes. From this follows that it is critical to establish at what and whose cost agriculture is made more productive and profitable through the promotion of new technology.⁵ Other research suggests that the introduction of new agricultural technologies, including high-yielding varieties with more labor intensive management systems, often prompts (re)negotiation of the

³ I use the term ‘intensification’ in its positive sense, that is, when intensification processes lead to agricultural growth and development.

⁴ Following Chambers (1997, p. xiv), I perceive development in broad terms as ‘good change.’

⁵ This is particularly imperative in relation to high-yielding rice varieties, since rice requires time-consuming and arduous cultivation practices, and because evidence from other rice-based interventions trace disappointing adoption dynamics to family labor issues (Hanger & Moris 1973; Dey 1981, 1985; Jones 1983, 1986; von Braun & Webb 1989; Carney & Watts 1991; Carney 1993; Moser & Barrett 2003; Paris & Chi 2005).

intra-household division of labor within prevailing gender and generational hierarchies (Whitehead 1990; Carney & Watts 1991; Carney 1993; Paris 1998; Doss 2001; Quisumbing & Pandolfelli 2010), and that gender-differentiated bargaining positions contribute to unequal effects on women and men's labor burdens (hence wellbeing). Indeed, Carney and Watts suggest that such '[g]ender-based struggles... are not simply additions to the debate over agricultural intensification; rather, they are constitutive of it' (1991, p. 678). It is also critical to establish who benefits from these changes in terms of gaining control over the windfall profits derived from the use of the new technology (Carney & Watts 1991; Kabeer 1991; Carney 1993). Again, such distributional outcomes can be traced to processes of intra-household negotiation, or bargaining (see Chapter 3). I identify two causal thrusts relevant to scrutinize in relation to this, given their clear implications for individuals' wellbeing: (i) how gendered norms and practices may influence the adoption and management of new agricultural technology, as well as women, men and children's experiences of this, and (ii) how the adoption and management of new agricultural technology, as well as women, men and children's experiences of this, may influence gendered norms and practices.

...and grounded in time and space.

An extensive body of literature reports on research demonstrating that the impacts of new agricultural technologies on women, men and children's wellbeing are highly place specific (Agarwal 1985; Whitehead 1990; Carney & Watts 1991; Carney 1993; Quisumbing 1995; Quisumbing et al. 1995; Doss 2001; Carr 2008). Consequently, I finally join Massey (1994, p. 177) in arguing that 'geography matters to gender.' In other words, and to follow Agarwal (1985), when a technology favors some groups over others, this need not be due to that the technology *per se* is bad:

More often than not, the problem cannot be located in the technological innovation *per se*, since what is often inappropriate about the innovation is not its technical characteristics but the socio-political context within which it is introduced. This context gives the innovation its specific class and gender bias and mediates the distribution of costs and benefits from its adoption. (Agarwal 1985, p. 112)

To understand what works, where, when and for whom, and why, the analysis of new agricultural technology cannot be confined to the technical nitty-gritty but also need to consider how this plays out in specific social contexts within delineated temporal boundaries.

AIM AND CONTRIBUTION

The overarching aim of this thesis is *to understand processes leading to NERICA-related wellbeing outcomes among differently comprised grower households in Hoima District, Uganda, by examining inter- and intrahousehold gender dynamics*. The central research question guiding me in this endeavor is: *How does the cultivation of NERICA influence smallholder women, men and children's daily lives and wellbeing in Hoima District, Uganda?* In carrying out the research, the following more operational questions emerged, each reflecting an article in my thesis:

1. How do female-headed NERICA grower households compare to male-headed NERICA grower households in respect to the production, productivity and marketing of the crop?
2. How are proceeds and other benefits, engendered by NERICA, shared within grower households?
3. How are NERICA-induced labor burdens shared within grower households?

My thesis is qualitatively designed and driven in that I am particularly interested in understanding and elucidating the subjective and embodied experiences of the NERICA growers in Hoima District. In researching their complex, gendered realities I have been using an integrated mixed methods approach.

The thesis can be read as a gender-informed analysis of the recent surge of NERICA in Hoima District, Uganda. But the concern of the thesis goes beyond both NERICA and Uganda. It points to the value of considering female- and male-headed households' various endowments and capabilities in specific localities, as well as differences in gendered resources, roles and responsibilities among women and men farmers (and their children) in these localities, when new productivity-enhancing agricultural technology and higher-value crops are

introduced. The thesis explores and explains how specific social structures and production relations may be constructed, maintained, legitimized, challenged, resisted and altered in relation to the introduction of a new crop. More specifically, the thesis presents systematic research on how the terms of and linkages between production, exchange, distribution, investment and consumption within the domestic arena are negotiated and renegotiated in relation to NERICA in Hoima District. While these findings are context-specific, they do, however, show the value of entering the deeply contested terrain of the household and focus on the processes behind the aggregate economic outcomes for a more comprehensive understanding of the context-specific success and retention rate of a new technology. Hence, the thesis can inform agricultural development debates and donors, policymakers, researchers and service providers envisaging an agricultural trajectory of change that engages and is of benefit to both women and men, as well as their children, in differently comprised households.

With much research on intrahousehold bargaining to date being influenced by formal quantitative models and analysis (see e.g. Darity 1995; Lundberg & Pollak 1993, 1994; the various contributions in Haddad et al. (eds.) 1997 (esp. Carter & Katz 1997); Warner & Campbell 2000), the contribution of my research to the literature on intrahousehold economics is to connect statistics with a qualitative analysis of bargaining outcomes, particularly informed by almost 800 interview accounts from women and men farmers and their children.

The thesis can also be read as an elaborate personal account on how to carry out fieldwork in relation to a mixed methods research project since it includes a detailed chapter where I outline and discuss the specific methods that I have employed, the various considerations I have made, and how I have dealt with the many challenges and trade-offs arising in the field. As such, it is of relevance to students, scholars and practitioners in the process of planning their fieldwork. By presenting specific ways of evaluating gendered implications of a new agricultural technology that go beyond statistically measuring aggregate household outcomes regarding production or cash income, the thesis can particularly inform those engaged in agricultural impact assessments.

The thesis is organized as follows: In Chapter 2, I introduce NERICA and situate this new upland rice in the specific agro-political context of Uganda. I also introduce Hoima District and the time frame of my analysis. I then provide the conceptual frame in Chapter 3, mainly focusing on agricultural development, gender relations and wellbeing. In Chapter 4, I present the research strategy that I embraced for this project. Thereafter, in Chapter 5, I introduce my data and discuss the field methods. Chapter 6 is dedicated to a presentation of how I have gone about analyzing my data. In Chapter 7, I summarize my research findings as they have been presented in my articles, reflect on their implications for theory and practice, and end with some concluding remarks. Finally, the three articles are included. To understand how the introduction of NERICA in Hoima District, Uganda, has influenced women, men and children's daily lives and their wellbeing, I advise the reader to consider the three articles as a cluster.

Next, I introduce the three articles, detailing their specific purposes. While they all address gender concerns in relation to the production of NERICA in Hoima District, Article 1 analyses the *interhousehold* aspects, comparing female- and male-headed households, while Articles 2 and 3 take specific account of important *intrahousehold* aspects. Another relevant distinction is that Article 1 has more of a production, productivity and market performance focus than the other two, which in more detail explore specific wellbeing outcomes for women, men and children that can be traced to intrahousehold bargaining processes regarding the sharing of NERICA proceeds and labor burdens. All three articles draw to various extents on a combination of quantitative and qualitative data. The findings are elaborated in Chapter 7.

In Article 1 (co-authored with my supervisors), *The New Rice for Africa – a new commercial opportunity for female-headed households in Hoima District, Uganda*, we examine how female-headed NERICA grower households compare to male-headed grower households in respect to the production, productivity and marketing of the crop. We use the headship typology also used in previous works on NERICA to be able to engage in comparative discussions on gendered implications of NERICA cultivation among differently comprised households. Informed by various studies that have identified gender-based differences between smallholders in access to land, other productive resources, and markets, we

introduce three hypotheses: (i) that female-headed households grow NERICA on smaller plots than male-headed households, and, consequently, arrive at an overall lower production; (ii) that female-headed households realize lower NERICA yields than male-headed households; and (iii) that female-headed households market smaller quantities of NERICA, as well as are paid a lower unit price, than male-headed households. In exploring these hypotheses, we draw heavily on my household survey of 302 NERICA grower households in Hoima District and complement the statistical data with qualitative and participatory data that I have gathered during interviews and focus group discussions with farmers and other rice value-chain stakeholders. By researching those who have already made the adoption decision, our study sheds light on whether the documented interhousehold gender gap in adoption of NERICA among smallholders in Uganda as reported by Kijima et al. (2008) corresponds with differences in the performance of the crop, and if so, how it is manifested.

In Article 2, *Intrahousehold bargaining and distributional outcomes regarding NERICA upland rice proceeds in Hoima District, Uganda*, I explore specific intrahousehold gender implications of NERICA among grower households. More specifically, the purpose of this article is to unravel the distributional outcomes from intrahousehold bargaining processes regarding *proceeds* engendered by NERICA, particularly within male-headed households. As such, it is the first of its kind. I use a combination of qualitative and participatory data from Hoima District. The interview accounts of women farmers proved particularly important for me to understand these processes. Complementary household survey data is used for contextual specification of the production and market performance of NERICA and its contribution to aggregate household cash income.

In Article 3 (co-authored with one of my supervisors and a Ugandan colleague), *New seeds, gender norms and labor dynamics in Hoima District, Uganda*, we continue the analysis of the consequences of intrahousehold bargaining processes for household members' individual wellbeing initiated in Article 2. In this article, the analytical focus is shifted from exploring various intrahousehold income effects to examining processes and wellbeing outcomes of the intrahousehold organization of farm *labor* related to NERICA production in Hoima District. We argue that it is critical to find out who has to work harder and under what

conditions when new labor-intensive rice seed technology is promoted. Consequently, the purpose of the article is to detail the architecture of working conditions and the balance of labor burdens in relation to the production of NERICA within grower households in Hoima District. Drawing on a combination of farm-level survey data and qualitative material that I have gathered by means of one-to-one interviews and focus group discussions (many including participatory exercises), the article provides a richly detailed account as well as a unique and timely illustration of the influence of NERICA on the gendered labor dynamics in grower households and their consequences for household members' individual wellbeing.

LIMITATIONS

In this thesis I am not investigating the *determinants* of NERICA adoption (see Kijima et al. 2008 for a relevant contribution), but smallholder women, men and children's *experiences* of adoption. A wealth of literature establishes that women farmers are less likely to adopt new agricultural technologies than are men farmers, both when they are heads of households and when they are members of male-headed households (Dey 1985; Quisumbing 1995; Dey Abbas 1997; IFAD 1998; Paris 1998; Doss 2001; Hazell & Haddad 2001; World Bank 2001; Quisumbing & Pandolfelli 2010). According to this literature, reasons women farmers do not avail themselves of new opportunities for agricultural intensification to the same extent as men farmers are partly related to culturally maintained and reproduced gender inequalities in rights, resources, responsibilities, roles, choices and voice (see e.g. Paris 1998; Doss 2001; Quisumbing & Pandolfelli 2010). When women farmers are constrained by a lack of access to productive resources (land and other inputs) or other forms of capital, be it physical, human or social, due to institutional barriers, this will likely affect their aptitude to adopt new agricultural technologies. In relation to NERICA in Uganda, Kijima et al. (2008) confirm what this literature indicates: female-headed households are less likely to adopt these new seeds than are male-headed households. With Kijima et al. having established an interhousehold gender gap in NERICA adoption, I want to find out how female-headed households that do adopt NERICA are performing versus their male counterparts in terms of production, productivity and marketing. I also want to understand

and elucidate the subjective and embodied experiences of different members within grower households (particularly in those headed by men) in relation to NERICA.

Another limitation of my research is that I am not looking into the long-term ecological sustainability of NERICA production in Hoima District, or Uganda as such. Currently, the strong performance of NERICA can partly be traced to a combination of high family labor inputs in crop management, that NERICA is high-yielding also without fertilizer application or irrigation, and the genetic resistance of NERICA to many stresses facing rice in Uganda, including for example drought, weed competition, blast, viruses, soil iron toxicity and acidity. This suggests that NERICA is well matched to the high labor – low input conditions on rainfed smallholder farms characteristic for rural Uganda (also see Chapter 2). But another reason for the strong performance in Hoima District can be traced to the fact that farmers there are actually mainly growing NERICA on non-degraded land, such as virgin or fallowed land, or land on which the previous season legumes or tobacco have been produced.⁶ With the demographic pressure increasing in the district, farmers are coping by for instance shortening the fallow periods and clearing more marginal lands. Currently, this has not affected the production of NERICA, since the farmers prioritize to grow this crop on the best land they access. But this can, predictably, change over time. This points the way to the need for research into these ecological aspects.

⁶ Legumes are known to enhance soil fertility, while farmers apply chemical fertilizer on tobacco that then remains in the ground to the benefit of NERICA.

2 SETTING THE SCENE

THE NERICA PROMISE

Sub-Saharan Africa is currently facing severe rice deficits. Despite a dynamic annual growth record of six percent in rice production, this is still not satisfying consumer demands for the cereal, which are increasing at an unprecedented rate of eight per cent per annum. Hence the region relies to a great extent on imports (Mohapatra 2006, 2008a, 2008b; Africa Rice Center (WARDA)/FAO/SAA 2008; Seck & Diagne 2008). To address the problem of overdependence on rice imports, African leaders are tapping into the opportunities new agricultural technologies have to offer.

NERICA upland rice (New Rice for Africa) is a recent example of such a technology, developed by a team of scientists lead by Dr. Monty Jones at the Africa Rice Center (earlier *WARDA*),⁷ who experimented tirelessly with inter-specific hybridization between the high-yielding Asian rice (*Oryza sativa*) and stress-tolerant African rice (*Oryza glaberrima*) to obtain improved varieties with superior performance characteristics that are genetically stable and fully fertile.⁸ Thus, NERICA is endowed with high resistance to the debilitating biotic and abiotic stresses characterizing African agro-ecologies, while farmers growing the rice can expect high yields even without fertilizer application or irrigation, making it apt for the better part of Africa's rice farms, which are conditioned by rain and low input use (see e.g. Africa Rice Center (WARDA)/FAO/SAA 2008 for a comprehensive review of the science behind as well as the agronomic, morphological and technological crop characteristics). Also, since NERICA is true breeding, farmers can recycle seed instead of having to purchase new each season.

⁷ The Africa Rice Center (AfricaRice), earlier the West Africa Rice Development Association (WARDA), is a pan-African rice research organization part of the Consultative Group on International Agricultural Research (CGIAR) Consortium. Its permanent headquarters are in Bouaké, Côte d'Ivoire, but due to the political situation there, it is operating from Cotonou, Benin. Research staff is also based in Senegal, Côte d'Ivoire, Nigeria and Tanzania.

⁸ NERICA was developed through conventional crossbreeding and is therefore not genetically modified (Africa Rice Center (WARDA)/FAO/SAA 2008).

Granted these traits, this scientific breakthrough comes with a promise of addressing both continental rice deficits and smallholder poverty and food insecurity. The Africa Rice Center themselves refer to NERICA as ‘a platform for development and economic growth’ (WARDA 2005, p. 20). It has even been contended that this ‘miracle’ rice (Harsch 2004) has the potential of propelling a rice-based Green Revolution in Sub-Saharan Africa the way the new rice HYVs (high-yielding varieties) did in Asia (Afrol News 2002; MOFA Japan 2002; Diagne 2006; Mohapatra 2006; Olembo et al. 2010).

Most of the studies I have found examining uptake of NERICA – the majority being mimeos from the Africa Rice Center – are confined to the African rice hub of West Africa, and more precisely to four countries in that region, namely Benin, Côte d’Ivoire, the Gambia and Guinea (see e.g. Diagne 2006, 2007; Diagne & Demont 2007; Africa Rice Center 2008a, 2008b; Agboh-Noameshie et al. 2008; Diagne et al. 2008, 2009). These are all countries with long histories of rice cultivation, both in lowland paddies and rainfed uplands. In West Africa, while most paddies have been controlled by men, most upland rice farmers have traditionally been women. This suggests that women farmers play a prime role in these four countries in relation to upland rice production (Jones 2004; Africa Rice Center 2008b; Agboh-Noameshie et al. 2008; Mohapatra 2008b; c.f. von Braun & Webb 1989). With regard to adoption and impact of NERICA among the farmers in these countries, it arguably seems the new varieties have been particularly beneficial to female-headed households when measured as production growth and household income gain (Diagne 2006, 2007; Africa Rice Center 2008b; Agboh-Noameshie et al. 2008).⁹ Thereby, these studies suggest that NERICA successfully is addressing income poverty on household level among these farmers as well as show decreasing inequalities in rice productivity between female- and male-headed farm households in the region. This is in line with the claim, which is supported by empirical evidence, that female-headed households are as efficient as male-headed households when controlling for levels of input and human capital (for a thorough review of the available body of literature in

⁹ More precisely, these studies have measured the impact on average yield of rice of adopting NERICA, calculated as surplus of production per hectare as compared to pre-adoption rice yields, alternatively as additional monetary gain per hectare of adoption (Diagne 2006, 2007; Africa Rice Center 2008b; Agboh-Noameshie et al. 2008).

this field, see Quisumbing 1996; see also Mook 1976). In this case, as the gendered 'levels of input' (the use of improved seed) are evening out, the interhousehold differences in agricultural productivity are too.

While it all began in West Africa, other parts of Sub-Saharan Africa soon joined. Uganda, in particular, stands out in this context. In July 2010, Ugandan daily *New Vision* cited the coordinator of JICA's NERICA Rice Promotion Project reporting the country now being one of the major producers of NERICA in the world (Maseruka & Kalyango 2010). This makes the country both relevant and interesting to research.

NERICA IN THE AGRO-POLITICAL CONTEXT OF UGANDA

One of the fastest growing economies in Africa with a Gross Domestic Product (GDP) growth record of between six and seven per cent in real terms per annum for over two decades (see e.g. MoFPED 2008; Aggrey 2009; World Bank 2009), Uganda however unequivocally remains a typical African agro-based economy with regard to the sector's share of GDP (21.5 per cent), contribution to export earnings (90 per cent) and employment of labor (70 per cent) (MoFPED 2008; Kraybill & Kidoido 2009; UBOS 2009). Despite an emerging inter-sectoral dynamism being recorded in the GDP, the country's dependency on the performance of the agricultural sector will not be radically altered during at least the immediate years ahead. With the majority of households depending on agriculture follows that the growth rate, productivity and profitability of the sector also directly influence their wellbeing. While Uganda historically has relied on the performance of a small number of traditional high-value cash crops (coffee, tea, cotton and tobacco), in recent years the country has been trying to diversify by experimenting with non-traditional agricultural exports (NTAEs) such as fish, spices, vanilla, cocoa, fruits and floriculture, while also exploring the potential in commercializing low-value staple foods, most notably maize. These emerging new generations of cash crops are pulled by strong macroeconomic policies and subsequent reforms in the 1990s that came about as a reaction to the backlashes of the long-time overdependence on a volatile world market for the traditionals (Collier 1997; Kasente et al. 2000; Balihuta & Sen 2001; IDEA 2004; Danida 2005; Diao et al. 2006; MAAIF 2009a). The government simmered a quite

seductive and coherent alphabetic soup of PEAP, PMA, DSIP, RDS, UFNP and PFA (see Box 1) over the following years to guide national development planning through agricultural transformation where farmers are helped to commercialize beyond their current limited market participation (MAAIF & MOH 2003; Danida 2005; MAAIF 2005; MOFPED 2008; MAAIF 2009a; MAAIF 2010). The extension messages brought to the farmers by the National Agricultural Advisory Services (NAADS) and other service providers have effectively resonated with the realization that since food crops can be sold locally and regionally, and the market for them is much more stable than the market for high-value export crops (see e.g. Djurfeldt et al. 2005; Diao et al. 2006; Hazell 2006), they are in many ways presenting an untapped opportunity in the combined commercialization and export diversification drive.¹⁰ Farmers, still remembering the most recent coffee, cotton and tobacco downturns, seemed more than ready to internalize this new, re-worked formula. Moreover, severe wilt and bacterial blight infestations wiping out many coffee, cotton and banana plantations (Sasakawa-Global 2000, personal communication, November 2008; IDEA 2004), should have fast-tracked this process by pushing farmers ever more into actively searching for viable alternatives.

In this context, rice has been recognized as a major food and income earner. But with the production frontier for lowland paddies severely constrained by wetland conservation concerns in line with the National Environment Statute (1995), Water Statute (1995) and National Wetlands Policy (1995), and with no tradition of cultivating upland rice, domestic demand for this cereal has

¹⁰ Diao et al. (2006), for example, report that 70 per cent of all agricultural output in Africa is food crops for domestic markets, and that the consumption is projected to have doubled by 2015. This suggests an annual growth rate of approximately four per cent. With increasing commercialization and urbanization, much of the new demand for staples is believed to be off farm. Therefore, according to Diao et al., there are no other markets in Sub-Saharan Africa offering this kind of growth potential. Also Danida, in evaluating Uganda's PMA, comes to the same conclusion, stating that there is a need for 'greater emphasis on traditional food crops, which are still the major crops grown by the poor. If successful, this approach should also deliver on growth objectives, as food crops are extensively traded both within Uganda and within the region. The benefits from increasing productivity of these commodities both for farmers, and for the economy far outweigh those from limited adoption of non-traditional export crops' (Danida 2005, pp. 26-27).

BOX 1

Policies of relevance to the agricultural sector in Uganda

PEAP - the Poverty Eradication Action Plan (PEAP) from 1997 is the medium-term national development planning framework in Uganda (N.B. revised in 2000 and 2004 and replaced in 2010 by the new National Development Plan; NDP).

PMA - the Plan for the Modernization of Agriculture from 2000/01 is the overarching agricultural sector policy and the central element in the implementation of PEAP (N.B. revised in 2011 into the National Agriculture Policy (NAP), which is aligned with the CAADP agenda of NEPAD and will harmonize various policy initiatives). More specifically, it is a strategy plan for how to increase agricultural productivity so as to achieve the goal of poverty eradication as outlined in PEAP.

DSIP - the Development Strategy and Investment Plan for Agriculture is the medium-term strategic plan for the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). The first plan covered the period of 2005/06–2007/08, while the second plan covers the period of 2010/11–2014/15 (N.B. the new DSIP for Agriculture has been aligned with NDP and NAP, as well as CAADP).

RDS - the 2005 Rural Development Strategy is a key supportive policy to PMA/NAP that focuses on achieving specific productivity targets for a selected number of crops and rural enterprises.

UFNP - the Uganda Food and Nutrition Policy (2003) is a sub-sectoral policy for achieving food security for every Ugandan, mindful of the role agriculture must play in realizing this goal.

PFA - the Prosperity for All (Bonna Baggagawale) agenda for action is one of the government's political vision statements and specified in the 2006 NRM Election Manifesto.

Sources: MAAIF & MOH 2003; Danida 2005; MAAIF 2005; MOFPED 2008; MAAIF 2009a; MAAIF 2010.

outstripped supply. Hence, along with other African countries, Uganda is racing the world market to secure rice imports so as to satisfy consumer demand.

When upland variety NERICA-4 was released in the country in 2002, where it also has become known as Suparica II and NARIC-3 (Africa Rice Center 2004),¹¹ the government soon identified NERICA as a new strategic crop for poverty eradication also in Uganda and a tangible way to address national production deficits. The *Vice-President Initiative* was launched in 2004 to honor this new political commitment by the country's top leadership through distribution of seed as in-kind credit to selected districts. Under the auspices of the president, the campaign was soon up-scaled to national level. The high-level support has since then been renewed and reinforced by rice-specific policies including the Uganda National Rice Development Strategy (UNRDS) (Laboke 2008; MAAIF 2009b) and a 75 per cent import duty on rice re-introduced under the East Africa Community Common External Tariff (East African Community 2007), which has proved constitutive for a soaring rice production. Also several of the sector-wide policy instruments acknowledged above are explicit on their part that rice is a priority crop, including for example the Prosperity for All (Bonna Baggaggawale) vision or agenda for action (also administered by the office of the Vice-President) and the Rural Development Strategy.

The national agricultural research and extension system, fronted by the National Agricultural Research Organization (NARO) and NAADS, early arrived at a Memorandum of Understanding with the Africa Rice Center and found allies in their development partners, including the Rockefeller Foundation, donors like JICA and USAID, and UN organizations such as FAO. This has enabled large investments to be channeled into various projects not only aiming at increased farm-level adoption through dissemination efforts but also the strengthening of the commercial viability of rice by means of capacity building throughout the value chain. These projects have generally been managed by local contractors, especially NGOs, in collaboration with private seed companies, agro-input dealers

¹¹ NERICA-4 was released in Uganda by two independent sources, under two different names. The National Agricultural Research Organization (NARO) released it as 'NARIC-3' and Nalweyo Seed Company (NASECO) released it as 'Suparica II' (Africa Rice Center 2004).

and millers.¹² Through this public-private partnership modality with a strong value chain focus, many smallholders in the country have effectively been reached. This has meant significant improvements in their productivity, market access and competitiveness. In several instances, women farmers have been explicitly targeted, although my key informants highlight the uneven success of such efforts. The recorded successes over the first years have also fostered further infusions of investments. For example, a new rice research and training center, financed by JICA and located at NARO's National Crops Resources Research Institute (NaCRRI) in Namulonge, was launched in late 2010 to cater for the East African region by offering a platform for scientist-farmer interaction.

By 2009, over 50,000 ha of upland rice, invariably NERICA-4, had been established in Uganda, involving tens of thousands of smallholders. This adds up to more than a third of total area planted to rice in the country, including paddy. Before NERICA was introduced in 2002, the upland rice area was limited to 1,500 ha, which points to the rapid adoption rates of NERICA among Ugandan farmers (JICA 2006; *Rice Breeders Technical Exchange Network Meeting* 2008; c.f. MAAIF 2009b; Afedraru 2010). In 2007, NERICA progenies 1 and 10 were also released, with seed multiplication efforts currently underway. The performance of NERICA has been instrumental in the revitalization of the rice sub-sector in Uganda and significantly contributed to the country's ability to cut the annual rice import bill by a third since 2005 (from 90m USD to 60m USD), saving 30m USD per annum and making rice no longer the third largest import expenditure post (Afedraru, 2010).

¹² NGOs particularly worth mentioning here are Sasakawa-Global 2000, Africa 2000 Network-Uganda and the USAID-funded the Investment in Developing Export Agriculture (IDEA), which later was replaced by the Agricultural Productivity Enhancement Project (USAID-APEP). Although IDEA (1995-2004) and APEP (2003-2008) were key USAID field operations in the country, contracted to the international development consulting company Chemonics, my interpretation of their everyday work during the operational years is that it metamorphosed into more resembling that of full-fledged NGOs. The seed companies included NASECO, Victoria and FICA. Processors Tilda Uganda and Nyati Rice Millers also deserve mentioning in this context.

The specific region I zoom in on in this research project is Hoima District, which was one of the first districts in the country where NERICA was introduced; the USAID-funded IDEA Project (see note 12) brought NERICA-4 seeds to the district in 2002, having teamed up with private seed company NASECO, for which they provided back-stopping in breeding and multiplication of the seeds (IDEA 2004; personal communication with former IDEA staff). Following Participatory Varietal Selection trials, NERICA-4 was subsequently released for wider dissemination in 2004. Today Hoima District boasts high adoption rates. The district has by JICA been classified as one of sixteen 'intensive rice-growing districts' in the country (defined as at least 30 per cent of the farm land being under rice cultivation). It is also categorized as a 'non-traditional rice growing area,' meaning rice production only has been scaled up after year 2000 (Candia et al. 2008, pp. 7-9).

Hoima District is located in western Uganda within the Albertine Graben¹³ where Lake Albert borders the DRC to the west. The topography is characterized by broad, flat-topped ridges undulating the landscape. The altitude ranges from 600 to 1000 m above sea level. The soils are mainly of low to medium productivity, shallow and stony, and with low amounts of organic material and poor moisture retention capacity leading to saturation during the rains and fast dry out during the dry season (Rwabwoogo 2002; NEMA 2003). While rains are bimodal, the total rainfall is yet rather low, ranging from 700 to 1000 mm per annum. The first, short, rains are due in March to May-June, with the second, longer, rains arriving between August and November. The subsequent dry spells occur from June to early July and from December to February. Temperatures are almost uniformly high at 28 °C, although ranging from 15 to 32 °C (ibid.). The climate, along with the district relief, has made way for short grasses and shrubs (Byamugisha 1994). Thereby it belongs to the *Western Savannah Grasslands* zone,

¹³ Rugadya and Kamusiime (2009, p. 1) note that the Albertine Graben, or the western rift valley, 'stretches from the northern end of Lake Albert down to the southern end of Lake Tanganyika and encompasses the forests, savannahs, wetlands and mountains to be found in the rift valley and on the adjacent escarpment in Uganda, Rwanda, Burundi, Tanzania and Democratic Republic of Congo.'

which is one of the ten agricultural production zones in Uganda as defined in the Plan for the Modernization of Agriculture (Kraybill & Kidoido 2009).

The total population as of 2002 was 343 618 while the mid-2009 projection was 476 000 (NEMA 2003; UBOS 2009). Hence, the demographic pressure on the land is well exceeding 100 persons per sq km today. The average household size is around five persons. The district is part of the Bunyoro Kingdom, with the majority of the population being ethnic Banyoro, followed by Bagungu. But there are also many pockets of migrant settlers such as Alur from the north and Bakiga from the south (NEMA 2003). The principal language is Lunyoro (Runyoro). Hoima town is the seat of government, and the district is divided in two counties with 11 sub-counties and two town councils, 52 parishes and 553 villages.

Less than ten per cent are urban dwellers since farming has formed the backbone of the household economy and provides subsistence for most of the district population (UBOS 2009). Many households keep some poultry and goats, and some households also keep cattle, including dairy cows. Despite constitutional provisions to the contrary, gender inequalities in property rights and in access to productive resources (land and other inputs) remain significant.

A wide variety of food crops are represented, including sweet potatoes, beans, cassava, maize, groundnuts, millet, matooke (plantains) and various vegetables, while the main cash crop produced by smallholder farmers in the district is tobacco, followed by Robusta coffee and tea. Lately, rice has made its way to the district cash crop portfolio at the same time as it has become an appreciated food, given the agro-ecological suitability for upland rice production in the district and a ready market (Bergman Lodin 2005). While most crops are grown in both cultivation seasons, tobacco is mainly produced in the first season and upland rice in the second season.

With the demographic pressure increasing, plot sizes have been shrinking over the years. Ever more marginal lands are being cleared and fallow periods are decreasing. In many places, farmers that I met with reported on increasing problems of land fragmentation, degradation and deforestation as direct consequences. This was confirmed by the extension workers that I talked to, who

also highlighted the district-wide problem of substantial on-farm yield gaps. Low yields were traced by all stakeholders to poor land management practices, unpredictable and variable climatic conditions and farmers' lack of access to external soil enhancing inputs. Currently, this has not affected the production of NERICA to any great extent, since the farmers prioritize to grow this crop on the best land they access.

The recent discovery of oil in the Albertine Graben has created both excitement and apprehension in the district (personal communication with various local stakeholders; see also Rugadya & Kamusiime 2009).¹⁴ The improvements of public infrastructure, especially roads, and of social services, such as local health clinics and schools, in support of the prospecting activities, as well as the creation of employment opportunities by the oil companies, are already benefitting the local communities in many ways (ibid; personal observations of de facto improvements having been made from 2005 to 2011¹⁵). At the same time, land and tenure conflicts are emerging as customary land under communal tenure is converted into private, registered leasehold. Mainly external investors and local elites are speculating in land, as they anticipate prices to be driven up by the influx of immigrants now attracted to the district. This individualization of tenure is putting new checks on local communities' access to farm land, grazing land, firewood and water points (including fishing communities' access to Lake Albert). Coupled with increasing population numbers due to in-migration, the demographic pressure on communal lands may therefore increase rapidly over the next years.

TIME FRAME OF ANALYSIS

The time frame of analysis is limited to the period of 2008–2010 when the field data was collected. I am aware that if social, economic, political and or

¹⁴ Although the original discovery of oil dates back to the 1930s, and major oil deposits were identified already in 1983 (Rugadya & Kamusiime 2009), it was only in 2006 that prospecting efforts revived and speculations about a budding oil boom created new headlines in newspapers both within and outside Uganda (ibid.; personal observation).

¹⁵ While I carried out my fieldwork between 2008 and 2010, I had the opportunity to spend a few days in the district also in May 2011.

environmental conditions change, this will likely translate into events taking new turns. For instance, since the farmers mainly produce NERICA for commercial purposes, a serious market downturn would likely quickly be reflected in their production willingness, and even more so since the crop is not a perennial. When I returned in the spring 2010, farmers in Hoima District explained how market prices had dipped in relation to the governmental embargo introduced to address the cross-border trade with southern Sudan (N.B. now South Sudan) and the DRC that had led to big amounts of cereals leaving the country. The quality concerns for locally produced rice related to milling also remains, which likely makes NERICA less competitive versus imported ditto. Therefore, shifting political priorities and policies could restructure the domestic rice sub-sector; No doubt, would the 75 per cent import duty on rice be cancelled before the quality matters have been resolved this would provide a severe blow against Ugandan rice farmers.

The possible effects of the recent oil boom are more difficult to anticipate. But if land becomes scarcer due to increasing demographic pressure, together with communal tenure being converted into registered leasehold, this suggests that farmers may have to decrease plot sizes further, clear ever more marginal lands, and shorten fallows. This can easily affect NERICA yields negatively.

Also, since gender relations are responsive to changing social, economic and political circumstances (Doss 2001), it is impossible to project the future of for example the gendered division of labor in NERICA farming or the intrahousehold sharing of proceeds.

For all these reasons and more, the time frame is important to keep in mind when reading this thesis.

SUMMING UP

This chapter took its point of departure in the fact that rice is becoming an increasingly important staple in Africa, where leaders are tapping into the opportunities offered by new technologies to address growing production deficits. I first introduced the reader to the new group of high-yielding and stress-tolerant

upland rice varieties known as NERICA – the New Rice for Africa – and that have been identified as having the potential of propelling a rice-based Green Revolution in Sub-Saharan Africa the way the new rice HYVs did in Asia. I also noted that most NERICA-related research to date has been carried out in the West African context. Recalling that Uganda has become one of the leading producers of NERICA, I argued that this makes the country both relevant and interesting to research.

I then went on grounding NERICA in the Ugandan context, taking into account both push and pull factors explaining its prompt uptake, which has contributed towards rice no longer being the third largest expenditure post in the country's import basket. For example, I considered environmental, agricultural as well as rice-specific policy frameworks facilitating the promotion of NERICA, the national and international agents involved in the rice value chain-oriented public-private partnerships through which thousands of smallholder farmers have been introduced to it, and specific farmer incentives.

Next, I provided specific information on Hoima District, which was one of the first districts where NERICA was introduced, and that boasts high adoption rates today. I noted that this rural district in western Uganda, where most are smallholder farmers, has very conducive agro-ecological conditions for upland rice production, especially in relation to the second, longer rain season. Together with a ready market, I argued that this has paved the way for rice to become a popular cash crop in the district, at the same time as it has become an appreciated food. In relation to this, I raised a concern about farmers' access over time to fertile lands, which likely are needed for the NERICA yields to remain high.

Finally, I highlighted the importance of keeping the time frame of analysis in mind when reading this thesis. This is limited to the period of 2008–2010 when the field data was collected. I traced this to the fact that if social, economic, political and or environmental conditions change, this will likely translate into events taking new turns.

3 CONCEPTUAL FRAME

FRAMING THE RESEARCH CONCEPTUALLY

The conceptual frame that I present in this chapter has evolved organically throughout the project. Initially, notions of the role of agriculture in development and smallholder wellbeing guided my research efforts. Following my initial fieldwork, the project has also come to revolve around gender relations, and more specifically the gendered implications of new agricultural technology. Over the years, I have refined my understanding of these concepts, and with further injection of analytical input from the field I have more specifically come to focus on intrahousehold bargaining and forms and consequences of labor intensity. Indeed, these latter concepts have provided meaningful lenses for analyzing and understanding how the cultivation of NERICA in specific ways has influenced smallholder women, men and children's daily lives and wellbeing in Hoima District, Uganda, and are the ones I explicitly introduce and elaborate at length in my articles.

CONCEPTUALIZING AGRICULTURAL DEVELOPMENT AS A DRIVER OF POSITIVE CHANGE IN AFRICA

The Role of Small Farms and Food Crops

Poverty in Sub-Saharan Africa is substantially higher than in other parts of the world and rising, in both absolute and relative numbers. Agriculture, and most of all smallholder farming, is the backbone of the African economies, contributing a third of GDP, occupying some 70 per cent of the labor force, and generating a major share of export earnings and government revenue. At the same time, most of Africa's people who are poor live in rural areas, and are smallholder farmers who do not produce enough to sustain neither themselves nor urban consumers. This calls for substantial rural reforms. But many scholars consider agriculture a sunset industry in Africa. They contend that the continent's smallholder farmers are unviable today, with processes of *depeasantization*, *deagrarianization* and *livelihood diversification* replacing – and where they are not, need to replace –

former natural resource-based livelihoods (see e.g. Ellis 1999, 2005; Ashley & Maxwell 2001; Bryceson 2002; Collier 2002; Wood 2002). Nevertheless, those challenging the skeptics make a case for smallholder-based agricultural development and a Green Revolution for Africa (see e.g. Nkamleu 2004; Djurfeldt et al. 2005, 2011; Lipton 2005; Diao et al. 2006, 2010; Binswanger-Mkhize et al. 2010; Haggblade & Hazell 2010; Hazell et al. 2010). These agriculture optimists draw on the strong evidence from Asia and the economic impact of rising agricultural productivity there, as well as argue the need for drawing lessons from dynamic processes of agrarian change in contemporary Africa. This contrary stance, that technology-driven agricultural growth, when converging with favorable market incentives, effectively slashes rural poverty and provides a pathway to broader development, can partly be traced to the legacy of Johnston and Mellor, who already in 1961 demonstrated the powerful roles of agriculture in national economic growth by identifying important production and consumption linkages between agriculture and other sectors (Johnston & Mellor 1961), as well as that of Hayami and Ruttan, who in 1985 espoused an ‘induced innovation model’ emphasizing the role of national technological innovation as a driver of agricultural growth (Hayami & Ruttan 1985).

The *Afrint* research group published their findings in 2005 (Djurfeldt et al. 2005; see also Djurfeldt et al. 2011), asserting that African agriculture has a production potential far above present levels, but that the sector suffers a deep economic and political crisis (rather than one that can be explained in terms of climate, ecology or demographics). They would like to see state-driven, market-mediated, smallholder-based agricultural development generating a dynamic food crop sector, which will contribute to inter-sectoral diversification and increased incomes. Thus, for agricultural growth to be pro-poor, it must take place in the small farms and food staples production sector – not in the high-value exports sector, as this would benefit large-scale commercial farmers rather than the 90 per cent of farmers being smallholders. Furthermore, as noted in Chapter 2, the local and regional markets for food staples are projected to have the greatest growth potential of all markets in the region, given increasing commercialization and urbanization levels (Djurfeldt et al. 2005; Diao et al. 2006; Hazell 2006). This rejuvenated attention to the role of smallholder farming was also persuasively manifested in for example the Maputo Declaration in 2003 and in the World

Bank's flagship publication the *World Development Report* for 2008 (World Bank 2007). It also sheds light on why NERICA, as earlier noted, is believed by some commentators to be potent enough to drive a Green Revolution in Africa (Afrol News 2002; MOFA Japan 2002; Diagne 2006; Mohapatra 2006; Olembo et al. 2010).

In this thesis, I follow these agro-optimists in arguing that the many smallholder farmers in Africa cannot be sidetracked in the quest of bringing about good change on the continent but indeed need to play a key role in these development efforts. It is, however, a challenging task ahead, which necessarily triggers questions about the validity and outcome of these optimistic assumptions about the role of technology-driven agricultural intensification and commercialization, including that of NERICA, for African development that are worthwhile to look further into.

The Gender, Agriculture and Technology Interface

Increasing awareness of women's decisive contribution to Sub-Saharan agriculture,¹⁶ together with the fact that many development program impacts have been particularly disappointing when it comes to improving women's wellbeing, has stimulated calls for a mainstreaming of gender into agricultural policy, research and extension services so as to correct gender-specific constraints in technology uptake, productivity, production and marketing (Whitehead 1990; Doss 2001; World Bank/FAO/IFAD 2009).¹⁷ Agricultural policymakers, research

¹⁶ The popular saying 'the African farmer and *her husband*' (a quick search for the exact phrase on Google.se (2012-01-19) generated 6820 matches, while the re-phrasing "the African farmer and his wife" generated zero) is only but one of many manifestations that women farmers over time have become more visible in the analyses of African agriculture, as scholars, planners and policymakers have started to appreciate women's important roles in the varied aspects of agricultural production, including but not confined to providing labor and managing the farm enterprise (Boserup 1970; Mook 1976; Dixon 1982; von Braun & Webb 1989; Whitehead 1990; Bryceson 1995; Udry et al. 1995; Quisumbing 1996; Udry 1996; World Bank/FAO/IFAD 2009).

¹⁷ The initiation of this analytical shift can partly be traced to the feminist critique of an ungendered analysis and practice in the 1960s and that during the following decades gave birth to WID, WAD and GAD (see e.g. Kabeer (1994) and Young (2002) for comprehensive reviews of these concepts). Gender mainstreaming then surfaced as the next buzzword to be assimilated into development work

institutes and service providers have in many cases responded by gearing efforts towards expediting, consolidating, scaling up and institutionalizing gender analysis in their work, often explicitly targeting women farmers as a group. Yet, more than 15 years after the Beijing Platform of Action (1995) was endorsed and adopted, some 25 years after the UN Decade for Women, and over 40 years after Boserup's (1970) pioneering work, (African) women farmers often do not benefit from the introduction of productivity-enhancing technology and higher-value crops (Peterman et al. 2010a; Quisumbing & Pandolfelli 2010). It seems strategies, programs and approaches in (mostly man dominated) policymaking, research and extension designed to respond to and encourage men farmers much more than women farmers have left deep footprints of gender inequality behind now difficult to wipe out. Thus, despite efforts to integrate women, change has been slow and disparities persist as manifested in, for example, gender asymmetries in technology uptake and impact, and in related decisions over productive resources.

Reasons women farmers do not avail themselves of new opportunities for agricultural intensification to the same extent as men farmers can partly be traced to unequal gender relations (elaborated in the following section). Therefore, so I argue, it is crucial in the dissemination of a new technology to understand how gender and other intersections, including age, class and ethnicity, affect adoption, impact, and the wellbeing of individuals in relation to that.¹⁸ Having reviewed 25 years of literature on women farmers in Africa, Doss (2001) concludes that it is extremely difficult to predict *ex ante* how the introduction of a new technology will play out in a particular place, at the same time as it is just as difficult to draw conclusions *ex post* based on that experience which later can be extrapolated to wider geographical and or social conditions. With agricultural development processes inextricably bound up in larger social and gendered processes, the local

jargon in the mid-90s – not least due to its entrance onto the donor countries' political agendas at home (Squires 2007; c.f. Moser 1989).

¹⁸ Although not writing with this discussion in mind, Reinharz (1992, p. 416) has made an observation that is highly relevant to my argument here: 'obtaining knowledge creates the potential for change because the paucity of research about certain groups accentuates and perpetuates their powerlessness... Because the needs and opinions of these groups are not known, their views have less influence on the conditions under which they live.'

context mediates how women and men, respectively, will experience a new technology (Agarwal, 1985). This calls for gender-informed research grounded in that specific context. As earlier noted in relation to NERICA in Uganda, Kijima et al. (2008) report on an interhousehold gender gap in adoption by showing that female-headed households are less likely to adopt these new seeds than are male-headed households. My thesis sheds light on complementary intrahousehold adoption dynamics and wellbeing implications.

CONCEPTUALIZING GENDER RELATIONS

The Power of Gender Relations

Following Agarwal (1994, 1997), I define gender relations as the power relations between women and men. As such, they are socially constructed, spatially and temporally grounded, and intersected by a complex of identities (including age, class and ethnicity). At any time, in any given society, gender relations are manifested in a full ensemble of social relationships and institutions. They are evident in the empirical average division of labor and resources between women and men, as well as in the anatomy of the oppositions feminine and masculine, by which women and men are ascribed ‘different abilities, attitudes, desires, personality traits, behavior patterns, and so on’ (Agarwal 1997, p. 1). These may in turn influence, organize and harmonize the kinds of opportunities and constraints women and men face in accessing and controlling material and discursive resources, their experiences, motivations and claims in life, and how they cope with and seek to transform their conditioning (Agarwal 1994, 1997; Kabeer 1994; Jackson & Palmer-Jones 1999; Moi 1999; Mabsout & van Staveren 2010;).

To quote Pandolfelli et al. (2008, p. 4), ‘a host of cultural, political and economic institutions, including the household, legal and governance structures, markets and religion’ tend to sanction, regulate and reinforce *specific* gender relations. These become what Connell (1987, cited in Kabeer 1994, p. 56) calls the ‘hegemonic forms’ of femininity and masculinity. But norms and discourses about gender always vary from gendered practice. What they do, according to Kabeer (ibid.), is to ‘constrain the actual practices of men and women, but [they]

do not determine them.’ Depending on the society, various pressure is put on its gendered subjects to conform to these normative and discursive standards.

In relation to this discussion, it is worth emphasizing that as social, economic, political and environmental circumstances change, so do gender relations. Neither gender norms nor practices are static but evolve in response to such changes. As Doss (2001) has pointed out, even entrenched gender rights, roles and responsibilities are quintessentially dynamic because they are continuously reproduced. But in contexts of change, cultural discourses may uphold normative visions that do not seem to correspond with empirical practices.

In the articles, I ground gender relations in the local context of Hoima District, Uganda. I discuss gendered norms and beliefs; for instance that women are perceived to have triple responsibilities in managing food production, the reproduction of the household and that of the village, and that men are perceived to have the responsibility for meeting household cash needs. I also discuss gendered practices, such as that food crops like sweet potatoes and beans are disproportionately grown by women, and that traditional cash crops are disproportionately grown by men.

Conceptualizing Households

Gender relations are worth analyzing on the interactive arenas of the household, the community, the market and the state. Given that NERICA grower households are important units of analysis in this thesis, and the household a major arena where smallholder women, men and children interact, I confine myself to mainly considering gender relations within the domestic arena (see Agarwal 1997 for a comprehensive analysis of gender relations that goes beyond the household). For analytical purposes I define the household as a unit of co-residency of primarily family members (Kabeer 1991). Chant (1997, p. 27) provides a somewhat more detailed definition, which I also adopt: ‘a household is designated as comprising individuals who live in the same dwelling and who have common arrangements for basic domestic and/or reproductive activities such as cooking and eating.’

In this thesis, I also define two categories of household headship: female and male. Female-headed households include both de jure and de facto female headship, that is, households headed by not married, divorced or widowed adult women and households headed by adult women in their husbands' absence (due to that the husband, for instance, has migrated for work). As pointed out by Chant (1997), it is usually, in short, a unit where an adult woman resides without a man partner (or a father or brother). Male-headed households connote an adult man empirically being present in the household.

I am aware that both the household and headship typologies are riddled with ambiguity, since there is no general agreement on the concepts of neither household, nor male and female headship (see e.g. Rogers 1995; Chant 1997, 1998; Doss 2002). The definitions I adopt here are adequate for the analysis I want to build since my respondents in Uganda establish the boundaries of the household along lines of generational and daily reproduction, and classify households according to male and female headship.

Intrahousehold Gender Relations

There are various analytical ways of approaching the household. For long, many influential scholars engaged in household economics accepted a Beckerian model of unitary household behavior that assume that households have a single budget constraint with a joint welfare, or aggregate utility, function representing their preferences. From this follows that the allocation of family labor in production is based on comparative advantage and the allocation decisions on the use and distribution of resources is taken by an altruistic and omniscient (some would say despotic) family-head to all the household members' equal benefit (Becker 1965, 1981; see also Samuelson 1956; Schultz 1973, 1990; Rosenzweig & Schultz 1982; Rosenzweig 1986). With the proliferation of empirical evidence to the contrary, this conceptualization of household behavior has successfully been called into question by a new generation of scholars who instead point to the need for bargaining models and approaches to understand intrahousehold allocation (Whitehead 1981; Sen 1990; Kabeer 1991, 1994; Lundberg & Pollak 1993, 1994; Agarwal 1994, 1997; Doss 1996; Haddad et al. 1997; Jackson 1998; Quisumbing 2003). In 1990, Sen published his pioneering work, suggesting that

the household should be seen as an arena of both cooperation and conflict; an approach to conjugal power relations that later has been amended by Kabeer (1991, 1994) and Agarwal (1994, 1997).¹⁹ In this thesis, I follow these authors.

The starting point of Sen's argument is that household members cooperate whenever this makes them better off than noncooperation. With multiple interdependencies thriving within the household, noncooperation, which in the case of marriage ultimately can translate into divorce,²⁰ is thereby more of a last resort. If the members faced only one cooperative possibility better for each of them than noncooperation, a bargaining problem would not arise. However, usually alternative cooperative solutions are achievable in relation to 'who does what, who gets to consume what, and who takes what decisions' (Sen 1990, p. 129). Therefore, they need to bargain over which outcome exactly to arrive at. Even if all cooperative outcomes are more favorable to each of them than noncooperation, some are more so than others since they have independent preferences and resource allocation priorities (represented by different utility functions). Hence 'one person's gain is another person's loss' (Agarwal 1994, p. 54).²¹ Which outcome they finally arrive at depends on the household members' relative bargaining power.

Informed by the works of Sen (1990), Kabeer (1991, 1994), Agarwal (1994, 1997) and Jackson (1998), in Articles 2 and 3 I elaborate on the various resources, assets and institutions that determine a member's bargaining power.²²

¹⁹ At this point, it is important to emphasize that multiple and conflictual intrahousehold bargaining models, approaches and perspectives coexist, but that this thesis is not concerned with providing a review of the field as such. The interested reader is advised to refer to the literature just cited.

²⁰ Although Lundberg and Pollak (1993) make it plausible that the marriage *per se* is never at stake in the many small decisions taking place on a daily basis.

²¹ This is the fuel of cooperative conflicts, which could explain why Sen (1990) indeed speaks about 'collusive' and not 'cooperative' outcomes; resonating the inherent conflictual nature of household *decisions*-making (in plural, since many, although not all, things are bargained over; explicitly or implicitly).

²² Suffice it to say here that it depends on this person's fall-back position (ability to recover socially and materially from exiting the household; which is determined by his or her control over assets and the gendered institutions in the society), his or her perceived contribution to and interest in shares of household prosperity, and his or her ability to exercise coercion.

In relation to this, it is worth noting that norms set the limits to bargaining in influencing what issues can be credibly bargained over in the first place. When certain norms, beliefs and practices, while being social constructs, become so widely accepted that they are taken for granted as natural self-evident states grounded in reality that are objectively necessary, they may claim the realm of the uncontestable – of *doxa*, to use a term introduced by French sociologist Pierre Bourdieu (1984, 1990) – and in that no longer be up for bargaining. According to Agarwal (1997, p. 15), ‘A good deal of what is justified in the name of “tradition” would fall in this category: “the tradition is silent, not least about itself as tradition” [Bourdieu 1977, pp 167-70].’

In this way, the bargaining power position of a person within the intrahousehold gender and generational hierarchies will impact his or her wellbeing in different ways.

CONCEPTUALIZING WELLBEING

Wellbeing as Doing Well – Feeling Good, Doing Good – Feeling Well

Without defining wellbeing, the concept still has an intuitive appeal contrary to the negatively charged concept of poverty. But what does it actually mean? And how can it be formally defined? Here I use it as a heuristic rather than a concept to be measured. ‘Well’ signals that the concept is normative. ‘Being’ points to its focus on states of the body, mind and spirit, as well as the state of being with others; that is, it is a process, and as such it is relational (White & Pettit 2004, Copestake 2008). Moving beyond these vague ideas, my search for conceptual precision soon revealed the concept’s elusiveness. Gough et al. (2006, p. 4) point out that even ‘The new edition of the usually concise and parsimonious Oxford Companion to Philosophy (Honderich 2005) has difficulty in defining its meaning: “Variously interpreted as ‘living and faring well’ or ‘flourishing’, the notion of wellbeing is intricately bound up with our ideas about what constitutes human happiness and the sort of life it is good to lead.”’ What this still rather fuzzy definition does embrace, and which is more clearly explicated by Sen in *Development as Freedom* (1999), is that the wellbeing concept needs to take account of both the material circumstances of a person (pertaining to for example

economic welfare, standards of living, assets, income, wealth, consumption levels, etc.) and this person's subjective evaluation of these.²³ These material and subjective foundations can be synthesized as wellbeing meaning '*Doing well – feeling good*' (White 2010, p. 160, my emphasis). But by recognizing that wellbeing is also about 'the sort of life it is good to lead,' this points the way to the need to move beyond individual preferences to also consider the shared values and frames of meaning making in a society, since these determine the canon of 'the good life' – including its moral underpinnings – in that particular place and time (Sen 1999; Gough et al. 2006; White 2010). This suggests that wellbeing is also and necessarily constituted through social interaction and cultural meaning and therefore both a relational and a dynamic concept: 'states of wellbeing/illbeing are continually produced in the interplay within the social, political, economic and cultural processes of human social being. It cannot be conceived just as an outcome, but must be understood also as a process' (Gough et al. 2006, p. 5). These moral and relational foundations are communicated in the formulation '*Doing good – feeling well*' (White 2010, p. 160, my emphasis). White (2010) suggests that wellbeing should be understood as an umbrella term for three key dimensions: practical welfare and standards of living (the material), interactive social and human processes (the relational), and individual perceptions and cultural ideology (the subjective).²⁴ She conceptualizes wellbeing diagrammatically as a triangle whose points rest on each of these dimensions. This way, she manages in a simple yet persuasive way convey their interdependency and suggest that wellbeing emerges in the *interplay* of the objective and subjective, and that these dimensions cannot be divorced in analyzing wellbeing.

²³ Sen (1999, pp. 70-71) traces the use a person can make of his or her objective circumstances to five contingent circumstances under which s/he lives: 'personal heterogeneities' (individual physical characteristics connected to gender, age, disability and illness), 'environmental diversities' (ecological and climatic conditions), 'variations in social climate' (social conditions, including public facilities and community relationships), 'differences in relational perspectives' (intersocietal conditions; cultural norms, beliefs and practices), and 'distribution within the family' (intrahousehold bargaining conditions).

²⁴ Following on this, White (2010, pp. 163-166) provides a very detailed operationalization of these dimensions of particular value to those interested in measuring wellbeing.

In researching labor-dependent livelihoods, there is a particular need to factor in labor intensity and burden in the analysis of wellbeing, given that a burdensome workload makes heavy inroads into people's wellbeing. I define labor intensity as a dual concept. On one hand, it is made up of *labor time* (the quantification of work, for example number of invested hours). This can objectively be measured. On the other, it also calls for a consideration of the balance of labor in terms of *intensity of effort*; the physical character of the work and how arduous and burdensome it is, and – most importantly – women, men and children's *bodily experiences* of the work (Jackson & Palmer-Jones 1999; Palmer-Jones & Jackson 2007). This is a subjective and relational evaluation, where burden is determined by the person's *body capital*, which Jackson and Palmer-Jones (1999) define as:

the type of body one has (female/male, large/small, healthy/unhealthy, experienced/inexperienced) [...]. Body capital is the cumulative outcome of the bodily endowment at birth, the health history and social relations of work, and so on, of the person to date, and which affects how burdensome a particular task *feels* to a gendered subject. (Jackson & Palmer-Jones 1999, p. 562)

These understandings of labor intensity and body capital are highly congruent with White's conceptualization of wellbeing (2010) as constituted of three dimensions: the material, the relational and the subjective; here represented by (i) the type of body a person has and the type and length of work s/he carries out, (ii) the social relations of work which affect how s/he and others perceive and value it, and (iii) how s/he subjectively experiences it (which critically hinges on the other two dimensions).

I discuss labor intensity, body capital and women, men and children's embodied experiences of cultivating NERICA at length in Article 3, where I also argue that the implications of overburdening the body in effort-intensive activity go beyond physical illbeing, since the current status of a person's body capital also influences his or her capability to claim, command and cultivate other forms of capital (economic, human, symbolic and social), which in turn affect other dimensions of wellbeing.

SUMMING UP

In this chapter I have introduced the reader to the conceptual frame that has guided me in my research efforts over these years and helped me raise the questions that I wish to address with my thesis. First, I argued the role of smallholder farmers producing food crops for African development, following researchers such as Djurfeldt et al. (2005, 2011), Lipton (2005), Diao et al. (2006, 2010), and Hazell et al. (2010). I particularly highlighted the role of women farmers here, while at the same time joining Whitehead (1990), Doss (2001), the World Bank/FAO/IFAD (2009), and Quisumbing and Pandolfelli (2010) in noting how many development program impacts, including the diffusion of new agricultural technology, have been particularly disappointing when it comes to improving women's wellbeing. I traced one reason for women farmers not availing themselves of new opportunities for agricultural intensification to the same extent as men farmers to the unequal gender relations.

Following Agarwal (1994, 1997), I defined gender relations as the power relations between women and men, and, influenced by for example her, Kabeer (1994), Jackson and Palmer-Jones (1999), and Moi (1999), I went on arguing that these influence, organize and harmonize the kinds of opportunities and constraints women and men face in accessing and controlling material and discursive resources, their experiences, motivations and claims in life, and how they cope with and seek to transform their conditioning. In relation to this, I also touched upon gendered norms and practices, and how these need not coalesce. I especially noted that in contexts of change, cultural discourses may uphold normative visions that do not seem to correspond with empirical practices.

Given that the NERICA grower households are important units of analysis in my thesis, I then set out to explain how I conceptualized the household as a unit of co-residency of primarily family members. I defined two categories of households, namely female- and male-headed. I also recognized that both the household and headship typologies are riddled with ambiguity. Following this, I considered intrahousehold gender relations as conceptualized by Sen (1990), Kabeer (1991), Agarwal (1994) and Jackson (1998) in more detail. I joined Sen (1990) in perceiving the household as an arena of both cooperation and conflict, where

household members bargain over resources and labor divisions, and where the bargaining power position of each person within the intrahousehold gender and generational hierarchies will impact his or her wellbeing.

Next, I noted how difficult it is to define wellbeing. I settled with defining it as: *Doing Well – Feeling Good, Doing Good – Feeling Well*. I particularly followed White (2010) in understanding it as an umbrella term for three necessarily interdependent and interplaying dimensions: practical welfare and standards of living (the material), interactive social and human processes (the relational), and individual perceptions and cultural ideology (the subjective).

I finally argued the need for a particular focus on labor intensity and burden when researching labor-dependent livelihoods, given their clear implications for personal wellbeing. In relation to this, I introduced the concept of body capital as theorized by Jackson and Palmer-Jones (1999).

4 RESEARCH STRATEGY

FRAMING THE RESEARCH METHODOLOGICALLY

My thesis is qualitatively designed and driven in that I am particularly interested in understanding and elucidating the subjective and embodied experiences of the NERICA growers in Hoima District. In this chapter, I introduce specific methodological points of departure for my research project. I discuss interpretivism, and focus on two frameworks that have inspired and influenced how I have structured my research approach, namely participatory approaches to research and pragmatic mixed methods approaches.

INTERPRETATIVE LOGICS

In trying to understand the complex realities of smallholder women, men and children and how the cultivation of NERICA influences their daily lives and wellbeing, my epistemological point of departure is *interpretivism*, whereby I try to understand these aspects from these women, men and children's distinctive point of view (for a discussion on interpretivism, see Schwandt 1994; Mikkelsen 2005; Bryman 2008). The concepts I use to organize, analyze and interpret the data are induced from my respondents' situated knowledge, subjective perceptions and embodied experience. Thereby, my interpretations are capitalizing on these gendered subjects' grounded narratives and conceptual frames. This does not mean that I simply repeat what they have told or shown me, or, put differently, that my interpretations are congruent with and convey their understandings and interpretations of their own realities. Instead, it is important to bear in mind that my representation of this local world is a *construct* that necessarily is shaped and limited by and reflect my own conditioning, mindset, frames for making meaning, and predispositions (see e.g. Kaber 1994; Chambers 1997; Creswell 2003; Bryman 2008) as a white, middle-class woman from Sweden with prolonged education, training and induction in development geography.

Moreover, as aptly highlighted by Bryman (2008, p. 17), as a researcher I also match my interpretations to concepts and theories relevant to my discipline. But instead of bringing a complete catalogue of concepts and theories to the field to test or search for evidence for, I have in a more inductive way started out to make my observations and discuss with the smallholders, their children, and other key informants how the cultivation of NERICA has influenced their daily lives and wellbeing. In relation to this, I was trying to keep my mind as open as possible to whatever awaited me, to listen actively to what everyone had to say (and internalize this), and to embrace surprises. By this, I am not trying to convey the impression that I came to the field sites as a blank slate. As I just pointed out, rather the opposite was the case: Obviously, a theoretical concern pertaining to wellbeing impacts of new agricultural technologies influenced the analytic conception of the research problem, explaining why I ended up in Hoima District, Uganda, in the first place. Hence, already by the time I arrived there, I was explicitly interested in trying to understand this broadly conceived topic. But I had not considered researching specific structures and processes related to gendered wellbeing, including the intrahousehold bargaining processes over the sharing of proceeds and labor. That I came to specifically do this can be traced to the conceptual repertoire that was induced from my prolonged dialogue with those participating in my research project.

In analyzing what I had observed and been told, using this conceptual repertoire, I have also turned to a body of social science literature for guidance, actively searching for others who may have made similar observations or been told similar things, and in turn have developed concepts or theories to explain that. In that way, I have come to consume theories in my effort to understand these smallholders' complex, gendered realities. This approach has helped me to match the empirical with the theoretical, and consequently frame my research academically and specifically ground it in the discipline of development geography.

'Participation'

Participation is a contested and vague concept (Mikkelsen 2005). In this thesis I consider participation a process where subjects express, share and analyze their knowledge and reality with each other and with me as the researcher. The goal of participation is, on one hand, to make my research relevant to these persons and allow me to learn from and relate to them and their complex, diverse and dynamic realities, and, on the other, to provide an arena where they can enhance their knowledge and capacity through this dialogue, which in the best case scenario will help them plan, make demands and act. Hence, the idea(l) is to achieve reversals of power, knowledge and ownership so as to move away from extracting information to empowering those engaging with the research project (Cornwall & Jewkes 1995; Chambers 1997, 2005, 2008).

Participatory Methodologies

Epistemological awareness, which is the building block of participatory methodologies, has also been a critical point of departure for my research project. Through self-critical introspection, I examine and reflect on how, what and why I learn (and possibly mislearn) and how I construct realities, and how that affects what I think I know and how I interpret and represent the realities of others (Chambers 1997). Since I value the farmers', the children's, and the other rice value chain stakeholders' own knowledge and ways of knowing, I have tried to facilitate for them to express and enhance these during the project while recognizing that my own knowledge and ways of knowing need to be humble (or preliminary) (Cornwall & Jewkes 1995; Chambers 2008). That is also the reason I entered the field sites with only a broadly conceived research topic.

My research efforts and the way I have carried out my research over these years have been much guided by the core values of rapid rural appraisal (RRA), participatory rural appraisal (PRA) and participatory learning and action (PLA); a sequence of participatory methodologies encouraging the deployment and

fostering of certain attitudes, behaviors, methods and relationships when learning about local realities.²⁵ Hence, I have tried to:

- remain flexible (so as ‘not just to “plan the work” but also to “work the plan” in a flexible manner that allows for creativity and modification...’; Khan Kaen University, 1987, p. 12, quoted by Chambers 2008, p. 80; see also Cornwall & Jewkes 1995);
- embrace an iterative research process;
- offset biases (urban, tarmac, roadside, man, dry season, etc.; see e.g. Chambers 2008, pp. 31-46):
- listen, reflect and learn (and ‘unlearn’, as Chambers (1997, 2005, 2008) constantly encourages researchers to);
- capitalize on semi-structured interviews, particularly with small groups but also with key informants;
- employ visual and tangible methods; and
- use mixed methods for data triangulation.

Since I have paid particular attention to how I as a researcher should behave and have used many group-visual methods detailed in PRA, it is worthwhile to say a few more words on that.

The mindset, behavior and attitudes of the researcher are key to the successful execution of a participatory research project. Here, the role of the researcher should be that of a facilitator and catalyst who does not dominate but in a ‘they can do it!’-spirit encourages and supports the participants’ own abilities to express and share their knowledge and reality as well as conduct the analysis within their own conceptual frames (Cornwall & Jewkes 1995; Chambers 1997, 2005, 2008). This demands, for example, stepping back, relaxing, listening, not being judgmental, and developing rapport. While this approach suits my personality, I

²⁵ The continuities and overlaps between RRA, PRA and PLA are many. Moreover, their original foundations and principles have evolved and merged with other participatory approaches and methodologies, leaving us with an eclectic and creative methodological pluralism today that has moved beyond these labels’ original connotations (Chambers 2008, pp. 86-88). Yet, I believe their core values in many ways remain intact and relevant, hence my reference to them here.

still found myself struggling to match this ideal at times; something I return to below.

The idea with participatory methods is to facilitate a reversal from closed to open interview formats, from individuals to small groups, from verbal to visual, and from measuring to comparing (Cornwall & Jewkes 1995; Chambers 1997, 2005, 2008; Kesby et al. 2005). The importance of the group for creating and sharing knowledge is particularly highlighted. Participatory visual mapping, ranking, scoring and diagramming exercises where the researcher in an early stage ‘hands over the stick’ (or the marker) help to tilt power, knowledge and ownership to the participants and have been identified as especially empowering for those who are disadvantaged and illiterate (ibid.). From personal experience, I can add that it also makes the research more fun for all parties involved, which likely will enhance data quality!²⁶

Synthesis: On Achieving Reversals and Local Empowerment

Some of my research interventions were more successful than others in achieving reversals and local empowerment. The less successful interventions can be traced to a complex of reasons. First, I have combined quantitative, qualitative and participatory methods, where the quantitative leg of my research project by its *modus of operandi* never was participatory. Second, my research has been a continuous learning process: Sometimes things did not work out the way I wished, for example whenever I failed to be attentive to my own actions, became too confident and less self-critical in my researcher role or tried to rush things. In such cases I had to embrace error and move ahead, more humble and enriched by that insight. Third, and most importantly, reversals and local empowerment was not always achieved since my research has never been explicitly participatory *per se* in scope and the main research objective was never action oriented. Rather, I have in a more conventional way aimed at explaining and understanding the phenomena and processes I have been researching, where action may (or may not) come later (Cornwall & Jewkes 1995), for instance if farmers on their own,

²⁶ Indeed, considering all my data, I find the output from these participatory exercises particularly trustworthy.

equipped with the visual outputs from the participatory exercises, act upon their new knowledge, and or if donors, policymakers, researchers and service providers act on the insights provided in this thesis. Had my research been more participatory and action oriented I believe the participants – and their communities at large – would have gained more. Yet I feel the core values of participatory research that have inspired and influenced me have contributed to my research moving in the right direction (this was also confirmed by many farmers; see Chapter 5). These principles have helped me avoid simply extracting information but instead initiate a dialogue with the farmers. This should also have improved the quality of my research.

MIXED METHODS PRAGMATISM

The Qualitative—Quantitative Complementarity

During this research project I have used a pragmatic mixed methods approach combining various quantitative, qualitative and participatory methods in a complementary manner. Efforts to marry methods have been referred to as mixed methods research, mixed research, triangulation, etc. (see e.g. Creswell 2003; Bryman 2008). I strongly believe that by combining various methods, techniques and tools in an integrated way, you may gain in terms of *research quality and rigor* (Johnson & Onwuegbuzie 2004; Tashakkori & Creswell 2008), given that this allows the nature of the issues at hand steer the choice of how they are researched (hence, my reference to this approach as ‘pragmatic’; see also Kelle 2001). This has empowered me to research the local, complex, diverse, dynamic and unpredictable realities of smallholder women, men and children in Uganda.

I have come to think that there are several strong arguments for combining methods. Influenced by the rationales provided by Greene et al. (1989),²⁷ I present my personal reasons for having done so in my research.

²⁷ Five reasons for using mixed methods according to Greene et al. (1989) are: (i) for triangulation (corroboration) reasons, (ii) for initiation reasons, (iii) for complementarity reasons, (iv) for research expansion reasons, and (v) for methodology development reasons.

First, a mixed methods approach has allowed me to approach each researched phenomenon from different angles, or perspectives. In this way, I have been able to cross-fertilize and triangulate data. When the methods' respective findings have converged and corroborated, I have taken this as further evidence for that they are reliable (Greene et al. 1989; Erzberger & Prein 1997; Johnson & Onwuegbuzie 2004; Bryman 2008; Flick 2009). Whenever I have encountered paradoxes or contradictions, such conflicts have hinted that the phenomenon is more complex than I otherwise would have understood. This has produced new insights that sometimes have altered my interpretations or conclusions, and sometimes have recasted or redirected my research (Greene et al. 1989; Erzberger & Prein 1997; Johnson & Onwuegbuzie 2004). When the individual findings have turned out incompatible, this has disclosed that some parts of my research might be invalid, thereby calling for a review of data to find out what might have caused this (Erzberger & Prein 1997).

By mixing methods it is also more likely that I have arrived at an enriched and elaborated understanding of each researched phenomenon, since I in this way have been able to cover more facets and levels of it. By observing a phenomenon from two or more perspectives, to follow Erzberger and Prein's (1997) analogy, I have been able to determine whether what first might have appeared to be a wall in fact is a cube. Together with theoretical input, this has helped me reveal social structures relevant to my understanding of how and why the cultivation of NERICA influences different members of differently comprised households in various ways and that I could have missed out on otherwise.

The mixed methods approach has also meant that I have been able to cover more phenomena, or aspects. This has increased the breadth of my study and provided a fuller picture: Some aspects I have measured and quantified, while others I have mainly tried to understand and explain in terms of the reasons and dynamics behind them. Yet other phenomena demanded both measuring/quantification and understanding/explanation to be addressed in a satisfactory way. This has enhanced my description of the gendered impacts of NERICA in Hoima District, Uganda and has fed into a better understanding of them (Greene et al. 1989; Johnson & Onwuegbuzie 2004; Johnson et al. 2007).

Finally, by sequencing different methods (Flick 2009), I could feed the findings from one method into the development of another.

Synthesis: On Marrying Qualitative and Quantitative Methods

Rather than allowing a fundamental epistemological or methodological principle, tradition, or even paradigm, determine my choice of methods, techniques and tools employed in this research project, I have used a more pragmatic guiding principle that has allowed the nature of the issue at hand guide the choice of how it is researched. I see the combining of methods as a way of addressing and an attempt to counter each method's specific weaknesses and therefore a means towards enhancing research quality and rigor.

SUMMING UP

In this chapter, I have framed my research methodologically. After identifying my research project as qualitatively designed and driven, I argued that my epistemological point of departure has been interpretivism, whereby I have tried to understand how the cultivation of NERICA influences smallholder women, men and children's daily lives and wellbeing by seeing it their way. I recognized that my analysis and representation of this local world is yet bound to be a personal and fallible construct, reflecting my conditioning, mindset, frames for making meaning, and predispositions as a white, middle-class woman from Sweden with prolonged education, training and induction in development geography.

I then introduced the reader to participatory methodologies, since my research efforts and the way I have carried out my research over these years have been much inspired and influenced by their core values and principles. These pertain to for instance epistemological awareness, flexibility, offsetting biases, listening and learning, group-visual methods and the use of mixed methods. I noted that some of my research interventions were more successful than others in achieving reversals and local empowerment; two general aims of participatory research. Following this, I recognized that my research has been a continuous learning process where things sometimes did not work out the way I wished. Also, I

stipulated that had my research been more explicitly participatory and action oriented in its scope, participants – and their communities at large – would likely have gained more. Nevertheless, I argued that the core values and principles of participatory methodologies have helped me avoid simply extracting information but instead initiate a dialogue with the farmers.

Next, I elaborated on my use of a pragmatic mixed methods approach combining various quantitative, qualitative and participatory methods, techniques and tools in a complementary manner. I argued that the use of cross-fertilization and triangulation strategies is first of all a way of addressing and an attempt to counter each method's specific weaknesses. When their findings deviate, this could hint that the issues at hand are more complex than would otherwise have been understood. It also allowed me to cover more phenomena, which has increased the breadth of my study and provided a fuller picture.

5 FIELD RESEARCH AS A PROCESS

INTRODUCING MY FIELDWORK

As earlier noted, my thesis is qualitatively designed and driven. To understand NERICA growers' complex, gendered realities, the thesis builds on the combined findings of a household survey, a complementary meso level village survey, a diary study, one-to-one interviews, and focus group discussions (often including participatory visuals like mapping-and-ranking exercises) that I carried out in Hoima District. It is underpinned by data that I collected in an exploratory pre-survey (sample survey) covering eight districts and a follow-up study on drop-outs that I did in two districts, as well as complemented by interviews that I have carried out with various rice value chain stakeholders based in Kampala and beyond. Hence, I have in a complementary mixed methods manner employed a combination of quantitative and qualitative methods, techniques and tools (the latter cluster including participatory approaches) that I thought would give me the necessary inputs for the analysis I would wish to build. The collection of field data took place at several points between January 2008 and May 2010 in line with Table 1 below, with both a sequential as well as a concurrent use of quantitative and qualitative methods (Flick 2009). The table also reflects that my project follows up on and expand my previous research in the district, which had focused on how the introduction of NERICA has impacted smallholders' financial and food security (Bergman Lodin 2005).

All in all, I have met with more than 1000 persons who, in one capacity or the other, are part of, or have been affected by, the recent surge of NERICA in Uganda.

TABLE 1
Data collection periods

<i>2005, February – April</i> <i>2.5 months</i>	<ul style="list-style-type: none"> • <i>One-to-one interviews with 50 NERICA growers</i> • <i>Focus group discussions</i> • <i>Key informant interviews with various rice value chain stakeholders</i>
January – February 2008 1 month	<ul style="list-style-type: none"> • Launch of diary study • Pre-survey in eight districts (running from February through April) • Key informant interviews with various rice value chain stakeholders (hereon ‘key informant interviews’)
May – June 2008 1 month	<ul style="list-style-type: none"> • Follow-up on pre-survey • Key informant interviews
October – December 2008 3 months	<ul style="list-style-type: none"> • Household survey • Meso level village survey • Focus group discussions • One-to-one farmer interviews • Key informant interviews
January – February 2009 1 month	<ul style="list-style-type: none"> • Follow-up on household survey • Meso level village survey • Collection of diaries and follow-up group discussions on diary study • Focus group discussions • One-to-one farmer interviews • Key informant interviews
April – May 2010 1 month	<ul style="list-style-type: none"> • Focus group discussions • One-to-one farmer interviews • Follow-up study on drop-outs in two districts • Key informant interviews

WORKING WITH ASSISTANTS

Before the actual fieldwork started, I recruited field assistants to help me execute the household surveys and translate as well as provide other facilitation during one-to-one interviews and focus group discussions.

During my fieldwork in Hoima District in 2005 I had been facilitated by, on one hand, a contact farmer and, on the other, a procurement officer from the Local Council 3 (Sub-County level), and working together with them had been an extremely smooth and highly rewarding experience. To some extent, they already knew the farmers I came to interview, they spoke the local language, and knew the culture from within. For the pre-survey of eight districts in the spring of 2008, with this earlier experience in mind, I recruited various extension officers and NGO contact farmers to help me administer the household questionnaires to the farmers. These assistants were identified through my contacts with a major NGO. Given that I was not around for the whole survey time, I also recruited a survey coordinator to monitor and coordinate things in my absence, such as provide back-stopping, collect the completed questionnaires and administer the final payments to the field assistants, etc. However, as I will return to below, this survey became very problematic and the data of varying quality. While all my seven assistants at this point were both enthusiastic and committed, their general lack of research experience was eventually reflected in the overall poor performance of this part of the research project. Therefore, when I returned to carry out the more exhaustive study in Hoima District, a top priority was to recruit field assistants who did not only speak the local language(s), understood the local culture and were enthusiastic and committed, but also who had extensive research/fieldwork experience. In other words, I learnt the hard way that research ethics and nonnegotiable survey procedures (for instance, in relation to sampling) cannot as easily be communicated to the point that they are internalized by fieldwork assistants during introductory training workshops the way the survey instrument *per se* can.

Through contacts at Makerere University, I could successfully recruit three highly talented, vigorous and professional assistants (two men and one woman) that I came to work with from November 2008 to February 2009. The two men

assistants would help me execute the household survey, and their extensive experience together with their organized and scholarly minds paved the way for good quality data. The woman assistant helped me with the one-to-one interviews and focus group discussions. Her experience in qualitative research, her personality as a sensitive and intelligent observer with strong interpersonal communication skills proved invaluable as she facilitated the group discussions in the most competent way; sometimes it even felt like we shared minds as she was seeing the same things I was seeing and often came up with suggestions of probing questions that I was about to ask myself.

In April and May 2010 when I continued my qualitative research, I recruited two other woman assistants since my earlier assistants by that time had other commitments. One of these assistants was recruited upon personal recommendations by the previous woman assistant, and the other upon recommendations by a Ugandan colleague who I carried out part of this fieldwork together with. Also these assistants became invaluable to me.

Throughout most of my research I lived together with my field assistants. This not only meant that we soon became friends but it also gave me a chance to continuously discuss the research program and findings with them.

Learning Lunyoro (and Luganda) was very difficult for me. I have spent more than a year in Uganda in total (in addition to the seven months during this research project, three previous visits to the country adds another six months), but the fragmented nature of my fieldworks meant that I spent a few, isolated months at a time in the country, and often ended up forgetting much of what I had learnt language-wise. However, for every time I returned, the process of 'refreshing' and expanding my Lunyoro vocabulary became less of a hurdle. The vocabulary I did internalize, mainly in terms of understanding, allowed me to often pick up the key messages of conversations before my assistants had translated them. But not being able to speak freely and directly with the farmers, children and traders remained, of course, a very unsatisfactory and always frustrating experience. Therefore, I am immensely grateful to my assistants for the excellent job they did in trying to bridge this language gap!

While my Lunyoro skills remained embryonic over these years, my understanding of local norms, practices and codes of conduct and communication accumulated, and during the major part of my fieldwork I felt very confident in how to behave and how to make sense of other people's behavior. This can partly be traced to my earlier visits to the country, as well as the fact that my assistants played a key role not only in interpreting language but also culture. I adopted many local English formulations originating in the local languages that I hope made me appear, and – if nothing else – made me *feel*, less of an odd bird.²⁸

I will now introduce the fieldwork sites and then in more detail present the quantitative and qualitative legs of my mixed methods research. I will also discuss my research as an *intervention*, given that my research affected the persons participating in it. I distinguish this discussion from the one I pursued in the previous chapter in relation to participatory research approaches. Here, I will focus more on the less intentional (potential) effects my research might have had on the participants, and particularly on potentially negative effects. In relation to this insight, I find the following quote by Patton (1990) both sobering and mindful:

Interviews are interventions. They affect people. A good interview lays open thoughts, feelings, knowledge, and experience not only to the interviewer but also to the interviewee. The process of being taken through a directed, reflective process affects the persons being interviewed and leaves them knowing things about themselves that they didn't know – or least were not aware of – before the interview. Two hours or more of thoughtfully reflecting on an experience, a program, or one's life can be change-inducing. Yet, the purpose of a research interview is first and foremost to gather data, not change people. (Patton 1990, p. 353)²⁹

²⁸ A very trivial and not research related yet illustrative example of that I at least was somewhat successful in this endeavor is the fact that I over these years have reached a point where I am no longer overcharged by boda boda (motorcycle or cycle taxi) drivers (a common means of transport besides the 'taxis', i.e. minibuses).

²⁹ I agree with Patton (1990) to the extent that my research project has not been action oriented. But guided by the principles of participatory research I do hope that my project has changed people – in positive ways. What I focus on here is the possibility that my research also has negatively impacted some people.

FIELDWORK SITES

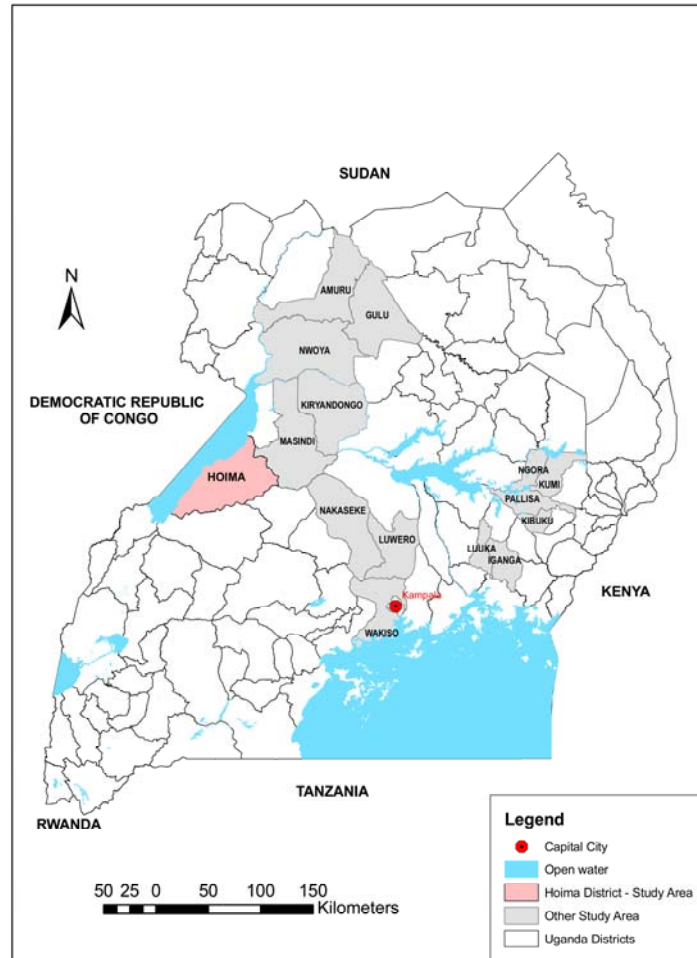
During the years of my research project, I have covered ten purposively selected districts in Uganda. The main focus has been on Hoima District, as elaborated earlier, where I continuously carried out fieldwork over the years 2008–2010. Hoima, Masindi, Gulu, Amuru, Nakaseke, Kumi, Pallisa and Iganga districts were covered in an exploratory pre-survey in 2008. Wakiso and Luwero districts were covered in a follow-up study on NERICA drop-outs in 2010. In July 2010, after I had completed fieldwork, some districts were subdivided. The original ten districts that I covered have now become fifteen districts. Map 1 shows the geographical location of these districts according to current divides.

In Hoima District, I have carried out fieldwork in 21 sites in five sub-counties. Eighteen of these sites are villages, and three are parishes, namely: Kyambara, Ibambiro, Katanwa, Kanigi, Nyabuhere and Mairirwe villages and Katanga parish in Bugambe Sub-County (S/C); Kihamba, Birongo, Kikonoka and Kibanjwa villages in Kitoba S/C; Ibanda, Karama B, Kitoole and Ruhunga villages in Buhimba S/C; Kaigo, Kigabu, Mukabara and Kihohoro villages in Kiziranfumbi S/C; and Kitonya and Bucunga Parishes in Buhanika S/C. Map 2 indicates the geographical location of the five sub-counties and plot the eighteen villages and three parishes. I employed a combination of a stepwise random sampling technique and a purposive sampling technique to identify these sites. I return to the details of the actual sampling procedure in sections below.

THE QUANTITATIVE LEG OF THE STUDY

The quantitative data was collected for purposes of arriving at a baseline describing the NERICA grower households and the current state regarding NERICA productivity, production and marketing in Hoima District. Hence, the quantitative leg of the study targeted aspects that I wanted to measure and quantify (see e.g. Parfitt 2005; Bryman 2008). I used a combination of different survey instruments and sampling techniques.

Uganda

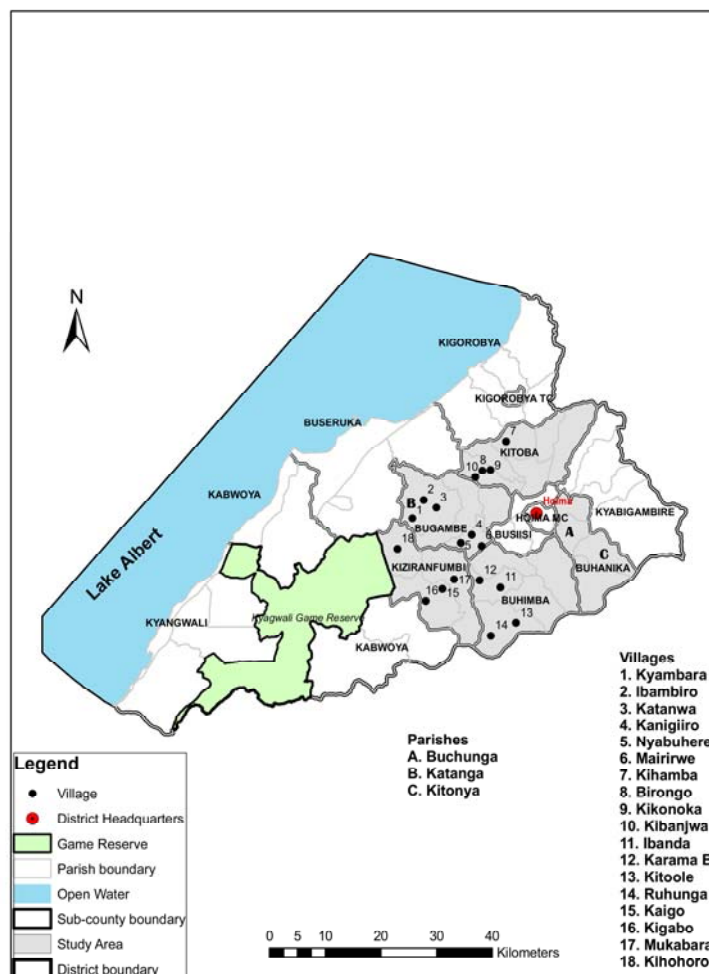


MAP 1

Map of Uganda indicating districts covered by the research project.

The map shows the districts of Uganda as of February 2012. Five of the ten districts that I have researched were subdivided in July 2010. The original ten districts are as follows (with new districts indicated in brackets): Hoima, Masindi (subdivided into Masindi and Kiryandongo), Gulu, Amuru (subdivided into Amuru and Nwoya), Nakaseke, Kumi (subdivided into Kumi and Ngora), Pallisa (subdivided into Pallisa and Kibuku), Iganga (subdivided into Iganga and Luuka), Wakiso and Luwero. *Cartographic source:* Uganda Bureau of Statistics. *Cartographic elaboration:* Revocatus Twinomuhangi, Makerere University, Kampala, Uganda.

Hoima District



MAP 2

Map of Hoima District indicating fieldwork sites.

The three parishes that I covered in my project, namely Katanga parish in Bugambe Sub-County (S/C) and Kitonya and Bucunga parishes in Buhanika S/C, are not indicated on the map. Katanga parish is located in western-most Bugambe (villages 1–3 are part of Katanga parish). Kitonya and Bucunga parishes are the two central (middle) parishes of Buhanika. *Cartographic source:* Uganda Bureau of Statistics. *Cartographic elaboration:* Revocatus Twinomuhangi, Makerere University, Kampala, Uganda.

The Diary Study

I launched a structured diary study in Hoima District in January 2008, running to December 2008. I relocated farmers in Bugambe and Buhanika Sub-Counties that I had interviewed during my undergraduate research project in 2005 and asked them to participate in this study. I encouraged them to log their family labor inputs in the production of NERICA on a daily basis (hours/person/activity/day) throughout 2008. Out of the more than 30 note books that I distributed, thirteen farmers completed their logs; seven women and six men, all belonging to households identified as male-headed. Eleven of them only planted NERICA in the second season, while two planted in both seasons. I chose this approach so that I would be able to establish the total family labor time requirements for producing NERICA and how the invested time is spent in different activities in a more accurate way than is possible with the traditional survey format, where farmers only can report on this in retrospection. This makes reporting subject to memory problems and to the tendency to round up or down (Bryman 2008). The study was initiated as a response to a combination of earlier anecdotal accounts from the farmers concerning the labor burden they are facing in rice cultivation as well as to test the survey findings of Kijima et al. (2007) and of the pre-survey I carried out in conjunction in eight districts in Uganda.

In retrospect I trace the rather low completion rate of the diary logs to the fact that I did not remunerate the farmers for their immensely important – and extended – efforts, thereby leaving them with little incentive to complete the logs. This was, of course, very insensitive and disrespectful of me. I partly trace it to the fact that I had not remunerated these farmers back in 2005 based on a principle that I had read about in fieldwork textbooks and that spelled out that such compensation will only create a precedent that will impact future researchers negatively when they find themselves in a situation where nobody wants to do anything without a reward. Mikkelsen (1995, p. 274) points out that ‘It has always been an honoured principle in anthropology and other social sciences not to pay for interviews, and in general not to pay for information.’ While recognizing this as a sound principle, she draws attention to the problem of data mining arising from it: ‘People in the South frequently complain that their role has been reduced to delivering “raw material” also in research, while Western

researchers go back and earn their credentials on the basis of that material' (ibid.). Over the following years when carrying out research in Nigeria and Sierra Leone, I internalized this message and did remunerate my respondents there as a token of that I honor their time as valuable: I did not expect these farmers to simply surrender their time and effort to me and my research project, when they can invest that in much more productive ways in their daily livelihood enhancing activities. But somehow, when returning to these Ugandan communities, I unconsciously dusted off old habits and went ahead with little reflection. Digging deep inside of me, I think I was prevented from reflecting further by the fact that when I returned, the farmers, time after time, pointed out that they were so happy to see me again since their experience was that 'outsiders', once they had finished off their work, *never* returned (even though I in 2005 had been very careful not to make any promises in this regard), and that they therefore really appreciated that I was 'different'; that I had 'remembered them' and now 'come back'. This left me with the feeling that they were both enthusiastic and devoted to my continued research project and would generously help me out once more with the data I needed. Of course, that only eleven of 30 farmers completed the logs has not got to do as much with their lack of devotion to me as my own failure to show them the respect they deserve. Most farmers, I suspect, were also too polite to ask for remuneration.

The Exploratory Pre-Survey

I initiated an exploratory pre-survey, or sample survey, that was carried out between February and May 2008 in eight districts, namely Hoima and Masindi in western Uganda, Gulu and Amuru in northern Uganda, Nakaseke in central Uganda, and Kumi, Pallisa and Iganga in Eastern Uganda, so as to establish a country baseline.³⁰ Following discussions with key informants, I purposively selected the districts to give a reasonably fair representation of the varying agro-ecological and market conditions throughout the country. After the districts had been identified, the survey benefited from a stage-wise random cluster sampling technique (see e.g. Parfitt 2005; Bryman 2008) where twenty NERICA grower

³⁰ As noted in the section on fieldwork sites earlier in this chapter (with particular reference to Map 1), five of these districts were subdivided in July 2010. Hence, these eight districts have become thirteen.

households in each district were interviewed, adding up to a total sample of 160 households. However, on each sampling level I first had to consider NERICA adoption rates so as to allow for sampling enough households in the final stage. Each district sample was confined to one parish, since it often was not possible to obtain a feasible sampling frame on village level due to too few households growing NERICA. A pre-tested questionnaire with invariably closed questions was employed. Field assistants who had been locally recruited and trained, as earlier noted, administered the questionnaires. Due to data quality problems, data from only half of these districts, namely Hoima, Masindi, Nakaseke and Iganga, could be analyzed. Out of the 80 households covered in these four districts, 64 were identified as male-headed and sixteen as female-headed. The questionnaire covered issues such as land resources, farm production with particular reference to NERICA, labor resources, farm technologies, inputs and management practices, marketing conditions, household income and expenditures, etc.

The data from this pre-survey became a real eye opener to me in relation to critical gender issues in NERICA productivity, production and marketing. Hence, it helped me reiterate my research focus on gender aspects. The findings also informed the design of the questionnaire used for the household survey in Hoima District as well as guided several of the themes that were used for the focus group discussions there. Even though the overall quality of the pre-survey was poor and I therefore am not presenting any of its findings in this thesis, I find it important to introduce the pre-survey in this chapter where I am presenting my methodological toolkit since it did inform and help me revise my pre-understanding of the critical issues in NERICA production in Uganda and confirmed the value and relevance of focusing on specific gendered impacts.

The Household Survey

In mid-November 2008, I initiated a detailed cross-sectional survey covering 302 NERICA grower households in Hoima District. The survey was completed on Christmas Eve that year. I timed the survey with the second (rain) season in the district, since that is when upland rice is mainly cultivated. The survey covered farmers in eighteen villages, divided between the four sub-counties of Bugambe

(n=64), Kitoba (n=90), Buhimba (n=74), and Kiziranfumbi (n=74). The farmers invariably turned out to be smallholders. I used a stage-wise random cluster sampling technique also here, however of a more complex nature. As the following outline will show, sampling can be a rather challenging task where random sampling aspirations need to be matched and molded to the field reality! This came somewhat as a surprise to me, and I had to deal with it ad hoc. Having read many research accounts in various articles and reports, this had still not prepared me for dealing with these challenges since none of these authors had discussed any, instead communicating the impression that random sampling is a very straightforward process. In hindsight, I suspect it has been these authors' active decision not to mention the challenges they faced while in the field, rather than that they actually did not run into any challenges; whether this is because they fear such 'confessions' would undermine their overall research findings, or because 'everyone' already knows about this type of sampling problems why they need not mention them.

My identification of the sampling frame started with numerous key informant interviews with various rice value chain stakeholders in the district, including District Agricultural Office staff and representatives from the Hoima District Farmers' Association (HODFA). That way I could chart the sub-counties where NERICA is grown. Aiming at a sample of 300 farmers, which I had settled with for time and budgetary reasons, I decided to sample four sub-counties, with three villages of 25 farmers in each. This was deemed both reasonable and feasible by my key informants.

After having identified all sub-counties in the district where NERICA is grown, I drew a random sample of four. With the help of local extension workers, first parishes and then villages where the rice is grown were identified in each sub-county. At this point, I decided to exclude villages where reportedly few farmers were growing rice so as to make the sample viable. Having listed all feasible villages in a sub-county, a random sample of three villages was drawn. With the help of extension workers, I and my assistants accessed the villages and were linked to the Local Government 1 (LC1) Chairmen (and in a few instances when they were not available, other suitable village-level gatekeepers) who helped us in compiling lists of all the households in the villages that were growing NERICA.

To be able to access critical information pertaining to production and marketing, households that were growing NERICA for the first time during the survey period in the second season of 2008 were purposively excluded from these sampling lists, since they by that time had not yet harvested their first crop. It usually took a day or two for the LC1 Chairmen to compile these lists.

I did not want to interview more than half of the grower households in each village since this would add little to the precision of my survey (see e.g. Cochran 1977 for a discussion on sampling theory that informed my decision). Hence, we did not go beyond sampling half of the households included on the lists. Here, it became clear that three villages in each sub-county would not be enough to arrive at a sub-county sample of 75 farmers, and for this reason I changed the village sampling frame to four villages instead, returning to the original village lists compiled by the local extension workers and randomly selecting one more village in each sub-county. I now aimed at sampling 20 NERICA grower households instead of 25 in each village, while sticking to the criteria of not going beyond half of those included on the lists. But to sample enough farmers in each village remained difficult, and as an attempt to make up for villages where very few households could be sampled, I expanded the upper sampling ceiling to 30 households instead of 20 in villages where almost all households were engaged in NERICA production. Hence, in some villages as few as five households were sampled, while in others the number of households reached 30. In Bugambe Sub-County, the production of NERICA proved highly scattered, and it turned out difficult to locate enough households and I had to add two more villages using the same sampling procedure as just reported on. Yet, this only left me with some 60 households. Feeling it was becoming a rather time and cash consuming exercise at this point, as only ten or twenty households were included in the sampling frames in each village, I decided to accept that this sub-county would remain under-sampled. This was compensated by an over-sampling of Kitoba Sub-County, where many households turned out to be growing NERICA. Hence the four villages that were covered in this sub-county left me with a sample of over 90 households. In a few instances (unfortunately, I did not record these, but I can recall two), the households that were approached did not want to participate in the survey, and in these cases we returned to the household lists and sampled a

new household to replace the original.³¹ Thereby in total, and as earlier noted, 302 NERICA grower households were covered by the survey. In Table 2 below, I detail the actual distribution of the final sample.³²

All of these households were remunerated for participating in the survey by being given a bag of salt. I am immensely grateful to the sensitivity of my research assistants here for raising this issue and thereby helping me back on track in regard to what should be judged as decent research practice. The remuneration format was arrived at after discussions with local key informants and my research assistants on what would be deemed appropriate. One criterion that came out as important here was that the gift should benefit everyone in the household. Another criterion was that if it still had to benefit some household members more than others, it should be the women. My research assistants suggested that I should buy salt, and this made sense: Purchasing salt is in many cases the responsibility of women, hence giving the household a bag of salt would thereby save some of the women's money. And since salt is used for cooking, everyone in the household benefits from it.

Out of the 302 sampled households, 274 were identified as male-headed and 28 as female-headed. Given that female-headed households are estimated to make up almost 20 per cent of the total households in Hoima District (UBOS 2006), while they represent less than ten per cent in my sample, this could suggest that they for example were particularly underreported in the household lists compiled by the LC1 chairmen (c.f. footnote 16), or that less female-headed households are growing NERICA. Findings from Kijima et al. (2008) suggest that female-headed households are less likely to adopt NERICA in Uganda. Hence, I find this latter

³¹ Parfitt (2005) and Bryman (2008) note that when some sample members refuse to participate in the survey this can negatively affect the representativeness and precision of the overall research instrument. This happens when these non-respondents differ in significant ways from those who do participate, and when these differences are significant to the research questions. However, since the response rate in my survey is very high, I hope my findings are not suffering from this bias.

³² It is worth noting that in several villages, the sampling frames included an even number of NERICA grower households (villages where 20 or 30 households were sampled being exempted since these even numbers are due to my sample ceilings). This suggests that they are underreporting the actual number of NERICA growers in the villages since I suspect that they suffer from the problem of having been rounded down to these even numbers.

explanation likely most powerful in shedding light on why the proportion of female-headed households in my sample is so low. Also interviews with local rice value chain stakeholders provided support for this.

TABLE 2
Final sample of NERICA grower households, Hoima District

Sub-county	Village	Number of households
Kizirarfumbi (N=74)	Kaigo	17
	Kigabu	30
	Kihohoro	20
	Mukabara	7
Buhimba (N=74)	Ibanda	18
	Karama B	14
	Kitoole	22
	Ruhunga	20
Bugambe (N=64)	Ibambiro	10
	Katanwa	12
	Kanigiro	5
	Kyambara	22
	Mairirwe	10
Kitoba (N=90)	Nyabuhere	5
	Birongo	30
	Kibanjwa (Kayera)*	10
	Kihamba (Buhamba)*	20
	Kikonoka	30

* These villages were reported by two different names, and no consensus could be arrived at!

A re-worked and further pre-tested version of the household questionnaire administered in the pre-survey was employed, again invariably consisting of closed questions. This improved questionnaire covered similar issues as in the pre-survey, such as land resources, farm production with particular reference to NERICA, labor resources, farm technologies, inputs and management practices,

marketing conditions, household income and expenditures, etc. But it had been adjusted according to the specific gaps and problems identified after the pre-survey as well as in relation to its pre-testing in Hoima District. The most substantial changes were related to questions of a gender-informed nature. Since many of the households at the time of the interviews had yet not harvested their rice crop for the second season of 2008, a follow-up round was undertaken in January 2009 where only production data was collected.

The targeted respondent was the ‘farm decision maker’ of the household. From the focus group discussions I have learnt that there usually is not a single decision maker in households in Hoima District but that spouses are usually in control of and deciding over different plots and crops. Therefore, my approach forced an alien concept on to the farmers, who subsequently identified the head of household as the farm decision maker. I find this a rather serious and highly regrettable shortcoming of my survey. The persons that my assistants ended up interviewing were usually either these heads or their spouses. One third of the respondents were women. Would I redo the survey today, I would interview both spouses separately in conjunction.

Each interview took around an hour and a half, sometimes two hours. In retrospect I do regret that I included so many questions: almost 500 variables distributed between around 150 overarching questions. It really became the epitome of what Chambers (2008) calls the ‘dinosaur questionnaire’. This was due to that I had not specified the purpose of the survey in enough detail. Instead, I thought of it as offering a chance to create a general baseline and tried to cover every aspect I could think of as useful at the time. I was also overly inspired by the questionnaire that my research group *Afrint* was using (see Djurfeldt et al. 2011; c.f. Djurfeldt et al. 2005). Indeed, I was afraid I would miss out on something important if I cut out too many of the aspects covered in that questionnaire. But while the *Afrint* questionnaire served that project well, given its aim of identifying drivers of agricultural intensification in nine Sub-Saharan countries using panel data, my survey questionnaire did not serve me as well. It generated data that ended up both unusable and – more importantly – unused.³³ Would I redo my

³³ In my three articles, I make use of less than 20 per cent of the almost 500 variables in total.

survey today, I would administer the questionnaire in *the end* of my research project when I (i) have identified more precisely which type of statistical data I need to answer my research questions, and (ii) have thought through how I want to use the variables for analytical purposes. This would allow me to craft a more focused, and thereby tighter, questionnaire, which in turn would have less negative ramifications for the farmers covered by it. I guess my survey therefore proved a costly, inefficient and insensitive way of trying to learn.

Let me now return to Hoima District in end-2008 when the survey was actually carried out. As earlier noted, two man field assistants administered these questionnaires to the NERICA grower households. They had been trained during three days prior to the launch of the survey. Also, during the first days I was with them during the household interviews, for instance first teaming up with the first assistant, and as soon as he had successfully executed about a third of the questionnaire I moved with the next assistant to a new household, participated in his interview for about a third of the time, and then returned to the first assistant so as to join him in winding up his interview, and so on. As soon as they were confident in executing these interviews, I started to carry out focus group discussions and semi-structured one-to-one interviews together with my woman assistant in tandem. But since we all were together in the same villages at this point, I could still monitor how the household survey was progressing during the day, and in case the man assistants ran into any kind of problems I was available to avail my assistance.

Importantly, every evening I went through all questionnaires that had been administered during the day, checking for inconsistencies and other potential problems. In some cases the problems could easily be resolved by the assistants themselves, but whenever needed it allowed us to follow-up with the interviewed farmers the next day. I would argue that this meticulous data cleaning process undertaken while still in the field added in important ways to the overall quality of the survey data.

The Meso Level Village Survey

In relation to the household survey, I also administered a structured village level questionnaire to the LC1 Chairmen and other knowledgeable persons in the eighteen villages so that I could get an overview of exogenous household conditions relevant for my study, particularly those affecting the production, productivity and marketing of NERICA. More specifically, the questionnaire covered 28 key questions that I had carefully crafted to capture critical information regarding when NERICA was introduced to the village, extension service provision, market access and other infrastructural conditions, and climatic and environmental conditions, including rainfall patterns, temporal variations and natural resource management practices. Some of these interviews I carried out myself together with my woman assistant during the household survey period. Admittedly, I forgot executing this survey in some villages, why questionnaires had to be administered to the remaining villages during the follow-up round in January 2009 when also the remaining household-level NERICA production data was retrieved. All these informants were given a bag of salt as remuneration.

THE QUALITATIVE LEG OF THE STUDY

I gathered qualitative data for purposes of trying to understand and explain certain aspects related to the recent surge of NERICA in Hoima District, such as for example intrahousehold bargaining processes over labor and NERICA proceeds. More specifically, through the qualitative leg of the research project I wanted to understand women, men and children's subjective perceptions and embodied experiences of the introduction and cultivation of NERICA and how this has influenced their daily lives and overall wellbeing. In relation to this, I also wanted to explore specific social structures and production relations that may underpin these outcomes. I used different qualitative and participatory research instruments to approach these matters from different directions. Contrary to the quantitative leg, I employed a continuous research design for this leg catering for unanticipated paths of inquiry. For instance, I did not once-and-for-all at the start specify the themes for the focus group discussions or which persons I should sample, but these decisions evolved organically throughout the project life cycle. This iterative process served me well.

Worth noting is that I took detailed notes during all focus group discussions and one-to-one interviews with farmers, children's artwork workshops and key informant interviews. Many but not all of these were also audiotape recorded. While a few key informants did not give their consent to be recorded, all farmers did. However, one annoying reason for not tape recording a few of my interactions with farmers was of a practical nature – I had simply forgotten to buy new batteries for my recording device. The participatory exercises were usually not tape recorded, although the preceding and ensuing discussions were. I decided not to record the group discussions with children, since I did not want to introduce this unfamiliar device to them, afraid that would cause anxiety. Many of the interviews with traders and middlemen were not either tape recorded since these took place at the mills where the level of background noise was so high that it made no sense to switch on the recording device in the first place. All visual outputs were documented by me taking photos of them.

Focus Group Discussions

I carried out 51 focus group discussions with women and men farmers in Hoima District, facilitated by my woman field assistants, between October 2008 and February 2009, and in April and May 2010. Most of them took place in the eighteen villages covered by the survey. Farmers who had participated in my earlier study in 2005 were mobilized on parish level for group discussions. Each meeting gathered on average seven to eight farmers, since I found this group size large enough to keep the discussion going and small enough for me to moderate while affording enough opportunity for all participants to actively engage (Stewart & Shamdasani 1990). The participants were purposively, or strategically, sampled based on the topic to be discussed (Flick 2009). In other words it was my express intention to involve persons whose perspectives on the topic and experiences I believed would maximize opportunities for me to discover the complexity of it and inform, refine and push my analysis further (Mason 1994; Bryman 2008; Flick 2009). A minority of these participants also had been randomly sampled to participate in the survey. They were identified together with the Local Council 1 Chairmen and other knowledgeable persons on village level, and usually mobilized from one day to the next. Since it is common that not all participants show up for this type of meetings, something that also turned out to be the case

here, usually around ten farmers were invited. I also evaluated my sample throughout the project, charting what experiences and voices (which type of persons) had already been covered so that I could address potential *gaps*. For instance, this way I realized that I needed to cover those who had stopped growing NERICA (the so called drop-outs), for whatever the reason, in a more systematic manner. Mason (1994, p. 103), who has also done this type of sample evaluation, offers an important reflection in relation to these gaps: 'But in identifying them as gaps we were guided by theoretical considerations about what was needed to build up and to test our developing analysis.'

The group discussions, which usually lasted for two hours or somewhat less, centered on gender issues of different types, farmers' perceptions and experiences of growing NERICA and other crops, reasons for NERICA adoption and disadoption (drop-out), farm management practices, extension service evaluations, and problems diagnostics related to NERICA and farming in general, etc. I employed a rich catalogue of participatory methods, techniques and tools during many of these meetings, such as visual mapping-and-ranking exercises of attitudes, perceptions and observations (including the ten sticks method and pile sorting), free rankings, and problem tree analyses. Participatory numbers generation and seasonal and daily routine calendar constructions were other visual methods that I used (Cornwall & Jewkes 1995; Chambers 1997; Kesby et al. 2005; Mikkelsen 2005).

The use of visual media in making the participants express, share and analyze their knowledge and reality proved a powerful tool throughout these exercises (this has also been noted by e.g. Cornwall & Jewkes 1995; Chambers 1997; Kesby et al. 2005; Mikkelsen 2005). It successfully involved and engaged all participants, who seemed to take great joy in these exercises. The visuals provided a highly useful agenda for further discussions as well as raised new questions informing the problem identification (*ibid.*). Hence, I did not mainly see them as end products in themselves.

Many mixed groups, by their mere nature, became excellent opportunities for eliciting gender differences and concerns (see e.g. Mikkelsen 2005). However, when I explicitly wanted to find out about more sensitive issues, particularly

intra-household bargaining over resources and labor, men and women were mobilized in separate groups (see e.g. Fern 2001). But also the mixed groups often entered this terrain during their discussions on more 'neutral' matters, such as the production performance of the crop.

Informed consent was a pre-condition for participation in all FGDs. I started out by introducing myself and my research project, particularly emphasizing my independence vis-à-vis the extension service providers, both governmental and NGO-based, as well as other 'donors and politicians'. In relation to this, I also explained that I could not offer them any of the services and inputs these organizations sometimes do, including trainings, seed and fertilizers. I explained the purpose of the discussion and presented the 'rules of the game': I pointed out that I was not looking for consensus but wanted them to share their various experiences with me and with each other, that there are no right or wrong answers (particularly emphasizing that I did not 'care' whether their experiences were positive or negative in relation to NERICA, extension service providers, etc.), that I wanted everyone to actively participate but not interrupt each other, that they were free to leave at any point they liked, and so on. Guided by the principle of non-maleficence, the introductory statement was also carefully crafted to address the various concerns that can arise in relation to a FGD, such as hierarchies, dominant personalities, overdisclosure, etc. (Stewart & Shamdasani 1990; Krueger 1998; Morgan 1998; Fern 2001; Puchta & Potter 2004; Bryman 2008; Flick 2009). I choose the word 'crafted', because I used a detailed check-list here so as to make sure I did not forget to cover any of these important aspects. Furthermore, during each session I monitored the group's comfort level, intervening according to need, and after I allowed for an informal debriefing where participants over a snack (which had been identified as appropriate remuneration for participating in the FGDs) could reflect upon their reactions and ask me questions. In those instances where the group had jointly produced some type of visual output of their experiences; a map, a diagram, a chart etc. they also agreed on who in the group should keep it after I had taken photos for later reference, and how they could make further use of it as a visible checklist or agenda in for example future contacts with extension service providers.

The first FGDs were structured around interview guides listing the key aspects I wanted to address (Bryman 2008). But I soon learnt that an unstructured format with only a theme prepared for the meeting, around which the initial discussions took form but from where participants were encouraged to take a lead role, served the research objectives better since this allowed the participants to set the priorities and discuss matters of greatest personal concern. In fact, and to my surprise and against received wisdom, it was through this approach that many of the sensitive aspects were vented in the first place. Frith, in an article on using focus groups in sex research, notes that 'Contrary to the popular assumption that privacy is key to ensuring the collection of information on sensitive matters, research using focus groups has shown that the presence of others can actively encourage individuals to talk about their experiences' (Frith 2000, p. 290; see also e.g. Kitzinger 1994; Morgan 1998). Also Chambers (1997, p. 148), while explaining the power and utility of Participatory Rural Appraisal (PRA), makes a similar observation: 'Contrary to many outsiders' beliefs, sensitive subjects are sometimes more freely discussed in groups, for example topics individuals would not wish to discuss alone with a stranger.' This is also my personal experience from researching sensitive intrahousehold gender aspects in Hoima District, Uganda. For instance, women farmers seemed much more comfortable, secure and outspoken in the company of other women who shared similar experiences and who they could laugh, joke, contemplate, debate, argue and negotiate with, than when I, as a researcher, set out to interview them on a one-to-one basis. The interactive and synergistic nature of FGDs (as described by e.g. Stewart & Shamdasani 1990; Fern 2001; Puchta & Potter 2004) also meant that the disclosure from one participant often stimulated others to open up and share their similar or contrasting experiences, thoughts and feelings, often building upon the prior remarks or by providing additional illustrative examples and insights. The fact that 'the [FGD] respondent soon realizes that the things he or she says are not necessarily being identified with him or her' (Hess (1968) cited by Stewart & Shamdasani 1990, p. 19) seems to have facilitated this process. The group format also allowed the participants, when they so preferred, to shift the focus from themselves to, for instance, 'women in this village in general,' or 'a neighbor,' which likely contributed towards further diffusing or eliminating potential anxiety (Stewart & Shamdasani 1990). I also believe that interspersing many of the FGDs with participatory elements helped in 'breaking the ice,' given that this

shifted the focus from the participants to the map, diagram, chart or calendar being constructed; it is then 'the visuals rather than the people that are interviewed' (Chambers 1997, p. 149). Chambers (p. 151) also argues that the ground, on which these exercises took place, is a democratic equalizer since both the educated and uneducated, the facilitators and participants work together on the same level (see also Kesby et al. 2005). In total I met with around 250 women and 150 men during these FGDs.

During several of the informal debriefings at the end of the FGDs, the farmers were explicit about that they felt their participation had been beneficial to them: They said that they felt their voices had been heard. They also said that they had realized that they could do things they did not know they could, as well as that they had learnt new things (these are similar outcomes to those observed by e.g. Chambers 1997; Dickson-Swift et al. 2008). More specifically, they said they felt I had taught them these new things. On these occasions I had to intervene to correct them. Because, by together expressing and analyzing their own realities; by sharing knowledge, they came to see things 'together and differently' (Chambers 1997, p. 156). So, if anything they were teaching themselves and each other – and me. They were, to paraphrase Chambers (ibid.), learning more of what they know and together they were presenting and building up more than anyone knew alone. In a way, they therefore arrived at a new, common knowledge base richer than each individual's prior (see also Patton 1990; Cornwall & Jewkes 1995). The FGD only provided an enabling environment; the canvas on which they could showcase their complex realities.

One-to-One Interviews with Smallholder Farmers

I also carried out 42 semi-structured one-to-one interviews with an equal number of women and men farmers. Several of these farmers had also been interviewed by me in 2005. Since I was interested in capturing potential changes over these years, these interviews were of a rather structured format in the sense that I relied on a more detailed interview guide than the one I used during the interviews with farmers that I met with for the first time. Taken together, these one-to-one interviews further informed my understanding of the complex intrahousehold gender relations under study and the multiple ways that NERICA has impacted

farmer livelihoods. It was particularly interesting to note how the re-interviewed farmers' experiences of growing NERICA had changed over time.

Some of these interviews were rather concentrated, lasting less than half an hour, while others went on beyond the hour, and some even for one hour and a half. Also these interviews were guided by the same ethical principles considered during the FGDs (see above, and e.g. Valentine 2005; Bryman 2008; Flick 2009). Most of these respondents were given bags of salt, although some of those who were interviewed in relation to the FGDs were only remunerated with the snack that had been provided in relation to the group discussion, which in hindsight was a bit unfair and reflects the fact that I never drafted a proper remuneration strategy covering all the various forms of respondent interactions and left me unprepared in some instances.

While I often felt the one-to-one interviews only allowed me to 'scratch the surface' in relation to the more sensitive issues, a few of them became highly emotional encounters bringing research ethics considerations (see e.g. Valentine 2005; Bryman 2008; Dickson-Swift et al. 2008; Flick 2009), including the principle of nonmaleficence, to the fore when women, unsolicited and therapeutically, disclosed their tragic situations caught in conjugal relations based on constant fear and regular battering. This is for instance illustrated by the following quote by a woman from Kitoole Village as she elaborated on her fruitless efforts to get control over some of the NERICA proceeds:

We dug together, but it was disturbing me too much. He liked it. He did not want to share the money. [...] He decided himself without consulting me. He didn't give me a single coin. Any coin he wants it. He does not even want me as the wife to take a 100 [shilling; eq. 0.05 USD]³⁴. He wants to go drink alcohol for every money. [...] This season I decided to dig alone, yet he took the money. He drinks alcohol and beats me seriously. I don't have peace in the home, only suffering. Only when the money is finished will I have peace. [...] I don't want my children to suffer in the future. But in the next year the children will suffer. He even wants to take the kid from school, 'cause we cannot afford! I want my children to get educated! When I ask for money to buy the books, he beats me... I

³⁴ The exchange rate used in this thesis is: 1000 UGX = 0,509 USD. See p. 7.

was first married to another man. I was suffering. Now with the second husband I am suffering. Now I say 'let's stay here suffering!' I feel that people are laughing at me, [since] I am marrying here and there.

At such points I could only offer my empathy and solidarity in terms of listening to their stories, but each time it felt terrible not being able to help them change their life situations, and not even offer them referrals to professional therapists or counselors, which has been cited as good qualitative research practice (Valentine 2005, p. 123; Dickson-Swift et al. 2008, p. 65). I did, however, try to 'warm down' these interviews by returning to lighter subjects before closing them so that they would end in a more positive spirit (Valentine 2005). Still, these interviews often caused what Lofland and Lofland (1995, p. 28, cited by Dickson-Swift et al. 2008, p. 51) refer to as an 'ethical hangover', where a persistent feeling of guilt haunted me a long time for having 'exploited' these women (it was always women) by not appropriately managing the interview boundaries; that I allowed the interview to take the form of a counseling session without me for that sake being a trained therapist. I wondered if I, even though I had not explicitly pressurized these women to elaborate on these difficult matters, had done that implicitly.³⁵ I was also wondering: Could I have been better prepared? But can you ever become prepared for listening to a story of great suffering and pain?

Children's Artwork Workshops

During the many focus group discussions and one-to-one interviews with women and men farmers, the critical role of children in the production of NERICA became clear to me. Also many farmers reported that their major impetus for cultivating NERICA was to be able to secure funds for improving their children's education. Hence, it seemed children occupied a central position in the NERICA trajectory of Hoima District as both benefactors and beneficiaries. Recognizing children and youth as social actors, I therefore wanted within the remit of my

³⁵ It has been noted that interviews can have a healing effect, with other researchers reporting that participants often 'have felt relief and a sense of catharsis from the sharing of their stories' (Dickson-Swift, James & Liamputtong 2008, p. 11; see also Patton 1990). Therefore, I hope that the fact that the interview offered these women a safe and confidential space to talk about their experiences and feelings with someone who wanted to listen to them was of some merit to them.

research project to also understand their lived experiences in relation to NERICA, and not only rely on their parents' subjective accounts of how the introduction of NERICA has impacted on their offspring. To zoom in on children is also increasingly being encouraged within the social sciences (James et al. 1998; Christensen & Prout 2006; Hill 2006; Veale 2006). This motivated my orchestration of three artwork workshops with a total of 34 school children (18 girls and 16 boys, aged 9 to 16 years) whose parents all are NERICA growers. My decision to approach schools derives from the fact that schools were the easiest and most obvious points of access to children. But I am aware that this approach however meant that the voices of those children excluded or absent from school remain muted in this thesis. This may be deemed particularly ironic given that the teachers reported that a major reason for children missing and even dropping out of school was that they were becoming too involved in the production of NERICA. Hence, it may be assumed that I never got the chance to interact with those children perhaps the most negatively affected by the introduction of this crop.

The children were purposively identified with the help of teachers at one private and two governmental schools in the district:

- Ruhunga Primary School (governmental), Buhimba Sub-County (15 participants, classes P4-P6, ages 13-15 years);
- Kyambara Primary School (governmental), Bugambe Sub-County (9 participants, classes P3-P6, ages 11-16 years); and
- Wanainchi Primary School (private), Katanga Trading Center, Bugambe Sub-County (9 participants, classes P3-P6, ages 9-14 years).

No sampling criteria beyond the fact that the child belonged to a NERICA grower household were used. Hence the distribution of girls and boys, as well as the children's age span, were not purposive. Instead, all available children meeting the sampling criterion that the teachers could identify were asked to participate. The workshops took place in designated class rooms with the headmasters' and children's own consent (worth noting here is that not all children that were

invited decided to participate; more specifically a few of the older boys declined).³⁶ They lasted between an hour and an hour and a half.

The rationale behind my choice of researching these children's experiences, perspectives and voice through artwork workshops can be traced to the budding literature discussing research methods with children and that highlight the value of employing creative and fun task-centered approaches and activities encouraging and tapping into children's imagination, exploiting their particular talents and interests, and stimulating their active participation (Stewart & Shamdasani 1990; James et al. 1998; Banister & Booth 2005; Greene & Hill 2006; Hennessy & Heary 2006; Hill 2006; Veale 2006). I also consulted both my research assistants and the teachers so as to affirm the suitability of this particular projective technique in this socio-cultural setting, since my aspiration was 'matching child to method' (Greene & Hill 2006, p. 17). Moreover, the same reasons driving me to carry out the many focus group discussions with the farmers convinced me of the appropriateness to gather the children in groups as in contrast to interviewing them immediately on a one-to-one basis. The school was deemed offering a familiar space to them. In this way, some of the particular ethical and practical considerations that arise when researching with children could be addressed (for comprehensive discussions on ability/competence, power and vulnerability differences in adult-child research relationships, see the many informative contributions in Greene & Hogan (eds.) 2006, especially Greene & Hill 2006, Hennessy & Heary 2006, Hill 2006 and Veale 2006; also see James et al. 1998). Also, I took particular care in how I presented myself to the children, both verbally and visually, and how I introduced my research so as to create a comfortable and accessible environment that the children felt was safe and that promoted rapport. Importantly, I emphasized that this exercise was not a test and that there were no right or wrong answers to the questions I would ask the way there are in relation to usual examinations taking place in their schools (Puchta & Potter 2004). Instead, I pointed out that they are the experts and that I was there

³⁶ In retrospect, it would, for obvious reasons, have been most appropriate to also obtain the informed consent from these children's parents. But time constraints made me at the time accept the schools' responsibility for the children and their wellbeing. However, I suspect that the authoritative role of teachers (not to say that of headmasters) in these communities may still have prevented many parents from opposing.

to listen and learn from them since I am interested in how children understand and interpret, negotiate and feel about the introduction of NERICA, and that only they, themselves, could tell me about this. In this way I hope I managed to convey to them that my research emphasis was on their own experiences and perspectives. Importantly, my woman assistant also played a crucial role here in achieving rapport and in monitoring the workshops, and even more so than in relation to my FGDs with farmers.

The artwork workshops responded to the overall research focus of my project by encouraging the children to elicit their experiences through free drawings and paintings of how the introduction of NERICA into their households' crop portfolios has impacted on their lives as children. The instructions given to the children were designed so as to prompt their thought processes associated with both positive and negative effects. While it turned out necessary to provide a few illustrative examples, I refrained from categorizing these as either positive or negative so as to try avoiding suggestive phrasings that could lead the children to certain responses. The children were also informed that I would take photos of their artwork while leaving them with the originals and that the wax crayons would be left with the teachers for future class room activities. Hence, the paintings and the crayons became their remuneration.³⁷

The children created rich collages illustrating their unique, subjective experiences. Following on this, their paintings were spread out on a table, around which the children gathered and discussed what they and others had depicted, facilitated by open-ended questions from me. I tried to tease out emerging themes from their discussions and upon their agreement we discussed these in more depth, together with other themes that the children came up with themselves. These themes included how they provided labor for the production of NERICA, how they helped their mothers with household and caring chores, how their schooling was affected, and how their parents had invested in better housing, educational

³⁷ I did not provide any snacks or its like, given that the other children in the school would not have received that, and this could have been perceived as unfair since children (especially those not participating in the artwork workshops) may not think of such compensation in terms of remuneration but as gifts.

expenditures, medical care, enterprise diversification, bicycles, and many more development friendly activities and items.

At the end of the session, I opened up for short one-to-one interviews to follow-up on what they had depicted in their individual artworks, but explained that also such narration was on a voluntary basis. All children participated also in these interviews, and this proved valuable for the later content analysis since some of the drawings were ambiguous (although many children had actually combined their drawings with illuminating writing; some of the older children even in English).

Key Informant Interviews

Besides interacting with farmers and children, I continuously consulted my research assistants and various rice value-chain stakeholders and other key informants. In Hoima District I met with around 75 persons; private entrepreneurs in the seed, processing and trade sub-sectors (including 21 traders and middlemen), NGO staff, extension workers, other ministerial, local government and research institute staff, farmers' associations representatives, and teachers. In Kampala and its vicinity, various NGO staff, researchers from Makerere University, representatives from the major seed companies, and staff from the Ministry of Agriculture, the Vice-President's Office and the National Crops Resources Research Institute of the National Agricultural Research Organization (in Namulonge) were approached. In total, around 50 persons were interviewed there. I also interacted with about 50 key informants in the other districts that were covered by my project, including extension workers, NGO staff and other ministerial and local government institute staff.

Various issues were discussed, often as the need emerged. Besides providing new information, these key informant interviews and meetings offered a chance to verify data gathered from the farmers and helped me juxtapose emic and etic perspectives (see Chapter 6).

Some of the interviews with the rice value-chain stakeholders and other key informants rather became *dialogues* stretching over several years than isolated

interviews. Meeting these respondents a number of times sometimes led to that we developed a friendship-like relationship. This necessarily raises issues about research boundaries and ethics. Since the research boundaries were blurred I may not always have been reminding them of my researcher role when I, for instance, during an otherwise informal dinner conversation chipped in specific questions to inform my research. In that way, they might not have been aware that I ‘interviewed’ them, and therefore neither in a position to give their informed consent to that.

The Follow-Up Study on NERICA Drop-Outs in Wakiso and Luwero Districts

Finally, I carried out a small qualitative study in Wakiso and Luwero Districts, two other early targeted districts for NERICA dissemination, since I wanted to find out why so many farmers reportedly have opted out of the production of NERICA there, which could also inform my understanding of the Hoima situation. This study took place during April and May 2010. I purposively sampled disadopters for group discussions and one-to-one interviews, and met with more than 100 farmers in total; half of them women and half of them men. Also various extension workers were interviewed. This study is not reported on in depth but only referred to in one of the articles.

SUMMING UP

In this chapter I have discussed the processes of fieldwork my thesis builds on. I have taken the reader through not only the de facto methods that I came to employ over the years 2008–2010, but also the more personal journey that this implied for me.

I argued that my thesis is qualitatively designed and driven in that I am particularly interested in understanding and elucidating the subjective and embodied experiences of the NERICA growers in Hoima District. In researching their complex, gendered realities, I emphasized that I have been using an integrated mixed methods approach combining quantitative and qualitative methods. I also pointed out that while nine districts have been covered by my

project, the main focus has throughout been on Hoima District, where eighteen villages and three parishes were particularly studied.

I detailed the quantitative leg of my research which included collecting data for purposes of arriving at a baseline describing the NERICA grower households and the current state regarding NERICA production, productivity and marketing, with particular reference to Hoima District. I used various survey instruments: I carried out an exploratory pre-survey (sample survey) in eight districts. In Hoima District, I carried out a structured diary study, a cross-sectional household survey and a meso level village survey.

Following this, I detailed the qualitative leg of my research, through which I wanted to understand more specifically smallholder women, men and children's subjective perceptions and embodied experiences of the introduction and cultivation of NERICA. I also wanted to explore specific social structures and production relations that may underpin these outcomes. I used various qualitative and participatory methods: I carried out focus group discussions and one-to-one interviews with farmers, orchestrated artwork workshops with children and interviewed various rice value-chain stakeholders and other key informants. Finally, I introduced the small qualitative study of NERICA drop-outs that I carried out in Wakiso and Luwero districts.

All in all, I have met with more than 1000 women and men farmers, children and their teachers, private entrepreneurs in the seed, processing and trade sub-sectors, NGO staff, farmers' associations representatives, extension workers, scholars, and ministerial, local government and research institute staff. All of these persons, in one capacity or the other, are part of, or have been affected by, what has been referred to as the NERICA Revolution in Uganda, and have in important ways contributed towards my understanding of how the cultivation of NERICA has influenced smallholder women, men and children's daily lives and wellbeing, particularly in the local context of Hoima District.

It has not been a straightforward journey for me. Rather, I would recap the process of my fieldwork as iterative; it has continuously been metamorphosing by responding to new and unanticipated paths of inquiry. I have also had to deal

with many challenges and trade-offs over these years, of which some I turned out to be rather poorly prepared for.

6 ANALYZING, INTERPRETING AND REPRESENTING DATA

ANALYZING, INTERPRETING AND REPRESENTING QUANTITATIVE DATA

I recruited assistants to help me enter the survey data into Excel spreadsheets, which I then converted into data files in the SPSS computer program. I will not discuss the analytical processes relating to the pre-survey here, since I have not used that data in this thesis for reasons outlined in the previous chapter. Instead, I focus my discussion on the analytical processes relating to the household survey of 302 NERICA grower households in Hoima District. In relation to this survey, data cleaning – the process of detecting and correcting (or removing) inaccuracies, inconsistencies, anomalies, contradictions, etc. from the database – became a rather smooth process, since much of that work had already been done while in the field. One of my man field assistants helped me with this. I had also prepared a checklist that guided us in this work. After having cleaned the data, he prepared a descriptive survey report presenting in table format each variable mean, including disaggregated by household headship. This gave me a good data overview and I could tease out the variables of most interest to me to move ahead with. I also created new variables according to need, drawing on the available data. For instance, the questionnaire had not covered any question about yields, so this was calculated by me combining data on area and total production. At this point, some variables were also merged while others were split, and some variables with multiple values were changed into dichotomous variables, etc. Also the diary study data entry and cleaning, as well as creation of new variables, became straightforward exercises, which I did on my own given the limited amount of data.

I then described and analyzed the quantitative data using for example t-tests and chi square tests in SPSS to compare differences between female- and male-headed households' production, productivity and market performance in relation to NERICA. The statistical findings are mainly presented in various tables in my articles.

Worth noting in relation to this analytical process is that it was not separated from the analysis of the qualitative data. Hence the qualitative findings often helped me interpret and make sense out of the quantitative data, as well as it guided me in relation to which specific quantitative variables to focus on and present in the articles.

At the end of the day, I came to use a very limited amount of all the data stemming from the household survey; something I also reflected on in the previous chapter: out of the almost 500 variables, distributed between around 150 overarching questions, I draw on less than 20 per cent in the articles. This is regrettable for two reasons: First of all, it means that my computer hosts a wealth of valuable information yet to be put into good use and reported on. Second of all, it means that I put 302 farmers through the tiring process of answering all these questions when in fact a much tighter questionnaire could have done the job (and even better so).

ANALYZING, INTERPRETING AND REPRESENTING QUALITATIVE DATA

My qualitative data set consisted of a personal diary, detailed field notes, recorded audio files and photos of visuals from the interviews and group discussions. Already during my time in the field did I initiate an informal and unstructured analytical process as I constantly reflected at length about what I was observing and being told, and every evening went through the notes and photos I had taken during the day, teasing out key messages and themes that could guide me in my continued research effort (Charmaz 2003). Admittedly, this was not a very rigorous form of data analysis, yet the speculations, conjectures and hypotheses that materialized were necessary since I, as earlier noted, employed a continuous research design in relation to the qualitative leg of my research project and needed constant analytical input to be able to proceed.

In the creative and critical processes of preparing, organizing, analyzing, interpreting and getting to understand the qualitative data following on the 2008/2009 and 2010 fieldwork periods, I employed a number of techniques. I will now take the reader through this more formal and structured data analysis where I drew upon notions of constructivist grounded theory strategies and

thematic analysis (see e.g. Charmaz 2003; Bryman 2008; Flick 2009), by particularly focusing on the analytical process in relation to the first round. This analytical process, that in my case initially meant exploring the data in an inductive way and encode and sort it into categories in search for emerging concepts and patterns, and eventually meaning, was, however, more relaxed than what these two widely accepted analytical procedures prescribe.

Preparing the Data

One of the first things I did was to print all the photos I had taken of the visuals created during the FGDs with farmers and artwork workshops with children. I also approached the recorded audio files, which I wanted to transcribe intelligent verbatim.³⁸ I was facing a massive volume of recordings; the interviews and group discussions between October 2008 and February 2009 added up to almost 40 hours. Lacking experience and appropriate equipment for transcription, and after having transcribed a few interviews, I realized I would have to estimate almost a full working day for transcribing only one recorded hour (an estimate also reported by Bryman 2008, p. 453). Hence, I was faced with months of transcription work! I abandoned this idea in favor of a pragmatic compromise that would allow me to invest that time and effort in data interpretation and analysis instead: I decided to listen through all my recordings while simultaneously comparing them to my field notes. I constantly complemented these notes according to need.³⁹ Thereby, my field notes became rough transcripts of what had been said, and similar to the output would I have semi-transcribed the recordings.⁴⁰ However, I am aware that these 'upgraded' field notes reflect the active choices I made on what to include and what to leave out based on what I

³⁸ I reckoned that this transcription level would provide sufficient detail given the aim of my research and the analytical purposes of the data (Flick 2009), together with the fact that I was using interpreters, why all the 'ums' and 'ers', fillers, stutters, breaks, amplitude changes, emphases and paralinguistic utterances in any case would not be *in vivo*...

³⁹ This process would likely have been impossible would I not have taken very detailed notes during the actual interviews and FGDs.

⁴⁰ Semi-transcription means that the researcher focuses on transcribing the content of the conversations that is of relevance, or significance, given the research questions.

thought significant at the time.⁴¹ Also, they were rather decontextualized abstractions of the original conversations since very few non-verbal expressions had been recorded.

This process of ‘upgrading’ field notes also worked as a broad reading of the texts that allowed me to get a general sense of the data (c.f. Crang 2005). For this purpose, I also read through and contemplated the field notes for which I had no complementary audio data. The photos were examined together with the related notes. Furthermore, I returned to my personal field diary that included my general thoughts, observations and impressions from that time. Throughout this process, I scribbled down emerging ideas, associations, questions, impressions etc. in a memo (Crang 2005; Flick 2009).

Since I would not use a computer software program for my data analysis, I saw no need in typing up my handwritten field notes digitally. Instead, I moved on to the next stage.

Organizing the Data into Codes, Categories and Themes

Following the broad reading of these qualitative materials, I needed to organize the data and I did this through coding (see e.g. Crang 2005). To start with, I went through my field notes stemming from the one-to-one interviews and FGDs with farmers and the artwork workshops with children *paragraph by paragraph*. I asked myself what was said and by whom. I wrote down a list of key words and phrases from these texts that illustrated the topics, incidents and events that had been touched upon. In a similar vein, I went through the photos and noted down key words in relation to them.

Having created this list, I clustered together those key words and phrases that were similar and converted each of these clusters into a code by selecting the phrasing I found most illustrative for that cluster (Creswell 2003; Crang 2005; Flick 2009). In many cases, these codes were *emic* (reflecting the participants’ own

⁴¹ Therefore, I would later on return to many of these recordings, listening through them again in case what I thought was significant had changed as the analysis had progressed.

words; Lett 1990; Crang 2005). I wrote down the codes on a (new) list. A copy of this list was cut into pieces so that I could easily move around the codes and start organizing them into categories. By creating ever larger categories by amalgamating earlier ones, I found four recurring grand themes that I deemed particularly relevant to my research (this was achieved when only four categories remained): (i) labor inputs in the production of NERICA; (ii) crop-specific characteristics, the production cycle and NERICA production performance; (iii) NERICA as a source of income (including market performance); and (iv) NERICA as a source of food. These themes synthesized what the participants had particularly focused on, and can therefore be seen as reflecting four key narratives that they discussed with each other and communicated to me. I could obviously at this point have structured the data in a different way, for example identifying intrahousehold bargaining over labor and NERICA proceeds as a theme or two. But such themes would have been much more theory-driven – and therefore *etic* (reflecting my conceptual and theoretical schemata; Lett 1990; Crang 2005) – than those I settled with, and in this stage of the coding process I focused on participants' perspectives, concepts and words. I could of course also have decided to settle with more than four themes as my point of departure. Hence, these four themes are necessarily reflecting my own subjective priorities... Yet, I found it useful to start out with very broad themes – and they did turn out to be effective entry points into the data, which was my whole point with creating them. Thereby, I never saw or treated them as analytical end-products.

Next, I re-read the field notes. Phrases and paragraphs that fitted into one of these four themes were transcribed to different colored post-it notes (with one color for each theme). Text segments not fitting into any of these themes, yet deemed relevant, were noted down on a separate set of post-its. Upon completing this tedious exercise, I returned to the list of codes I had created. I wrote down each code on a separate A4 sheet and sprinkled these papers all over my office. I then distributed the post-it notes (passages) between these sheets of paper (codes) according to which code I thought described the passage best. Passages that I found similar were given the same code (Charmaz 2003; Crang 2005). This was not always a straightforward process, since I often had to decide through interpretation if a person talked about a particular topic or not (Mason 1994). I also soon realized that not all passages could be sensibly labeled using this set of

codes. Therefore, I added new codes according to need. Some codes were also scrapped. Worth noting here is that even though *all* codes earlier on had been amalgamated and eventually subordinated one of the four themes, during this passage–code matchmaking exercise the prior coding hierarchy was somewhat altered. Instead, some codes ended up accommodating more than one theme.

Finally, I read through all post-it passages that had been labeled with the same code, comparing them to make sure they were consistent. I referred to the field notes and sometimes the audio recordings. When I ran into inconsistencies, I had to, informed by my developing theoretical and analytical ideas (which were cultivated by this process *per se*, by engagement with the key informant interview transcripts, and by my constant reading of literature that I identified as relevant in helping me understand what I was observing), decide if a deviating passage would be more accurately represented if labeled with a different code (including any of the newly created ones or by yet others), or if the code label itself needed adjustment. Hence, I created new codes and abandoned old ones, collapsed some and subdivided or refined others. I moved around and reorganized passages accordingly. For instance, the code I had labeled ‘birds’ first included passages as diverse as those concerning the high levels of labor input in bird scaring (first theme), how farmers have observed that birds love eating rice (second theme), and how birds destroy the crop so that the farmers end up with nothing to sell (e.g. third theme). I then subdivided this code into three new codes that better captured this diversity: ‘bird scaring’, ‘pests’ and ‘reasons for not selling rice’. The new codes that emerged from my work were often of a more abstract, etic character than the original codes I had created.

Analyzing and Interpreting Categories

I moved on to create categories, clustering together similar or related codes. Compared to the (emic) categories I had created in the early process of coming up with the four grand themes, these new categories were primarily of an etic character informed by my theoretical and conceptual considerations. I linked excerpts of the key informant interviews and photos of the visuals to appropriate categories. As the analytical process continued, categories became increasingly analytical.

I pasted all the post-its into an A3 notebook creating a visual library of hierarchically organized themes, categories and codes. Since post-its are self-adhesive, they could easily be moved around whenever I changed my mind as the analysis progressed further.

With this stage, coding and analyzing became ever more iterative processes where I was moving back and forth between my constantly evolving, and transforming, theoretical and conceptual frames and these textual, audio and visual materials (and the quantitative data) to verify the meaningfulness and accuracy of the codes and categories that I created and the specific positions I assigned the data excerpts (passages) within these codes and categories (Patton 1990). Perhaps most significant here were the analytical synergies developing from the creative symbiosis of inductions and deductions where I both refined concepts, categories and patterns by drawing on the texts, recordings and visuals, as well as tested concepts, categories and patterns against these materials (Flick 2009). As such, it was anything but a linear process.

This way, I came to identify intrahousehold bargaining as particularly relevant to focus on in relation to understanding individual wellbeing in Hoima District, Uganda. I read the many and various, including contradictory, contributions to this field and found the works by Sen (1990), Kabeer (1991, 1994), Agarwal (1994, 1997) and Jackson (1998) particularly informative to my case (see Chapter 3). The fact that the labor intensity of NERICA was one of the most frequently raised and returned-to topics by the farmers made me particularly keen to zoom in on that, and not only focus on intrahousehold bargaining processes regarding the sharing of proceeds. Farmers classified crops as labor intensive when they were time consuming and or labor exhausting to grow. Searching the literature, to my surprise I found the farmers' conception of labor intensity completely in line with that of Jackson and Palmer-Jones' (1999) and Palmer-Jones and Jackson's (2007), hence I could make use of their concept of body capital to better represent what I had been observing and had been told (see Chapter 3).

It was also during this late stage in the analytical process that the systematic write-up process gained momentum, since I at that point, as the first conference paper submission deadlines drew closer in late 2009, was *forced* to put words on my

interpretations, findings and conclusions regarding how the cultivation of NERICA has influenced women, men and children's daily lives and wellbeing in Hoima District, as well as the processes leading to these outcomes. I had found it quite challenging before that to structure all my thoughts and ideas into a reasonable analysis.

The second fieldwork period produced new data which helped me fill in earlier knowledge gaps, contributed towards further sharpening my analysis, and enhanced my understanding. This data was prepared, coded and categorized in a similar way to the earlier, and integrated with that. While the overall findings and conclusions were not substantially revised after this data injection, the way I interpreted and theoretically and conceptually *framed* these findings and conclusions were enhanced. Another contributing factor to the continued development and refinement of these findings and conclusions was my constant consumption of theory; I was persistently searching the literature for ever 'better' theories that would ever more precisely fit and explain my observations and align with my conjectures and arguments. This analytical progress can be traced throughout my drafted papers and articles to the final versions included in this thesis where I with confidence can say that I have arrived at a deeper understanding of the complex and subjective realities of NERICA farmers and their children.

SUMMING UP

In this chapter I have provided a detailed account on how I have analyzed data, taking the reader through the various processes associated with quantitative and qualitative data analysis, respectively.

In the first section, I discussed *quantitative* data analysis, interpretation and representation. I focused the discussion on the household survey of 302 NERICA grower households. I first described data entry and cleaning, and how I teased out the most relevant variables to move ahead with. I then explained how I analyzed the data using t-tests and chi square tests in SPSS to compare differences between female- and male-headed households' production, productivity and market performance in relation to NERICA. I highlighted that the quantitative analysis

was not divorced from the qualitative. Finally I pointed out that it was regrettable that I had designed the questionnaire so poorly, suggesting that a tighter questionnaire could have done the same job while saving farmers from the tiring process of answering all these questions that I in any case never made use of in my analysis.

In the second section, I discussed *qualitative* data analysis, interpretation and representation. That I found processes of qualitative data analysis more complex, including to describe, is reflected in the length of this section vis-à-vis the preceding on quantitative data analysis. I first introduced my qualitative data set consisting of a personal diary, detailed field notes, recorded audio files and photos of visuals from the interviews and group discussions. I also noted that already during my time in the field had I initiated an informal and unstructured analysis of these. I then focused the discussion on the more formal and structured data analysis where I drew upon notions of constructivist grounded theory strategies and thematic analysis. I took the reader through the creative and critical processes of organizing, analyzing, interpreting and getting to understand the qualitative data. These processes meant that I first came to explore the data in an inductive way and encode and sort it into themes and categories in search for emerging concepts and patterns, and eventually meaning. I noted that with time these processes became more iterative as I was moving back and forth between my constantly evolving, and transforming, theoretical and conceptual frames and the textual, audio and visual materials (and the quantitative data). I argued that perhaps most significant here were the analytical synergies developing from the creative symbiosis of inductions and deductions where I both refined concepts, categories and patterns by drawing on the texts, recordings and visuals, as well as tested concepts, categories and patterns against these materials. Throughout, I highlighted challenges I had encountered. Finally I emphasized that my interpretations, findings and conclusions that made me understand how the cultivation of NERICA has influenced women, men and children's daily lives and wellbeing were developed and refined by my persistent search in the literature for ever better theories that would ever more precisely fit and explain my observations and align with my conjectures and arguments.

7 SUMMARY, REFLECTIONS, CONCLUSIONS

SUMMARY OF FINDINGS – NEW SEEDS, OLD NORMS, CHANGING PRACTICES

The key findings from the three articles now follow.

In *Article 1* we provide insights into under-researched upland rice farming systems in Uganda and the recent surge of NERICA with attention to specific similarities and differences in performance and impact of NERICA between female- and male-headed households. We use farm-level data stemming from my household survey of 302 grower households in Hoima District that allows for interhousehold comparison. We complement this data with a wealth of qualitative and participatory data that I have gathered during over 50 focus group discussions with women and men farmers and by means of several one-to-one interviews with farmers and other rice value chain stakeholders. Initially, we presented three hypotheses that we then investigated.

Our research strongly supports our first hypothesis that female-headed households are growing NERICA on smaller plots than male-headed households and arrive at a lower production. For instance, male-headed households arrive at a production about 75 per cent larger than that of female-headed households. We infer that this is partly due to their better access to land. Interestingly, headship is not related to the proportion of land allocated to NERICA, with both categories of households dedicating one third of their cultivated land to the production of NERICA. We argue that this manifests the importance of this rice to both household categories, despite their differentiated land endowments.

Stacking up against received wisdom, our research does not support the second hypothesis that female-headed households are realizing lower NERICA yields than male-headed households, given that the observed differences in mean yields between household categories were not statistically significant. Instead, both categories of households arrive at a mean yield close to 1 mt/acre (2.4 mt/ha), which is more than twice the estimated upland rice average for Sub-Saharan Africa. We trace this to that female- and male-headed NERICA grower

households in Hoima District have similar access to productive inputs (land excluded) and human capital. Hence, we argue that this could suggest that these female-headed households are not handicapped by their resource base beyond their access to land when it comes to growing NERICA.

Finally, our research strongly supports our third hypothesis that female-headed households are marketing smaller quantities of NERICA than male-headed households, as well as are paid a lower unit price. Indeed, male-headed households sell almost twice as much grain as female-headed households and earn more than twice as much money on these sales. The fact that male-headed households are paid a *de facto* higher unit price adds to the interhousehold gender gap in cash income. At the same time, we note that both categories of households market around 75 per cent of their total produce and that the money they make from NERICA sales contributes considerably to their respective overall cash income. This highlights the important role of NERICA as a new commercial opportunity for both female- and male-headed households in Hoima District. Indeed, the crop was identified as the most important income earner by both women and men farmers we interacted with during the group discussions. Given that tobacco, the major traditional high-value cash crop grown by smallholders in the district, is disproportionately grown by male-headed households, and in light of that the food crop surpluses usually marketed by female-headed households are of low value, we argue that while NERICA has turned out to be an economic opportunity in terms of cash income that for many households goes unmatched, NERICA is especially attractive for households headed by women, providing opportunities that may contribute towards more equitable production, productivity and marketing conditions between female- and male-headed households. Our contention is that NERICA is more accessible to female-headed households than are the traditional cash crops, particularly tobacco, because it is not solely perceived as a commercial crop but also a food crop with a ready, local market, and because it performs well also without the application of expensive chemical inputs.

In Articles 2 and 3, the foci are shifted from interhousehold to intrahousehold analysis and from analyzing the actual production, productivity and market performance of NERICA to underlying processes. These two articles are my

combined effort of trying to understand specific intrahousehold dynamics related to how the cultivation of NERICA influences women, men and children's daily lives and wellbeing in Hoima District. As I set out to research this crop, the absence of such analysis in the present works on NERICA became striking. This called for particularly detailed reporting on the matter, and I therefore decided to present my analysis in two separate articles even though they both deal with the same units of analysis.

In *Article 2*, I focus on the intrahousehold sharing of NERICA proceeds among grower households in Hoima District. I draw on the works of Sen (1990), Kabeer (1991, 1994), Agarwal (1985, 1997), Whitehead (1981, 1994) and Jackson (1998) to conceptualize the intrahousehold bargaining processes. My analysis is particularly informed by the accounts of more than 250 women farmers who participated in the focus group discussions and that I interviewed on a one-to-one basis.

I show how NERICA has expanded the space for women to earn money through commercial agricultural activity and provided socio-economic leverage for these women vis-à-vis men farmers. However, I argue that how the potential fortunes of NERICA translate into tangible income effects among married women depend on the degree of control these women are able to attain over the produce in relation to their husbands. I trace this to their intrahousehold bargaining power position and identify the plot setup arrangement as influential here: When the spouses have grown NERICA on a joint household plot, some of the proceeds are jointly decided over, while a good share is yet controlled by the man alone; When the spouses have grown NERICA on separate plots, the woman is usually in command of what she has produced while the man is in command of the output from his plot; Finally, when the spouses have grown NERICA on a joint household plot and the woman in addition to that has her own, the woman usually controls what she has produced on her plot while she also bargains for shares of the proceeds from the joint plot. I argue that the third scenario is the dominating plot setup arrangement and that it often materializes after the spouses have grown NERICA a few times on a joint household plot and the wife feels she has not been successful enough in bargaining for shares of the output from this plot and therefore decides to also have her own.

My findings point to that married women are more successful in bargaining for shares of the proceeds and other benefits engendered by NERICA vis-à-vis their husbands than they are in relation to the traditional cash crops like tobacco. One factor contributing to this is the way NERICA has challenged the dichotomy of (men's) high-value cash crops and (women's) low-value food crops by being a *high-value food crop*. In cultivating NERICA, women are not categorically perceived as 'unremunerated family labor' only dutifully *helping* their husbands with *his* commercial crop (as has much been the case with tobacco), but instead recognized by their husbands (and by themselves) as *contributing partners* in a joint endeavor. Thereby, they are also in a better position to successfully bargain for shares of the proceeds from NERICA than they ever were in relation to the traditional cash crops, since perceptions about a household member's contribution to household prosperity affects the perceived legitimacy of the claims s/he subsequently makes to shares of the rewards/proceeds/benefits (Sen 1990).

In *Article 3* we consider the working conditions architecture and how labor burdens are shared within households in the production of NERICA in Hoima District. Hence, with this article we shed light on specific wellbeing outcomes for women, men and children that are related to patterns of intrahousehold production relations. We draw on my household survey of 302 NERICA grower households as well as a diary study that I executed to chart specific family labor inputs in thirteen purposively sampled households. Vital data that helps us qualify our arguments was retrieved from the over 50 focus group discussions I had with farmers (of which many were interspersed with participatory exercises creating visual outputs), the artwork workshops I orchestrated with children, and the one-to-one interviews I carried out with farmers and other rice value chain stakeholders. Importantly, our analysis is grounded in the local context and the embodied and gendered subjectivities of smallholder women, men and children. Once again, the intrahousehold bargaining and resource allocation metaphor serves as a useful heuristic device. Our analysis of labor burdens is also informed by the specific work of Jackson and Palmer-Jones (1999) on body capital. Following farmers' perceptions, we examine labor intensity via a composite measure combining two separate empirical indicators: *time consumption* and *labor exhaustion*, where the former is an objective measure of the total labor input in hours and days, while the latter is a subjective measure of intensity of effort; that

is, how arduous and burdensome an activity feels to a subject in the context of his or her body capital.

Our findings reveal that while households that have adopted NERICA have become better off in economic terms, common gendered patterns for organizing farm labor in Hoima District have translated into that it is mainly women and children that are shouldering the two most labor intensive activities in the production of NERICA, namely bird scaring and weeding. The extreme labor burden that NERICA demands in bird and weed control affects women and children's wellbeing negatively by exacerbating their time poverty and energy expense. Indeed, women farmers reported to be feeling like 'slaves to the rice' unable to look after themselves, maintain the production of the food crops they usually grow, take care of the daily household chores, care for their children, attend group meetings, link up with friends, participate in functions, and so on. Children described how their education was negatively affected since they repeatedly were missing school or scaring birds instead of doing their homework. We argue that the body capital of these women and children is often already taxed, and overburdening their bodies further may impinge on their ability to sustainably improve their livelihoods over a life course, given that there are clear interactions between body capital and other forms of capital.

However, we also note embryonic renegotiations of the intrahousehold division of labor. We argue that this involves both push and pull factors. On the one hand, experienced costs of new and grueling claims on women and children's labor that bird scaring and weeding are making push women to challenge prevailing expectations of them as generally responsible for these activities. On the other, the prime role women have in the production of this lucrative crop lend them bargaining power when they are trying to alter the burden sharing arrangement. Men's vested economic interests in NERICA also make them more willing to participate in these traditionally feminine activities, at least to a certain extent. This points to that gender roles and divisions of labor are dynamic and respond to new economic opportunities and production technologies (Doss 2001).

Finally, our findings shed light on why farmers are opting out of NERICA production in some places; namely because women there are not coping with the new labor burdens.

SEEDS OF CHANGE – REFLECTIONS ON THE IMPLICATIONS FOR THEORY AND PRACTICE

My thesis departed from three propositions regarding agricultural intensification processes and development. I will now consider how these propositions come to matter in relation to my research, where my aim has been to understand processes leading to NERICA-related wellbeing outcomes among differently comprised grower households in Hoima District, Uganda, by examining inter- and intrahousehold gender dynamics. What particularly stands out in relation to my research results is how the cultivation of NERICA has *changed* these smallholder women, men and children's daily lives and wellbeing. As noted in the introduction, I broadly perceive development as *good change*. So, has NERICA engendered such?

How NERICA Comes to Matter

With my first proposition, I asserted the importance of technology-driven agricultural intensification and commercialization for broad-based development in Sub-Saharan Africa. I argued that the many smallholder farmers of the continent growing food crops hold a major potential in relation to this, following the 'small farms and food crops' proponents (see e.g. Nkamleu 2004; Djurfeldt et al. 2005, 2011; Lipton 2005; Diao et al. 2006, 2010; Binswanger-Mkhize et al. 2010; Haggblade & Hazell 2010; Hazell et al. 2010). In Chapter 3, I particularly highlighted the contributions by the *Afrint* research group (Djurfeldt et al. 2005, 2011) to the theorization of the role of smallholders in African development. *Afrint* suggests that state-driven, market-mediated, smallholder-based agricultural development generating a dynamic food crop sector will contribute to inter-sectoral diversification and increased incomes. While I have not researched inter-sectoral diversification processes, my results show that NERICA has increased cash incomes for smallholder grower households, in line with these stipulations. Moreover, I argue that the promotion of NERICA has been state-driven in that

the Government of Uganda has introduced rice-specific policies, a 75 per cent import duty on rice (under the East Africa Community Common External Tariff) and rolled out many NERICA-related projects together with their development partners. The process has also been market-mediated in that the projects have generally been managed by local contractors, such as NGOs, seed companies and processors, in a public-private partnership modality with a strong value chain focus. With rice becoming an increasingly popular food in Uganda, this is reflected in a high market demand for NERICA, suggesting favorable incentives for farmers to adopt these new seeds.

For Uganda, NERICA seems to have already helped overcome the 'tyranny of rice', as the problem of overdependence on rice imports plaguing many Sub-Saharan countries has come to be called (Seck & Diagne 2008), given that rice no longer is the third largest expenditure post in the country's import basket (Afedraru 2010). In the regional context of Hoima District, I have shown that NERICA has turned out to be an economic opportunity in terms of cash income that for many smallholders goes unmatched. I trace this to two interconnected factors: (i) that NERICA is delivering on its high-yielding potential in the socio-economic and agro-ecological context of this district, and (ii) that there is a ready market for rice in the district, which paves the way for making rice production a profitable enterprise.

That NERICA can be successfully produced without the application of expensive inputs like chemical fertilizers and herbicides, and that it needs no irrigation, suggests that it is more accessible to cash-constrained smallholder farmers than new high-yielding crops and varieties that demand such. Also, since NERICA is true breeding, farmers can recycle seed instead of having to purchase new every season. The money the households make on NERICA sales contributes in important ways to their overall cash income, with many farmers pointing out that it is their most important source of cash, enabling them to invest in various development friendly activities and items, including education, health care, enterprise diversification, housing and transport. Farmers also highlighted how much they appreciate NERICA as not only a source of cash but also food. This became even clearer in relation to farmers' narratives of the most recent market

downturn for tobacco; the major traditional high-value cash crop grown in the district by smallholder farmers.

Considering that NERICA has offered a new source of cash income that for many grower households in Hoima District goes unmatched, this is certainly a manifestation of *good change*. This suggests that the promotion of NERICA could offer a solid strategy for Uganda to achieve food security and income poverty amongst its smallholders. At the same time, there are several challenges ahead which may constrain the income poverty-reducing potential of this promising new agricultural technology in a setting where a catalyst that can help farmers move out of poverty is much needed.

First of all, NERICA drop-outs we have already observed in Hoima, Wakiso and Luwero districts may represent a challenge to a strategy that hinges on many farmers embracing the crop in a sustained manner. The reasons for such are related to the high labor inputs in the production of this rice, and I return to them in the following section.

Second of all, as noted early in this thesis, it is also difficult to predict the long-term ecological sustainability of NERICA production in Hoima District and elsewhere in Uganda. For the time being, farmers are allocating their best land to the crop. But if a point is reached in time where this no longer is possible this might translate into lower yields unless they can compensate decreasing soil fertility with external soil enhancing inputs. This suggests that more research is needed into specific ecological sustainability aspects related to NERICA.

How Gender Comes to Matter

With my second proposition, following scholars such as Whitehead (1990), Carney and Watts (1991), Paris (1998), Doss (2001), and Quisumbing and Pandolfelli (2010), I argued that processes of agricultural intensification and development are social and gendered, often prompting (re)negotiation of the intrahousehold division of labor and resources with potentially unequal effects on women and men's wellbeing due to their differentiated bargaining (power) positions. For this reason, it is critical to establish who has to work harder and

under what conditions when new productivity-enhancing agricultural technology is introduced.

The results of my research show that as households have adopted NERICA, it has mainly been women and children who have to work harder, and that they have to do that under conditions that are highly arduous and burdensome. This is *not* a manifestation of *good change*. But at the same time, I have been able to observe glimpses of renegotiations of the gendered division of labor in relation to NERICA that could contribute to more balanced and sustainable investment of household labor in the production of this new rice. I trace this to that women farmers' bargaining position in these households has been strengthened for reasons reviewed above and in the articles. Yet, in the context of Hoima District, men's levels of participation were in many cases too low to substantially alter the time poverty and energy expense that NERICA induces on their wives and children. As a consequence of this dilemma, I met several households in the district, as well as in Luwero and Wakiso districts, that had stopped growing NERICA.

Given that an extensive body of literature also suggests that women farmers, both in female- and male-headed households, often do not benefit from technological change and new economic opportunities (Dey 1985; Quisumbing 1995; Dey Abbas 1997; IFAD 1998; Paris 1998; Doss 2001; Hazell & Haddad 2001; World Bank 2001; Peterman et al. 2010a; Quisumbing & Pandolfelli 2010), it is also critical to establish who gains control over the proceeds and other benefits derived from the use of the new technology (especially within male-headed households), as well as compare performance between female- and male-headed households in relation to the new technology.

With my research I provide a powerful illustration of when female-headed households do benefit from technological change and new economic opportunities. My research shows that NERICA is especially attractive for households headed by women, providing opportunities that may contribute towards more equitable production, productivity and marketing conditions between female- and male-headed households. For instance, much research suggests that female-headed households have a weaker resource base than male-

headed households, which in turn is reflected in their worse productivity performance as measured in lower yields (Udry et al. 1995; Quisumbing 1996; Udry 1996; Dey Abbas 1997; Tiruneh et al. 2001; Alene et al. 2008; Kumase et al. 2008; Horrell & Krishnan 2009; Peterman et al. 2010b). My data does not support this technological/managerial gendered difference hypothesis. Instead, I show that both female- and male-headed households in Hoima District achieve similar NERICA yields, and trace this to that grower households headed by women in this district are not handicapped by their resource base in this regard. I argue that this shows that NERICA matches both female- and male-headed households' endowments and capabilities. This is certainly a manifestation of *good change*. It also resonates the growing recognition that female-headed households as a group need not always represent the poorest, weakest and most marginalized in a community. At the same time, I note that female-headed households have worse access to land and remunerative markets, which is of concern. Conditions allowing female-headed households to benefit from NERICA to the same extent as male-headed households require continued and concerted effort to improve women's land rights in Uganda as well as identification and resolution of factors underlying lower price per unit earned by female-headed households selling NERICA.

The results of my research also show that many women in male-headed households are more successful in bargaining for shares of the proceeds from NERICA than they are in relation to the traditional cash crops, for the same reasons as they are in relation to the division of labor. This is also certainly a manifestation of *good change*.

Considering women farmers in both female- and male-headed households, I argue that this has provided socio-economic leverage for them vis-à-vis men farmers, both within and outside their households.

I finally argue that the widely accepted perception of women as the main benefactors and men as the main beneficiaries of new agricultural technology is too simplistic. Hence, while the cultivation of NERICA clearly has *changed* these smallholder women, men and children's daily lives and wellbeing, it is more difficult to settle with a simple yes-or-no answer to the question whether

NERICA has engendered *good change*. I have shown that gender roles and divisions of labor and resources are dynamic and respond to new economic opportunities and production technologies (Doss 2001), and that the cultivation of NERICA has influenced women, men and children's daily lives and wellbeing in both positive and negative ways. In relation to this, I find it worth quoting Doss (2001):

As women's labor burdens and responsibilities increase, however, their control over their labor and output may also increase. Increased labor input may be accompanied by increased independence and control over the output. Thus, a net increase in women's well-being may result. Obviously, if a technology both decreases women's burdens and increases their independence and control, the benefits to women will be more substantial. But when there are both positive and negative effects, the women themselves must be the ones to judge the direction of the net effect. (Doss 2001, p. 2078)

In relation to NERICA in Hoima District, Uganda, many women seem to be of the opinion that while the new labor burdens associated with the cultivation of NERICA have made them into 'slaves to the rice', they have become more free (independent) and gained decision-making power in their households vis-à-vis their husbands. This was powerfully communicated by a woman during a focus group discussion in Ibanda village: 'We now have the decision power! In the past he was the one to decide, since he was the one to grow income generating crops.'

How Geography Comes to Matter

With my third proposition, I argued that the impact of new agricultural technology on women, men and children's wellbeing is highly place specific, thereby joining an extensive body of literature in doing so (Agarwal 1985; Whitehead 1990; Carney & Watts, 1991; Carney 1993; Quisumbing 1995; Quisumbing et al. 1995; Doss 2001; Carr 2008). I emphasized that to understand what works, where, when and for whom, and why, the analysis of new agricultural technology need to consider how it plays out in specific social contexts within delineated temporal boundaries.

The economic outcomes in terms of increased cash incomes for particularly female-headed NERICA grower households in Hoima District, Uganda, that I have documented correspond to what has been observed in West African localities. However, these results do not alter the need for carrying out continued gender-informed and context-specific research on NERICA. Because, while the comparative outcomes turn out similar, the reasons behind are entirely different.

Many countries in West Africa, including those researched by the Africa Rice Center, have long histories of rice cultivation. Most upland rice farmers in that region are women who have been afforded little support. Consequently, they were mainly growing traditional low-yielding upland varieties before NERICA was introduced. In contrast, many male-headed households were growing improved paddy varieties that already were high-yielding. Since NERICA is a high-yielding upland variety, this meant that the yield rent could be successfully captured by many female-headed households growing upland varieties. This explains why the introduction of NERICA into these settings has had a greater impact on female-headed households' average rice yields and incomes than on male-headed households' when calculated as surplus of production per hectare as compared to pre-adoption rice yields or as additional monetary gain per hectare of adoption (Africa Rice Center 2008b; Agboh-Noameshie et al. 2008; Diagne 2006). As the gendered 'levels of inputs' (the use of improved seed) are evening out, the male-female differences in agricultural productivity are too.

In Hoima District, Uganda, upland rice cultivation – or rice cultivation in general – has a very different trajectory; much shorter, not to say that it altogether is lacking. Therefore, in this context NERICA cannot be meaningfully analyzed in terms of a *new variety*; it is a *new crop*. As such, it was introduced in a setting where cash crop production mainly is perceived as a masculine domain and food crop production mainly is perceived as a feminine domain. Moreover, in Hoima District, the input and output markets for cash crops are often located outside the farmers' villages while markets for food crops usually are available within these villages. This has contributed to that cash crops are disproportionately grown by men farmers. By being a high-value food crop, it seems NERICA has transcended the prevailing gender patterns of crop production. With women farmers earlier on

having few opportunities to grow crops for the market that were remunerative, NERICA has proven particularly important to female-headed households.

What is more, in West Africa, the rice trajectory is first of all one on rice as food; rice is mainly produced for home consumption needs, with surpluses being sold off (although rice has become more commodified over time as market demand is growing) (Africa Rice Center (WARDA)/FAO/SAA 2008). Contrary, in Uganda, rice is mainly perceived by farmers growing it as an income earner that fortuitously also can be consumed. As such, it was introduced at a time when (i) the market demand for rice is growing, (ii) severe wilt and bacterial blight infestations had wiped out many coffee, cotton and banana plantations, and (iii) the most recent coffee, cotton and tobacco downturns were still in fresh memory. The last two aspects should have pushed farmers into actively searching for viable alternatives, and given the first aspect, NERICA proved a viable alternative for many.

A final comparison between the West African and the Ugandan experiences worth making is related to labor. Africa Rice, in explaining the rationale behind focusing on the upland ecology in developing NERICA, states that it partly can be traced to the fact that ‘The majority of upland rice farmers in the region are women, who lacked appropriate varieties to help reduce the strain of their back-breaking work’ (WARDA 2003). Also, some of the assessments of NERICA in West Africa highlight how it has saved women’s labor (see e.g. Africa Rice Center 2008b; Africa Rice Center (WARDA), FAO & SAA 2008). What I have found in Uganda is that NERICA, instead of saving women’s labor, has substantially increased it, with women farmers reporting to be feeling like ‘slaves to the rice’. Indeed, the labor intensive nature of NERICA was the most frequently raised and returned to topic by the farmers I interacted with in the focus group discussions, reflecting their concern for this. Here, it becomes relevant to understand how the intentions of Africa Rice and the experiences of (women) farmers in Uganda can be in such conflict. I trace this to the fact that in West Africa women farmers, in reporting on lighter workloads, are comparing NERICA to the earlier more labor-intensive rice varieties they were growing, while in Uganda, women farmers, in reporting on heavier workloads, are

comparing NERICA to other less laborious crops they are growing like sweet potatoes, maize and beans.

Taken together, these comparisons point the way to the underlying issues that require consideration as the uptake of NERICA and other new agricultural technology is examined in different places.

CONCLUDING REMARKS – ENGENDERED PROMISES, GENDERED CHALLENGES

With high yields and stress tolerance, NERICA comes with a promise of addressing both continental rice deficits and smallholder poverty and food insecurity. The Africa Rice Center refers to NERICA as ‘a platform for development and economic growth’ (WARDA 2005, p. 20). NERICA has also been described as a ‘miracle’ rice with the potential of becoming a locomotive in Africa’s Green Revolution (Afrol News 2002; MOFA Japan 2002; Harsch 2004; Diagne 2006; Mohapatra 2006; Olembo et al. 2010). With reference to Uganda, Kijima et al. (2006) suggest that a *NERICA Revolution* is unfolding.

In this thesis I have noted that NERICA has contributed in important ways to help Uganda overcome its overdependence on rice imports by boosting national rice production. I have also shown that for many smallholder households, especially those headed by women, NERICA has turned out to be an economic opportunity in terms of cash income that goes unmatched. I have also shown that many women in male-headed households are more successful in bargaining for shares of the NERICA proceeds than they ever have been in relation to the proceeds from traditional cash crops. *These are the engendered promises of NERICA in the context of Uganda.*

At the same time, I have identified *several gendered challenges in relation to the production of NERICA in Uganda.* These are related to, on one hand, female-headed households’ worse access to land and remunerative markets than male-headed households, which is constraining their production and market performance, and, on the other, the extreme labor burdens that NERICA demands in bird and weed control, which affects women and children’s wellbeing negatively by exacerbating their time poverty and energy expense.

The results of my research suggest that both long-term and short-term agricultural research priorities, extension services and political strategies need to address land, market and labor challenges in more equitable ways if the production of NERICA is to have a balanced impact on wellbeing of members in differently comprised households, and become sustainable among Ugandan smallholders. I argue that conditions allowing women to benefit from NERICA to the same extent as men require (i) continued and concerted effort to improve women's land rights in Uganda, (ii) identification and resolution of factors underlying lower price per unit earned by female-headed households selling NERICA, and (iii) interventions supporting a sustainable management of household labor inputs to avoid harmful labor burdens and time poverty among certain members.

My research points to the value of considering female- and male-headed households' various endowments and capabilities in specific localities, as well as differences in gendered resources, roles and responsibilities among women and men farmers (and their children) in these localities, when new productivity-enhancing agricultural technology and higher-value crops are introduced. I have shown the value of calculating household labor inputs together with economic outcomes, and of disaggregating labor burdens and proceeds within the contested terrain of the household. I argue that this can contribute to a more comprehensive understanding of the context-specific success and retention rate of a new technology. With a detailed chapter in this thesis presenting the combination of quantitative, qualitative and participatory methods that I have employed, I have also provided concrete guidance on how this can be done. This can inform those engaged in agricultural impact assessments and those researching intrahousehold economics using a bargaining approach. For all these reasons, the concern of my thesis goes beyond both NERICA and Uganda.

But I have also shown that gender roles and divisions of labor and resources are dynamic and respond to new economic opportunities and production technologies, highlighting the difficulty of establishing *a priori* how a new technology will play out in a specific locality at a specific time. Therefore, I argue that careful and contingent analysis by research organizations, donors and service providers at every stage of a dissemination project will help understand how

gendered norms and practices influence adoption, management and the wellbeing of individuals in relation to that, as well as how the adoption, management and individual wellbeing implications of a new technology may influence gendered norms and practices. This can provide important insights into local variations in technology uptake and impacts and inform agricultural development debates and donors, policymakers, researchers and service providers envisaging an agricultural trajectory of change that engages and is of benefit to both women and men, as well as their children, in differently comprised households.

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Appendix

Lund, 8 March 2012

To whom it may concern,

The authors hereby certify that the paper entitled "*The New Rice for Africa – a new commercial opportunity for female-headed households in Hoima District, Uganda*" is based on 85% / 10% / 5% contributions by the respective authors, Bergman Lodin / Jirstrom / Paulson.


Johanna Bergman Lodin


Magnus Jirstrom


Susan Paulson

Kampala and Lund, 6 March 2012

To whom it may concern,

The authors hereby certify that the paper entitled "New seeds and women's welfare – The case of NERICA upland rice and the limits of women's labor in Hoima District, Uganda" which has been accepted by *Journal of Eastern African Studies* is based on 80% / 15% / 5% contributions by the respective authors, Bergman Lodin / Paulson / Mugenyi.


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