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Closing the Gender Asset Gap

Learning from Value Chain Development in Africa and Asia

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ABSTRACT

Strengthening the abilities of smallholder farmers in developing countries, particularly women farmers, to produce for both home and the market is currently a development priority. Although value chain analysis has increasingly incorporated gender issues, the intersection between women's asset endowments and their participation in market-oriented agriculture receives minimal attention. This paper explores initial findings from four case studies in the Gender, Agriculture, and Assets Project on changes in gender relations in different agricultural interventions. It documents the adaptive measures projects are taking to encourage gender-equitable value chain projects. Findings suggest that the dairy and horticulture value chain cases have successfully increased the stock of both men's and women's tangible assets and those assets they own jointly. The projects have also increased social and human capital, particularly for women. The projects are an important first step, but other targeted support to farmers may be needed to promote acquisition of the physical assets required to expand agribusinesses and to enter other nodes of the value chain. Further, successful value chain operations influence how people accumulate assets and the specific assets in which they are able to invest, itself a function of initial asset endowments of men, women, and households.

Keywords: gender, value chains, assets, agricultural development projects, impact evaluation, food security

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¹ See www.womeneconroadmap.org for more information.

1. INTRODUCTION

A value chain charts the sequence of actions and the organizational links that move a product or service through production, processing, marketing, and delivery to final consumers, 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). Initially value chain research focused on governance, upgrading, or market competition; recently the goal of achieving gender-equitable agricultural development is emerging as an explicit component of value chain development efforts (for example, Mayoux and Mackie 2007; Rubin, Manfre, and Barrett 2009). Yet many approaches remain limited in their ability to inform implementers about how to formalize and expand value chains while overcoming gender disparities in participation and access to inputs and services.

Addressing gender within value chain analysis recognizes that value chains are embedded in a social context that defines the work that men and women do, the groups they join, and how resources and benefits are distributed. However, the process of building efficient and effective value chains can also transform gender relations both within and outside the household. For example, 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 required to transform crop outputs for market sale, they can free up time for other productive activities. Conversely, in communities where men typically own land, 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. Formalizing market linkages can also shift household financial management practices. Finally, it may be possible that, with awareness of how value chains and systems of gender relations intersect, value chain development and achieving gender equity can be mutually supportive (Rubin, Manfre, and Barrett 2009; Rubin and Manfre 2012).

Understanding of the role of assets in economic development and poverty reduction has also grown in recent years. Assets are acknowledged as critical for accumulating wealth and managing vulnerability. Beyond their economic effects, assets also influence the current and future well-being of an individual or household in other ways, such as improved future orientation and outlook on life; greater social empowerment, including improved social status and feelings of social inclusion and enhanced civic and political engagement; decreased risk-taking behaviors; and improved social behaviors and well-being of offspring (Schreiner and Sherraden 2007).

Attention to assets in the gender literature is a relatively new area of inquiry (for example, Deere and Doss 2006; Meinzen-Dick et al. 2011). It grew out of testing models of household behavior that dismantled the idea of the unitary household, leading to a more nuanced understanding that incomes are not always pooled within households but can be held and managed by individuals (Haddad, Hoddinott, and Alderman 1997). Each household member may have access to different types and levels of assets and may have obtained them through different pathways, conditioned by social norms and beliefs, including those related to gender. Individuals' asset holdings may also have different implications for bargaining power within the household.

A conceptual framework developed by the Gender, Agriculture, and Assets Project (GAAP) highlights the gender dimensions of asset access, control, and ownership throughout a process of creation, accumulation, and savings or consumption (Meinzen-Dick et al. 2011). The framework defines assets broadly, including tangible (for example, physical capital) and intangible assets (for example, social capital, human capital), and 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.

This paper reviews emerging lessons from ongoing GAAP impact evaluations of agricultural interventions in South Asia and Africa south of the Sahara that are embedded within value chains. The study analyzes how the operation of emerging milk and vegetable value chains influences how people accumulate assets and the specific assets in which they invest income earned from participating in a value chain. Specifically, it examines (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 the initial results imply for value chain development, considering the different social, economic, and cultural contexts in which the interventions operate. Because analysis of the endline surveys is ongoing, this paper synthesizes the results of the qualitative studies and the quantitative baseline surveys that were undertaken as part of this mixed-methods research program.

We find that underlying patterns of asset ownership and control condition men's and women's ability to participate in and benefit from value chain projects. Projects can be consciously designed to counter existing gender disparities, but may also unintentionally exacerbate gender asset gaps. Initial gender differences in asset ownership and control may affect the take-up of interventions, particularly if decisions need to be made about whether to adopt new technologies or allocate time to new activities, as well as their subsequent impact. The remaining sections describe GAAP and the four interventions included in this review, provide results around the three study questions, and discuss the implications of findings for gender-sensitive research and program design.

2. THE GENDER, AGRICULTURE, AND ASSETS PROJECT: FOUR AGRICULTURAL PROJECT INTERVENTIONS

GAAP is a capacity-building and evaluation initiative led by the International Food Policy Research Institute (IFPRI) and the International Livestock Research Institute that works with nine agricultural interventions implemented by different partners. Using both quantitative and qualitative methods, it identifies approaches to addressing gender inequalities so that projects can successfully build women's assets, in order to reduce the gender asset gap and increase 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 their ownership and control. Targeting an increase in women's assets is an important development objective because untargeted agricultural interventions are more likely to increase men's control of assets, increasing the gap between men's and women's asset endowments (Kumar and Quisumbing 2011).

This paper synthesizes ongoing work on two dairy and two vegetable value chain GAAP case studies. The first is the Land O'Lakes Manica Smallholder Dairy Development Project, funded by the United States Department of Agriculture through the Food for Progress Program. The first phase of the MSDDP started operations in Manica Province, Mozambique, in 2006, with the second phase beginning in 2012. GAAP provided funding to assess gendered asset impacts. The program aims to rebuild Mozambique's dairy industry to meet market demand and to increase incomes for smallholder farmers by their participating in a sustainable dairy value chain. The program has 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 11 dairy associations and three dairy cooperatives. Beneficiary households qualify to receive a cow according to established criteria, including the willingness and ability to invest their own resources in a dairy operation and to send two household members to all training courses, and the ability to make decisions about land use. Initially, Land O'Lakes assumed that all household members would benefit equally from the asset transfer, and requested only one household member (typically the husband) to attend trainings. But when new knowledge did not trickle across, threatening to undermine project performance, households were told to send two members to training, often including the wife. The evaluation compares those who had already received cows with those who had been selected to receive cows but had not yet received any (Johnson et al. 2013).

The second case study, CARE's Strengthening the Dairy Value Chain (SDVC) project, works with 35,000 smallholder farmers in northwest Bangladesh to improve their dairy-related incomes (Ahmed et al. 2009; Alam et al. 2011). The first phase of the program began in 2007 and ended in 2013; it is now in its second phase. The first phase aimed to reduce key constraints that 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 create dairy farmer associations, mostly formed by groups of poor women smallholder dairy farmers. The project also aims to increase women's employment throughout the value chain, as producers, as input suppliers (including as livestock health workers (LHWs), and in other jobs where they are typically underrepresented. The evaluation uses two counterfactual comparison groups (eligible nonbeneficiary farmers in areas where SDVC operates and eligible farmers in areas without milk-chilling plants).²

The third case study is Helen Keller International's (HKI)'s Enhanced Homestead Food Production (EHFP) program, which was implemented from 2009 to 2012 in the Fada N'Gourma Department of the Gourma Province in Burkina Faso. Its goal is to improve infant, young child, and maternal health and nutrition outcomes through a set of nutrition and production interventions targeted to women (Behrman et al. 2011). It sets out to achieve this through (1) increasing the availability of

² The comparison groups in the CARE-Bangladesh project comprise eligible but nonparticipant households. Most of the findings reported in the paper are based on qualitative work conducted among project participants and should not be interpreted as quantitative "impact" estimates.

micronutrient-rich foods through increased food production by women; (2) income generation through the sale of surplus production; and (3) increased knowledge and adoption of optimal nutrition practices, including the consumption of micronutrient-rich foods. The target beneficiaries of the program are 120 female village farm leaders and 1,200 mothers with children between 3 and 12 months of age. The program is evaluated through a randomized control trial design experimenting with two different channels of promoting behavior change: older women leaders or village health committees. The EHFP program provides mothers with inputs (chickens, seeds, and gardening materials) to start homestead gardens, and gives trainings in small livestock rearing and irrigation. Furthermore, the program trains community members who in turn train beneficiary women in agriculture and improved nutrition practices by using behavior change communications. 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 synthesis focuses on impacts on physical assets, and to a certain extent on human capital, whereas the larger study has a more explicit nutrition focus.

The final project is the HarvestPlus Reaching End Users (REU) project, which introduced biofortified orange sweet potato (OSP) in Uganda in 2007 to increase dietary intake of vitamin A and reduce the prevalence of vitamin A deficiency (de Brauw et al. 2010). OSP, developed by HarvestPlus, is a dense source of vitamin A and is moderately higher yielding compared with conventional white or yellow sweet potato varieties typically grown in Uganda. The REU project engages existing farmers' groups, composed largely or entirely of women, in a multipronged intervention, including free vine distribution to members of selected project farmer groups; trainings of farmer group members on OSP cultivation; trainings of adult women in project households on the nutritional benefits of OSP; and trainings of farmer group members on marketing. The project also includes a rigorous randomized control trial-based component to test and document the most cost-effective method to disseminate OSP and encourage its consumption.

3. GENDER AND ASSET DYNAMICS IN DAIRY VALUE CHAINS: MOZAMBIQUE AND BANGLADESH

Both productivity and consumption are low in Mozambique's dairy industry. In Manica, the project area, agriculture is the primary household-income-generating activity, and earnings from dairy and meat sales are the second-most-important source of income for rural households after sales of plant crops. Livestock, comprising mostly small stock such as chickens or pigs, was found to contribute 74 percent of the value of women's asset portfolio. Men are also active in the dairy industry, but women provide most of the labor, contributing 53 percent of their time to the daily care of dairy cows including milking and selling milk. Despite their high degree of involvement in agriculture, Mozambican women are limited in their control of and access to household cash, land, and crops, and thus in their ability to meet the minimum requirements for dairy production. Cattle are typically considered to be men's property, except where women are household heads (Nhambeto and Hutchinson 2011).

Data from focus group discussions (FGDs) highlighted that men and women in project areas have different responsibilities in livestock care and management as well as milk production and marketing. Men typically 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 veterinary technicians. Women typically feed and water cows, collect fodder, make minor repairs on cattle enclosures, sell milk in local markets, and hand-dress cows (for example, removing ticks). Both men and women may clean enclosures or change dirty water. Some women household heads hire laborers to perform this work (Johnson et al. 2013).

Beneficiary FGD participants reported that men were the ultimate decisionmakers on most cattle or dairy-related issues, for example, 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 but did not have final authority.

Table 3.1 presents data from 177 households in the project area on the distribution of land and physical assets by ownership type.³ FGD participants agreed that most land and assets within the household and very small areas of land are owned jointly and by females. Households own mostly local-breed cattle; few own purebred or exotic cattle and even fewer own crossbreeds. Males own more head of local cattle than females, although joint ownership of local cattle is most common. On average, males own more crossbred cattle than females; however, most exotic cattle are jointly held or owned by females. Consumer durables (domestic assets) and agricultural durables/productive assets⁴ are mostly jointly held, although males own a large portion of nonagricultural durables and transport (for example, cars/trucks, motorcycles, bicycles, and carts).

³ The Land O'Lakes Mozambique Food for Progress Program /GAAP survey of the MSDDP 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, contains only observations for households that received cattle through the Land O'Lakes program.

⁴ 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.

Table 3.1 Asset ownership by gender in Mozambique, imputed 2008 value (*n* = 177)

Asset category	Total held by the household (Standard deviation)	Male	Female	Joint
Land in hectares	3.85 (3.79)	2.33 (3.42)	0.70 (1.32)	0.76 (1.83)
Cattle				
Crossbreed	0.10 (0.94)	0.02 (0.17)	0.00 (0.00)	0.04 (0.24)
Pure breed/exotic	0.54 (0.81)	0.00 (0.77)	0.17 (0.63)	0.46 (0.75)
Local	3.04 (5.38)	1.45 (4.08)	0.18 (0.91)	1.06 (2.89)
Total	3.68 (5.69)	1.47 (4.16)	0.34 (1.14)	1.56 (3.09)
Consumer durables	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: Author computations from the Land O'Lakes Mozambique Food for Progress Program/GAAP household survey, March 2011 and April 2012 rounds.

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

The dairy value chain in Bangladesh is also small, but growing. Local cows are less productive than imported but more expensive improved breeds; their productivity is limited by low-quality fodder and poor feeding practices (Ahmed et al. 2009). A baseline survey conducted in 2008 revealed that women carry out the main daily activities related to milk production in most households. 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 3.2 presents the distribution of land and asset ownership within surveyed households in the baseline survey round. In the project area, the Bogra and Rangpur districts of Bangladesh, land is almost exclusively owned by the husband, with a small portion owned by the wife (in wealthier households) and an even smaller portion of land owned jointly. 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 jointly by the household. Jewelry is typically regarded as a woman's asset in Bangladesh, and cattle are regarded as men's property; thus 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 women's empowerment is a core objective of CARE-Bangladesh's programming. Nevertheless, ownership does not necessarily translate to control over these jointly *owned* items; men report rights to decide whether to buy or sell even jointly held livestock (Ahmed et al. 2009).

Table 3.2 Asset ownership by gender in Bangladesh, 2008 (n = 1,500)

Asset category	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 nonland assets in taka:			
Agricultural production	1,841 (8914)	644 (2712)	4,119 (36180)
Nonagricultural production	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: Author computations from the baseline survey of the IFPRI Impact Evaluation of the Strengthening the Dairy Value Chain Project, 2008.

Note: ^a 1 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.

Some similarities and differences between these two projects are worth noting. Most basically, ownership of or access to a dairy cow is an obvious precondition to participation in the dairy value chain as a producer. The Mozambique project distributed dairy cows to existing cattle owners, whereas the Bangladesh project linked smallholder dairy producers to other actors in the value chain. In Mozambique most FGD participants, both men and women, agreed that men owned the cows distributed by the project in male-headed households, but women owned them in female-headed households, and that these owners kept the proceeds from sales from their animals. A small group of women stated that women in households headed by men did on occasion own cows, even if the animals were registered in the man's name, and that 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 management of the animal. There was limited interest in exploring options of joint registration under the name of both husband and wife (Johnson et al. 2013). 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, and such cows are jointly owned by the group (Waithanji et al. 2012).

The projects also increased beneficiaries' human capital through training. In Mozambique, skills acquired through training contributed to men's enhanced income and improved lifestyles whereas skills acquired in training enabled women to improve their household's nutrition. Practicing their knowledge about hygiene enhanced women's self-esteem. In Bangladesh, all the participants said that their knowledge of better farm management increased and they are adopting improved practices.

FGDs indicate that both dairy value chain projects have increased household dairy incomes. In Mozambique, farmers who previously received incomes averaging USD\$37 a month from crops are reporting average monthly incomes of USD\$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. These range from sole control by men to joint control by husband and wives, and control of income by women to manage household expenses. Both men and women received income from sales of milk to neighbors through informal markets. In Bangladesh, prior to the SDVC project, few women sold milk regularly. The project's identification and training of milk collectors 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 project, the milk collectors collect milk from each homestead daily and return with payments weekly or monthly. Milk collection centers are also located within villages; collected milk is then taken to a local chilling plant. Women use income from milk sales to purchase cattle feed, medicine, and artificial insemination services and to seek treatment for disease. Group savings are used to organize services such as deworming and vaccinations. Others report using their milk income to pay school fees.

Changing patterns of decisionmaking within the household is an issue central to gender analyses of value chains. In the Bangladesh project, women FGD participants reported that they have control over milk sales income and can manage it independently. Although 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, but give these funds to their husbands who purchase assets for themselves. 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, often occur as a result of participation in dairy value chain projects. In Mozambique, introducing dairy cows increased workloads and created a larger management burden for both men and women. Men's labor increased fourfold, but women's increased eight times. The improved cows provided by the project are milked twice daily. 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 noted difficulties in managing their time to accomplish household, field, and dairying tasks because of the need to feed and water their cow(s); they needed to plan their workdays carefully and delegate responsibilities to other household members. Men noted that they had to employ laborers to do the work previously done by their wives. 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, participants reported increased labor demands linked to milk production. Using recommended feeding and care practices has resulted in an additional 15 to 45 minutes of work daily, depending on the number of dairy cattle owned. 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 projects have also built women's social capital. Although the Land O'Lakes project encouraged women to join the trainings as the second member in cow-receiving households, the increase in women's labor in caring for the cows also reduced the time available to meet with other members of the community. In the future, the project could introduce labor-saving tools and find ways to expand women's networks, bringing women participants together for training. The SDVC project may have built on existing social capital, because dairy producer groups in Bangladesh are mostly, though not exclusively, composed of women. Women group members strategically choose male members (typically a husband of one of the members, who is literate and numerate) who can contribute new skills to the group. Some producer groups have used group savings to purchase dairy cows in the group's name, using social capital to catalyze the accumulation of livestock capital. Group-based approaches to service delivery are commonplace in Bangladesh; membership in both local and international nongovernmental organizations tends to be pro-poor, and women are more likely to participate in such organizations than men (Quisumbing 2009). The widened social networks, and their role in supporting women's participation in the milk value chains, appear to have had a positive impact.

4. GENDER AND ASSET DYNAMICS IN HORTICULTURE VALUE CHAINS: BURKINA FASO AND UGANDA

Creation and formalization of value chains is occurring in Burkina Faso; however, vegetables and fruits continue to be marketed in small quantities, typically through local markets. The 2010 baseline study showed that agriculture is the main livelihood of the study population, with sorghum, millet, and beans produced most often (Behrman et al. 2011). Households typically 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 generally responsible for buying and selling high-value livestock like goats, and women are engaged in the cultivation, harvest, and preparation of food, collection of water and firewood, and care of their children.

Table 4.1 presents descriptive statistics on gender-differentiated control over and value of different assets from the baseline survey.⁵ Men cultivate larger land areas than do women, but women farm one more plot than men, on average. Production on men’s plots is about six times higher 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 and number of animals. Men own more pieces of agricultural equipment; 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 4.1 Agricultural production and asset ownership by gender in Burkina Faso, 2010 (n = 1,767)

Variable	Men (Standard deviation)	Women
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 (kilograms)	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: Authors’ computations from HKI, Enhanced Homestead Food Production for Improved Food Security and Nutrition in Burkina Faso Baseline Household Survey (2010).

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 and 9 percent of the beneficiary women reported being responsible for caring for chickens. About a third of the women stated that they assisted their husbands with these responsibilities. Time spent maintaining gardens conflicted with other activities such as domestic household chores, cooking, working outside of the home, commerce, childcare, and collecting wood for about one-quarter of

⁵ The baseline questionnaire collected information on men’s and women’s assets but 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, up to 25 percent in Ghana (Deere et al. 2013). The endline questionnaire followed the same protocol for collecting male and female asset ownership, for comparability with the baseline.

women beneficiaries (26 percent). Care of chickens created fewer time-use conflicts, consistent with the reports that it requires less time and was primarily the male spouse's responsibility. Approximately 75 percent of beneficiary women made decisions on sales of vegetables and were able to keep the income generated from those sales, but only about half were in a position to decide to sell or keep proceeds from the sale of chickens.

In Uganda, the value chain in potatoes, primarily white 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 the horticultural value chain is fairly well developed, with larger farmers exporting to Europe and the Middle East. 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. The REU project was implemented in three districts in Uganda, two of which (Kamuli and Mukono) had similar gender roles in agricultural production, with the other (Bukedea) having greater male control over agriculture. 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 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 are responsible for vine sales 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 take OSP to the market because sweet potato is locally described as a "women's crop" (Behrman 2011).

The top panel of Table 4 shows that, similar to the other case studies, land is owned mostly by husbands in the REU project sites. The wife owns a very low fraction of household assets. While wives access a larger share of assets through joint ownership with the head, the fraction of assets exclusively held by the wife is only 10 percent.

We further examine the distribution of the household's nonland assets. Consumer durables accounted for more than three-quarters of nonland assets value in 2007. Of those, the majority are owned by the husband with about a quarter jointly owned by both spouses. Agricultural durables account for a meager share of total nonland assets. Husbands own more than 50 percent of those and wives about 12 percent. Jewelry constitutes less than 1 percent of total nonland asset value. 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 although wives own 26 percent of total livestock value, it is still a little over half the share owned by husbands.

The bottom panel of Table 4.2 shows that women have exclusive control of only 16 percent of landholdings and 22 percent of other assets. Respondents reported that 25 percent of land and 31 percent of nonland assets were jointly owned by men and women. There is considerable variation by district, with a clear pattern of much higher share of land (59 percent) and nonland assets (62 percent) under exclusive control by men in Bukedea.

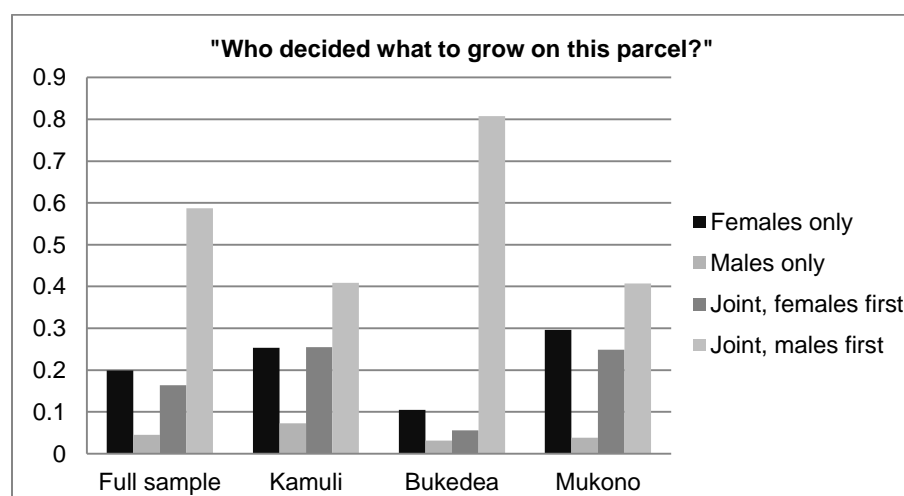
Table 4.2 Asset ownership by gender in Uganda, 2007 ($n = 1,594$)

Asset category	Owned by husband	Owned by wife (Standard deviation)	Jointly owned
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 nonland 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)
Share of value of land owned	0.59	0.16	0.25
Share of value of nonland assets owned	0.49	0.22	0.31
Share of value of land owned, by district			
Kamuli	0.46	0.20	0.35
Bukedea	0.74	0.11	0.15
Mukono	0.55	0.18	0.27
Share of value of nonland assets owned, by district			
Kamuli	0.40	0.21	0.40
Bukedea	0.62	0.16	0.23
Mukono	0.42	0.28	0.32

Source: Authors computations from HarvestPlus Reaching End Users Orange-Fleshed Sweet Potato Baseline Household Survey, 2007 (top panel) and Gilligan et al. (2013) (bottom panel). Descriptive statistics are presented for the pooled sample of treatment and control households.

In Uganda, there are gendered differences in landownership and decisionmaking in agriculture. Figure 4.1 shows the response to the question “Who decided what to grow on this parcel?” in the first season of 2009. The figure shows that on nearly 60 percent of parcels, control over crop choice is joint but that the male takes the lead in making the decision. However, on 20 percent of parcels women solely make decisions on crop choice, reflecting in part the number of single-head households headed by females. Only 4.5 percent of parcels are reported to be under exclusive male control, with the remaining 16.5 percent of parcels under joint control with a woman taking the lead in the decisionmaking. The figure also shows that in Bukedea, the pattern of male dominance of control over crop choice decisions is magnified.

Figure 4.1 Distribution of control over crop choice decisions on household parcels (proportion reporting)



Source: Gilligan et al. (2013).

Unlike the dairy value chain projects, both horticulture projects had explicit nutrition objectives. However, attaining the 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 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, nor actual cultivation of, that plot. This is well illustrated in both the Uganda and Burkina Faso projects. The probability of adoption of OSP is highest on parcels for which there is joint control but where women take the lead in deciding which crops are grown. The probability of adopting OSP is also lowest on parcels exclusively controlled by men (Gilligan et al. 2013).

In the Burkina Faso study, 95 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. Land for gardens was usually owned by husbands (44 percent), another village member (28 percent), or another male household member (21 percent). Approximately 75 percent of beneficiary women were able to make decisions on the sale of vegetables and to keep the income generated from those sales, and most beneficiary women maintained control of seeds. Similar results were reported for decisionmaking authority about sales of vegetables and chickens, as well as who keeps the revenue generated from those sales.

HKI also facilitated agreements with landowners in beneficiary villages who ceded land to women for the duration of the project to set up VMFs. This was done in anticipation of the risk that husbands would take control of the land once income generation increased. Women also appeared to have high levels of decisionmaking power with regard to the homestead gardens, although the land used for those gardens was mostly owned by their husbands. After one year, there appeared to be more joint decisionmaking regarding the use and sale of chickens in the beneficiary villages compared with control villages. However, ownership and decisionmaking authority related to goats remained primarily in the hands of men in both control and beneficiary villages.

The horticulture value chains appear to have promising impacts on nutritional objectives and building of human capital. The OSP impact evaluation (de Brauw et al. 2010) found that conditional on adoption of OSP, children aged between 6 and 35 months increased their intakes of vitamin A due to increases in OSP consumption. 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. Additionally, the REU project had positive impacts on mothers' knowledge of correct infant and young child feeding practices. However, the evaluation observed no evidence of impact on fathers' knowledge of child feeding practices.

After one year of HKI program implementation, operations research findings (Olney et al. 2012) show that beneficiary women reported an increase in their knowledge of poultry production and 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. Further, women believed that their increased production improved their own and their families' health. 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 nonbeneficiaries, and were also more likely to be able to name at least two types of vitamin-A-rich and iron-rich foods. In addition, 93 percent of the beneficiaries interviewed believed the nutrition trainings to be beneficial. The primary benefits mentioned were that the trainings contributed to gaining new knowledge (29 percent) and led to the adoption of better practices that enabled them to take better care of their children (32 percent), improve the nutrition of themselves and their children (29 percent), and protect their children against common illnesses (16 percent).

Similar to the livestock projects, the increased demands on women's time formed an issue identified by the operations research. Although the women were generally enthusiastic about the EHFP program and its benefits, and all but one said that they planned to continue participating in the program, about half reported having to make sacrifices in other areas. Out of a sample of 134 women, 5 percent reported they had other work to do and 17 percent said that participating in the activities associated with the EHFP program was too time consuming (Olney et al. 2012).

5. PROGRAM DESIGN FOR GENDER EQUITABLE OUTCOMES

The additional support provided by GAAP to partners who did not initially address gender in their programming enabled them to analyze the impact of the interventions on the gender asset gap and its relationship to achieving project objectives. For example, although the Land O'Lakes project was not sensitive to gender issues in designing its phase 1 project, project designers and implementers realized that not requiring a female trainee to attend extension services would jeopardize project success. The training sessions with farmer groups also promote gender-equitable approaches. These strategies are being implemented based on findings from the GAAP initial assessment (Marinho Nhambeto, personal communication). 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 about household dairy businesses. 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.

In other cases, 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 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 transaction and transportation costs and also ensures quality of the milk. By the time of the midterm evaluation, respondents perceived 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—chilling plants are typically located in larger market areas—but they offer a way to sell milk with lower transaction costs while ensuring milk quality.

Attempts to increase women's participation in the dairy value chain in Bangladesh have not been uniformly effective. Although the SDVC project has done well with respect to women producers, with close to 80 percent of the project's producers being women, only 25 percent of LHWs and 17 percent of milk collectors are women (Alam et al. 2011). Rearing dairy cows within the homestead is a traditional, acceptable, and respectable task for women, but being an LHW or collector is a nontraditional occupation. Cultural barriers to becoming an LHW appear to be less than those associated with being a milk collector. Women LHWs have been successful, and men also said that being an LHW is an honorable profession, and that a woman will be recognized for the money she earns and the service she delivers (Alam et al. 2011). 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. Concerns about her physical security related to attending to late-night calls, traveling great distances to attend to clients, fulfilling domestic responsibilities, and interacting with nonfamily members nonetheless remain barriers to increased involvement.

Community members perceived that milk collection would be difficult for women because physical strength is required to drive vans and collect and transport the milk containers, and because the woman would need to be away from her home for an extended period. To address these constraints, fixed milk collection points could be set up at convenient locations within the village. Informal processors report that village-based collection points might be possible because many women go to the market to sell milk anyway (Alam et al. 2011, 35). Transporting milk to the chilling plant remains challenging. Not only is milk transportation physically difficult, but chilling plant staff also doubted that a woman could be swift in transactions and capable of increasing coverage on her own. Although such misgivings may arise

from real logistical challenges (distances, need for physical strength, numeracy), they reflect even more sharply the limitations of cultural perceptions of women's roles.

Restrictions on women's mobility continue to challenge increased women's participation in the Bangladeshi context. Reluctance of guardians and spouses of female farmer leaders and LHWs to attend residential training away from their homes was overcome by allowing them to visit the training venues. According to the project's gender manager, the project has successfully addressed most of the problems, including a few incidents of domestic violence. Project implementers found that allowing male family members and guardians to observe project activities and participate in discussions was a good way to sensitize men toward the women in their family. With GAAP support, CARE is also undertaking a community intervention to increase men's support for women's ownership and control of assets (including livestock), support women in their domestic responsibilities, and reduce domestic violence.

HKI originally piloted the HFP model in Bangladesh in the 1980s, expanded and adapted the program for Cambodia, Nepal, and the Philippines in the late 1990s, and adapted it recently for West African conditions. The model was broadened to include small animal husbandry in order to address multiple micronutrient deficiencies, including iron and zinc. The original Bangladesh model did not initially challenge gender norms or patriarchal power structures (Hillenbrand 2010, 416). Agricultural training was conducted by all-male field staff, and nutrition education was delivered by all-female staff. The main selection criteria for the VMF owner were possession of a suitable and sizable land plot and prior experience in farming, favoring men for VMF selection. Inadvertently or deliberately, men were not held responsible for the nutritional side of food production, reinforcing existing gender roles. Agricultural technology transfer in this model reinforced the stereotypes that whereas men are capable of farming, women are suited for gardening and food preparation. Although the HFP model 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 greater decisionmaking power within the household (Hillenbrand 2010: 416). Subsequently, programming in Bangladesh was modified to address gender concerns more directly, by eliminating land size as a criterion for choosing VMF owners, having women's groups themselves choose the village farm leader, using group-based marketing, using new tools to describe and build women's own capacities and needs, and creating opportunities at all levels for staff training and reflection on gender.

Specific adaptations were made for Burkina Faso, where the village farm leaders are females, and model farms are being cultivated on land that is designated by the village for that purpose. The Burkina Faso environment, similar to much of West Africa, faces more severe water constraints than in HKI's Asian sites, and operations research also identified potential program adaptations related to irrigation. Even if both men and women would benefit from adaptations addressing water scarcity, they may be more beneficial for women if women are typically responsible for water collection. In addition increasing space available at VMF would tend to benefit women more, as they typically do not have land of their own that has a reliable water supply (Olney et al. 2012).

Despite attention to gender in these projects, challenges remain. HKI is aware of the need for strategies to support women's rights to landownership to ensure their continued control of project benefits following the withdrawal of project support. In HKI's Bangladesh projects, increasing women's access to markets despite the societal value placed on female seclusion 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 is working on new guidelines for enhancing women's assets and rights through HFP in Bangladesh.

Another challenge projects faced was in targeting and providing extension services, especially in the case of nontraditional crops like OSP. Biofortification strategies have to be adapted to the local context because 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, the role of marketing (Gilligan 2012), as well as gender norms. This contrasts with supplementation and fortification approaches, which have fairly uniform delivery mechanisms.

The evaluation of the REU project found no evidence of impact on fathers' knowledge of child-feeding practices in Uganda (de Brauw et al. 2010), and the contribution of nutrition messages received by women on the impact of the project on OSP adoption and dietary intakes of vitamin A appears to be relatively small (de Brauw et al. 2010). Nonetheless, in this setting, our results suggest that engagement of the project with both men and women in the household may be the best strategy to promote adoption.

Future efforts to disseminate OSP should take the gendered nature of social networks into account. 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 in the same ways, making marketing ineffective as a primary dissemination strategy. Instead, most households obtain planting material from other households. Although other types of sweet potato are traded commercially in the REU project districts, most households will initially access planting material through subsistence production on their own land and diffusion through social networks. In Kamuli and Mukono, only 16 percent and 15 percent, respectively, 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.

6. CONCLUSIONS: EMERGING IMPLICATIONS FOR VALUE CHAIN DEVELOPMENT

These emerging findings from the qualitative studies and baseline surveys of four agricultural projects reveal a complex but mutually conditioning relationship between value chain development and operations and the gendered access to, control over, and ownership of different types of assets. The successful development and operation of a value chain influences both the way people are 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, individuals' existing stock of assets also influences their ability to participate in the chain. Gender roles and ideologies influence access to, control over, and ownership of assets as well as define appropriate occupational positions in the chain. Each of these preliminary studies also speaks to the critical role of human and social capital, through training programs and the formation and management of different types of farmer associations that may facilitate the accumulation of other types of assets. However, because the social and cultural constraints to women's participation in the value chains differ across countries and contexts, local adaptations need to be made for these projects to succeed, such as disseminating extension messages through older women leaders in Burkina Faso, disseminating messages through farmers' groups and women's networks in Uganda, and reducing constraints to women's mobility in Bangladesh.

In the dairy programs, interim results show 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 to raise the productivity of their cows, resulting in a greater volume of hygienically better-quality milk for their families' consumption and higher income from milk sales. However, only in the Bangladesh case does it seem that women are directing dairy income toward the purchase of new dairy cows and poultry and toward their children's education. At the same time, social expectations for women to use such income to support their husband's asset accumulation make women's ability to control household assets, even if purchased from their earnings, questionable.

The horticulture projects are less directly linked into emerging value chains, partly because of difficulty of storage of OSP vines (Uganda) and the generally low level of marketed surplus in both countries. In both cases, increases in human and social capital were the primary gains to women in the projects. The increased yields from the project are being harnessed for improved nutritional gains through home consumption, rather than increasing the marketed surplus. Women may not necessarily own the land on which vegetables are produced (Burkina Faso) nor be the primary decisionmaker on land on which OSP is grown (Uganda). 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, but this view can be an obstacle to expanding women's involvement in market-oriented chains.

Training and facilitating the return of benefits to women who are producers and suppliers are among the basic principles for gender-equitable value chain development. However, although increases in financial, human, and social capital clearly constitute an important first step, other targeted support to farmers' groups may be needed to enable women to acquire other physical assets needed to expand agribusinesses and to enter the higher-value nodes of the value chain, such as processing and export.

One strategy may be to strengthen horizontal linkages between different producer associations, cooperatives, and business associations, particularly those at the same node of the value chain. The formation of groups, and the subsequent creation of links between them, helps overcome constraints that individual farmers may face in meeting large orders or purchasing inputs. Producer organization members can often access more 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 market relationships. Additional adaptations may also be needed to make each intervention successful in its local context. Whereas taking existing gender norms into account is important, 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 needs. Finding ways to facilitate and sustain women's control of the physical and financial assets their increased involvement in value chains generates remains an important challenge these and future gender-sensitive value chain projects must address.

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