

Closing the Gender Asset Gap: Learning from value chain development in Africa and Asia

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Acronyms

AI	Artificial Insemination
BCC	Behavior Change Communications
BRAC	Bangladesh Rural Advancement Committee
E-HFP	Enhanced-Homestead Food Production
GAAP	Gender, Agriculture, and Assets Project
IFPRI	International Food Policy Research Institute
ILRI	International Livestock Research Institute
LHW	Livestock Health Workers
MSDDP	Manica Smallholder Dairy Development Project
OFSP	Orange-Fleshed Sweet Potato
REU	Reaching End Users
OWL	Older Women Leader
SDVC	Strengthening the Dairy Value Chain
VFL	Village Farm Leaders
VMF	Village Model Farm

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Executive Summary

The past few years have seen a growing interest in strengthening the abilities of smallholder farmers, particularly women farmers, to produce for both home and the market. Although value chain analysis has increasingly come to address gender issues, there has been minimal focus on the intersection between women's asset endowments and their participation in market-oriented agriculture. This linkage is a focus of ongoing research under the Gender, Agriculture, and Assets Project (GAAP) jointly implemented by the International Food Policy Research Institute and the International Livestock Research Institute. The GAAP research documents the impact of agricultural development projects on men's and women's abilities to accumulate assets. This paper brings out the initial findings on changes in gender relations supported by the projects and explores the types of adaptive measures projects are taking to encourage more gender-equitable value project implementation.

This paper builds on that research on value chain-linked projects in South Asia and Africa south of the Sahara, namely dairy in Bangladesh and Mozambique implemented by CARE/Bangladesh and Land O'Lakes, respectively, horticultural crops in Burkina Faso implemented by Helen Keller Institute, and the expansion of orange-flesh sweet potato production by HarvestPlus in Uganda. Qualitative and quantitative data from each of these projects is used to measure men's and women's access to, control over, and ownership of key productive assets and explores the linkages between women's level of control over these assets and their ability to engage in emerging value chains.

The focus on assets rather than income is the result of recent research that has recognized the critical role of assets in both accumulating wealth and managing vulnerability. Access to, control over, and ownership of assets including land and livestock, homes and equipment, and other resources enable people to create stable and productive lives. Programs to increase ownership of and control over assets help provide more permanent pathways out of poverty compared to programmatic measures that aim to increase incomes or consumption alone. A conceptual framework developed at the start of the GAAP research recognized the importance of looking at ownership, control, and access to assets not simply at the household level, but also identifying the ways in which men and women engage with assets as individuals and jointly. The framework proposed testable hypotheses, including whether: i) different types of assets enable different livelihoods, with a greater stock and diversity of assets being associated with more diverse livelihoods and better well-being outcomes; ii) men and women use different types of assets to cope with different types of shocks; iii) interventions that increase men's and women's stock of a particular asset improve the bargaining power of the individual(s) who control that asset; and iv) interventions and policies that reduce the gender gap in assets are better able to achieve development outcomes related to food security, health, nutrition, and other aspects of well-being related to agency and empowerment

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The research illustrates both variation and commonality in men's and women's assets. While the specific types and numbers of assets that men and women individually and together identify as theirs varies from country to country, men typically continue to demonstrate more control over higher value and larger assets. Women typically own lower value assets, e.g., chickens rather than cattle.

Some of GAAP's partner projects did not initially include attention to gender asset disparities in their programming in which case GAAP provided additional support to enable partners to analyze the impact of these interventions on the gender asset gap and its relationship to achieving project objectives. For example, expanding their training program to include women from the beneficiary households in the Land O'Lakes project has resulted in women being consulted more by men in the household regarding decisions made about the household's dairy businesses. Other projects had already recognized the role of gender considerations in contributing to, or detracting from, project success, and made adaptations in implementation to respond more effectively to the local context. CARE's core programming activities in Bangladesh focus on building women's empowerment, but they found that they were able to increase women's participation in the dairy value chain by locating fixed milk collection facilities closer to producers within the project villages, even though restrictions on mobility remain a constraint for some. Results from the HarvestPlus and HKI projects suggest that women's access to land in terms of both ownership and decisionmaking affects the adoption of new varieties and agricultural practices as well as the ability to control proceeds from home gardens.

Preliminary findings suggest that the agricultural interventions studied have successfully increased the stock of both men's and/or women's tangible assets, but particularly those assets they own jointly. In addition, the projects have also increased the stock of social and human capital, particularly for women. By providing training and facilitating the return of benefits to the women who are producers and suppliers, the projects follow principles for gender-equitable value chain development. But while increases in financial, human, and social capital are clearly an important first step, other targeted support to the farmers' groups may be needed to translate these gains into avenues for the acquisition of the physical assets required to expand agribusinesses and to enter the non-production nodes of the value chain.

The findings further suggest that the successful development and operation of a value chain influences the way that people are both able to accumulate assets and the specific assets in which they are able to invest. The types of assets people have also influence the node at which they can participate in the chain. Each of these studies emphasizes the role of investments in human and social capital—through training programs and the formation and management of different types of farmer associations—as facilitating the accumulation of other types of physical and natural assets.

I. Introduction: Understanding the links between gender, assets, and value chain development

Policymakers are increasingly seeking development interventions able to achieve the dual objectives of economic efficiency and increasing gender equity. In the agriculture arena, one focus of interest centers on strengthening value chains to link smallholders to markets. Over the past few years, the question of how to promote more gender-equitable agricultural development has emerged as an explicit component of value chain development efforts (e.g., Chan 2010; Mayoux and Mackie 2007; Rubin, Manfre, and Nichols Barrett 2009). Yet many approaches remain limited in their ability to inform implementers about how to formalize and expand chains while overcoming existing gender disparities in participation and accessing inputs or services.

This paper reviews emerging lessons from ongoing impact evaluations of agricultural interventions in South Asia and Africa south of the Sahara that are embedded within emerging value chains. It explores two bodies of work—one on gender relations and asset accumulation and another on gender relations and value chain development—to learn more about how gender dynamics influence the ability to use assets in promoting women’s participation in agricultural value chains. While these evaluations are not yet complete—in most cases the quantitative endline data have not been analyzed—analysis of the baseline data and findings from qualitative work and operations research has identified areas where attention to gender norms may enhance project success.²

This review, supported by the United Nations Foundation, builds on a body of work conducted under the Gender, Agriculture, and Assets Project (GAAP) by the International Food Policy Research Institute (IFPRI) and the International Livestock Research Institute (ILRI) with funding from the Bill and Melinda Gates Foundation. The GAAP project is a collaborative effort between IFPRI, ILRI, and nine main partners³ to document initial levels of gender disparities in asset control and ownership and to monitor the effects of their development activities on a range of different assets, tangible and intangible, using both existing data and through the conduct of new surveys. The research seeks to identify the factors contributing to changes in the extent of gender

² In the nutrition program context, “operations research” aims to study the processes by which programs are implemented and interventions are delivered to intended beneficiaries. The main purpose is to identify, as early as possible in the life of a program, any shortcomings in the process that may affect the effective delivery of the intervention, and as a result, its potential impact on the expected outcomes. Thus, the overall goal of operations research is to generate the necessary information to program planners and implementers that will allow them to design and test potential solutions to improve program delivery and will lead to the timely implementation of corrective actions (Loechl et al. 2005).

³ BRAC (formerly the Bangladesh Rural Advancement Committee) in Bangladesh, CARE Bangladesh, Harvest Plus in Uganda, Heifer International (with ILRI and others) in East Africa, Helen Keller International in Burkina Faso, the International Rice Research Institute (and other partners of the Cereal Systems Initiative in South Asia), Kickstart International in Kenya and Tanzania, Landesa (Rural Development Institute) in India, and Land O’ Lakes in Mozambique (see <http://gaap.ifpri.info/> for more detailed information about the GAAP project and its partners).

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disparities in asset accumulation. The project also helps to build the capacity of the partners to measure and monitor the gendered aspects of their projects, using both qualitative and quantitative data, as well as to learn to use that data to adjust program activities to enhance actions that are narrowing the gender asset gap.

This paper looks more closely at some of the qualitative and quantitative findings from case studies of two emerging value chains in milk and vegetables. It uses baseline data and qualitative work undertaken under GAAP to illuminate:

- 1) how initial asset endowments of men and women affect their ability to participate in value chains;
- 2) how these agricultural interventions have facilitated or impeded men's and women's abilities to accumulate assets; and,
- 3) what these initial results imply for value chain development, considering the different social, economic, and cultural contexts in which these interventions operate.

Gender, Assets, and Value Chains

A value chain charts the sequence of actions and the organizational links that move a product or service from conception, through a series of steps, including production, processing, marketing, and delivery to final consumers, through to its consumption and disposal. Value chain analysis provides a focused process of data collection and interpretation to understand the new forms of connectivity between producers, buyers, and consumers in today's global food system (Kaplinsky and Morris 2000; Bolwig et al. 2008).

Initially, research on value chains focused on i) identifying how chains were governed, particularly the ability of key or "lead" firms to organize the activities along a chain and their ability to control the distribution of labor and resources within it; ii) how firms take advantage of opportunities for upgrading, i.e., improving the position and benefits of actors in the chain, increasing the number or quality of the activities that a single actor or firm provides, or improving the quality of a firm's products; and iii) enhancing competitiveness of actors within the chain or the chain itself, e.g., by developing and maintaining an edge over market rivals by offering lower costs, differentiating products and services by better quality or branding, and moving into new markets.

The implications of value chain growth for development soon emerged, with a pro-poor focus (Humphrey 2005). Attention to gender emerged only later (Bolwig et al. 2008; Mayoux and Mackie 2007; Rubin, Manfre, and Nichols Barrett 2009), despite the large literature on the gendered effects of agricultural commercialization that emerged in the 1980s.⁴

⁴ Even the comprehensive "Gender in Agriculture Sourcebook" published jointly by the World Bank, IFAD, and FAO in 2009 did not include a chapter on gender and value chains as a separate reference topic, and other recent

Addressing gender issues within value chain analysis recognizes first, that value chains are embedded in a social context. Gendered patterns of behavior define the types of work that men and to women do, the groups they join, and how resources and benefits are distributed. Thus the construction and operation of value chains reflects how gender relations work from the household to the firm. At the same time, the process of building efficient and effective value chains can also transform gender relations both within and outside the household. Introducing new technologies or new crops can change gendered relations of production with different outcomes for men and for women. When women gain access to labor-saving farm equipment, they can free up time for other productive activities. Or, in communities where land is typically owned by men, women may lose income from or access to their garden plots as new markets enhance the value of the crops grown on them and the land is repossessed (see, for example, case studies in the edited volume by von Braun and Kennedy 1994). Formalizing market linkages can shift household financial management practices; whether by channeling payments to men as household heads and account holders or by using mobile phone based payments that can enhance women's independent access to income from sales. Finally, there is a third assumption that, with awareness of how value chains and the systems of gender relations intersect, it is possible to ensure that value chain development and supporting gender equity are mutually supportive goals (Rubin, Manfre, and Nichols Barrett 2009; Rubin and Manfre 2012).

Understanding of the role of assets in economic development and poverty reduction has also been growing in recent years. Assets have been acknowledged as critical in both accumulating wealth and managing vulnerability. Access to, control over, and ownership of assets including land and livestock, homes and equipment, and other resources enable people to create stable and productive lives. Programs to increase ownership of and control over assets also help provide more permanent pathways out of poverty compared to programmatic measures that aim to increase incomes or consumption alone.⁵ Beyond their economic effects, assets may also influence the current and future wellbeing of an individual or household in a variety of ways, such as improved future orientation and outlook on life; greater social empowerment, such as improved social status and feelings of social inclusion, and enhanced civic and political engagement; decreased risk-taking behaviors and improved awareness and improved economic/social behaviors and wellbeing of offspring (Schreiner and Sherraden 2007).

contributions to setting research priorities for value chains continue to downplay or ignore the gender dimensions of the topic (see Gomez et al. 2011).

⁵ This statement draws from the work of Michael Sherraden and colleagues. Beverly et al. (2008), reviewing studies on financial asset accumulation by low-income households, state that aside from education (an investment in human capital), U.S. social policies have tended to focus on income transfers and social services that satisfy basic consumption needs, rather than measures to build the asset base of the poor. However, because most income transfers are spent on consumption, an asset-based approach could shift the focus from short-term survival to the long-term development of individuals, families, and communities.

Attention to assets in the gender literature has only in the past few years emerged as a significant area of inquiry (e.g., Deere and Ross 2006; Doss, Grown, and Deere 2008; Meinzen-Dick et al. 2011; Quisumbing et al. 2011; Raney et al. 2011). It grew out of work on tests of models of household behavior that dismantled the idea of the unitary household, creating in its place a more nuanced understanding of how, within households, incomes are not always pooled, but can be held and managed by individuals (Haddad et al. 1997). In many empirical tests of the collective vs. the unitary model of the household, assets featured prominently as a measure of the bargaining power of each spouse within marriage, whether these assets were measured at the time of marriage (Thomas, Frankenberg and Contreras 2002; Fafchamps and Quisumbing 2002; Quisumbing and Maluccio 2003), or current assets (Doss 1999). Generalizing beyond husband and wife, each household member may have access to different types or levels of assets and may have obtained them through different pathways, conditioned by social norms and beliefs, including those related to gender. Different types of assets may also have different implications for bargaining power or well-being within the household.⁶

BOX 1: TYPES OF ASSETS AND CAPITALS

- natural resource capital: land, water, trees, livestock, genetic resources, soil fertility;
- physical capital: agricultural and business equipment, houses, consumer durables, vehicles and transportation, water supply and sanitation facilities, and communications infrastructure;
- human capital: education, skills, knowledge, health, nutrition; these are embodied in the labor of individuals;
- financial capital: savings, credit, and inflows (state transfers and remittances);
- social capital: membership in organizations and groups, social and professional networks; and
- Political capital: citizenship, enfranchisement, and effective participation in governance.

Source: Meinzen-Dick et al. 2011.

A new conceptual framework highlights the gendered character of asset access, control, and ownership throughout a process of creation, accumulation, and savings or consumption (Meinzen-Dick et al. 2011).⁷ It maps the gendered pathways through which asset accumulation occurs. It includes not only men's and women's exclusively-owned assets but also assets whose control and ownership is jointly shared. Unlike previous frameworks, this model depicts the gendered dimensions of each component of the pathway, recognizing that men and women not only control, own, or dispose of assets in different ways, but also access, control, and own different kinds of assets.

⁶ Many discussions of asset portfolios (for example, Bebbington 1999; DfID 1997) only refer to the first five types of assets. For more on the inclusion of political capital see Bauman 2005.

⁷ This conceptual framework was developed by the GAAP research team and is a guiding model of its work.

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The framework generates hypotheses that can be tested empirically, including that : i) different types of assets enable different livelihoods, with a greater stock and diversity of assets being associated with more diverse livelihoods and better well-being outcomes; ii) men and women use different types of assets to cope with different types of shocks; iii) interventions that increase men's and women's stock of a particular asset improve the bargaining power of the individual(s) who control that asset; and iv) interventions and policies that reduce the gender gap in assets are better able to achieve development outcomes related to food security, health, nutrition, and other aspects of well-being related to agency and empowerment (see Meinzen-Dick et al. 2011).

This paper takes steps towards linking the gender-oriented value chain and assets approaches. It draws on the experiences of four different agricultural projects in the GAAP activity to study how the operation of a value chain influences the way that people are both able to accumulate assets and the specific assets in which they invest the incomes earned from their participation in a value chain. It also looks at whether the types of assets people have influences the node at which they can participate in the chain, recognizing that the socio-cultural context strongly determines what types of assets people may hold and what types of rights men and women have to those assets. Because the larger study is still ongoing and endline surveys are not yet completed, this paper focuses on synthesizing the results of the qualitative studies and the quantitative baseline surveys that were undertaken as part of this mixed-methods research program. In the sections below, the report examines early results from the GAAP activities in order to understand how access to different types of assets affects men's and women's ability to participate in value chains.

II. The IFPRI-ILRI Gender, Agriculture, and Assets Project (GAAP): Four agricultural project interventions

The IFPRI-ILRI GAAP activities comprise a combined capacity building and evaluation initiative that works with nine ongoing agricultural interventions implemented by different partners. Using both quantitative and qualitative methods for impact evaluation, it identifies approaches to addressing gender inequalities in the selected projects to determine which can successfully build women's assets, in the context of reducing the gender asset gap and increasing assets of the poor. The research explicitly recognizes that the importance of specific assets and the effectiveness of approaches to increase them are context-dependent, depending on the extent of market development, existing resource scarcities, the range of assets being considered, and the social and cultural norms governing the ownership and control of those assets. Targeting an increase in women's assets is an important development objective because agricultural development interventions, even if targeted to women, are not guaranteed to increase their control of assets. Non-targeted agricultural interventions are more likely to increase men's control of assets, increasing the gap between men's and women's asset endowments, but there is no guarantee that targeting interventions to women necessarily increases her asset holdings more than men's.

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The four GAAP partner projects are introduced here. The sequence of presentation moves from the livestock and dairy value chains to the vegetable value chains in different national contexts to highlight the argument that context is critical in understanding the way that gender relations intersect with both asset ownership and value chain operations.

A. Land O'Lakes, "Mozambique Gender, Agriculture, and Assets" project⁸

The Land O'Lakes Manica Smallholder Dairy Development Project (MSDDP) is funded by the United States Department of Agriculture. It operates in Manica Province, Mozambique and has two primary objectives: 1) rebuilding Mozambique's dairy industry to meet market demand, and 2) increasing incomes for smallholder farmers by participating in a sustainable dairy value chain. The program provided training in soil conservation, milk collection, marketing, and animal husbandry techniques. It set up three milk collection, processing, and distribution centers and helped establish eleven dairy associations and three dairy cooperatives. The potential beneficiary households qualify to receive a cow according to agreed-upon criteria, including being willing and able to invest their own resources in a dairy operation, to send two household members to all training courses, and able to make decisions about land use. The inclusion of another household member is a result of greater attention paid to gender dynamics by the implementors. Initially, implementors assumed that all household members benefit equally in terms of resource allocation and utilization. Thus, only one household member (typically the husband) was sent to training courses, but when this threatened to undermine project performance, a household was allowed to send two members to the training course (one of these was usually the wife).

B. CARE-Bangladesh, "Strengthening the Dairy Value Chain (SDVC)"⁹

The CARE SDVC project works with 35,000 smallholder farmers in northwest Bangladesh to improve their dairy-related incomes. It seeks to achieve this goal by removing or reducing key constraints that currently inhibit smallholder participation in the value chain: lack of farmer knowledge and coordination, weak milk markets, and limited access to productive inputs. The project helps to create dairy farmer associations, most of which are formed among groups of poor women smallholder dairy farmers. It also helps the groups to select leaders. Reflecting the focus of CARE-Bangladesh's programming, the project aimed to increase women's employment throughout the value chain, as producers, input suppliers (including as livestock health workers (LHW), and in other jobs where they are typically underrepresented (e.g., Artificial Insemination (AI) specialists, as milk collectors, as loan officers, and in transport). As of 2011, women were the majority of project participants (82 percent); they comprised 72 percent of farmer leaders in

⁸ This section is largely based on the work of GAAP researcher Elizabeth Waithanji and colleagues. "A Report on the Qualitative Gendered Assessment of GAAP/Land O'Lakes-Mozambique Smallholder Dairy Development Project (MSDDP)" (2011).

⁹ This section draws from the baseline survey report (Ahmed et al. 2009) and the midterm evaluation report (Alam et al. 2011).

the program, and 45 percent of members in producer groups. However, women formed a much lower percentage of livestock health workers and other categories of workers in the dairy value chain. At the midterm evaluation (Alam 2011), only 25 percent of LHW were women, compared to the target of 50 percent.

C. Helen Keller International (HKI), “Enhanced Homestead Food Production for Improved Food Security and Nutrition in Burkina Faso” project¹⁰

Helen Keller International (HKI) started its Enhanced-Homestead Food Production (E-HFP) program in Burkina Faso in 2010, an adaptation from the HFP programs it has carried out in Asia for the past 20 years (Hillenbrand 2010). The goal of the E-HFP program, which runs until 2012, is to improve infant, young child and maternal health and nutrition outcomes through a set of nutrition and production interventions targeted to women with children between three and twelve months of age. It sets out to achieve this through i) increasing the availability of micronutrient-rich foods through increased food production by women ii) income generation through the sale of surplus production; and iii) increased knowledge and adoption of optimal nutrition practices, including the consumption of micronutrient-rich foods . The target population of the program is thirty villages in the Fada N’Gourma Department of Gourma Province, and within these villages, 120 female Village Farm Leaders (VFL) and 1,200 female household gardeners.

The program is experimenting with the most effective way to promote behavior change through two different channels: older women leaders (OWLs) or village health committees. The E-HFP program supports mothers to start homestead gardens by providing them with inputs (chickens, seeds, and gardening materials), as well as trainings in small livestock rearing and irrigation. Furthermore, the program trains community level trainers who in turn train beneficiary women in agriculture and improved nutrition practices by using Behavior Change Communications (BCC). The E-HFP in Fada N’Gourma targets women, based on a growing body of evidence that suggests that increasing women’s control over and ownership of resources can have an important impact on child health and nutrition, agricultural productivity, and income growth (Hoddinott and Haddad 1995; Quisumbing 2003; Smith et al. 2003).¹¹ The primary assets involved in the program include physical assets (project inputs and products), financial capital (increased revenue from household gardens), social capital (through groups organized around Village Model Farms), and human capital (through agriculture and nutrition training and improved knowledge and adoption of best practices in agriculture and nutrition). This paper focuses on physical assets and financial capital, and to a certain extent on human capital, although the larger study has a more explicit nutrition focus.

¹⁰ This section is based on Behrman et al. (2011).

¹¹ Past evaluations of HKI’s Homestead Food Production programs, focusing mostly on Asia, have shown marked increases in household production and consumption of micronutrient-rich foods. While this could positively affect maternal and child health and nutrition outcomes, more evidence is required to determine *how* these programs are achieving impact and how this impact can be maximized.

D. Harvest Plus, “Reaching End Users Orange-Fleshed Sweet Potato” project in Uganda¹²

Starting in 2007, the HarvestPlus “Reaching End Users” (REU) project introduced biofortified Orange-Fleshed Sweet Potato (OFSP) in Uganda and Mozambique with the goal of increasing dietary intakes of vitamin A and reducing the prevalence of vitamin A deficiency. OFSP, which was developed by HarvestPlus, is a dense source of vitamin A, is moderately higher yielding than conventional white/yellow sweet potato varieties, but is more vulnerable to rot during dry periods. The REU project involved a multi-pronged intervention, including: distribution of 20 kg of free OFSP vines each to members of selected project farmer groups; trainings of farmer group members on OFSP cultivation; trainings of adult female members of households in the project on the nutritional benefits of consuming OFSP and other vitamin A sources; and trainings of farmer group members on marketing plus limited coordination to support marketing of OFSP roots. The analysis in this paper focuses on the Uganda dissemination effort.

The REU project involved existing farmers’ groups in the project. These groups were composed largely or entirely of women. In addition to the intervention, the project also included a rigorous randomized control trial-based component to test and document the most cost-effective method to disseminate OFSP and encourage its consumption. This project and evaluation were intended to provide a “proof of concept” of a multi-million dollar effort to support biofortification as a strategy to reduce micronutrient deficiency.

III. Men’s and women’s participation in dairy and vegetable value chain projects

This section presents a description of men’s and women’s participation in dairy and vegetable value chain projects, and the role of gendered control of assets in facilitating or impeding their participation.

The first part describes men’s and women’s roles in emerging milk value chains in Mozambique and Bangladesh under the Land O’Lakes and CARE projects, respectively, as well as the evaluation design. The CARE-Bangladesh evaluation uses two counterfactual comparison groups (eligible non-beneficiary farmers in areas where SVDC operates and eligible farmers in areas without chilling plants). The evaluation of the Mozambique dairy value chain case study compares early and late recipients of dairy cows. That is, the comparison group for those who had already received cows consists of those who had been selected to receive cows but had not

¹² This section is based on the impact evaluation report of the REU project in Mozambique and Uganda (de Brauw et al. 2010) and ongoing work under the GAAP project (e.g., Gilligan et al. 2012).

yet received any.¹³ The CARE-SDVC evaluation will eventually draw on the quantitative baseline and endline surveys (the latter was completed in December 2012). This discussion draws on the baseline (Ahmed et al. 2009) and midterm reports (Alam et al. 2011), findings from the qualitative work, and tabulations of imputed baseline assets data for SDVC and the draft qualitative report (Waithanji et al. 2011) for Land O'Lakes.

The second part of this section addresses the same issues in the Burkina Faso and Uganda projects for the vegetable-oriented value chains. Both horticulture value chain projects use a randomized control trial evaluation methodology, involving quantitative baseline and endline surveys and qualitative studies. The HKI study also included operations research (process evaluation), which was conducted after the program had been operating for one year (in 2011), and additional qualitative research focused specifically on gender roles was carried out in 2012—both conducted on two smaller groups. Results from the impact evaluation study for OFSP have been released (de Brauw et al. 2010); analysis from the qualitative work examining gendered asset dynamics in the context of OFSP adoption is also used here (Behrman et al. 2011). Because the endline survey data for HKI are currently being analyzed, the discussion of HKI's E-HFP project draws on the baseline survey (Behrman et al., 2011) and findings from operations research (Olney et al. 2012).

A. Livestock/Dairy Projects

Early research on livestock production systems reported that the contribution made by women to livestock care and lagged behind gender analysis in plant cropping systems was often ignored (Niamir-Fuller 1994; Doss 1999; Warner and Hansen 1995). Expanding knowledge about the details of men's and women's participation in livestock (and dairy) production and marketing (e.g., Ahmed et al. 2009), have confirmed that women's contributions are diverse, ranging from minimal or no input to primary responsibility for herding and managing both small and large livestock and for processing livestock products. In each case, rights of use, control, and ownership are further differentiated.

Mozambique

Gender dynamics and asset allocation in milk production, processing, and marketing: The dairy industry in Mozambique is weak, and both productivity and consumption are low. In

¹³ The control or comparison groups in the CARE-Bangladesh project are comprised of eligible but non-participant households. Two control or comparison groups of households have been created to assess the impact and to capture the potential spillover effects. Control 1 households have been selected from unions where the SDVCP is operating; and control 2 households have been selected from *upazilas* without any milk chilling plants in the nine project districts. Because most of these findings are based on qualitative work conducted among project participants, the findings reported in the paper should not be interpreted as "impact" in the sense that this term is used in quantitative impact evaluation.

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Manica, the project area, agriculture is the primary household income generating activity with 71 percent of women and 29 percent of men engaged in agricultural activities. Earnings from dairying and meat sales are the second most important source of income for rural households after sales of plant crops, accounting in some areas for up to 40 percent of total income, and 80 percent of households report owning livestock. In Mozambique, livestock were found to contribute 73.8 percent of women's asset portfolio, mostly small stock such as chicken and pigs. Men are also active in the dairy industry, but do not provide all the labor required for dairy management. Women contribute 53 percent of their time to the day-to-day care of dairy cows including milking and selling milk (Land O'Lakes 2012).

Despite their high degree of involvement in agriculture, Mozambican women are limited in their control of and access to household resources (cash, land, crops) and thus their ability to meet the minimum requirements for dairying: owning cattle and land on which to grow or collect feed or build enclosures. Cattle are typically considered to be men's property, except where women are household heads. Women do participate in and may control milking practices and milk allocation in the household, but often lack the freedom to decide how cattle are managed or what pasture and fodder resources are planted (Mucavele 2000).

Data from focus group discussions (Waithanji et al. 2011) highlighted that men and women in the MSDDP areas have different responsibilities in livestock care and management as well as milk production and marketing. Men prepare forage plots and pasture areas, build enclosures for their animals, cut grass for feed, purchase supplementary rations, clean cow teats, take milk to the collection centers, and report sick cows to paravets or technicians. Women are responsible for feeding and watering the cows, collecting fodder, making minor repairs on cattle enclosures, selling milk in local markets, and hand-dressing cows (e.g. removing ticks). Both men and women may clean enclosures and/or change dirty water. Some women who are household heads hire laborers to perform some of this work (UNIDO 2012). These tasks were reported to occupy on average less than one hour for men and four to five hours for women, although the range for both groups varied from one to six or seven hours daily. Men play an active role in infrastructure, community needs, and dairy industry and marketing.

In the study communities, focus group members who had received cows from the project reported that men were the ultimate decision makers on most cattle or dairy-related issues, e.g. about input use, production practices used, technologies adopted, attendance at trainings, joining a cooperative or association; or registration for cow distribution. Women were often consulted and could offer suggestions but did not have final authority.

Asset ownership by men and women: In this project, assets were classified into four groups: animal, domestic, production, and transport assets. Table 1 presents data from a survey of 177 households in the project area on the distribution of land and physical assets owned by

ownership type.¹⁴ Anthropological evidence and findings from the focus group discussions (FGD) agreed that most land and assets within the household are owned by men. In the Manica project area very small areas are owned by females and slightly more held jointly by both sexes. Households own mostly local breeds, with few purebred/exotic cattle and even fewer crossbreeds. Males own more heads of local cattle than females, although there is also significant joint ownership of local cattle, more than men own individually (1.56 head per household, on average, compared to 1.47 head for men). On average, males own more crossbred cattle than females, but most exotic cattle are jointly held or owned by females. Consumer durables (domestic assets) and agricultural durables/productive assets¹⁵ are mostly jointly held, although males own a large portion of nonagricultural durables and transport (e.g., cars/trucks, motorcycles, bicycles, and carts) (Table 1).

Table 1: Land, livestock, and asset ownership by ownership category, Mozambique, imputed 2008 value^a (standard deviations in parentheses)

	Total held by the household	Male	Female	Joint
<i>Number of households=177</i>				
Land in hectares	3.85 (3.79)	2.33 (3.42)	0.70 (1.32)	0.76 (1.83)
<i>(Standard Deviation)</i>				
Large livestock (cattle)				
Crossbreed cattle	0.10 (0.94)	0.02 (0.17)	0.00 (0.00)	0.04 (0.24)
Pure breed/exotic cattle	0.54 (0.81)	0.00 (0.77)	0.17 (0.63)	0.46 (0.75)
Local cattle	3.04 (5.38)	1.45 (4.08)	0.18 (0.91)	1.06 (2.89)
Total cattle	3.68 (5.69)	1.47 (4.16)	0.34 (1.14)	1.56 (3.09)
Consumer durables (domestic assets)	7.73 (7.16)	1.22 (5.62)	1.10 (3.64)	5.92 (8.22)
Agricultural durables	8.78 (8.64)	0.86 (4.73)	0.29 (1.86)	6.79 (7.25)
Nonagricultural durables (transport)	18.38 (34.52)	9.77 (25.73)	0.25 (2.88)	8.46 (25.43)

Source: Land O' Lakes Mozambique Food for Progress Program/GAAP Survey, March 2011 and April 2012 rounds.

- a. The summary statistics in the table are a proxy for 2008 asset indices of the 177 unique beneficiary households in the sample, constructed from both the 2011 and the 2012 survey information. If a household was present in both the 2011 and 2012 surveys, the indices were averaged across the two years.

FGD participants' views shed light on the nuances of asset ownership, access, and control in these communities.¹⁶ Men reported three main views, ranging from the family owning all assets

¹⁴ The Land O' Lakes Mozambique Food for Progress Program/GAAP survey was conducted in March 2011 and April 2012. The survey had 638 household level observations in 2011 and 557 observations in 2012. The table in the report, however, only contains observations for households that received cattle through the Land O' Lakes program. Ultimately there were 125 beneficiary households in the 2011 survey and 150 beneficiary households in the 2012 survey with 98 beneficiary households were in both the 2011 and 2012 surveys.

¹⁵ This category includes hoes, spades/shovels, plows, water pumps, sprayer pumps, and sewing machines. The latter are considered productive assets for those owning a tailoring business.

¹⁶ Although the meaning of asset ownership was discussed extensively, participants in the focus groups offered a varied set of definitions and no systematic distinctions between men's and women's understandings of asset ownership emerged. In the discussion, the focus appeared to be on the opportunity for access rather than attention to the distribution of benefits from asset access or ownership.

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jointly, or that men owned all assets, or that men owned some of the productive assets. Some women agreed with the position that the family owned all assets jointly, but others asserted their independent ownership of domestic assets, a claim not included in the men's responses. Other women agreed that men owned key productive assets (such as cattle) or even all assets, citing their lack of authority to take assets after divorce.

Bangladesh

Gender dynamics and asset allocation in milk production, processing, and marketing: The dairy value chain in Bangladesh is small but growing. Local cows are not very productive, imported, improved breeds are more expensive and their productivity is limited by low quality fodder and poor feeding practices (Ahmed et al. 2009). A baseline survey of treatment and comparison group households in the project areas revealed that women are responsible for carrying out the main daily activities related to milk production in most households. They feed, water, and milk the cows and also provide health care. Men provide some of the labor for cutting grass and straw and for bathing the animals. Although women provide most of the labor for daily livestock-rearing activities, they made care and sales decisions in only 20 percent of cases. Nearly 80 percent of the husbands were reported to be the primary decisionmakers on buying, selling, or leasing a dairy cow (Ahmed et al. 2009).

Table 2 presents the distribution of land and asset ownership within surveyed households as of the baseline survey round. In the project area, the Bogra and Rangpur districts of Bangladesh, land is almost totally owned by the husband (male head), with a small portion owned by the wife (in wealthier households) and an even smaller portion of land is jointly owned. This reflects the patrilineal inheritance regime and the practice of partible inheritance, where the father's property is divided among many heirs, and Sharia law, where sons inherit twice the share of daughters. Cattle, jewelry, and consumer durables are the most valuable assets owned by the household. While jewelry is typically regarded as a woman's asset in Bangladesh, and cattle regarded as men's property, the high proportion of jewelry and cattle that is considered jointly owned is worth noting. Moreover, women appear to own a relatively large share of the household's stock of cattle, in addition to sheep, goats, and ducks. This unusually high share of women's livestock ownership may occur because a large proportion of the sample consists of households who participate in CARE Bangladesh's projects, which include women's empowerment as one of their core objectives. Nevertheless, ownership does not necessarily translate to control over these jointly "owned" items; men report rights to decide whether to buy or sell livestock, even they are jointly held (Ahmed et al. 2009).

Table 2: Area of owned land and value of non-land assets owned, by type of ownership, Bangladesh, 2008 (standard deviations in parentheses)

	Owned by male head/spouse	Owned by female head/spouse	Jointly owned by male and female
	<i>(Standard Deviation)</i>		
Area of land owned in decimals ^a	88.6 (210.5)	5.2 (37.2)	1.3 (29.5)
Value of non-land assets in taka:			
Agricultural production durables	1,841 (8914)	644 (2712)	4,119 (36180)
Non-agricultural production durables	1,044 (5469)	1,524 (8001)	1,382 (4010)
Consumer durables	6,345 (18264)	2,251 (4574)	6,889 (13744)
Jewelry	1,634 (7045)	10,070 (16616)	17,699 (40279)
Cattle	19,460 (27276)	25,886 (17861)	35,838 (33520)
Goat/sheep	532 (1572)	2,448 (1908)	3,339 (3689)
Chicken/duck	305 (964)	866 (1039)	1,338 (2344)
Other	231 (5283)	2,618 (2508)	8,635 (17594)

Source: IFPRI Impact Evaluation of the Strengthening the Dairy Value Chain Project: Baseline Household Survey in Bangladesh, 2008

Notes: ^a1 acre=100 decimals. The table does not report land owned by other household members, land owned jointly with nonmembers, or land that is rented out.

B. Horticulture Projects

In contrast to the lack of recognition of women's involvement in livestock value chains, women's involvement in the production and marketing of high-value vegetables has long been a central theme in the value chain literature. Probably the most famous cases are those of women's participation in the export-oriented horticulture value chains of French beans and cut flowers from Kenya to European markets (e.g., Dolan and Sunderland 2006).

Burkina Faso

Gender dynamics and asset allocation in vegetable production, processing, and marketing in the E-HFP project: Creation and formalization of value chains in several crops have been emerging in Burkina Faso, with greater emphasis on livestock and grains rather than horticultural crops. Vegetables and fruits continue to be marketed in small quantities through local markets for local consumption. Most vegetable producers are small holders who cultivate plots of less than 0.5 hectare. Fruits are produced primarily on small orchards ranging from 1 to 10 hectares (World Bank 2007).

Although the Government of Burkina Faso has adopted several policies to promote gender

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equality in recent years.¹⁷ women have less decision-making power and less access to economic resources, education, and services such as microcredit. Even though women contribute substantially to the rural agricultural economy, they have less access than men to assets such as land, agricultural inputs, equipment, technology and credit (Gouvernement du Burkina Faso 2010). They usually can only claim land ownership under certain conditions (such as widowhood or living with dependent children), but these conditions vary across regions and ethnic groups.

Although gender roles in agriculture and livestock are complex and vary between different cultures and regions within the country, it is common for men to dominate the trade of and decision-making over livestock, especially with regards to high value animals such as goats and cows, and they often control the income generated from the sale these animals. They are also involved in growing cereals and at times in (seasonal) paid labor.¹⁸ Although preparation of land/soil is often conducted by men, women are engaged in much of the care for and cultivation of crops, harvesting and preparation of food for the household, and care of the children. They are also often responsible for collecting water and engaging in the trade of (often lower value) products at local markets.

Consistent with the above, the vast majority of landowners in Burkina are men, and in nearly all of Burkina Faso's ethnic groups, "women are restricted in their rights to use and dispose of property" (Kevane and Gray 1999: 2). Women are often only able to gain access to land in certain circumstances such as inheritance, although customary tenure rules vary depending on ethnic group, region, and other contextual factors. Kevane and Gray (1999) point out that while women usually do not have direct ownership of or control over land, "women in many ethnic groups do farm small plots independently of their husbands. Women obtain these fields from their husbands, and in many cases are said to have a right to fields" (Kevane and Gray 1999: 8). Thus, while women may not own the land, they may have control over the cultivation and sale of the crops they grow on this land, and in some cases, may grow high value crops, albeit on very small parcels of land (Kevane and Gray 1999; Udry 1996).¹⁹

Similar patterns are found in Fada N'Gourma, the mostly rural region in the N'Gourma Province in southwestern Burkina Faso, where HKI's Enhanced-Homestead Food Production (E-HFP) program was implemented in Mossi and Gourmantche villages.²⁰ A baseline study carried out in 2010 as part of the program's impact evaluation showed that agriculture is the main source of

¹⁷ These include the creation of the Ministry of Women (2004), the adoption of a National Policy for the Advancement of Women (la Politique Nationale de Promotion de la Femme) (2004), a law setting quotas for municipal and legislative elections (2009), and the adoption of the National Gender Policy (Politique National Genre) (2009).

¹⁸ See http://www.fao.org/docrep/V7947e/v7947e06.htm#P76_5790.

¹⁹ Udry's 1996 study finds that the crops grown on women's plots are often of higher value than those grown on men's plots - even though the size of women's plots is about one tenth of the household family plot (Kevane and Grey 1998: 9).

²⁰ The Mossi and Gourmantche are two of Burkina Faso's many different ethnic groups.

livelihood for its population, with sorghum, millet, and beans produced most often (Behrman et al. 2011). Households on average cultivate multiple household plots, but face constraints of water availability and inputs that “limit the production potential of households and constrain both the food availability and dietary diversity of households” (Behrman et al. 2011: 30). In Fada N’Gourma, men are also generally responsible for buying and selling high value livestock like goats, and women are engaged mostly in cultivation, harvesting, and preparing of food, as well as collection of water and fire wood, and care of their children.

The baseline study results are consistent with the above on the control over and value of different assets (Table 3).²¹ Men cultivate larger land areas than women, but women farm one more plot than men, on average. Production on men’s plots is about six times more than that on women’s plots, possibly reflecting more intensive application of fertilizer and manure. Men also hold more small animals and large livestock than women, both in terms of the value of the animals as well as the number of animals. Men own more pieces of agricultural equipment, but women own more durables. Although overall men held a fewer number of household assets than women, their value was significantly higher than that of the assets held by women (Behrman et al. 2011).

Table 3: Characteristics of agricultural production and asset ownership by gender, Burkina Faso 2010 (Standard Deviations in parentheses)

	Men	Women
<i>Number of households=1767 (Standard Deviation)</i>		
Household land		
Hectares cultivated	2.8 (2.4)	0.8 (1.3)
Average number of plots	2.7 (3.3)	3.7 (4.9)
Total household production (kg)	1,833.3 (2362.4)	320.8 (559.4)
Input utilization by plot		
Fertilizer	18%	4%
Pesticides/herbicides/insecticides	4%	6%
Manure	41%	11%
Livestock holdings		
Number of small animals	20.6 (20.8)	4.7 (6.0)
Number of large livestock	5.5 (7.9)	0.2 (1.2)
Other Assets		
Number of durables	9.7 (9.3)	28.6 (18.1)
Number of agricultural capital equipment	6.7 (5.0)	2.7 (2.5)

Source: Helen Keller Institute (HKI), “Enhanced Homestead Food Production for Improved Food Security and Nutrition in Burkina Faso” Baseline Household Survey 2010.

²¹ The baseline questionnaire was designed to collect information on men’s and women’s assets and did not have a category for joint ownership, based on the common phenomenon of “separate purses” in West African households. Subsequently, new research in West Africa has shown that there may be a small degree of joint asset ownership. In Ghana, e.g., individual asset ownership dominates, with up to 75 percent of assets owned individually. Most assets, with the exception of businesses and jewelry, are owned individually by men, and ownership by the principal couple is the exception (Doss et al. 2011). The endline questionnaire followed the same protocol for collecting male and female asset ownership, for comparability with the baseline.

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The operations research revealed that beneficiary women were primarily responsible for care of the garden (84 percent), with the assistance of co-wives (27 percent) and husbands (24 percent). About two-thirds of husbands reported being responsible for caring for chickens, and 9 percent of beneficiary women reported to be primarily responsible for the care of chickens, although about a third stated that they assisted their husbands with these responsibilities. Time spent caring for the garden conflicted with other activities for about one quarter of beneficiaries (26 percent), such as domestic household chores, cooking, working outside of the home, commerce, childcare and collecting wood. Care of chickens created less time-use conflicts, in line with reporting that this requires less time and was primarily the spouse's responsibility. Approximately 75 percent of beneficiary women made decisions on sale of vegetables and were able to keep the income generated from these sales, but only about half were in a position to decide to sell or keep proceeds from the sale of chickens.

Uganda

Gender dynamics and asset allocation in vegetable production, processing, and marketing:

The value chain in potatoes, primarily English potatoes with a smaller proportion of red potatoes, is still rudimentary and local. Sweet potatoes, although an important staple, are not a significant portion of the marketed production (Wang'ombe 2008), although a market for sweet potatoes is emerging, and the horticultural value chain, in general, is fairly well developed, with larger farmers exporting fruit, vegetable, and flowers to Europe and the Middle East.

Women in Uganda typically make decisions regarding the composition and quality of food served to children, so the REU project accommodated existing gender roles by directing information on the nutritional benefits of consuming dietary-rich sources of vitamin A like OFSP towards women. Although women have primary control over food choices, men and women have complex and shifting roles concerning crop choice and on-farm labor supply in smallholder agriculture in Uganda. Women also play a vital role in the diffusion of food-based agricultural technologies (Behrman 2011).

The REU project was implemented in three districts in Uganda, two of which (Kamuli and Mukono) were similar in gender roles in agricultural production, with the other (Bukedea) having greater male control over agriculture (see below). Group interviews confirmed that decisionmaking over agriculture is complex. Both men and women say that in their capacity as household heads, men have the final say on crop type and crop quantity for a given plot. Yet in practice, participants reported that decisions are commonly made after discussion and consultation between husbands and wives. Women reported that the only exception is that women are solely in charge of decisions about which and how much of a crop to grow on plots controlled and managed by women, while men reported that they have decisionmaking authority even over such plots (Behrman 2011).

Similar complexity surrounds the responsibility for marketing the sweet potato vines. Respondents from Kamuli, both men and women, reported that men take it to be sold because they are the household head and are responsible for finances. On the other hand, in Bukedea men and women concur that it is the women who bring OFSP to the market because sweet potato is locally described as a “women’s crop” (Behrman 2011).

Asset ownership by men and women: In the REU project sites in Uganda, land is owned mostly by husbands, compared to wives (see Table 3). The predominance of male landownership is similar to other countries in our case studies. However, unlike in Bangladesh where most of the households’ assets are considered jointly held, and similar to Mozambique, the largest proportion of Ugandan household assets is held by the husband (head), followed by jointly owned assets. A striking feature of this table is the very low fraction of household assets that are owned by the wife. While wives have access to a larger share of assets through joint ownership with the head, the fraction of assets exclusively held by the wife is a meager 10 percent. We further examine the distribution of the household’s nonland assets across four main categories. Household’s nonland assets consist mainly of consumer durables, which accounted for over three-quarters of nonland assets in 2007. Of these the large majority is owned by the husband with about a quarter jointly owned by the husband and wife. Agricultural durables account for a meager share of total nonland assets. Husbands account for more than 50 percent of these and wives about 12 percent. Jewelry constitutes less than a percent of total nonland assets. This sharp contrast to Bangladesh is probably due to cultural differences where in Bangladesh even the very poor own some gold. In Uganda, wives own one-fifth of the household jewelry but the husband still owns the majority. Livestock constitutes 18.2 percent of total nonland assets and while wives own 26 percent of total livestock value, it is still a little over half the share owned by husbands.

Table 4: Land owned, value of nonland assets, and share of asset categories, by category of ownership, Uganda 2007 (standard deviations in parentheses)

	Owned by husband	Owned by wife	Jointly owned
<i>Number of households=1594</i>		<i>(Standard Deviation)</i>	
Owned land (in acres)	1.52 (2.08)	0.09 (0.32)	0.47 (1.31)
	Asset holdings (in thousand Ugandan shillings)		
Total value: nonland assets	1870.89 (2473.91)	246.13 (703.72)	800.03 (1829.25)
	Ownership shares of major household asset categories		
Consumer durables	62.73 (39.15)	11.05 (19.58)	26.22 (39.75)
Agricultural durables	50.89 (46.08)	11.93 (26.43)	37.18 (47.89)
Jewelry	54.04 (47.04)	20.89 (37.05)	25.06 (42.97)
Livestock	55.25 (42.69)	26.30 (36.15)	18.45 (37.04)

Source: HarvestPlus Reaching End Users Orange-Fleshed Sweet Potato Baseline Household Survey, 2007. Descriptive statistics are presented for the pooled sample of treatment and control households.

These data were used to create estimates of the share of land and nonland assets exclusively owned by women, exclusively owned by men or jointly owned. These measures of relative

bargaining power within the household are summarized in Table 4. Women have exclusive control of only 16 percent of land assets and 22 percent of other assets. Respondents reported that 25 percent of land assets and 31 percent of nonland assets were jointly owned by men and women. By district, there is considerable variation, with a clear pattern of much higher share of land (59 percent) and nonland assets (62 percent) under exclusive control by men in Bukedea.

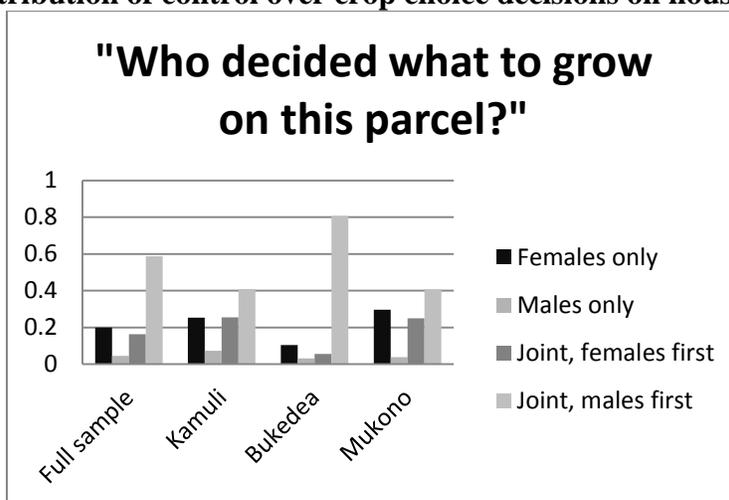
Table 5: Sex differentiation in asset ownership at baseline, 2007

	Male exclusive ownership	Female exclusive ownership	Joint ownership
Share of value of land owned, 2007	0.591	0.161	0.248
Share of value of nonland assets owned, 2007	0.488	0.219	0.308
<i>By District</i>			
Land, 2007			
Kamuli	0.457	0.204	0.349
Bukedea	0.739	0.108	0.154
Mukono	0.550	0.182	0.268
Nonland assets, 2007			
Kamuli	0.402	0.215	0.400
Bukedea	0.623	0.164	0.227
Mukono	0.420	0.281	0.317

Source: Gilligan et al. 2012

Similar to the Mozambican case where ownership and control are not necessarily equivalent, there are differences in land ownership and decisionmaking in agriculture. Figure 1 shows the response from the survey to the question, “Who decided what to grow on this parcel?” in the first season of 2009. Respondents were allowed to give up to two responses. The figure shows that the most common arrangement, on nearly 60 percent of parcels, is that control over crop choice is joint but that the male takes the lead in making the decision. However, on 20 percent of parcels only women make decisions on crop choice, which in part reflects the number of single-headed households headed by females. However, only 4.5 percent of parcels are reported to be under exclusive male control, while the remaining 16.5 percent of parcels are under joint control with a woman taking the lead in the decision making. The figure also shows that in Bukedea, the pattern of male dominance of control over crop choice decisions is magnified, with more than 80 percent of parcels under joint control, but where the male takes the lead in the decision. As will be revealed in the subsequent discussion, these differences in land ownership and control have implications for OFSP adoption.

Figure 2: The distribution of control over crop choice decisions on household parcels



Source: Gilligan et al. 2012

IV. Asset ownership, control, and participation in agricultural value chain projects

Underlying patterns of asset ownership and control condition men's and women's ability to participate in, and benefit from, these value chain projects. Projects can be consciously designed to counter existing gender disparities, but there is also a strong possibility that they may unwittingly exacerbate gender gaps in assets. Gender differences in asset ownership and control may also affect the take-up of interventions, particularly if decisions need to be made about the adoption of new technologies or allocation of time towards new activities. In this section, we examine how gendered patterns of asset ownership and control affect the impact of these value chain projects, making comparisons within projects of similar type. While these are not quantitative impact estimates, they provide insights into the potential impact of interventions on the gender asset gap.

A. Dairy value chain projects

Ownership of or access to a dairy cow is an obvious precondition to participation in the dairy value chain as a producer. The Land O' Lakes project in Mozambique distributed dairy cows to existing cattle owners, while CARE-SDVC project in Bangladesh did not distribute dairy cows, but linked smallholder dairy producers to other actors in the value chain. Within the Land O' Lakes project, most focus group participants, both men and women, agreed that men owned the cows distributed by the project in households headed by men, while women owned them in female-headed households, and that these owners kept the proceeds from sales of their animals. A small group of women voiced the position that women in households headed by men did on occasion also own cows, even if the animals were registered in the man's name. And some women claimed joint ownership for the animals, regardless of household headship. Most respondents stated further that whose name the cow was registered under did not influence the

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management of the animal. There was limited interest in exploring options of joint registration under the name of both husband and wife (Waithanji et al. 2011). In the CARE-SDVC project in Bangladesh, among the 12.4 percent of women who owned cows at the start of the project, 2.3 percent of them now own additional cows. A few noted that they purchased cattle of their own from the proceeds of milk sales. Also, some groups have bought improved breed cattle for group members with their savings—these cows are jointly owned by the group (Waithanji et al. 2012).

Aside from directly or indirectly increasing ownership of dairy cows, the projects also increased beneficiaries' human capital through training. In Mozambique, the project provided training on animal and fodder husbandry techniques, which included milk hygiene. Men were the primary trainees and women secondary. For men, skills acquired through training contributed to their enhanced income and improved lifestyles whereas for women, skills acquired in training enabled them to improve their family's nutrition, and putting their knowledge on hygiene to practice enhanced their self-esteem. In Bangladesh, the project provided training on farm management, awareness in dairying and improving breeding (through artificial insemination). All the participants said that their knowledge of better farm management increased and they are adopting improved practices. Some women have also been trained as livestock health workers.

Focus group discussions indicate that both dairy value chain projects have increased dairy incomes. In the Land O' Lakes project, farmers who previously received incomes averaging \$37 a month from crops are reporting average monthly incomes of \$106 from dairy farming. However, there appear to be large variations in patterns of control over the income from milk sales, which in most cases is paid monthly at the collection center. There were reports of i) sole control by men; ii) joint control by husband and wives; and iii) control of income by women to manage household expenses. Both men and women received income from sales of milk to neighbors through informal markets. Prior to the SDVC project, few women sold milk regularly. Now, the project identification and training of milk collectors has significantly expanded women's outlets for milk sales. Owing to the value placed on female seclusion in Bangladesh, women were reluctant to travel long distances to take milk to market. Under the SVDC, the milk collectors come door to door to collect milk on a daily basis and return with milk payments on either a weekly or monthly basis. Milk collection centers are also located within villages; collected milk is then taken to a local chilling plant. Women report earning an average monthly income from milk sales of US\$ 13.27 and report using it to purchase cattle feed, medicine, treatment of disease, and AI services. Women in the associations have also saved money in those groups and organized services for their groups such deworming and vaccinations. Others report using their milk income to pay school fees.

Whether participation in a value chain project changes patterns of decisionmaking within the household is a question central to gender analyses of value chains. In the Bangladesh project, most women reported that they have control over milk sales income and they can manage it

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independently. However, while both men and women believe that women have easier access to small levels of credit than do men, women do not seem to use it to generate income. It was reported that women give these funds to their husbands who purchase assets for themselves. This is a point worth further investigation. In the Mozambique project decisionmaking authority within the household appears to have remained unchanged. Men reported that disagreements over decisions related to the cow distributed by the project created a risk of losing the asset. As a result, after consultation between husband and wife, the husband is said to have final decisionmaking authority. In households headed by women, the women have greater autonomy.

Increased labor demands, particularly for women's time, often occur as a result of participation in dairy value chain projects. In the Land O' Lakes project, the introduction of the dairy cows to project beneficiaries increased the workload and created a larger management burden for both men and women, but particularly for women. The improved cows provided by the project are milked twice daily, in the early morning and in the late afternoon. Morning milk is sold to the milk collection centers (typically handled by the men) and evening milk is either consumed at home or sold to neighbors in an informal market (typically handled by women). Women reported needing to plan their workdays carefully and delegating responsibilities to other household members in order to care for the improved cows. Men noted that they had had to employ laborers to do the extra work previously done by their wives. Women noted difficulties in managing their time to accomplish household, field, and dairying tasks because of the need to feed and water their cow(s). Increases in both income and the quality and quantity of milk consumed by the household are perceived to offset these increased labor demands. Similarly, in the SDVC project area, project participants reported that the labor demands linked to milk production had increased. Following the recommendations for improved feeding and care practices has resulted in an additional 15 to 45 minutes of work daily, depending on the number of dairy cattle owned. Although no time allocation surveys were conducted, project participants reported that nearly all of the labor increase is borne by women in the household; men's increased contribution is reported to be low because men spend only a few days a month tending cows, whereas women tend them daily.

Through group training activities, both of these projects have also built women's social capital. Although the Land O' Lakes project initially excluded women from participation in its activities, after adjustment in the participation guidelines, women were encouraged to join the trainings as the second member in cow-receiving households. However, the increase in women's labor in caring for the cows also negatively impacted the time available to meet with other members of the community. Introducing labor-saving methodologies and bringing women participants together for training to expand their networks can be strengthened in the future. The SVDC project may have built on existing social capital, owing to the group-based approach of CARE's work, particularly in Bangladesh, and because producer groups—which are mostly, though not exclusively, composed of women, are not only trained together in improved practices for caring

for dairy cows, but also save money as a group. The women in these groups are quite strategic in choosing male members—typically a husband of one of the members, who is literate and numerate, and who can therefore contribute some skills to the group which the women would not otherwise have. Some producer groups have used group savings to purchase dairy cows in the group's name, indicating that social capital has helped catalyze the accumulation of livestock capital. In fact, SDVC has a very well-developed monitoring and evaluation system that tracks group performance in various aspects of dairy management. Group-based approaches to service delivery are commonplace in Bangladesh; membership in both local and international NGOs tends to be pro-poor, and women are more likely to participate in these NGOs than men (Quisumbing 2009). The value of these widened social networks and their role in supporting women's participation in the milk value chains has not yet been a focus of the GAAP research, but it appears to have had a positive impact. A wider social network can be utilized to access credit, information, and buyers. It can potentially be mobilized to find labor to overcome time constraints whether for home or in business tasks. Additional research on the importance of social capital for promoting women's value chain participation is needed.

B. Vegetable value chain projects

Unlike the dairy value chain projects, both vegetable projects had explicit nutrition objectives, that is, to build this form of human capital within the target population. However, attaining these nutrition objectives depended on ownership or control of other assets, particularly land. Decisions to adopt biofortified varieties or to engage in vegetable production will depend on access to land on which to grow these crops as well as decisionmaking on what type of crop to grow. Such land tenure arrangements are especially complicated in Africa, where there may be multiple owners of land within the household, and ownership of a plot of land does not necessarily mean primary decisionmaking power on that plot, nor actual cultivation of that plot. This is well illustrated in both Uganda and Burkina Faso projects. Recall that in the Uganda REU project area, men had dominant ownership of land, and men and women may have different degrees of decisionmaking power over land parcels. Table 6 shows the probability of OFSP adoption and area planted by gender-differentiated control over the land parcels. On average, the probability of adoption of OFSP in 2009 is higher for parcels under exclusive female control than for parcels under exclusive male control or under joint control but with the male taking the lead. Area planted under OFSP is also higher on average on parcels exclusively controlled by women than on those exclusively controlled by men. Women may be more inclined to adopt OFSP, but these simple differences in means do not control for selection into parcel control within the household or the joint decision of the household concerning what to grow on all of its parcels (Gilligan et al. 2012). Further analysis of adoption decisions, taking into account control of parcels within the household or decisions regarding what to grow is ongoing.

Table 6: Mean probability of OFSP adoption and area planted by gender demographics

	Females only	Males only	Joint, females first	Joint, males first
	(1)	(2)	(3)	(4)
Grow OFSP on this parcel	41.6 ^{a,c}	28.7	47.4	35.9
OFSP area planted on this parcel (Ha)	0.073 ^b	0.054 ^b	0.092	0.099

Notes: a. Significantly different from (2) "Males only".
b. Significantly different from (3) "Joint, females 1st".
c. Significantly different from (4) "Joint, females 1st".

In the Burkina Faso HKI project, ninety-five percent of beneficiary women reported themselves to be the owners of their gardens, but only one woman claimed to own the land on which the garden was planted. The land for the garden was usually owned by the husbands (44 percent), another village member (28 percent), or another male family member (21 percent). Approximately 75 percent of beneficiary women were able to make decisions on sale of vegetables and were able to keep the income generated from these sales. In relation to use of inputs and related products, most beneficiary women maintained control of seeds. Similar results were reported for decisionmaking authority about sale of vegetables and chickens, and in relation to who keeps the revenue generated from these sales.

Village Model Farms (VMF) were also a part of the HKI project. HKI facilitated agreements with land owners in beneficiary villages who ceded land to women for the duration of the project. This was done in anticipation of the risk that husbands may have wanted to take control of the project once income generation increased. These transfers of land may have an influence on individual or community opinions on women's land ownership.

The HKI project also had a small component on small animals, owing to the desire to diversify diets using animal sources. As mentioned earlier, within the project area, husbands owned the majority of higher-value animals (chickens, goats). Husbands kept most of the revenue from the sale of these in both beneficiary and control villages, whereas women tended to have more control over low-value assets such as seeds and vegetables. Women appeared to have high levels of decision-making power with regards to the homestead gardens, although the land used for these gardens was mostly owned by their husbands. After one year of the project however, in 2011, there appeared to be more joint decision-making with regards to the use and sale of chickens in the beneficiary villages as compared to control villages. However, little seemed to have changed with regards to ownership and decision-making authority related to goats, which was primarily in the hands of men in both control and beneficiary villages.

Were the vegetable value chain projects successful in attaining their nutritional objectives and building this form of human capital? An impact evaluation found that conditional on adoption of OFSP, children aged between 6 and 35 months in Uganda and Mozambique increased their

intakes of vitamin A, and increases in OFSP consumption fully accounted for increases in vitamin A intakes among these children. The REU intervention had impacts on young child-feeding and vitamin A knowledge among mothers, but the impacts are relatively modest in magnitude—partly because mothers in Uganda already had a high level of knowledge about vitamin A at baseline. While the mothers cite the project as a source of information on child feeding practices in general, the greatest positive impacts are found in specific practices. The REU project had positive impacts on knowledge about breastfeeding for two years and that first water and food must be given at 6 months among mothers in the treatment models. Mothers in the treatment groups are 34 to 37 percentage points more likely than control group mothers to report extension agents as a source of information about child feeding practices. However, the evaluation observed no evidence of impact on fathers' knowledge of child feeding practices—a point to which we return in the next section.

In the HKI project, after one year of program implementation, operations research findings (Olney et al. 2012) show that beneficiary women reported an increase in their knowledge of new gardening techniques, enabling them to grow vegetables in their gardens year round. Ninety percent of these women beneficiaries reported to have established new gardens since the start of the program. They believed that their increased production improved their own and their families' health. They also reported having gained knowledge of poultry production. In addition, these women reported having acquired new knowledge of nutritional practices. Approximately half of beneficiaries specifically stated that they learned about the importance of immediate breastfeeding (53 percent), exclusive breastfeeding for the first six months of life (48 percent) and practices related to complementary feeding (71 percent). Beneficiaries were more conversant on topics covered in the trainings than non-beneficiaries, and were also more likely to be able to name at least two types of vitamin-A rich and iron-rich foods. In addition, the majority of beneficiaries interviewed (93 percent) believed the nutrition trainings contributed to: gaining new knowledge (29 percent); adoption of better practices; enabling them to take better care of their children (32 percent); improving the nutrition of themselves and their children (29 percent); and to protect their children against common illnesses (16 percent).

Similar to the livestock projects, the increased demands on women's time were an issue identified by the operations research. Although the women were generally enthusiastic about the E-HFP program and its benefits, and all but one said that they planned to continue participating in the program, about half did report having to make sacrifices in other areas. Five percent reported they had other work to do²² and 17 percent said that participating in the activities associated with the E-HFP program was too time consuming (Olney et al. 2012).²³

²² N = 7 out of 134. These figures are from the first round of the operations research data, conducted one year after the baseline survey

²³ N = 23 out of 134. These figures are from the first round of the operations research data, conducted one year after the baseline survey.

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Conducting many of the intervention activities through farmers' groups that were composed mostly or only of women enhanced the opportunity for networking both within and across villages. The HKI village model farms were sites to which women came for training to improve their agricultural productivity and farm management. Purposive counseling by older women leaders or by village health committee members as part of the behavior change communications activities also introduced a new form of interaction among village women (Behrman et al. 2011). In the REU project, the density of the networks within the community seems to have had an impact on the likelihood of farmers who were not members of the participating farmer groups to adopt the orange flesh sweet potato cultivation. McNiven and Gilligan found that:

[first,] offering the crop to many households in just a few communities may better promote diffusion than offering it to just a few households in many communities. Second, dissemination of the crop to households who are neighbors of many households may be more effective than dissemination on other grounds. Third, dissemination to households who are neighbors of many households that are predicted to have high potential OFSP productivity may be most effective (2012: 59).

V. What can projects do to improve gender equitable outcomes?

Some of GAAP's partners did not initially include attention to gender asset disparities in their programming; GAAP provided additional support to enable them to analyze the impact of these interventions on the gender asset gap and its relationship to achieving project objectives.

The Land O' Lakes project was not sensitive to gender issues at the design stage of its Phase 1 project, but project designers and implementers realized that project success would be jeopardized. To ensure greater female inclusion in project activities and to empower women in household decision making and management roles, Land O'Lakes adopted a mandatory criterion to include two members per household in capacity building activities required before a household could receive a dairy cow through the project. The training sessions with farmer groups also promote gender-equitable approaches. These strategies are being implemented based on findings from the from the GAAP initial assessment (Nhambeto, personal communication). Findings from the GAAP baseline indicate that by introducing the dairy cow as a household asset, the project has led to women's increased involvement in dairy management. This, in turn, has resulted in women being consulted more by men regarding decisions made about dairy businesses at household level. These lessons have been considered by Land O' Lakes in planning the second phase of its project, which will pay greater attention to involving women at the household level and within dairy associations and cooperatives.

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In other cases, whether at the design stage or at project initiation, projects had already recognized the role of gender considerations in contributing to, or detracting from, project success, and had included adaptations to the local environment and sociocultural context. For example CARE's core programming in Bangladesh includes activities to empower women. The midterm evaluation of the SDVC project noted that the project's "group approach to capacity building has proven to be useful to building confidence of poor rural women and should be continued" (Alam et al. 2011: 35). Some adaptations, even if not intended to redress gender biases, also increased women's participation. Although most households sold milk within the village to either milkmen (who went door-to-door) or to the informal market (Ahmed et al. 2009) at baseline, locating fixed milk collection facilities (including testing for quality using a lactometer) more conveniently within the village benefits all dairy producers because it reduces transactions and transportation costs and also ensures quality of the milk. By the time of the midterm evaluation, there was a perception that the overall quantity and quality of milk had improved as a result of the project (Alam et al. 2011). The milk collection facilities within the village, however, do not directly reduce the barriers to women's mobility outside the village—the milk still has to be transported to the chilling plants which are typically located in larger market areas—but at least they offer a way to sell milk with lower transactions cost while assuring milk quality.

Attempts to increase women's participation in the value chain have not been uniformly effective. While SDVCP has done well with respect to women producers—as of the midterm evaluation about 79 percent of the project's producers are women—only 25 percent LHW are women versus the target of 50 percent, while only 17 percent of milk collectors are women (Alam et al. 2011). Rearing dairy cows within the Bangladeshi homestead is a traditional, acceptable, and respectable task for women, but being a livestock health worker or collector is a nontraditional occupation. Cultural barriers to becoming a livestock health worker appear to be less than those associated with being a milk collector. Women LHWs interviewed as part of the midterm evaluation (Alam et al. 2011) have been successful, and men also said that being a LHW is an honorable profession, and that a woman will be recognized for the money she earns and the service she delivers. A female LHW can be a role model for other women and would be able to gain access to women within their homesteads because women feel more comfortable talking to another woman about dairy problems. However, perceptions about her physical security, for example, attending to late night calls, traveling great distances to attend to clients, and domestic responsibilities remain barriers to increased involvement. Concerns were raised about how in-laws would perceive a profession that required the woman to be away from home, interacting with many people. It might be easier to convince better-off families to support women in these new employment areas since poorer families perceive that the women's role is primarily in the home.

Perceptions of the communities about women working as collectors were mixed; collectors said that milk collection would be difficult for women because physical strength is required to drive

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vans, collect and transport the milk containers. Milk collection would also involve taking the woman away from her home for an extended period, over great distances. However, fixed milk collection points could be set up at convenient locations within the village, and informal processors report that using collection points within the villages might be possible since many women go to the market to sell milk anyway (Alam 2011: 35). However, transporting milk to the chilling plant remains more difficult for women. While transporting the milk is a physically difficult task, key informants plant staff members expressed concerns that to be a collector, the person needs to be swift in transactions and building the business to increase coverage —many had doubts whether a woman could do this on her own. While these expressed misgivings may arise from real logistical challenges (distances, need for physical strength, numeracy), they may reflect even more sharply the limitations of cultural perceptions of women's roles.

Restrictions on women's mobility continue to be a barrier to women's participation in the Bangladeshi context. One challenge faced by the project occurred when the farmer leaders and women LHWs were required to attend residential training away from their homes. Reluctance of the guardians and spouses of the women was overcome by allowing them to observe the training and training venues to dispel their concerns over the women's safety. According to the project's gender manager, the project has been successful in tackling most of the problems including a few issues of domestic violence. Project implementers found that including male family members and guardians in observing project activities and participating in discussions was a good way to sensitize men toward the women in their family. According to Alam et al. (2011), the project has had to develop specific activities to sensitize family and community toward women's role in the dairy sector on par with men and to address new gender-related needs as they arose. CARE/Bangladesh, with GAAP support, is also undertaking an intervention targeted towards communities to increase men's support for women's ownership and control of assets (including livestock assets), increasing their support for women in their domestic responsibilities, and reducing domestic violence. Alam et al. (2011) concluded that the project's strategies that have been developed to overcome barriers to women's development need to be updated from time to time; implementation of these strategies should be well documented for future reference and possible replication.

In the HKI Burkina project, some adaptations were made in transferring a program that has been very successful in Asia to West Africa. HKI pioneered the homestead food production model to address vitamin A deficiency in Bangladesh in the 1980s. As initially conceived, the program aimed to increase dietary diversity using household labor intensively on small gardens within the homestead, allowing women to grow a variety of fruits and vegetables and tend small livestock while fulfilling their domestic and child care responsibilities. HKI expanded and adapted the program for Cambodia, Nepal, and the Philippines in the late 1990s, through strategic partnerships with more than 200 local nongovernmental and governmental organizations. The HFP model was broadened to include small animal husbandry in order to address multiple

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micronutrient deficiencies, including iron and zinc; the program in Cambodia included chicken and duck production in addition to vegetables. This aspect, too, is consistent with women's asset accumulation strategies: women tend to own and care for small livestock, while men are responsible for larger animals (Ianotti et al. 2009).

The HKI model was eminently suited to the Bangladeshi context where it was initially developed, because it did not initially challenge gender norms or patriarchal power structures (Hillenbrand 2010: 416). Stereotypes about farmers being male were often unchallenged. The agricultural training component was delivered by all-male field staff, while nutrition education was delivered by all-female staff. The main selection criteria for the VMF owner were possession of a suitable and sizeable land plot, and prior experience in farming, implying that the VMF owner was usually a man. Inadvertently or deliberately, men were not held responsible for the nutritional side of food production, reinforcing existing beliefs about men's and women's roles. On the other hand, the transfer of agricultural technology in the model occurred in a manner that reinforced the stereotypes that men are capable of 'farming' (large-scale, commercially oriented), while women are suited for 'gardening' (domestic, small-scale) and food preparation. Although HFP has been viewed as "empowering" to women, the notion of empowerment was initially not central or even tangential to the programming. The language of 'women's empowerment' gradually crept into the documentation, as field officers observed positive changes in women's quality of life, and their say over household decisions related to their participation in the program (Hillenbrand 2010: 416). Over time, HKI programming in Bangladesh has been modified to address gender concerns more directly, for example, by eliminating land size as a criterion for choosing VMF owners, having women's groups themselves choose the VFL, using group-based marketing, requiring the hiring of both men and women in a cash-for-work program, using new tools to describe and build women's own capacities and needs, and creating opportunities for staff training and reflection on gender, from top-level managers down to field staff and beneficiaries.

HKI also adapted its approach when transferring the HFP model to Burkina Faso. Similar to CARE/Bangladesh, some adaptations were not necessarily made because of gender concerns. The agricultural component is similar to its programs in Asia, where HKI provides agriculture inputs and training to establish VMFs that are being cared for by four village farm leaders (VFLs). In the Burkina Faso project, these VFLs are females, and the model farms are being cultivated on land that is designated by the village to serve as a model farm. The BCC strategy is being implemented by two distinct groups—a village health committee members consisting of male and female village members; and an older women group comprised of older influential women from the villages.

One feature of the environment where HKI has operated in Asia is that water constraints are less pronounced than in the West African context. Dillon (2011) provides some evidence that, if

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water constraints can be reduced through irrigation, large gains in both agricultural production and consumption have been realized by Malian farmers. In the process of conducting operations research, the following were identified as program adaptations related to irrigation that could be undertaken: (1) Improve access to water for beneficiaries which is a major constraint for garden development; and (2) Improve irrigation capabilities (watering cans, drip irrigation, wheelbarrows for transport and barrels for storage). Thus adaptations addressing water scarcity concerns would benefit men and women alike. However, the operations research recommendation to increase space available at VMF, because not all women have access to their own plots of land, particularly during the planting seasons, would tend to benefit women more.

Despite attention to gender in these projects, certain concerns continue to persist. In their midterm report to GAAP, HKI identified the need to address the issue of land tenure in Africa and the need for strategies to support women's rights to land ownership to ensure their continued control of project benefits following the withdrawal of project support. In Bangladesh, increasing women's access to markets in the context of purdah is a central concern; the current approach of supporting group sales to a male community member to allow them to generate revenue from HFP is considered inadequate. HKI's food security and gender advisor and a project director in Bangladesh have been working together on new guidelines for enhancing women's assets and rights through HFP (HKI Progress Report, 2011).

The HKI project did not involve dissemination of "new" crops, and yet extension messages and the modality of extension delivery were important. The challenge of disseminating biofortified crops is even greater: to be effective as a nutrition intervention, attention to mechanisms to disseminate biofortified crops is necessary in order to achieve the high rates of adoption and consumption in geographically distinct areas compared to many other new agricultural technologies (Gilligan 2012). In a review of biofortification strategies, Gilligan (2012) states that strategies have to be adapted to local context, because those strategies that lead to high rates of adoption will vary considerably by crop and location in terms of delivery strategies, crop traits, quality of existing systems for accessing seeds or planting material, and the role of marketing, in stark contrast to supplementation and fortification approaches, which have fairly uniform delivery mechanisms across contexts. One of the local adaptations that biofortification efforts need to address is the role of gender norms in the adoption and diffusion of these new varieties.

While the breeding of OFSP is undeniably an innovative approach to addressing vitamin A deficiencies that are prevalent among women and children, the REU project played to traditional gender roles in targeting women as recipients of extension messages regarding the nutritional benefits of OFSP. Fathers were not targeted to receive nutrition messages in the REU project. The evaluation of the REU project found no evidence of impact on fathers' knowledge of child feeding practices in Uganda and Mozambique (de Brauw et al. 2010). Even though increasing fathers' knowledge on child feeding was not an explicit objective of the REU project, it was

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expected that the fathers would learn about these messages from their wives, radio and the theatre. While baseline knowledge levels were relatively higher in Uganda, which might explain the lack of an impact, in neither country did fathers report their wives as an important source of knowledge about infant or young child feeding practices. This is another instance showing the perils of using the “unitary household” model in designing interventions—while traditional extension systems wrongly assumed that agricultural extension messages would reach women, if delivered to men, it is also wrong to assume that nutritional messages, if targeted to women, would reach men. This is a missed opportunity because men own and control most of the land in Ugandan households. Adoption might conceivably be higher if messages regarding the nutritional benefits of adoption were directed to men and women alike, and adapted to suit their different preferences.

Future efforts to disseminate OFSP vines would do well to take into account the gendered nature of social networks. For many seed crops, adoption can be encouraged through marketing campaigns for biofortified seeds, but for crops like cassava and sweet potato, planting material in the form of vine cuttings cannot be stored, making marketing ineffective as a primary dissemination strategy. Instead, most households obtain planting material for these crops through interaction with other households. Although other types of sweet potato are traded commercially in the REU project districts, most households will access the new OFSP crop, at least for the first several years, through subsistence production on their own land, and diffusion through social networks. In Kamuli and Munoko, two of the REU districts in Uganda, only 16 percent and 15 percent of gifts and sales were to males, suggesting that OFSP is largely viewed as a female crop. In Bukedea, 42 percent of gifts and sales were to males, indicating substantial gender differences in diffusion across districts. The higher rates of transmission to males in Bukedea may owe to the demands for OFSP vines from other NGOs operating near Bukedea and the casual observation that, in general, marketed crops are males’ domains with subsistence crops are the domains of females (de Brauw et al. 2010).

VI. Conclusions: Emerging implications for value chain development

These initial findings from the qualitative data collection and baseline surveys of four agricultural projects on gender and assets indicate that there is a complex but mutually conditioning relationship between value chain development and operations and the access to, control over, and ownership of different types of assets. The emerging findings suggest that the successful development and operation of a value chain influences the way that people are both able to accumulate assets and the specific assets in which they are able to invest, using the income and other benefits earned from their participation in a value chain. At the same time, the types of assets people have also influences the node at which they can participate in the chain. As discussed above, gender roles and ideologies influence access to, control over, and ownership of assets as well as define appropriate occupational positions in the chain. In particular, each of

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these preliminary studies speak to the critical role of human and social capital, through training programs and the formation and management of different types of farmer associations in determining the pathway and the extent of accumulation of other types of assets (see McNiven and Gilligan forthcoming). However, because the social and cultural constraints to women's participation in these value chains differ across these countries and contexts, specific adaptations need to be made in the local setting for these projects to succeed. For example, extension messages are being disseminated through older women leaders in Burkina Faso and farmers' groups and women's networks in Uganda, while efforts are being made to overcome constraints to women's mobility in Bangladesh.

In the dairy programs, interim results are showing that each of the projects is having a positive impact on women's income and access to training. Women report using the knowledge they have gained in training to raise the productivity of their cows, resulting in more and hygienically better quality milk for their families' consumption and higher income from milk sales.

However, only in the Bangladesh case is there suggestive information that women are directing the new income toward the purchase of new dairy cows and poultry. They also report using their income for their children's education. But at the same time, there are social expectations for women to support their husband's asset accumulation with their additional income, and women's control of additional income generated from dairy, and their ability to control household assets, even if purchased from their earnings, remains questionable.

The vegetable projects are less well linked into emerging horticultural value chains, partly because of difficulty of storage of sweet potato vines (Uganda) and the still generally low level of marketed surplus in both countries. In both the Ugandan and Burkina cases, increases in human and social capitals were the primary gains to women in the projects. The increased yields that they have gained from the project are being harnessed for improved nutritional gains at the household level through home consumption, rather than increasing the marketed surplus. Women may not necessarily own the land on which vegetables are produced (Burkina) nor be the primary decisionmaker on land on which sweet potatoes are grown (Uganda) raising questions about how decisionmaking and control are linked. In some cases, women are "allowed" to plant vegetables and other food crops on land owned by men because temporary crops (unlike trees) do not create long-term land rights (Quisumbing et al. 2001), but this view can be an obstacle to expanding women's involvement in market-oriented chains.

By providing training and facilitating the return of benefits to the women who are producers and suppliers, the projects are following basic principles for gender-equitable value chain development. But while increases in financial, human, and social capital are clearly an important first step, other targeted support to the farmers' groups may be needed to translate these gains into avenues for the acquisition of other physical assets required to expand agribusinesses and to

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enter the non-production nodes of the value chain.

One strategy for this may be in strengthening horizontal linkages between different producer associations, cooperatives, and business associations, particularly those at the same stage of the value chain. The formation of the groups and the subsequent creation of links between them helps overcome constraints that individual farmers may face to meet large orders or to purchase required inputs. Producer organizations' members can often access new or more numerous services from other actors in the value chain, including inputs, credit, and education or training. Having the backing of the group can increase incentives to buyers and producers to engage in a market relationship. Additional socio-cultural adaptations may also be needed to make each intervention successful in its local context. While taking existing gender norms into account is important, one must also be aware that adapting to existing norms runs the risk of reinforcing them, rather than using the project as an opportunity to be gender-transformative or to engage men to support the project. Similar to other development interventions, gender-sensitive value chain approaches that also attempt to build women's assets and reduce gender asset inequality must balance the need to meet women's practical versus strategic gender needs²⁴. Finding ways to facilitate and sustain women's control of the physical and financial assets generated by their increased involvement in value chains remains an important challenge that needs to be addressed by these and future gender-sensitive value chain projects.

²⁴ For a critique of this classification, see Kabeer (1994).

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