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**Women's Land Rights as a Pathway to
Poverty Reduction**

A Framework and Review of Available Evidence

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ABSTRACT

Land is an important asset for rural households, and having secure land rights is important for poverty reduction. Despite the large body of literature on the relationship between land tenure security, livelihoods, and poverty, most of this literature is based on household-level data and does not consider possible intrahousehold inequalities in land ownership. We know very little about the relationship between women's land rights and poverty, not only because data on women's land rights (WLR) are rare, but also because of the implicit assumption that women belong to households that pool resources completely. Thus, it is the land rights of households, not women, that matter for poverty reduction. However, growing evidence that households do not pool resources completely and that women have fewer assets than men warrants attention to the potential role of WLR in poverty reduction. This paper reviews the literature on WLR and poverty reduction. It adapts the Gender, Agriculture and Assets Project (GAAP) conceptual framework to identify pathways by which WLR could reduce poverty and increase wellbeing of women and their households in rural areas. It uses a systematic review search methodology to identify papers for inclusion, but adopts a more synthetic approach to assess the level of agreement and the amount of evidence within this literature. The paper examines the evidence from qualitative as well as quantitative studies on each of these pathways. Owing to the scarcity of experimental studies, the review of empirical work is based mostly on observational studies. We find some evidence on these relationships, but many of the key pathways have not been empirically analyzed. The evidence is strong for relationships between WLR and bargaining power and decision making on consumption, human capital investment, and intergenerational transfers. There is a high level of agreement, but weaker evidence on the relationship between WLR and natural resource management, government services and institutions, empowerment and domestic violence, resilience and HIV risk, and consumption and food security. There is less agreement and insufficient evidence on the associations between WLR and other livelihoods, and a higher level of agreement, but still limited evidence on associations between WLR and credit, technology adoption, and agricultural productivity. Notably, we find no papers that directly investigate the link between WLR and poverty. Many gaps in the evidence arise from a failure to account for the complexity of land rights regimes, the measurement of land rights at the household level, the lack of attention paid to gender roles, and the lack of studies from countries outside Africa. Many studies are limited by small sample sizes, the lack of credible counterfactuals, lack of attention to endogeneity and selection bias, and possible response bias on questions of domestic violence and empowerment. There are very few rigorous evaluations of reforms that strengthened WLR. The paper concludes that gaps in the evidence should not deter the careful design and implementation of programs and policies to strengthen WLR, given the ongoing land tenure reforms in many countries. Different modalities and mechanisms for strengthening WLR could be tested, with appropriate counterfactuals. Program designers and evaluators can strategically identify pathways and outcomes where evidence gaps exist, and deliberately design studies to close those gaps.

Keywords: property rights, assets, women's land rights, poverty, gender

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ACRONYMS

BMI	body mass index
HIV	human immunodeficiency virus
HSAA	Hindu Succession Act Amendments
LUC	land use certificates
NRM	natural resource management
QE	quasi-experimental
WLR	women's land rights

1. INTRODUCTION

Rural households depend on a wide range of natural resource assets for their livelihoods—land, water, trees, and other resources. Among these, land is clearly the most valuable asset in most rural households’ portfolios and is the foundation for agricultural production. A large literature exists on the relationship between land tenure security, livelihoods, and poverty (for example, Deininger et al. 2008; Prosterman, Mitchell, and Hansted 2009), but most of it is based on household-level data. We know very little about the relationship between women’s land rights (WLR) and poverty, not only because data on WLR are rare but also because of the assumption that women belong to households that pool resources completely and thus it is the land rights of households, not women specifically, that matter for poverty reduction.

However, accumulating evidence exists on the importance of women’s ownership of and control over assets for a range of development outcomes, both for women themselves and for their families (Agarwal 1994; Haddad, Hoddinott, and Alderman 1997; Quisumbing and Maluccio 2003). Men are generally advantaged in owning assets, given the gender norms that govern asset ownership, which means that they tend to own more assets and assets of higher value than women own (Deere and Doss 2006; Deere et al. 2013; Quisumbing and Maluccio 2003). This is especially true in the case of land: even when we account for joint ownership of land, women tend to own less land than men (Doss et al. 2015; Kieran et al. 2015, 2017; Deere and Leon 2003; Agarwal 1994). Given the empirical evidence showing that who owns and controls the assets within households affects household decision making and resource allocation (Haddad, Hoddinott, and Alderman 1997; Schultz 2001; Quisumbing and Maluccio 2003; Doss 2006), it is worth investigating whether and how WLR—and interventions to strengthen those rights—affect poverty reduction.

This paper develops a conceptual framework based on that from the Gender, Agriculture, and Assets Project (Meinzen-Dick et al. 2014) to review and interpret empirical evidence published since 2000 on the association between WLR and poverty reduction. It goes beyond research on WLR and natural resource management (NRM) in Ghana and Indonesia undertaken by the International Food

Policy Research Institute and the International Center for Research in Agroforestry (Quisumbing and Otsuka 2001) to examine a broader range of outcomes and a wider set of pathways. Although it uses a systematic review search methodology (Waddington et al. 2012) to identify papers for inclusion, it adopts a more synthetic approach to assess the level of agreement and the amount of evidence within this literature (Moss and Schneider 2000).

We find some evidence on these relationships, but many of the key pathways have not been empirically analyzed. The evidence is strong for relationships between WLR and bargaining power and decision making on consumption and human capital investment, and on intergenerational transfers. There is a high level of agreement but weaker evidence on linkages with NRM, government services and institutions, empowerment and domestic violence, resilience and human immunodeficiency virus (HIV) risk, and consumption and food security. There is a low level of agreement and insufficient evidence on the associations between WLR and other livelihoods, and a higher level of agreement, but still limited evidence, on associations between WLR and credit, technology adoption, and agricultural productivity.

Notably, we find no papers that directly investigate the link between WLR and poverty. There are several possible reasons for this gap. First, it is difficult to identify the causality in observational studies, particularly when pathways extend through numerous steps. Second, most of the studies address only one aspect of these broader relationships. Finally, the interventions that have been rigorously evaluated are fairly recent and long-term impacts on the final outcome of poverty reduction may not yet have been realized. The lack of direct evidence must not be interpreted to mean that WLR do not contribute to poverty reduction: given that studies did not directly and systematically investigate this relationship, absence of evidence does not mean that the link does not exist.

The paper is organized as follows. Section 2 defines how WLR are conceptualized and measured. Section 3 presents a conceptual framework that links WLR to poverty reduction, working through its effects on agricultural investments, technology adoption, access to government services and institutions, to agricultural and nonagricultural livelihoods, to full income and its allocation to consumption and investment—via processes that are affected by bargaining within the household. The conceptual

framework accounts for potential direct effects of strengthening WLR on resilience and empowerment, as well as the possibility of feedback from investment to WLR. Section 4 lays out the methodology for the literature search, Section 5 presents the findings, and Section 6 concludes.

2. WHAT DO WE MEAN BY WOMEN'S LAND RIGHTS?

Land rights is a broad term with both economic and legal components. Different rights exist within a broad bundle of potential rights and the dimensions are related to security of tenure. Land may be held under statutory or customary tenure systems, and many countries, particularly those in Africa, may have several systems operating simultaneously.

One commonly used framework (Schlager and Ostrom 1992) considers five rights regarding land: access, withdrawal, management, exclusion, and alienation or transfer rights. These may be bundled together into what we commonly refer to as ownership, or they may be vested in different people. Access is the right to enter a property. Withdrawal is the right to remove things from the property, such as gathering from the forest or fishing from a lake. Management is the right to change the property, by planting crops or cutting trees. Exclusion is the right to keep others off the property. Alienation is the right to transfer the property rights to others, through sale, bequest, or gift. Thus, one person may have the right of alienation, while another has the right to use the land to grow crops.

Drawing from the gender and assets literature, the WLR literature often talks about use, control, and ownership rights to land (IFPRI 2013; Johnson et al. 2016). Each of those terms refers to different components within larger “bundles of rights” discussed above. Use rights involve the ability or permission to employ an asset; control rights signal greater levels of power, including management and exclusion. Ownership implies having all these rights, including sale or other forms of disposal, backed by formal legal institutions. In practice, however, the definitions are often not clear cut; men and women can accrue benefits from land even without having full landownership rights.

It is not only the bundles of rights that matter but also the security of property rights. Place, Roth, and Hazell (1994) define three dimensions of tenure security: robustness, duration, and assurance of rights. Robustness refers to how many of the rights are held. Duration is the length of time for which a right is valid. A woman may have the right to farm a piece of land for only a season or for her lifetime.

Assurance is the certainty with which the rights are held and the extent to which the rights are enforceable.

When considering the impact of WLR on poverty reduction, we would want to know which rights are held by women and the security of their tenure. Yet rarely do we have this full range of information, as is true of the land rights literature more generally. In an analysis of empirical papers on land tenure security (not focused on women), Arnot, Luckert, and Boxall (2011) find that tenure security is often ill defined and that the literature uses a wide range of indicators, making it challenging to make comparisons across studies.

When considering WLR, there is an additional layer of complexity. Most studies consider household land rights without identifying who within the household holds the rights. When land rights are measured only at the household level, comparisons are based on the sex of the household head. We do include papers that use this framework within our analysis because excluding them would yield very few papers to analyze. But using headship ignores the impact of land rights held by the majority of the world's women who live in dual-adult households. Data on individual land rights are beginning to be more widely available, creating opportunities for better analyses of WLR.¹

When we consider land rights at an individual level, it is also useful to know whether the person holds them alone or jointly with another person or persons. There is evidence that holding land jointly is common in many, but not all, places in the world (Doss et al. 2014 for Africa; Kieran et al. 2015 for Asia; Deere and Leon 2003 for Latin America). Whether a woman is the sole owner of a plot of land or shares the ownership with her husband may have different implications for many household and development outcomes. While analyses of the dimensions of joint ownership are still emerging (Jackson 2003; Ambler et al. 2017; Doss, Meinzen-Dick, and Bomuhangi 2013), it should not be assumed that joint and independent ownership have the same implications.

¹ The FAO Gender and Land Rights Database, www.fao.org/gender-landrights-database/en/, documents many of these datasets.

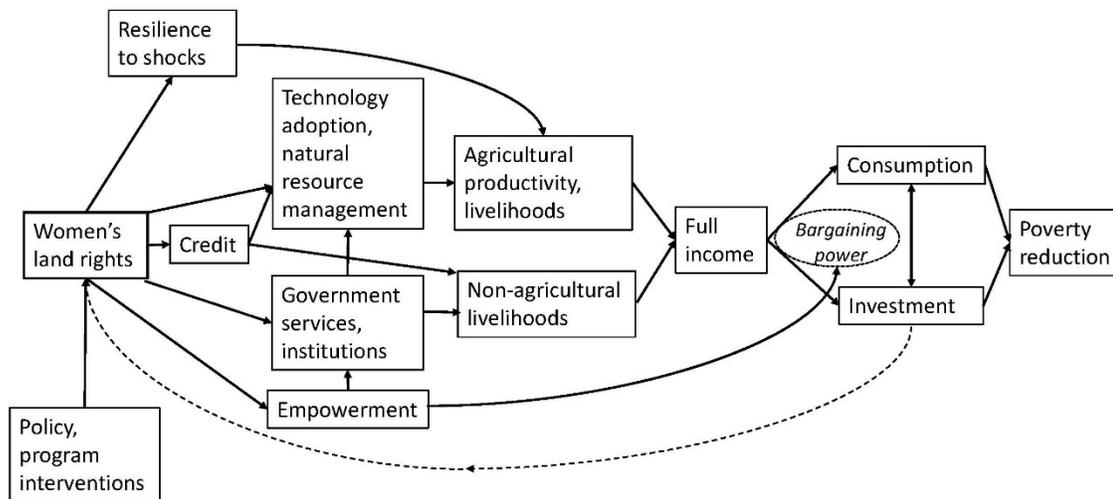
The analyses of WLR considered here similarly use a wide range of conceptualizations and indicators of WLR. Although we attempt to identify the rights that are being considered in each paper, the papers themselves are not always clear. Surveys typically use one of three approaches: whether the person has formal, documented land rights; whether the respondent simply reports that he or she owns the land; or finally, whether the person reports him- or herself as the farmer or manager of the plot. Some qualitative studies have more nuanced definitions of WLR, including local definitions and perceptions of tenure security, and of the two-way linkages between tenure security and social status.

Our conceptual framework does not distinguish among the various rights. Yet it is likely that different forms of land rights and levels of tenure security are needed for different pathways to reduced poverty. For example, duration of tenure security will affect willingness to invest in land. Someone who has tenure for only one season would not be expected to make investments with longer-term payoffs. Formal legal documentation of one's rights may strengthen tenure security, but this is not always the case, especially for women (Lastarria-Cornhiel 1997). Several of the more recent land formalization programs, such as in Ethiopia and Rwanda, have paid particular attention to WLR, to ensure that women's names are included, but as noted below even this is not sufficient unless women are aware of their rights with regard to land registration and ownership, inheritance, and divorce. The implications of different aspects of WLR is an area that would benefit from more rigorous analyses.

3. CONCEPTUAL FRAMEWORK

The Gender, Agriculture, and Assets Project developed a broad conceptual framework relating gendered rights over assets and multiple outcomes (Meinzen-Dick et al. 2014). Because land is an important asset, here we adapt the framework to focus specifically on WLR and the linkages to poverty reduction. We have accounted for a number of specificities of land rights and modified the framework to that presented in Figure 3.1. We use the adapted framework to guide our search for and presentation of the evidence. The framework lays out the expected linkages; in the presentation and discussion of the evidence we note which of those linkages have been studied.

Figure 3.1 Conceptual framework for links between women’s land rights and poverty reduction



Source: Authors.

Starting in the lower left corner of the framework, policy and programmatic interventions may have consequences for WLR that may be intentional or unintentional and positive or negative. While the impact of such programs is not the focus of this study, many of the papers examined are impact assessments of programs that expect to have positive outcomes because they work through improving

WLR. Thus, a first step is to acknowledge that there would be no impact of such programs on a range of outcomes if they do not first affect WLR.

Following the general literature on impacts of land tenure security as well as WLR specifically, we could expect to see direct effects in terms of resilience to shocks, technology adoption, NRM practices, credit, government services and institutions, and empowerment (Deininger 2003; FAO 2002; Grown, Gupta, and Kes 2005; Higgins et al. 2017; Place 2009). In turn, credit and government services (notably extension services, but also water supply, electricity, and so on) or participation in institutions (for example, cooperatives) can affect technology adoption and NRM practices. Empowerment can affect access to government services and institutions.

We hypothesize that women with strong land rights are more resilient to adverse shocks that affect their communities and households. Some of these links work through the investment pathway, to be discussed in greater detail below. For example, women with stronger land rights may be more likely to invest in NRM technologies that reduce their exposure to climatic shocks. Like other assets, land may also be sold or leased out to bring in income to deal with a shock. Women's land, which is typically smaller than men's land, is often sold first to cope with adverse shocks, since this strategy preserves the economic base of the household unit and provides the household with an additional consumption-smoothing mechanism.² Women with strong land rights may also be less likely to engage in risky behavior (such as transactional sex), reducing their vulnerability to HIV/AIDS and other sexually transmitted diseases.

Although some forms of technology adoption, such as use of new crop varieties, fertilizer, or machinery, are conceptually distinct from NRM practices such as agroforestry or mulching, in practice there is considerable overlap, and many of the studies address both. We have therefore grouped them together and focus on a range of agricultural technologies and innovations, such as climate-smart

² In Bangladesh, for example, the finding that adverse shocks have generally insignificant impacts on joint land and asset holdings—while individual assets are sacrificed at the margins—indicates that husbands and wives try to preserve the economic base of the household unit (Quisumbing, Kumar, and Behrman 2017).

agricultural practices and NRM techniques. These, together with resilience, access to credit, and government services or institutions, are expected to influence agricultural livelihoods. Access to credit could potentially increase the possibility of diversifying into nonagricultural livelihoods. Together these livelihood strategies would provide full income (which includes cash and in-kind income as well as the value of time).

Full income, in turn, is allocated between various forms of consumption and investment. Those allocation decisions are influenced by the bargaining power of household members; the empowerment effects of WLR might therefore be expected to affect women's bargaining power, and hence the consumption and investment outcomes. Consumption addresses poverty reduction in the short term; investment lays the basis for long-term poverty reduction. Investment includes human capital investments in the next generation as well as physical investments. We particularly examine intergenerational land transfers in this context. Although we examine NRM along with technology adoption, many NRM practices such as tree planting, fallowing, or other investments in soil fertility can also be interpreted as investments in the land, and can have feedback effects on WLR by increasing women's tenure security.

4. METHODS

This review uses a systematic search process to assess the available high-quality evidence on the effects of strengthening WLR on development outcomes related to poverty reduction. It evaluates the strength of the causal links between land rights and expected effects, identifies patterns and gaps in the existing evidence base, and generates insights on factors that mediate the effect of WLR on development outcomes. Although this review uses a systematic search process, it is not a systematic review but an evidence review, for reasons discussed below.

Previous systematic reviews on land tenure security have examined broad development outcomes (see Higgins et al. 2017), agricultural productivity and investment (see Lawry et al. 2017), and food security (see Holden and Ghebru 2016). This review complements those reviews by synthesizing the evidence on how *women's* land rights affect various development outcomes. Rather than assessing the effectiveness of interventions on WLR themselves (see Giovarelli, Richardson, and Scalise 2016), this review focuses instead on the implications of WLR on other outcomes of interest.

The review methodology follows the guidelines of Waddington et al. (2012) for systematic reviews in international development, which are designed to establish a comprehensive, documented, and replicable protocol to search defined databases, screen and select evidence against prespecified eligibility criteria, and synthesize the selected evidence.

Eligibility Criteria

The review specifies the types of studies, population, interventions, and outcomes of interest to include, detailed in Table 4.1, as part of the eligibility criteria (the “PICOS” framework, Higgins and Green 2011; Petticrew and Roberts 2006). The review includes peer-reviewed publications and published working papers, in English, published between January 1, 2000, and April 10, 2017, to focus the review on a manageable body of current and rigorous literature.

Table 4.1 Inclusion and exclusion criteria

		Include	Exclude
Study type	Publication type	<ul style="list-style-type: none"> Peer-reviewed publications and published working papers, including conference papers from the World Bank 2017 Land and Poverty Conference 	<ul style="list-style-type: none"> Abstracts, reports, briefs, declarations, laws
	Date of publication	<ul style="list-style-type: none"> January 1, 2000, through April 10, 2017 	<ul style="list-style-type: none"> 1999 and earlier
	Language	<ul style="list-style-type: none"> English 	<ul style="list-style-type: none"> Language other than English
	Study type	<ul style="list-style-type: none"> Quantitative, qualitative, mixed methods Observational and impact assessment 	<ul style="list-style-type: none"> Historical analyses
Types of participants	Landholder	<ul style="list-style-type: none"> Women in dual-adult households Women in female-headed households 	<ul style="list-style-type: none"> Men only
	Type of land use	<ul style="list-style-type: none"> Agricultural land, agroforestry 	<ul style="list-style-type: none"> Rangeland, wetlands, mangrove, forest, water, or urban
	Geography	<ul style="list-style-type: none"> Low- and middle-income countries 	<ul style="list-style-type: none"> High-income countries
Indicators of WLR and types of interventions	Type of land tenure	<ul style="list-style-type: none"> Women's documented (certificate, title) and undocumented land rights Customary and statutory tenure regimes Individual and joint household land rights 	<ul style="list-style-type: none"> Common property
	Types of changes to land tenure security	<ul style="list-style-type: none"> Laws, policies, programs, projects <ul style="list-style-type: none"> for example, documenting land rights; land allocation; awareness campaigns; legal aid; dispute resolution; agricultural development projects Inheritance and family law Privatization Conflict 	<ul style="list-style-type: none"> Large-scale land-based investments Descriptions of the gender gap in land Assessment of data available on gender and land
Types of outcomes	Types of effects related to poverty reduction	<ul style="list-style-type: none"> Resilience Technology adoption and natural resource management Credit Agricultural productivity and livelihoods Government services and institutions, including political participation Women's empowerment Reduced violence against women HIV risk Consumption and food security Bargaining power and decision making over consumption Bargaining power and decision making over human capital investment and intergenerational transfers Poverty status or change in poverty status 	<ul style="list-style-type: none"> Women's land tenure security Perception of tenure security Awareness of land rights Gendered distribution of property rights Evaluation of the efficacy or efficiency of land reforms, policies No disaggregation of outcomes by gender

Source: Authors.

Note: WLR = women's land rights; HIV = human immunodeficiency virus.

As Table 4.1 describes, the inclusion criteria define women’s land tenure rights more broadly than the more restrictive, but not uncommon, understanding of WLR as a woman’s individual, documented rights to land. Women in both dual-adult households and female-headed households were defined as potential participants. We include studies that examined relationships between WLR and our outcomes of interest as well as those that attempted to assess the impact of policies and interventions that strengthened both documented and undocumented rights (for example, perception of security), under customary, statutory, or legally pluralistic regimes.

Search Strategy

Several online databases (Web of Science, PubMed, IFPRI E-Brary) were searched and then screened against the eligibility criteria by title, abstract, and then full text. Additional titles were added via “snowballing” sources found in articles’ reference lists, reviewing leading land tenure institutions’ websites, and manually searching the World Bank 2017 Land and Poverty Conference for research papers in the pipeline but not yet published in peer-reviewed journals.

The following search term was used to identify articles that contained the specified phrase in its title, abstract, or keywords, with minor modifications to fit the search algorithm of each database:

1. Publication date >1999
2. (“Women” OR “gender”) AND (“land rights” OR “landownership” OR “land tenure” OR “property rights”)

A total of 511 articles were initially identified in these three databases. After removing duplicates, screening titles, abstracts, and text, and adding articles via snowballing, the search yielded 51 references that examined a wide range of property rights interventions, definitions of WLR, and outcomes (see the appendix for a full list of the papers). For each study, the type of study, sample design, methodology, definition of land rights, degree of sex disaggregation, and outcomes measured were recorded. Unlike the biomedical or nutrition literature in which effect sizes can be judged against what is biologically possible, there are no clear benchmarks for evaluating the effectiveness of a land tenure intervention or the

plausibility of effect sizes. The context specificity of gender norms also makes it difficult to predict ex ante the direction of influence. Given that many different themes of outcomes and methodological approaches are considered in this review, a qualitative (or narrative) review approach was chosen to synthesize the findings.

5. EVIDENCE ON THE CONTRIBUTIONS OF WOMEN'S LAND RIGHTS TO POVERTY REDUCTION

As noted in the conceptual framework, WLR may affect both agricultural and nonagricultural livelihoods. Secure land rights are expected to increase investment on the land, both directly and through greater access to credit for investment, and thus increase agricultural productivity. They may affect nonagricultural livelihoods by increasing access to credit, which facilitates diversification into nonagricultural livelihoods, and by increasing access to land rental and sales markets.

Resilience

The conceptual framework indicates that WLR can affect resilience by encouraging investment in climate-smart agriculture and NRM techniques, by providing women with an asset base that can be used to obtain credit for consumption smoothing (or that can be disposed of to protect the household's main asset base), and by reducing the likelihood of risky behavior. WLR can also affect women's exposure to agricultural risk. However, direct evidence on WLR and resilience is scant. One exception is a recent observational study using panel data in Malawi (Asfaw and Maggio 2017), which finds that high-temperature shocks during the agricultural season disrupt households' consumption more severely when plots in the household are managed solely by women. In contrast, when men are the exclusive managers of the plots or when the plots are jointly managed, households' consumption is more resilient to extreme events. However, it also finds that female-managed households are less vulnerable when they live in matrilineal districts compared with those in patrilineal districts, suggesting that tenure security and social norms that are supportive of women are also important. Because the evidence on resilience is closely related to other outcomes or pathways of interest, we discuss this in greater detail in the section on HIV risk and resilience below.

Technology Adoption and NRM

While land use rights are necessary for the adoption of any agricultural production technologies, control rights and security of tenure are most likely to affect the adoption of longer-term investments, particularly

NRM practices (Besley 1995; Meinzen-Dick and Di Gregorio 2004). Unfortunately, most studies on adoption of technologies and resource management do not identify which rights they consider and use varying indicators of tenure security. Of the 15 studies identified, five were impact assessments that use some type of formalization as an indicator of tenure security, primarily comparing male- and female-headed households, and 10 were observational studies using some form of self-reported tenure security. Note that all these studies are from seven countries in Africa, with most studies from Ethiopia, Ghana, and Malawi, particularly areas with some form of matrilineal inheritance in the latter two countries.

There is a large literature on technology adoption that focuses on the factors correlated with the adoption of improved varieties of seeds and fertilizer, some of which include a measure of the sex of the household head or the farmer. Yet almost none of it specifically considers *women's* land rights as a factor related to such technology adoption. In one of the few that do, Santos et al. (2014) use propensity-score-weighted regressions to examine the impact of a land allocation and registration program in West Bengal, a program that targets poor populations and promotes the inclusion of women's names on land titles. Compared with eligible nonbeneficiary households, the authors find that beneficiary households are significantly more likely to have higher reported tenure security and invest in improved agricultural inputs.

Some analyses of the relationship of tenure security and long-term investments have included indicators of WLR. Expectations that tenure security has a positive impact on long-term investments were borne out in an impact assessment of pilot land tenure regularization in Rwanda (Ali, Deininger, and Goldstein 2014), which found that program participants were twice as likely as control households to invest in or maintain bunds, terraces, and check dams for soil conservation, and female-headed households whose lands were regularized were the most likely to undertake such long-term investments after regularization, because they were the most tenure insecure before. By contrast, female-headed households were significantly less likely to use improved seed, which is a short-term investment. Participation in the program did not significantly increase women's likelihood of using improved seed.

The demarcation of land is the first step in a land registration process. In an impact evaluation of such a program in Benin, Goldstein et al. (2015) found that in female-headed households in the treatment villages, fallowing increased by 1.5 percentage points; only 1 percent of households in the control group practiced fallowing. Increases in the investment in trees and reductions of renting out of parcels did not vary by the gender of the household head.

In Ethiopia, Deininger et al. (2008) use panel data from 2004 and 2006 to examine the short-term effect of the first-stage (low-cost) land certification programs across different agroecological zones, and find a strong positive impact on land-related investments, especially terracing and bunding, at the household level. Although female-headed households were less likely to make such investments, the effect was not significant. Persha, Greif, and Huntington (2017) use quasi-experimental (QE) panel data to examine the marginal impact of second-level certification (that included Global Positioning System demarcation and the development of a land certificates database) relative to first-level certification and find no evidence that the second-level certification had had, or was expected to have, any effect on investment in soil and water conservation, by male- or female-headed households. However, this may be related to households' not reporting any perceived increase in tenure security because of the second-stage certification. Quisumbing and Kumar (2014) use 2009 Ethiopian Rural Household Survey data to examine the medium-term impact of the land registration. They find that households believe that certificates increase their incentive for planting trees, but the effect is stronger for male-headed than for female-headed households. However, a closer look at the evidence on investment shows that certification alone is not enough: knowledge of land rights in three domains (tenure security, land transferability, and gender rights) significantly affects adoption of soil conservation practices and the planting of tree crops and legumes, and women's relative lack of knowledge about their land rights is a significant constraint to adoption of these investments.

Deininger, Ali, and Yamano (2008) also find, based on observational survey data in Uganda, that both the legal status of land and knowledge of land rights affect adoption. Household knowledge of land rights significantly increases tree planting and soil conservation and has a greater effect than having

transfer rights to the land, with female-headed households significantly more likely to make such investments.

Four observational studies from Ghana bear out the relationship between security of tenure and investments in the land. Goldstein and Udry (2008) use political standing as a proxy for tenure security, and find that those without political power, including women, leave land fallow less often. Fallowing is a means of increasing the productivity of land over time. In a mixed-methods study combining surveys and qualitative methods, Antwi-Agyei, Dougill, and Stringer (2015) found that migrant status as well as gender affects tenure security, but that both migrant and local women in two districts of Ghana were more likely than men to say that complex tenure (that includes customary and statutory tenure) is a barrier for climate change adaptation, which they define as short-term soil conservation (mulching, use of inorganic fertilizers) and longer-term tree planting. In another mixed-methods study, Bugri (2008) found that men were more likely than women to report that customary tenure provided greater security than statutory tenure for environmental management and agricultural production. However, Bugri also notes that factors other than tenure are a significant constraint to environmental management and productivity.

Awanyo's (2009) study in Ghana draws on local definitions of land tenure security, including the breadth, duration, and assurance of land rights, in a mixed-methods (qualitative- and survey-based) observational analysis that looks at the relationships between tenure and different types of investment that favor tree biodiversity. These include high-investment practices such as selective clearing and minimum tillage during the clearing phase of farming and minimum tillage during the cultivation stage; medium-level investments of mixed cropping of trees and nontree crops and selective weeding at the cultivation phase and planting and transplanting tree seedlings at the fallow phase of farming; and low-level investments in mulching and pruning. They find that although tenure security increases selective clearing, income and gender do not have significant interaction effects with landholding rights. This study also points out that tenure insecurity can prompt both women and men to invest in the resource base to strengthen claims on the land itself. Similarly, in an extensive (community-level) study in cocoa areas of Ghana, Quisumbing, Estudillo, and Otsuka (2004, 165–166) found that “people invest not only in trees but

also in social relationships, [and] the wife's help in planting trees is also an investment in the stability of her marriage. Helping the husband also guarantees the wife a share of the land should the marriage eventually end in divorce." They observe endogenous changes that strengthen women's tenure security, with men gifting land to wives and children, as well as changes in the Intestate Succession Law of 1985. Both men and women plant cocoa trees to be given the land as a gift, but women have to plant roughly twice as much of the land as men for the husband to bestow her the same area of land.

Dillon and Voena (2017) use an interesting identification strategy to consider how WLR affect household technology adoption in Zambia. Limiting the sample to couple-headed households, they analyze whether technology adoption patterns differ in communities where widows inherit the land upon the death of their husband from those where they do not. They find that in areas where widows inherit, households are more likely to invest through fertilizer use and fallowing. The impacts on intensive tillage are in the same direction, but less robust.

While the overall evidence is that women's lack of land tenure security is a constraint to investment in the resource base, several studies from Malawi provide a cautionary note; men's tenure security also matters for such investment. Whereas in most areas of virilocal marriage (where women move to the husband's area) it is women who are vulnerable to loss of land upon dissolution of a marriage, in areas with uxorilocal marriage (where men move to the wife's community) men may be more tenure insecure. Using a survey from two villages with contrasting marriage patterns, Hansen and Luckert (2005) find that uxorilocal marriage and inheritance patterns where land is not inherited by men's own children discourage tree planting by men and do not necessarily promote tree planting by married women. However, a high proportion of unmarried women is associated with more tree planting in uxorilocal areas. Because tree planting can be done to establish tenure claims, Lovo (2016) uses a large plot-level dataset to examine investments in soil conservation as well as tree planting and hybrid maize. She finds that insecure male decision makers (in uxorilocal or mixed-residence areas) invest less in conservation than secure female counterparts—the effect is similar to having a short-term rental contract. Conversely, insecure female decision makers (in virilocal areas) invest less in soil conservation than their

secure male counterparts. The effect is less marked for tree planting, and tenure insecurity related to inheritance practices does not affect the adoption of hybrid seeds. Similarly, based on focus group interviews in a Malawi village that had changed from matrilineal to patrilineal inheritance, Pircher, Almekinders, and Kamanga (2013) found that women are reluctant to invest in soil improvements because they do not have long-term land tenure security.

Credit

It is routinely claimed that land rights allow the holder to access credit, which can be invested to gain higher returns and thus reduce poverty (De Soto 2000). Yet there is little evidence supporting this, partly because this pathway requires well-functioning credit markets, banking systems that accept land as collateral, and legal systems that effectively adjudicate cases where land is used as collateral. In their systematic review of the impact of increased tenure security (not specific to WLR), Higgins et al. (2017) found only two of seven studies of credit report a significant link between increased tenure security and credit.

We find only two studies that assess the impact of women's property rights on credit. In Ethiopia, mortgaging of land is illegal, so land cannot be used as collateral for formal loans, but Persha, Greif, and Huntington (2017) note that land certificates may help in obtaining microfinance or loans from informal sources by signaling that the holder is attached to a place and has capacity for repayment. They find that strengthening WLR through second-tier land registration increased the access to credit for both male- and female-headed households, but with a larger effect for male-headed households. In addition, in West Bengal, beneficiary households in a land allocation and registration program were more likely than nonbeneficiary households to use credit for agriculture (Santos et al. 2014).

Agricultural Productivity and Livelihoods

Ideally, information on the impact of WLR on agricultural livelihoods would include information on productivity, crop choice, and profitability. While there has been a recent resurgence of literature comparing the productivity of men and women farmers (see Doss forthcoming for a review), almost none

of it considers the impacts of WLR. This literature has shifted away from comparing male- and female-headed households to analyses of the productivity of plots farmed by men and women, but the land rights themselves are not generally considered. For example, Peterman et al. (2011) analyze agricultural productivity differences on plots managed by men and women in Uganda and male- and female-headed households in Nigeria, considering a range of issues including crop choice. To identify the plot managers in Uganda, they asked who owned the crops produced on the plot but they do not identify the owner of the land itself. A recent set of papers (Aguilar et al. 2015; Ali et al. 2016; Slavchevska 2015; de la O Campos, Covarrubias, and Patron 2016; Oseni et al. 2015; Kilic, Palacios-López, and Goldstein 2015) all use the sex of the plot holder as the stratifying variable in decomposition analyses to understand the factors underlying the differences in the value of output on men's and women's plots. Although being the plot holder implies having land use rights, it provides no information about tenure security.

Three of the six papers that explicitly examine the relationship between land rights and productivity use QE methods, while the remainder are observational. Five of these six papers are based in Africa. The three QE studies analyze the impact of various government land allocation or registration programs on productivity outcomes. In Ethiopia, Bezabih, Holden, and Mannberg (2016) use the rollout of the Ethiopian land certificate program to look at the impacts on productivity by the sex of the household head in two zones. They find that the value of output increases in households with certificates relative to those without and that the impact is greater for female-headed households. Similarly, Mendola and Simtowe (2015) analyze a land reform program in Malawi, using difference-in-difference analyses and propensity score matching, to compare the outcomes by the sex of the household head. They do not find significant improvements in agricultural productivity and income, food security, or access to social services for beneficiary households headed by women, although there is an impact for those headed by men. Yet other impacts, including increases in total income and assets, are similar for beneficiary households headed by men and women.

In the only one of these six analyses not based in Africa, Newman, Tarp, and van den Broeck (2015) use panel data from Vietnam to analyze how the acquisition of land use certificates (LUCs) affects the productivity of rice farmers. As with the other QE studies, the analysis is at the level of the household. However, they specifically analyze WLR by considering whose names are on the certificate. They find that plots with LUCs have higher productivity and that productivity is not lower on plots that are jointly titled.

Goldstein and Udry's (2008) observational study in Ghana traces the relationship between political power, tenure security, land fallowing, and agricultural profits. Those with less political power are less tenure secure, and women are overrepresented among this group. Thus, women fallow their land for less time, have lower productivity, and earn lower agricultural profits.

The other two observational studies simply compare households with different land rights. In Malawi, Bhaumik, Dimova, and Gang (2016) use a treatment-effects model and instrumental-variables regressions to see how the amount of land owned by men and by women within the household affects decisions to grow high-value crops or the share of income from high-value agriculture and then estimate the relationship of growing high-value crops (or the share of income from high-value agriculture) with per capita household consumption.³ In the exposure/share of income regressions, they interact the size of land owned with a dummy variable for matrilineal location to further identify the strength of WLR. They find that the size of land owned, regardless of the sex of the landowner, is positively related to exposure to high-value crops (or the share of income from high-value agriculture), which in turn is associated with higher per capita consumption. However, even in matrilineal areas, male land owners have an advantage in high-value agriculture. In both specifications, the interaction term between male-owned land area and matrilineal location is positive and significant, whereas the interaction term between women-owned area and matrilineal location is negative—it is insignificant in the treatment-effects specification, and significant in the instrumental-variables specification. This indicates that, even if WLR are stronger in

³ The authors use exposure to high-value crops in the first stage in the treatment-effects regressions, and share of income from high-value agriculture in the instrumental-variables regressions.

matrilineal areas, male farmers may still have the advantage in entering high-value agriculture in an environment where women do not have adequate access to markets and complementary resources such as capital and hired labor.

Finally, Owoo and Boakye-Yiadom (2015) compares maize yields across male- and female-headed households with and without titles to the land in Kenya. This approach does not address any of the selection issues. Maize yields are higher on men's plots than on women's plots and on plots with titles compared to those without titles.

Other analyses find more indirect effects. Deininger and Castagnini (2006) use an observational analysis of households who have experienced conflict over land and those who have not, and they find that female-headed households are more likely to experience land conflict. They also find that productivity is negatively correlated with land conflict, but they do not explicitly consider productivity by sex of the head.

Government Services and Institutions

Because many government services are provided to recognized landowners, links may exist between WLR and government services or institutions. However, much of the literature on such linkages, such as to electricity, water, and even police protection, is related to housing or urban issues, which are not covered in our rural-focused paper. Participation in public institutions can be empowering and provide access to services. For example, Meinzen-Dick and Zwarteveen (1998) note that because membership in water users' associations is often restricted to landowners, women are excluded from participation. However, we found no studies showing the links between WLR and extension services or irrigation.

Three papers explore the link between WLR and different aspects of women's participation in institutions: speaking in community meetings (Grabe 2015), involvement in community-level land governance (Goldman, Davis, and Little 2016), and collective action in a coffee cooperative (Selhausen 2015).

Grabe (2015) finds that landownership is positively and significantly correlated with speaking in community meetings and household decision making and that it decreases the extent to which a woman feels controlled by her partner in northern Tanzania. Using path analysis, she argues that landownership increases women's power within their marital relationships, which in turn increases the likelihood of their participation in these meetings.

Goldman, Davis, and Little (2016) emphasize the value of the process of learning about land rights in becoming empowered to participate in community decisions and political processes. Based on qualitative and quantitative observational data from 2009 to 2013 in Tanzania, they find that the work of nongovernmental organizations (NGOs) to educate women about their land rights, even if they did not directly facilitate women's access to land, strengthened women's social relations, expanding access to customary authorities and increasing knowledge of political processes.

Selhausen (2015) finds that women's landownership increases their probability of joining a women's coffee cooperative in western Uganda but does not significantly affect the degree of a woman's participation. The size of land owned by women has a positive and significant effect on women's probability of membership, which Selhausen hypothesizes could be due to greater perceived gains from membership in the cooperative or increased bargaining power to participate in the cooperative, or both. Selhausen then examines what factors affect whether women sell coffee to the cooperative or sell to private buyers on the side. Two measures of spousal cooperation, including joint landownership and spousal income pooling, are found to positively influence women's participation in collective coffee marketing. Selhausen suggests that women may face incentives to side-sell to a private buyer if they are threatened by spousal competition over the sale of coffee, and that women's individual landownership does not necessarily guarantee control over selling the coffee produced. Consistent with the idea that individual landownership may not encourage selling to the collective, husbands' greater relative landownership adversely affects wives' collective marketing, implying that men's relative control over productive resources is likely to decrease women's collective-marketing prospects.

Other Livelihoods

Most of the possible ways in which WLR may affect nonagricultural livelihoods have not been analyzed, or they have been excluded because this paper focuses on rural areas and on agricultural land, rather than housing. For example, it is possible that WLR could affect the probability of migration to urban areas and diversifying into nonagricultural livelihoods, but that would not be captured in the papers included in our search criteria. Only three studies consider women's ability to earn an income through renting out land—all based on Ethiopia. Holden, Deininger, and Ghebru (2011) use a QE approach with data from 400 households in Tigray before and after the land registration process. They find that women landholders are more likely to rent out their land if they have a certificate. They suggest that when women have stronger tenure security, they are able to rent out their land without fear of losing it.

Using observational data on 700 female-headed households, Akpalu and Bezabih (2015) analyze the decision to rent out land. They find that female household heads are more likely to rent out land when their risk of losing a plot is low, livestock ownership is low, marginal cost of litigation is low, and climate variability is high.

Holden and Bezabih (2008) present a different angle on the issue when they analyze why productivity is lower on plots rented out by women than on those rented out by men. Note that the gender differences are in the plot owners, not the managers. They suggest that because women have weaker tenure security, they have less bargaining power in the negotiations and are more likely to rent out the land to relatives, who have lower productivity.

Empowerment

The conceptual framework indicates a direct link between WLR and empowerment, and our systematic search locates eight papers that focus on this link. While a separate section discusses papers on WLR and bargaining power, this collection of papers explores how WLR strengthen three different manifestations of empowerment, including one paper on sexual behavior and HIV risk (Muchomba, Wang, and Agosta 2014), three papers on women's participation in collective action (Grabe 2015; Goldman, Davis, and

Little 2016; Selhausen 2015), and three papers on domestic violence (Grabe 2010; Grabe, Grose, and Dutt 2015; Panda and Agarwal 2005).

Although these papers do not all explicitly define empowerment and furthermore consider different aspects of empowerment, we review them together because they address empowerment and bargaining power beyond household decision making, focusing on women's perceptions of their own power and their available options to avoid domestic violence and risky sexual behavior. As shown in the conceptual framework, these aspects of empowerment in turn affect (a) women's participation in government services and institutions and (b) women's bargaining power, understood more broadly as better livelihood options (for example, whether to engage in transactional sex) and relationship options (for example, whether she experiences domestic violence and the ability to leave an abusive relationship).

Of these seven papers, three were written in the context of an intervention and four are observational. Although the papers on interventions compared outcomes across treatment and control groups, and claim to have samples that are "matched" in terms of observable characteristics, no attempt was made to use statistical matching techniques such as propensity score matching to create a counterfactual. Two of the intervention-based papers and one of the observational papers also included a qualitative component. In almost all the papers, land rights are defined as self-reported landownership (for example, interpreting an affirmative response to "do you own land" or interpreting a respondent who farms her "own land" to mean the respondent owns land). One paper also looked at homeownership. One paper distinguishes between individually owned land and jointly owned land (Selhausen 2015), and one differentiates between owning land, having title to land, and being able to "control" (make decisions on) land (Goldman, Davis, and Little 2016), but the rest do not record whether land rights are documented.

This group of papers also reflects how empowerment affects other outcomes, as indicated in the conceptual framework. The papers on participation suggest that WLR affect access to government services and institutions via empowerment. The papers on HIV risk and domestic violence show how WLR affect bargaining power and resilience.

HIV Risk and Resilience

Some of the pathways between WLR and resilience may not occur through the productive sphere, as illustrated by potential pathways between risky sexual behavior and HIV risk. As noted in an evidence review of the literature on women's property rights and HIV status (Tumlinson, Thomas, and Reynolds 2015), a study by Muchomba, Wang, and Agosta (2014) is the only empirical paper to date that uses quantitative data to test the relationship between WLR and risky sexual behavior associated with HIV infection. Drawing on panel data from the 1998, 2003, and 2008–2009 Kenya Demographic and Health Surveys, the authors use logistic regression to examine the association between landownership and HIV infection status, transactional sex, unprotected sex, and unprotected sex with casual partners in a sample of 5,511 women working in the agricultural sector. Landownership was measured through whether the respondent reported working on own farm, in contrast to family land, rented land, or someone else's land. As such, there is some ambiguity over whether landholdings are individually or jointly owned and type of tenure.

Unmarried and married/partnered women face different pathways of exposure to HIV infection, namely survival sex and unprotected sex. Landownership appears to influence the first but not the second pathway. While single women not living with a husband who is the household head are more likely to engage in survival sex, women living with a male partner are more likely to be exposed to HIV through unprotected sex with their partner. While the authors find that women's landownership is associated with fewer sexual partners in the past year and a lower likelihood of engaging in transactional sex, it is not associated with unprotected sex with partners (casual or not) among women who perceive themselves at risk for HIV. Furthermore, landownership was associated with reduced HIV infection only among single women but not married/partnered women. These findings suggest that landownership can decrease HIV risk by reducing women's economic reliance on high-risk sexual partnerships but not by affording them greater ability to negotiate safer sex. Reflecting on the conceptual framework, in this context women's landownership did not significantly improve women's bargaining power (for safer sex) but did reduce the

need for survival sex as a livelihood option. To the extent that WLR empower women to avoid risky sexual behavior and HIV risk, they can also improve resilience.

Empowerment and Domestic Violence

Our review includes papers that examine the relationship between WLR and domestic violence, one of the clearest indicators of disempowerment. Three of the four observational studies analyze violence that occurred at any time during a marriage and current violence (violence experienced in the past 12 months) and include measures of both psychological and physical violence; the fourth examines just current violence. Two studies use a Conflict Tactics Scale, which also includes questions on partner control (for example, whether partner exhibits controlling behavior) (Grabe 2010; Grabe, Grose, and Dutt 2015). These studies include both land and house ownership (Panda and Agarwal 2005) and landownership alone (Grabe 2010; Grabe, Grose, and Dutt 2015). The papers show how property ownership deters domestic violence by increasing women's status and presenting an exit option for women to leave an abusive relationship. The papers suggest that property ownership works through several channels: as an independently controlled source of income and livelihood (via rental, cultivation, or other economic uses of the land), which decreases economic dependence on a spouse; as a symbolic source of status; as a fallback asset to cultivate or sell; or as a physical shelter upon leaving the relationship. However, the papers do not consider why women own property; whether the property is generating income, and if so, who controls the proceeds; or whether the property (land or house) is currently owned or being used jointly by husband and wife. In addition, the location of the property and its current use should affect its appropriateness as an exit option, to provide either shelter or alternate livelihood. Finally, the papers do not address endogeneity of property ownership—whether women have property because they have higher status, rather than the reverse.

Panda and Agarwal (2005) examine associations between property ownership and domestic violence in the district of Thiruvananthapuram, Kerala, India. They choose this site for its prevalent matrilineal inheritance, relatively high rates of women's property ownership, and cross-cousin marriage

customs, whereby women can marry in their own village and thus experience greater postmarriage familial and neighborly support than if they had moved to their husband's village. Panda and Agarwal highlight that in addition to women's property serving as a viable exit option for women experiencing domestic violence, it can also deter domestic violence by presenting a visible symbol of women's status and ability to leave a relationship. In this observational study, rates of domestic violence were higher among those women who owned neither land nor house (49 percent physical violence; 84 percent psychological violence); those who owned both land and house reported much lower rates of physical and psychological violence (7 percent and 16 percent, respectively). Although the sample size is quite small (302 rural women, 200 urban women), none of the nine rural women interviewed who owned both land and house reported experiencing any form of violence. Panda and Agarwal also find that of the 179 women who experienced long-term physical violence, the 43 who left their home were more likely to own land, house, or both. Of the women who left home, 24 returned later; most of these women who returned were propertyless ($n = 21$). Panda and Agarwal therefore suggest that women who own property are in fact able to use it, in large part, to escape abuse. However, as they aggregate both house and landownership, it is unclear the role that each plays.

Panda and Agarwal also undertake separate logistic analyses for different kinds of violence and find that women's property ownership is significantly and negatively associated with both physical and psychological violence experienced both long term and in the current period. The effect is strongest when women own both house and land, followed by just house ownership, then land. These effects outweigh other significant variables, including per capita household expenditure, women's access to social support, husband's employment status, and husband's witnessing marital violence in childhood. These findings suggest that house and landownership serve as the strongest deterrent to marital violence. However, the authors note that women who own these assets may perceive more stigma and therefore be less likely to report domestic violence. In addition, reverse causality, especially for lifetime violence, cannot be ruled out.

Grabe (2010) studies the relationship of landownership with several measures of women's agency and experiences of domestic violence in Nicaragua, and then in Grabe, Grose, and Dutt (2015), contrasts these findings with a similar study in Tanzania. Both studies look at landowning women who gained access to land by participating in an NGO effort to facilitate women's landownership and titling and raise women's awareness of their rights. Using path analysis, the studies find significant links between landownership, relationship power, and reduced domestic violence. However, neither study addresses the selection bias related to participation in the NGO programs or considers pathways other than relationship power through which property ownership might decrease domestic violence, and the mechanism through which landownership increases relationship power is not clear.

Grabe, Grose, and Dutt (2015) include a qualitative component, where they report women's perception that landownership increases joint decision making with their husband in both countries. However, in Tanzania, where women's landownership is much less common and men are traditionally considered to own all family assets, women attribute more transformative potential to landownership including greater autonomy and financial independence, which they identify as a deterrent to domestic violence.

Full Income

The conceptual framework suggests that WLR (and interventions or policies strengthening them) will affect full income through the pathways discussed above. The systematic search identified 17 papers that could be used to examine linkages between WLR and full income, and WLR and bargaining power. The latter would affect the allocation of full income across consumption and investment. Evidence of a direct association between WLR and full income, however, does not exist, possibly because of the difficulties in conceptualizing or measuring full income. Instead, we review two papers that investigate the links between WLR and food security, broadly defined as household calorie availability. The bulk of evidence relates to household bargaining power and decision making: we found nine papers on bargaining power,

decision making, and expenditure allocation, and six papers on bargaining power, investment in human capital (health, education, nutrition), and intergenerational transfers.

Among the 17 papers reviewed, six were QE studies (including “natural experiments”) that took advantage of the timing of a property rights reform or exogenous differences in eligibility and the rest were observational studies. These property rights reforms were (1) community-based land registration in Ethiopia; (2) the Hindu Succession Act Amendments (HSAA) in India; (3) joint titling of land in Peru; (4) changes in the inheritance law in Nepal; (5) the Marriage and Family Law and subsequent Land Law in Vietnam; and (6) the distribution of microplots to landless families in West Bengal, India. Each of these reforms affected WLR, but in different ways. The community-based land registration led to joint certification of husbands and wives, giving stronger land rights to women. The HSAA, made by five Indian states (Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, and Maharashtra) between the late 1970s and early 1990s, stated that women who were unmarried at the time the reform was passed in their state would be granted claims equal to that of their brothers in ancestral or joint family property, including the right to a share by survivorship (Agarwal 1994). In Peru, a rural land titling effort in 1996 required land to be jointly titled between a man and a woman who share their life in a nuclear family (Wiig 2013), but not all peasant communities were eligible for the titling effort. In Nepal, two constitutional amendments passed in 2002 and 2007 significantly improved landownership rights of women (Mishra and Sam 2016). The 2002 amendment expanded women’s rights by guaranteeing equal inheritance of property at birth by sons and unmarried daughters, providing married women rights to a share of their husband’s property immediately after marriage, and lifting the age limit on widows. However, daughters had to renounce their share of the inherited property upon marriage (Shrestha 2008; cited in Mishra and Sam 2016). The latest amendment of the Interim Constitution in 2007 guaranteed joint landownership by both husband and wife of the land provided by the state and implemented policies to facilitate a wife’s joint ownership of her husband’s land. The amendment also removed the “unmarried” requirement from inheritance of property by daughters, meaning both sons and daughters have equal rights to ancestral property regardless of their marital status. In Vietnam, the Marriage and Family Law of 2000 stipulated that any LUC

obtained by husband and wife over the course of the marriage would be considered their common property, while any LUC obtained prior to the marriage or through inheritance by the husband or wife would be considered common property only by mutual agreement. Further, the 2001 Land Law reform led to the issuance of LUCs at the plot level. Household members could own multiple plots, and any plot under the common ownership of husband and wife was required by law to be registered under both names (Menon, Rodgers, and Nguyen 2014). Finally, in the Nijo Griha, Nijo Bhumi (NGNB) program in West Bengal, the government purchases tracts of land and provides microplots to landless rural families (Santos et al. 2014). The microplots are intended for building a homestead, cultivating a small vegetable garden, planting fruit and wood trees, and raising livestock. These plots are documented with *pattas* (land titles) issued by the state, and the NGNB explicitly stipulates that *pattas* issued to dual-headed households should be issued in the woman's name only or jointly titled to the male and female heads.

The observational studies were undertaken mostly to examine the association between men's and women's control of assets (including land) and household decision-making outcomes, often in the context of tests of the collective model of the household. Some of the studies of property rights reforms were also observational.

Consumption and Food Security

Food consumption is a priority of rural households, accounting for the bulk of household expenditures among the poor. The two papers examining food security outcomes are from Ethiopia and India. Ghebru and Holden's QE study (2013) uses five rounds of household panel data from Tigray, Ethiopia, collected in the period 1998–2010 to assess the impacts of a land registration and certification program. Using the number of years that the household had a land certificate for identification of impacts and controlling for unobservable household and farm characteristics by using household fixed effects models, Ghebru and Holden (2013) found significant positive effects of certificate ownership on food availability and body mass index (BMI) of children. The effects on calorie availability (but not BMI) were higher for female-headed households. The authors posit that the positive food security effects were associated with land

rental market participation, which has been enhanced not only by the land certification program but also by increased investment and productivity on owner-operated land. Note, however, that the variable used to capture gendered effects—the sex of the household head—is at best an imperfect measure of gender differences in land rights. In their study of a land allocation and registration program in West Bengal (cited above), Santos et al. (2014) found greater women’s decision making over household food and agriculture among beneficiary households, but no evidence of significant short-term improvements in food security in the two years between the baseline and endline surveys.

Bargaining Power and Decision Making over Consumption

Among the nine papers on bargaining power and decision making, three used QE methods and six were observational. Most of the QE studies exploited eligibility criteria or variations in the timing of reform relative to the timing of the survey to identify impacts of the reform. Brule (2010) found that the HSAA, which give sons and daughters equal rights to inherit, have increased women’s perceived ownership of household land, women’s self-reported bargaining power in the household, and women’s probability of inheriting land. Although the law had a very limited substantive impact on the equality of women’s land shares, households with an HSAA beneficiary spend more on women’s goods, medical care, and children’s education. Wiig (2013) compared decision-making outcomes in Peruvian peasant communities that were eligible for joint titling with those communities that were not eligible. Women living in communities eligible for joint titling participated in a significantly higher number of household decisions than those living in communities ineligible for joint titling. The effect is strongest for agriculture decisions and land-related investments. Less impact was observed on household expenditures as market operations are traditionally seen as a woman’s responsibility. Mishra and Sam (2016) used coarsened exact matching and instrumental-variables approaches on nationally representative data collected before and after the reform of inheritance laws in Nepal. They find that women’s landownership in Nepal significantly increases their involvement in household decision making in areas of their own healthcare, major household purchases, and visits to family or relatives. Although the authors cannot empirically test

the impact of the land rights reforms of 2002 and 2007 in Nepal, they note that the strength of the association between landownership and decision making seems to have risen following their enactment, suggesting that the implementation of similar progressive laws could result in more empowerment for women. Kumar and Quisumbing (2015), in an observational study, examine complementarities between the reform of the Family Code and land registration in Ethiopia. They take advantage of data on women's perceptions of the distribution of assets upon divorce collected in 1997 (prior to the reform of the Family Code) and again in 2009. They find that women who are aware of the land registration process are also more likely to have changed their perceptions about the distribution of assets upon divorce and to believe that this distribution would become more equal, potentially increasing women's bargaining power within the household. The positive coefficient on awareness of the land registration process is being driven mostly by wives in male-headed households, because this coefficient is insignificant for female heads of households. Having at least one female member in the Land Administration Committee also is positively correlated with the perception that divorce allocations would be equal. Such change in perception indicates that women are becoming more aware of their rights if their marriages should dissolve.

The observational studies used data from household surveys in Ethiopia (Dercon and Krishnan 2000; Fafchamps and Quisumbing 2002); Bangladesh, Ethiopia, Sumatra (Indonesia), and South Africa (Quisumbing and Maluccio 2003); Ghana (Doss 2006); India, Malawi, Mali, and Tanzania (Doss et al. 2014); and Karnataka, India (Swaminathan, Lahoti, and Suchitra 2012). The datasets contain information on women's and men's property rights, although definitions differed across datasets and across studies, and many of the studies did not explicitly set out to test the relationship between WLR and bargaining power, but differential control of resources, more broadly, and bargaining power. Notably, because most of these studies tested the hypotheses that women's property rights over assets, broadly defined, significantly affected household decision-making outcomes, in four of them the property rights variable aggregated land with other assets. The findings should therefore be interpreted as the associations between women's land and asset ownership and various outcomes, and not associations with WLR alone. Two studies used similar definitions of women's property rights: Doss et al. (2014) used whether women

own land individually or jointly, or whether women own a house individually or jointly, and Swaminathan, Lahoti, and Suchitra (2012) used a binary variable: whether the woman was an owner of either land or a house and a continuous variable capturing the share of total household gross value of land and housing owned by women. Doss (2006) used the share of farmland owned by women, and Fafchamps and Quisumbing (2002) and Quisumbing and Maluccio (2003) focused on land and livestock brought to marriage. Dercon and Krishnan's (2002) study on risk sharing within households in Ethiopia was not focused on examining the impact of WLR; however, in testing the determinants of the sharing rule, the interaction term between the household's landholding and location in the South (where women are more disadvantaged) is a proxy for the weakness of WLR.

The findings from the associational studies indicate that, although WLR have significant and positive associations with women's increased decision-making ability and empowerment, these associations are not significant across the entire range of outcomes nor consistently significant across countries, owing to the context specificity of gender norms. Doss et al. (2014) examine associations between women's sole and joint landownership on a range of outcomes (growing crops primarily for household food consumption, cash crop farming, taking products to market, purchasing inputs for agricultural production, minor household expenditures, children's education, and major household expenditures) and find that individual and joint landownership have statistically significantly different effects on women's input into agricultural decisions for all four of the decisions in the three African countries, but find no relationship between landownership and decision making in India. Whether land is owned jointly or individually has less of an impact on other household decisions; the difference is statistically significant in four of the 12 estimates (three decisions in each of four countries). Swaminathan, Lahoti, and Suchitra (2012) find that owning a house or a plot of agricultural land enhances women's ability to travel to the market, health center, and other places outside the community, and to make decisions about their employment, health, and use of money independently.

Fafchamps and Quisumbing (2002) examine associations between land and livestock brought to marriage (treated separately) by the husband and wife. They find that the premarriage land of the wife and share of land use rights of the wife positively affect the shares of land and livestock going to the wife upon divorce, but have no effect on disposition of assets when the husband dies. The premarriage land of the wife is also positively associated with the wife's share of land rights and her right to rent land; but a wife's premarriage rights to livestock have no relationship with the wife's share of livestock or her right to sell livestock. The assets that each spouse brings to marriage have little impact on the distribution of assets if either spouse dies, but they matter in the case of divorce. Quisumbing and Maluccio (2003) explore associations between assets brought to marriage by husband and wife on expenditure shares and child schooling in Bangladesh, Ethiopia (same dataset as Fafchamps and Quisumbing study), Indonesia (Sumatra), and South Africa. Increasing relative resources controlled by women leads to higher expenditure allocations to education. In two out of three countries where men's and women's assets have significantly different effects (Bangladesh and South Africa), increasing the share of assets controlled by women increases educational budget shares, although effects vary across sons and daughters.

The consensus from this set of studies is that strengthening WLR increases women's decision-making power, mobility, and empowerment. In addition, via a hypothesized increase in bargaining power, WLR are associated with greater decision-making power over land within marriage and greater control over consumption decisions, resulting in higher budget shares for child schooling.

Bargaining Power and Decision Making on Human Capital Investment and Intergenerational Transfers

The conceptual framework predicts that WLR, acting through bargaining power, affects investment decisions, including investment in human capital. Our search yielded six papers on the relationship of WLR with human capital (health and nutrition of children), two of which were QE and the others observational. Allendorf (2007) used one round of the Nepal Demographic and Health Surveys to explore whether women's landownership empowers women and benefits young children's health in Nepal. This QE study used variations in the timing of reform for identification and found that women who own land

are significantly more likely to have the final say in household decisions, a measure of empowerment. Similarly, children of mothers who own land are significantly less likely to be severely underweight. Menon, Rodgers, and Nguyen (2014) investigate whether land titling for women improves child health and education in Vietnam and exploit two rounds of panel data before and after the joint titling reform. Distinguishing between LUCs held by women only and those held jointly, they find that woman-only-held land use rights decreased the incidence of illness among children, increased their health insurance coverage, raised school enrollment, and reallocated household expenditures toward food and away from alcohol and tobacco. These effects were almost all stronger than in households with male-only or jointly held land use rights.

Finally, WLR may affect transfers to the next generation by increasing women's bargaining power, which would affect both how much is allocated to the next generation and to whom in the next generation. Two QE studies analyze the impacts of the Hindu Succession Act Amendments but arrive at very different results because they use different "triggers" for partition of family property. Deininger, Goyal and Nagarajan (2013), who use the timing of the father's death relative to the implementation of the HSAA, find that (1) there is a clear discontinuity in the likelihood of women inheriting land at the time of the reform and an increasing trend in this variable thereafter; (2) reforms had a positive impact on the total value of asset transfers women received, the share of household land they received, and their level of landownership at the time of the survey (that is, effects persisted); and (3) girls but not boys whose education decisions were made under the amended inheritance regime had significantly higher levels of primary education (by some 0.37 years) than those for whom decisions were made under the old regime. Roy (2015), however, interprets the HSAA as applying to family property, and uses the death of the grandfather as the event that triggers the partition of the estate. Roy's findings are less optimistic than those of Deininger, Nagarajan and Goyal (2013): despite the HSAA stipulating that daughters would have equal shares as sons in ancestral property, she finds that the reform failed to increase the actual likelihood of women inheriting property. Instead, parents appear to be "gifting" their share of land to their sons to circumvent the law. Parents appear to have already been compensating their daughters for the fact that

they would not inherit household property by transferring to them alternative forms of wealth including dowry or education. For daughters who were past primary school age when the reform was passed in their state, but approaching marriageable age, compensation took the traditional form of dowries at the time of marriage. For daughters that were still school age when the reform was passed, compensation for not inheriting household property took the form of increased investment in their education, while dowry payments for them were lower. Thus, even reforms that were meant to strengthen WLR may not necessarily benefit the next generation as originally intended owing to trade-offs among forms of intergenerational transfers.

Two observational studies on the reform of the Family Code and land registration in Ethiopia (Kumar and Quisumbing 2012; 2015) found that awareness about the land registration process is positively correlated with the shift in perceptions toward equal division of land and livestock upon divorce, especially for wives in male-headed households, signifying stronger bargaining power. Stronger bargaining power is reflected in investments in child schooling: children in households where perceived divorce allocations favor the husband do worse compared with children of the same age, but girls fare even worse than boys in these households.

Quisumbing, Estudillo, and Otsuka's (2004) three-country observational study of intergenerational transfers explores how WLR in Ghana, Indonesia (Sumatra), and the Philippines affect the allocation of land and schooling among sons and daughters and how this, in turn, affects their lifetime incomes. Using retrospective data on inheritance, the study finds that in Ghana there is parental discrimination against girls in land transfers and schooling (although lessening through time), in Indonesia the distribution of land and schooling is equal between sons and daughters, and in the Philippines sons are favored in land inheritance and daughters in schooling. Landholdings of parents have differential impacts on their children's land inheritance, consistent with a bargaining model of the household. Estimates of the impacts of changing the distribution of land and schooling on children's lifetime incomes, however, illustrate the context specificity of the relationship between WLR and incomes. In the Philippines, the smaller farm income of daughters (arising from their disadvantage in land

inheritance) is compensated by higher nonfarm incomes owing to higher schooling, while in Sumatra, sons' and daughters' incomes are equalized (reflecting the relatively equal distribution of land). In contrast, in Ghana, where both land and schooling are biased against women, women's income is significantly lower than men's. Thus, the effects of WLR on intergenerational transfers may come full circle, by affecting the incomes of the next generation.

6. CONCLUSIONS

Our review of the literature on WLR and the outcomes identified in our conceptual framework indicates that, despite the generally medium to high level of agreement, the amount of evidence is both fairly low and very uneven. Table 6.1 presents our assessment of the quality of evidence on WLR along various pathways to poverty reduction, based on the amount of evidence and the level of agreement. The evidence is strongest (with high levels of agreement and a larger body of evidence) in the areas of bargaining power and decision making on consumption and bargaining power and decision making on human capital investment and intergenerational transfers. There is a high level of agreement but insufficient documentation on NRM, government services and institutions, empowerment and domestic violence, resilience and HIV risk, and consumption and food security. There is a low level of agreement and insufficient evidence on the associations between WLR and other livelihoods, and a higher level of agreement but still limited evidence on associations between WLR and credit, technology adoption, and agricultural productivity. Finally, although agreement is high that WLR ultimately reduce poverty, this assertion is unproven, partly because there are no rigorous studies that directly measure the link between WLR and poverty.

Table 6.1. Assessment of quality of evidence on women’s land rights and pathways to poverty reduction

		Amount of evidence		
		Limited	Medium	High
Level of agreement	Low	<i>Suggested but unproven</i> <ul style="list-style-type: none"> • Other livelihoods 	<i>Speculative</i>	<i>Alternate explanations</i>
	Medium	<i>Tentatively agreed by most but unproven</i> <ul style="list-style-type: none"> • Credit • Technology adoption • Agricultural productivity 	<i>Provisionally agreed by most</i>	<i>Generally accepted</i>
	High	<i>Agreed but unproven</i> <ul style="list-style-type: none"> • Poverty reduction 	<i>Agreed but incompletely documented</i> <ul style="list-style-type: none"> • Natural resource management • Government services and institutions • Empowerment and domestic violence • Resilience and HIV risk • Consumption and food security 	<i>Well established</i> <ul style="list-style-type: none"> • Bargaining power and decision making over consumption • Bargaining power and decision making on human capital investment and intergenerational transfers

Source: Authors.

Note: HIV = human immunodeficiency virus.

Some of the gaps in evidence cut across outcome areas. For example, the need to identify the bundles of rights held by women, the security of those rights, and knowledge of those rights is common across the body of literature. The divergent conclusions observed may arise from “a failure to account for the complexity and multi-dimensional nature of land rights in Africa which are often not adequately captured by traditional tenure categories” (Deininger, Ali, and Yamano 2008, 614). Indeed, land tenure regimes in all parts of the world are characterized by differences in the relative importance of customary

and statutory law, differences in underlying inheritance and kinship systems, and differences in social norms.

Another gap relates to the long-standing practice of defining and measuring land rights at the household level rather than at the individual level. While there is certainly agreement that stronger land rights would have a positive impact on both technology adoption and agricultural productivity, there is almost no evidence on WLR specifically. The few studies on women's agricultural productivity focus on women farmers or managers—but do not account for their land rights. Other gaps relate to the lack of attention paid to gender roles—the socially determined relationships between women and men. In the literature examining NRM and long-term investment, for example, there is supporting evidence that stronger WLR encourages investment. However, the Malawi cases show that if men do not have secure tenure, this may limit their incentives to invest. In addition, having land rights may be insufficient if no good investment opportunities exist, if women do not know about the ones that do, or if social norms, in general, limit women's ability to take advantage of such opportunities.

An important gap in the literature on NRM is that almost all cases (and all that we cite) are from Africa, not from Asia or Latin America. To some extent this may be because Africa has more female-headed households, and women there are more likely to have independent plots, even within dual-adult households. Thus, analyses of WLR can be done at the household level (although as we note, this is problematic) and at the plot level. In Asia, joint family farming is more often the norm. However, family farming in Asia is changing, especially in areas with high rates of male outmigration, like Nepal.

Interestingly, despite the rhetoric that WLR increase the ability of women to obtain credit, thereby encouraging investment and diversification of income portfolios, there is remarkably little evidence on this issue. Nor is there much evidence of such a pathway for men. Associations between WLR and livelihoods are suggestive but unproven because the available studies focus only on rental markets and we exclude studies in urban and peri-urban areas, where women who have diversified livelihoods may have migrated.

Although there is more agreement and evidence on outcomes related to empowerment and bargaining power, gaps in the evidence remain. Most papers that directly explore other aspects of empowerment apart from household decision making agree that WLR support women's empowerment, but only a small number of papers explore this link. Most of the evidence they present is limited by small sample sizes, observational methods without counterfactuals, not addressing endogeneity of women's landownership, vague definitions of land rights, selection bias in participating in land rights interventions, and possible response bias on questions of domestic violence and empowerment (since women who own land and have higher status may be less likely to report domestic violence and more likely to value and be able to articulate their empowerment).

Incomplete definitions of land rights are problematic across outcomes studied, but they are glaring in the papers on empowerment outcomes. To better understand the mechanism by which land empowers women, the indicator of land rights must go beyond self-reported ownership or even possession of a document; investigations of women's control over the use of and revenues from the land and how she acquired it are needed. That information would help us answer questions such as why land rights deter domestic violence or increase a woman's power in her relationship. The design of future programs depends on understanding whether the key is that landownership provides a source of independent income, status within the community, or fallback options or physical shelter if women leave the marriage.

Few papers situate a woman's land rights in the context of her household. The paper on HIV risk behavior demonstrates why this is important. In this context, land rights decreased HIV risk behavior for female heads of household by mitigating dependence on survival sex but did not change the risks for women in dual-adult households. Although most of the papers that look at empowerment consider only women's power relative to her spouse, the papers on participation in institutions reflect that power within a relationship has implications for empowerment in the public sphere. These papers indicate that the effects of WLR for the empowerment of women differ for women who are in dual-adult and female-headed households.

Finally, there are evidence gaps even in the outcome area where both the level of agreement and the quantity of evidence is strongest—that of bargaining power and decision making on household consumption, human capital investment, and intergenerational transfers. Despite the large number of papers, very few are rigorous evaluations of reforms that strengthened WLR. Although the datasets contain information on women’s and men’s property rights, the definitions differ across datasets, countries, and contexts, making generalizations difficult. Moreover, most of these studies do not explicitly set out to test the relationship between WLR and bargaining power, but instead use differential control of resources as a proxy for bargaining power. Thus, they often aggregate landownership with ownership of other assets (notably housing), making it difficult to identify the separate impact of WLR.

Identifying the impact of WLR and disentangling it from the underlying social, political, and economic environment is important to guard against perpetuating the myth that WLR by themselves are a panacea. For example, the study from Malawi showing that households with a greater proportion of women-managed plots are more susceptible to climate-related consumption shocks, particularly in patrilineal areas, cautions us against concluding that strengthening WLR is sufficient to achieve development outcomes. Similarly, attempts to give daughters equal inheritance rights to land in India may not have eliminated gender inequality in land inheritance, owing to parents’ giving inter vivos gifts of land to their sons. Parents may also have invested more in daughters’ schooling. Eliminating gender biases in access and use of resources other than land, making sure that information and extension messages reach women, and tailoring social and legal institutions to women farmers’ needs will be important in making sure that women farmers are equally productive as men. At the same time, the findings showing that husbands have insecure tenure in uxorilocal areas in Malawi, and are thus less likely to invest in tree planting, indicate that men do not always have strong tenure rights. The links between inheritance regime (matrilineal or patrilineal), residence patterns (virilocal or uxorilocal), and tenure security are more nuanced and require attention to men’s and women’s tenure security in the specific context.

Although further research is needed to address evidence gaps, that should not deter the careful design and implementation of programs and policies to strengthen WLR. Land tenure reforms are proceeding in many countries, owing to increasing pressures on the resource. If such reforms do not specifically seek to strengthen WLR, they are likely to weaken them, with clear negative consequences. If programs and policies are designed with careful consideration of existing land rights institutions, gender inequalities, and social norms, and if they are designed and implemented with an impact assessment strategy from the start, evaluations of such programs could themselves contribute to the body of evidence. Different modalities and mechanisms for strengthening WLR could be tested, with appropriate counterfactuals. Rather than relying on assertions that reflect agreement but are unsupported by evidence, program designers and evaluators would do well to strategically identify pathways and outcomes where evidence gaps exist, and deliberately collect data to close those gaps. Some of the impacts to be measured—such as those on poverty reduction—may require a longer interval to assess impact. A careful mapping of the evidence, such as what we have attempted in this review, could be the beginning of a strategy to make strengthening WLR an important part of agricultural development strategies.

APPENDIX: SUPPLEMENTARY TABLE

Table A.1 Description of papers reviewed

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Resilience							
Asfaw and Maggio (2017)	Malawi	Explore the gender- differentiated effects of weather shocks on households' welfare in Malawi	Quantitative, observational	Panel household and community data from the Malawi Integrated Household Panel Survey; 3,104 households	Share of land managed solely by women; share jointly managed; share managed solely by men	Total consumption, food consumption, daily caloric intake	Temperature shocks severely affect household welfare, reducing food consumption, and daily caloric intake. The negative welfare effects are more severe for households where land is solely managed by women. Temperature shocks significantly affect women's welfare only in patrilineal districts, where investment in agricultural technologies is lower.
Technology adoption and natural resource management							
Akpalu and Bezabih (2015)	Ethiopia	Analyze the decisions of female smallholder landholders to rent out their land	Quantitative, observational	700 FHHs	FHHs with land	Probability of renting out land	Risk preference, average productivity of plot (proxied by livestock holdings), variability of yield (proxied by rainfall), and risk of losing plot were correlated with FHH renting out plot.
Ali, Deininger, and Goldstein (2014)	Rwanda	Evaluate the short-term impact of a pilot land regularization program	Quantitative, QE impact assessment	Treatment 1,456, control 2,098 households; total 3,554 households, 6,330 parcels	Land tenure regularization versus no regularization	Investment in and maintenance of bunds, terraces, and check dams for soil conservation	Program increased investment and maintenance of soil conservation, especially for FHHs, who were most insecure before.
Antwi-Agyei, Dougill, and Stringer (2015)	Ghana	Explore linkages between land tenure arrangements and land management practices	Observational, participatory mixed methods: surveys, key informant interviews, oral narratives, and focus groups	Stratified random sample, 270 households in six farming communities	Perceptions and attitudes about land rights	Climate change adaptation: short- term soil conservation (mulching, inorganic fertilizers), longer-term tree planting	Compares indigenous with secure tenure rights with migrants. In both groups, women were more likely than men to say that complex tenure is a barrier for climate change adaptation.

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Awanyo (2009)	Ghana	Examine link between land tenure security, wealth/income, gender, farmers' investments related to tree biodiversity	Quantitative, qualitative, observational	Stratified by gender and wealth, from "referred sample," 80 households	Local definition of land tenure security, considering breadth, duration and assurance of rights	Tree-biodiversity-friendly practices: selective clearing, minimum tillage, mixed cropping of trees and nontree crops and selective weeding, planting and transplanting tree seedlings, mulching and pruning Value of output per hectare	Land tenure security has significant effect on selective clearing; local perception that more secure land tenure regimes provide more of an incentive for investment. Income and gender do not have significant interaction effects with landholding rights; land anxieties drive farmers of both genders and income groups to invest in practices that strengthen land tenure security. High number of investors in minimum tillage, with no significant differences between men and women.
Bezabih, Holden, and Mannberg (2016)	Ethiopia	Evaluate impact of land certification program on agricultural productivity	Impact evaluation	Plot-level panel data collected in 2005 and 2007 in East Gojjam and South Wollo zones in Amhara region; each round with 1,500 households and more than 7,500 plots	Land certification, by sex of household head		Certification has positive impact of productivity, more so for FHH; women more likely to rent out after certification.
Bhaumik, Dimova, and Gang (2016)	Malawi	Demonstrate that women owning land does not result in high-value crops when complementary inputs are not available	Quantitative, observational	Malawi Integrated Household Survey	Referred to owned land, but notes that they are only use rights	Consumption (per adult equivalent) as a measure of welfare	Landownership is key driver of high-value agriculture, for both men and women. In matrilineal societies, men's landownership has a bigger impact on high-value agriculture than women's. They claim that where women do not have access to inputs, owning land does not improve household welfare.

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Bugri (2008)	Ghana	Investigate implications of tenure security for agricultural production and environmental sustainability	Observational, qualitative, quantitative	35 communities for qualitative; 419 stakeholders for quantitative analysis (half of those interviewed are women)	Qualitative assessment of tenure security	Investment in the land; effectiveness of customary and statutory land management	Respondents identify nontenurial factors (lack of finance, poor soil fertility, inadequate and unreliable rainfall, pests and diseases, inadequate farmlands, bush burning, and excessive tree cutting) as main causes of low investment; women and strangers (that is, non-community members) generally had little or no power and control over land use decision making and management under customary land tenure.
Deininger, Ali, Holden, and Zevenbergen (2008)	Ethiopia	Examine the impact and identify lessons from Ethiopia's land certification program	Observational, quantitative, before/after	Second round of national survey of 2,300 households in 115 villages stratified by agroecological zone and region to cover all the country's agricultural production systems	Land certificates; formal tenure regime, ownership versus occupancy rights, length of occupation, and legal knowledge; indexes of conditional and unconditional rights	Land-related investment; tree planting (long-term, visible investment); manure, mulch, or crop residue (invisible investment)	Tenure security increases investment; FHH more likely to invest in land; households' awareness of land rights has large impact on investment, maybe larger than land rights variables.
Deininger, Ali, and Yamano (2008)	Uganda	Assess impact of tenure regime, perceived transfer rights, and legal knowledge on land investment and productivity	Observational, quantitative	970 households, 2,185 parcels in 12 parishes in six districts	Formal tenure regime, transfer rights, ownership versus occupancy rights, length of occupation and knowledge of law	Trees planted (long-term, visible investment) and manure, mulch, or crop residue (invisible investment); productivity, land values	Transfer rights increase investment in trees but not soil fertility; conditional rights not significantly different from unconditional, implying that concerns that requiring spousal approval would reduce investment were ill founded. Knowledge of the law matters more than having transfer rights; FHHs invest more than men.

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Dillon and Voena (2017)	Zambia	Analyze whether widows' land rights affect productivity	Quantitative, observational	8,094 households, plots under customary tenure	Whether widows inherit in the community	Inorganic fertilizer, fallowing, and intensive tillage	Lower levels of land investment by married-couple households in areas where widows do not inherit.
Goldstein, Hounghbedji, Kondylis, O'Sullivan, and Selod (2015)	Benin	Analyze the impact of a land formalization program on agricultural productivity	RCT on rollout of demarcation	289 villages: 191 treated and 98 control, 3,507 households; 6,572 parcels	Community demarcation of plots in a land registration process; compares MHH and FHH	Fallowing, tree planting, labor, fertilizer, output, crop choice	Demarcation process leads women to move ag to plots outside the village that were not demarcated and are less secure—as a means to increase their tenure security.
Goldstein and Udry (2008)	Ghana	Analyze the impact of ambiguous and contested land rights on agricultural productivity	Quantitative, observational	Panel data, 240 married couples (four village clusters); panel of 15 interviews over two years	Security of tenure based on political standing, gender	Fallow duration	Those without political power, including women, leave land fallow less often.
Hansen and Luckert (2005)	Malawi	Investigate how marriage and inheritance patterns affect tree planting	Quantitative, observational	Two villages, total of 204 households	Marriage and intended inheritance patterns	Who plants trees (wife, husband, both together, or other); number of trees held; nonnative spousal investment in their village of origin	Uxorilocal marriage patterns discourage tree planting by men, do not necessarily promote tree planting by women; high incidence of unmarried women is associated with increased tree planting by women.

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Lovo (2016)	Malawi	Examine effects of tenure insecurity on conservation of natural resources	Quantitative, observational	Agricultural Integrated Household Living Standard (LSMS-ISA); more than 9,000 households	Tenure insecurity due to short-term tenancy contracts and gender-biased inheritance practices	Erosion control, investment in trees, and adoption of hybrid seeds	Land tenure insecurity has important consequences for investment in soil conservation: probability of investing.
Persha, Greif, and Huntington (2016)	Ethiopia	Analyze the impact of Ethiopia's land certification program	QE: difference-in-difference design and matching	4,319 households, surveyed across 284 <i>kebeles</i> (villages); panel	Compares second-level registration with first-level; MHHs and FHHs, also widows	At household level; access to credit, land disputes, land rental activity, soil and water investments, land tenure security, female empowerment and decision making over land	Investment in conservation measures is 6% lower for rented than for inherited and purchased plots. No differences for allocated plots. Investment in conservation is 8% lower for men in matrilineal/matrilocal societies, more than 3.5% lower for men in mixed systems.
Pircher, Almekinders, and Kamanga (2013)	Malawi	Explain low adoption of legume technologies to improve soil fertility by farmers	Quantitative, observational	10 focus groups; some in-depth interviews; 21 semistructured interviews with farmers	Gendered roles, perceptions of tenure	Use of legumes for soil fertility	Women do not own land, are not responsible for soil fertility, and do not invest in the land.

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Quisumbing, Estudillo, and Otsuka (2004)	Ghana, Indonesia, and the Philippines	Examine determinants of the intrahousehold distribution of land and schooling and its impact on lifetime incomes	Quantitative, observational	Ghana: 255 households in 10 villages in western Ghana, 1996–1997; Philippines: 339 households in five villages in central Luzon and Panay, (1985, 1989, 1997, 1998); Indonesia: 262 households in four villages in Sumatra, 1996–1997	Individual landholdings of respondent’s parents; individual landholdings of respondent and spouse	Individual land inherited, years of schooling	Ghana: there is parental discrimination against girls in land transfers and schooling (although lessening through time); Indonesia: distribution of land and schooling equal between sons and daughters; Philippines: sons favored in land inheritance and daughters in schooling. In terms of impacts on lifetime income in Philippines, smaller farm income of daughters is compensated by nonfarm incomes owing to higher schooling; Sumatra: sons’ and daughters’ incomes equalized; Ghana: women’s income significantly lower than men’s.
Quisumbing and Kumar (2014)	Ethiopia	Examine medium-term impact of land registration and knowledge of program	Quantitative, observational	Ethiopian Rural Household Survey 1997, 2004, and 2009 rounds; about 1,300 households in 15 villages	Proportion of land registered; knowledge of property rights under the land registration	Planting tree crops and legumes, soil conservation practices	Near-universal registration of land among both MHH and FHH. Controlling for household level of land rights knowledge, gender gaps in knowledge about land rights in three domains—tenure security, land transferability, and gender rights—reduce adoption of soil conservation practices and planting of tree crops and legumes; different domains of rights matter for different practices.

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Santos, Fletschner, Savath, and Peterman (2014)	West Bengal, India	Evaluate the impact of India's land allocation and registration program in West Bengal	Quantitative, QE, with qualitative components (propensity- score-weighted regressions)	1,373 households in three districts; 803 NGNB beneficiary households; 570 control households	Whether household is an NGNB program beneficiary; woman's name on document	Food security, household dietary diversity score, protein consumption, intrahousehold distribution of food, security of tenure, agricultural investments, and women's involvement in food and agricultural decisions	Compared with eligible nonbeneficiary households, NGNB households are significantly more likely to have improved intermediate outcomes, including reports of tenure security, use of credit for agriculture, investments on improved agricultural inputs, and women's decision making over household food and agriculture; no evidence of significant improvement in current food security among beneficiary households.
Credit							
Persha, Greif, and Huntington (2016)	Ethiopia	See above.					
Santos, Fletschner, Savath, and Peterman (2014)	West Bengal, India	See above.					
Productivity							
Bezabih, Holden, and Mannberg (2016)	Ethiopia	See above.					
Bhaumik, Dimova, and Gang (2016)	Malawi	See above.					

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Productivity							
Deininger and Castagnini (2006)	Uganda	Analyze the incidence of land conflicts and their impact on productivity	Quantitative, observational	430 households, one-half chosen from those with land conflict, one-half chosen randomly	FHHs	Land conflict	FHHs more likely to experience land conflict; land conflict is negatively related to productivity.
Goldstein and Udry (2008)	Ghana	See above.					
Mendola and Simtowe (2015)	Malawi	Evaluate impact of a land redistribution program	Impact evaluation	1994 households in six districts; panel of four rounds from 2006–2009	Compares beneficiaries and nonbeneficia ries of the land reform by sex of household head.	Land acquisition, output, productivity, food security, income and expenditure	Project enabled both MHHs and FHHs to acquire more land. However, impact estimates for other outcome variables suggest that the land project had a smaller impact on beneficiary FHHs than MHHs. Only MHHs had a significant improvement in agricultural productivity and income, food security, and access to social services. Similar impacts for MHHs and FHHs on total income and asset accumulation.
Newman, Tarp, and van den Broeck (2015)	Vietnam	Examine the effect of land titling, including joint titling, on agricultural productivity	Observational, QE identifying plots that change LUC status	2,200 households in 12 provinces; three rounds of panel from 2006 to 2010	LUC, compares joint and individually owned	Productivity of rice plots	Positive impact of titling on productivity; no negative effect of joint titling on productivity.
Owoo and Boakye- Yiadom (2015)	Kenya	Explore the relationship of gender, tenure security, and agricultural production	Observational	320 observations, two districts in Kenya	Tenure security proxied by title; data on land users, 43% of sample are women	Maize yields per unit of land	Compares maize outputs for those with and without titles, by sex. Output is highest for men with titles, followed, in order, by women with titles, men without titles, women without titles.

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Productivity							
Peterman, Quisumbin g, Behrman, and Nkonya (2011)	Nigeria and Uganda	Analyze impact of gender on agricultural productivity	Observational	Uganda: 3,625 plots in 851 households in eight districts; Nigeria: 3,750 households in program areas	Uganda: sex of person who owns the crops on the plots; Nigeria: sex of household head	Agricultural output	Productivity differences depend on aggregation of gender indicator, crop-specific samples, agroecological zone, and biophysical characteristics.
Government services and institutions							
Goldman, Davis, and Little (2016)	Tanzania	Explore the relationship between women's landownership, awareness of rights, and participation in community land governance	Mixed methods	204 married women plus qualitative interviews in five districts	Self-reported ownership of agricultural land	Increased awareness of land rights; speaking out against illegal/unjust land sales	Access to land, knowledge, social relations, and political processes leads to women's empowerment and helps keep land within communities; larger effects than landownership.
Grabe (2015)	Tanzania	Explore the relationship between women's landownership and participation in community meetings	Quantitative, observational	225 women (74 landowners, 151 nonlandowners)	Self-reported ownership, titles, mode of acquisition	Political participation (whether they spoke or not in community meetings)	Landownership is positively and significantly correlated with speaking in NGO meetings and household decision making, and with decreases in partner control.
Selhausen (2015)	Uganda	To understand factors that influence women's participation in a women's coffee cooperative	Quantitative, observational	Stratified random sample, 421 women cooperative members plus 210 nonmember women	Self-reported ownership	Women's cooperative membership and intensity of participation in cooperative (as measured through collective coffee marketing and share capital contributions)	Size of land owned before membership has a positive and highly significant effect on women's probability of membership.

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Other livelihoods							
Akpalu and Bezabih (2015)	Ethiopia	See above.					
Holden and Bezabih (2008)	Ethiopia	Understand why land rented out by women has lower productivity than that rented out by men	Observational	230 landlord households in sample of approx. 2,000 households in Amhara region	Landlords—those who rent out land	Agricultural productivity	Considers why productivity is lower on plots rented out by FHHs. Female landlords are more tenure insecure and have less bargaining power. Thus, they screen less well and are more likely to rent to relatives.
Holden, Deininger, and Ghebru (2011)	Ethiopia	Assess the impact of land certification on allocative efficiency	QE	400 households in Tigray, year before and three rounds after land registration	Acquisition of land certificate; FHHs	Land rented out	Female landholders are more likely to rent out land if they have a certificate.
HIV risk and resilience							
Muchomba, Wang, and Agosta (2014)	Kenya	To assess whether women's landownership decreases risk of HIV	Quantitative, observational	5,511 women working in the agricultural sector from the 1998, 2003, and 2008– 2009 Kenya Demographic and Health Surveys	Self-reported landownership: whether the respondent worked on (a) her own land; (b) family land; (c) rented land; or (d) someone else's land	HIV infection status, transactional sex, unprotected sex, and unprotected casual sex	Women's landownership was associated with fewer sexual partners in the past year and lower likelihood of engaging in transactional sex but was not associated with reduced unprotected sex with casual partners among women with high self-perceived HIV risk, indicating no difference in safer sex negotiation.

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Domestic violence							
Grabe (2010)		Examine the links between women's landownership, gender ideology, relationship power, and domestic violence	Quantitative, observational	238 women (124 landowners, 114 nonlandowners)	Self-reported landownership	Gender ideology, partner control, relationship power, conflict tactics scale	Landownership among women challenges traditional gender ideology and increases women's power and control within the marital relationship, which in turn, reduces levels of violence. However, comparable levels of lifetime violence are observed between treatment and control.
Grabe, Grose, and Dutt (2015)		Examine the links between women's landownership, relationship power, and domestic violence	Mixed methods, observational	267 surveyed in Nicaragua (121 landowner and 146 nonlandowner women), 225 in Tanzania (74 landowner, 151 nonlandowner women) plus 14 qualitative interviews in Tanzania, 19 in Nicaragua	Self-reported landownership	Conflict Tactics Scale, partner control	Links found between women's ownership of land, relationship power, and receipt of physical and psychological violence in both the countries. Collectively, the findings suggest that when women own land, they gain power within their relationships and are less likely to experience violence.
Panda and Agarwal (2005)		Assess the relationship between women's land and house ownership and domestic violence	Quantitative, observational	502 women (302 rural and 200 urban) of ever-married women in the age group 15–49	Women's land or house ownership	Long-term and current physical and psychological violence	Women owning immovable property (land or a house) are found to face a significantly lower risk of marital violence than propertyless women.

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Consumption and food security							
Ghebru and Holden (2013)	Tigray, Ethiopia	Assess the impacts of a land registration and certification program on food availability and food security	QE (panel analysis)	Five rounds of household panel data from 400 households in Tigray, Ethiopia, 1998–2010	Years of certificate ownership, MHHs and FHHs	Calorie availability per adult equivalent, BMI	Certificate ownership is positively related to food availability and children's BMI. Effects on calorie availability (but not BMI) were higher for FHHs.
Santos, Fletschner, Savath, and Peterman (2014)	West Bengal/India	See above.					
Bargaining power and decision making over consumption							
Brule (2010)	India	Analyze the effects of a law that equalized women's inheritance rights	Mixed methods, QE (RDD)	(1) Quant: nationally representative panel data collected across 17 Indian states, 1971 to 2006–2008, 8,659 households; Qual: 850 women and their husbands	Whether legal beneficiary of HSAA	Women's probability of inheriting land; equality of land share between sons and daughters; self-reported ag labor on own field; women's financial bargaining power; area of land registered (women); expenditure on women's goods; expenditure on medicine; expenditure on daughter's education; expenditure on son's education	The law has increased women's perceived ownership of household land, women's self-reported bargaining power in the household, and women's probability of inheriting land. The law has a very limited substantive impact on the equality of women's land shares, but a significant welfare impact: households with an HSAA beneficiary spend more on women's goods, medical care, and children's education.

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Bargaining power and decision making over consumption							
Dercon and Krishnan (2000)	Ethiopia	Test whether individuals smooth consumption over time and within the household	Quantitative, observational	Ethiopian Rural Household Survey, 1,477 households in 15 villages in rural Ethiopia; 2,343 individuals	No indicator of women's individual land rights, but proxies for gender norms using interaction between living in the South and having land	(1) Change in log BMI across rounds; (2) the predicted log of the ratio of the Pareto weights of husband over wife, times a scaling factor, using regression on couples (190 couples)	Differences in the ages of husband and wife mattered for allocations, as did the relative wealth of the husband and the customary rules on divorce settlement. However, the wealth of the household measured by its landholding had a very large positive effect on the wife's allocation in the South, suggesting that productivity-related effects rather than bargaining may be at the root of the relative bias.
Doss (2006)	Ghana	Examine how the share of assets owned by women in Ghanaian households affects household expenditure patterns	Quantitative, observational	1991–1992 and 1998– 1999 Ghana Living Standards Surveys, 1,372 rural households	Share of assets owned by women: business assets, savings, farmland	Budget shares for nine expenditure categories	Women's share of assets (using both agricultural land and a broader measure of assets) has an impact on household budget shares for a number of expenditure categories in each time period. Women's share of household land explains five of the nine budget categories including food.
Doss, Kim, Njuki, Hillenbrand, and Miruka (2014)	India, Mali, Malawi, Tanzania	Explore the relationship of women's individual and joint property ownership and the level of women's input into household decision making in India, Mali, Malawi, and Tanzania	Mixed methods, observational	India: 662; Malawi: 643; Mali: 588; Tanzania: 773 as part of baseline data for CARE Pathways Program	Whether women own land individually or jointly; whether women own a house individually or jointly	Decisions on growing crops primarily for household food consumption, cash crop farming, taking products to market, purchasing inputs for agricultural production, minor household expenditures, children's education, and major household expenditures	Individual and joint landownership has statistically significantly different effects on women's input into agricultural decisions for all four of the decisions in the three African countries. There is no relationship between landownership and decision making in India. Whether land is owned jointly or individually has less of an impact on other household decisions; the difference is statistically significant in four of the 12 estimates (three decisions in each of four countries).

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Bargaining power and decision making over consumption							
Fafchamps and Quisumbing (2002)	Ethiopia	Investigate how the control and devolution of productive assets within marriage are associated with assets brought to marriage, asset ownership, control within marriage, and disposition upon death or divorce	Quantitative, observational	1,405 households in Ethiopian Rural Household Survey	Premarriage land and livestock of wife (husband); share of land use rights of wife	Share of land and livestock going to wife upon divorce; whether wife inherits all jointly owned livestock upon death of husband; whether wife inherits all land upon death of husband; share of land owned by wife; right to rent land; share of livestock owned by wife (husband); right to sell livestock	Share of land and livestock going to wife upon divorce positively associated with premarriage land of wife and share of land use rights of wife; women's land rights have no effect on disposition of assets at death of husband; premarriage land of wife positively associated with share of land rights of wife and right to rent land; premarriage rights of wife have no relationship with share of livestock owned by wife and right to sell livestock.
Kumar and Quisumbing (2015)	Ethiopia	Show how changes in the Family Code implemented in 2000 and the community-based land registration undertaken since 2003 may have created conditions for gender-sensitive reforms to reinforce each other	Quantitative, QE	1997, 2004, and 2009 rounds of the Ethiopian Rural Household Survey; 972 observations (female heads of households and spouses in male-headed households)	2004 landholding size, land quartile in 2004, awareness of land registration process, whether woman in Land Administration Committee	Changes in perceptions about the distribution of assets upon divorce between 1997 and 2009	Awareness about the land registration process is positively correlated with the shift in perceptions toward equal division of land and livestock upon divorce, especially for MHHs. Having at least one female member in the Land Administration Committee also is positively correlated with the shift in perception toward equal allocation of land among FHHs and livestock allocation for all samples.

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Bargaining power and decision making over consumption							
Mishra and Sam (2016)	Nepal	Empirically examine how women's landownership affects her healthcare, major household purchases, and visiting family or relatives	Quantitative, QE (coarsened exact matching, panel analysis, and IV)	2001 and 2011 Nepal Demographic and Health Surveys; 4,066 and 3,047 observations in 2001 and 2011 of women who are involved in agriculture and whose households own land, and who are currently married and residing with their husbands	Woman owns land and works on family land	Household bargaining power, own healthcare decisions, major household purchases, and visits to family or relatives (argue more linked to empowerment than decisions that women already make, like Allendorf's use of daily purchases)	Women's landownership significantly increases their empowerment, defined by household decision making in areas of own healthcare, major household purchases, and visits to family or relatives.
Quisumbing and Maluccio (2003)	Bangladesh, Ethiopia, Indonesia (Sumatra), South Africa (Kwazulu-Natal)	Test the unitary versus the collective model of the household using education and assets at marriage of husband and wife as measures of bargaining power	Quantitative, observational	Bangladesh: micronutrients and gender study (1996–1997); Ethiopia: Ethiopian Rural Household Survey 1997; Indonesia: Sumatra land rights survey; South Africa: Kwazulu-Natal Income Dynamics Survey; Households with husband and wife present: Bangladesh: 839 households; Sumatra: 114 households; Ethiopia: 1,347 households; South Africa: 492 households	For both husband and wife: Bangladesh: value of assets at marriage (including land); Indonesia: land at the time of marriage; Ethiopia: value of land and livestock brought to marriage; South Africa: count of assets at marriage (including land)	Expenditure shares; children's schooling (measured as deviation from cohort mean)	Increasing relative resources controlled by women leads to higher expenditure allocations to education. In two out of three countries where men's and women's assets have significantly different effects (Bangladesh and South Africa), increasing the share of assets controlled by women increases educational budget shares.

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Bargaining power and decision making over consumption							
Swamnathan, Lahoti, and Suchitra (2012)	Karnataka, India	Examine the impact of women's property ownership on their mobility and autonomy in decision making	Quantitative, observational	Karnataka Household Asset Survey 2010–2011, representative at the state level; rural sample of 2,626 households	Whether woman owned land or a house; proportion of household gross value of land and house owned by women	Mobility index that includes whether they were usually allowed to travel to the market, health facility, and other places. Employment and access to health services: whether women make decision on whether, when, and where to be employed, and accessing health services for themselves. Women's control over money.	Owning a house or a plot of agricultural land enhances women's ability to travel to the market, health center, and other places outside the community, and to make decisions about their employment, health, and use of money independently.
Wiig (2013)	Peru	Measure the impact of a reform instituting joint land titling in the names of husband and wife on decision making	Quantitative, QE	Peru Land Gender household survey, 2010; 1,259 female respondents; 1,267 male respondents	Lives in a community where private titling (individual or joint) is possible	Women's decision making on expenditure, investment, agriculture, and market empowerment	Women living in communities with titled plots participated in 70% of household decisions made, versus 65% in communities without titled plots. The effect is strongest for agriculture decisions and land-related investments.

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Bargaining power and decision making on human capital investment and intergenerational transfers							
Allendorf (2007)	Nepal	Explore whether women's land rights empower women and benefit young children's health in Nepal	Quantitative, observational	2001 Nepal Demographic and Health Survey; 4,884 women respondents who were agricultural workers and regular members of the household who are currently married and residing with their husbands (for example, no FHH)	Landownership (individual or joint) categorized as "lives in landed household," "owns land herself," and "lives in landless household"	Decision making: who in their household usually has the final say on own healthcare; large household purchases; household purchases for daily needs; and visits to family, friends, and relatives. Whether the child is seriously malnourished.	Women who own land are significantly more likely to have the final say in household decisions. Children of mothers who own land are significantly less likely to be severely underweight. Land ownership is comparable to education and employment in its impact on child health.
Deininger, Goyal, and Nagarajan (2013)	India	Explore the impact of reforms that strengthened women's inheritance rights, implemented between 1986 and 1994	Quantitative, QE using natural experiment in timing of death relative to reform	2006 nationally representative Rural Economic and Demographic Survey conducted by the Indian National Council for Applied Economic Research; 8,190 rural households in 16 major states of India	Whether or not father died after the inheritance reform	Whether individual inherited any land; the share of household land inherited by the female, the total value of other gifts (pre- and postmortem) received, the value of total transfers (gifts and land) received, and the amount of land owned	Females are more likely to inherit after the land reform; reforms increased the total value of asset transfers women received, the share of household land they received, and their level of landownership at the time of the survey (that is, effects persisted); and girls but not boys whose education decisions were made under the amended inheritance regime had significantly higher levels of primary education (by some 0.37 years) than those for whom decisions were made under the old regime.

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Bargaining power and decision making on human capital investment and intergenerational transfers							
Kumar and Quisumbing (2012)	Ethiopia	Examine how women's perceptions of the distribution of land and livestock after divorce affects women's well-being and investment in child schooling	Quantitative, observational	1997, 2004, and 2009 rounds of the Ethiopian Rural Household Survey; 972 observations (female heads of households and spouses in male-headed households)	2004 landholding size, land quartile in 2004, awareness of land registration process, whether woman in Land Administration Committee	Women's satisfaction and control of their life; child schooling	Women who perceive that their husband would get all the assets in case of a divorce also tend to perceive less control over their lives. Children in households where perceived divorce allocations favor the husband do worse compared with children of the same age; girls fare even worse than boys in these households.
Kumar and Quisumbing (2015)	Ethiopia	See above.					
Menon, Rodgers, and Nguyen (2014)	Vietnam	Analyze whether land titling for women improves child health and education	Quantitative, QE, panel data with fixed effects	1,728 matched households from the 2004 and 2008 Vietnam Household Living Standards Surveys	LUC variables: whether an LUC is held solely by a man, solely by a woman, or jointly by husband and wife	Proportion of children: sick, with health insurance, enrolled in school; expenditure shares: food and beverages, alcohol and tobacco, education	Female-only-held land use rights decreased the incidence of illness among children, increased their health insurance coverage, raised school enrollment, and reallocated household expenditures toward food and away from alcohol and tobacco. These effects were almost all stronger than in households with male-only or jointly held land use rights.
Quisumbing, Estudillo, and Otsuka (2004)	Ghana, Indonesia (Sumatra), and the Philippines	See above.					

Table A.1 Continued

Author(s) (year)	Country	Purpose	Type of study	Dataset and sample size	Measures of land rights	Outcomes measured	Findings
Bargaining power and decision making on human capital investment and intergenerational transfers							
Roy (2015)	India	Analyze the impact of women's property rights on alternative transfers including to education and dowries	Quantitative, QE using natural experiment in timing of death relative to reform	The Rural Economic and Demographic Survey 1999, representative of 16 states; retrospective information on all household members	Whether or not the woman's grandfather died after the inheritance reform	Likelihood of inheritance by women, likelihood of land gifts to brothers, dowry, education	Although progressive legislation aimed at improving inheritance rights of women in India did not have the desired first-order effect, parents may have compensated their daughters for such disinheritance which resulted in alternative forms of transfers to daughters.

Source: Compiled by authors

Note: BMI = body mass index; FHH = female headed households; HSAA = Hindu Succession Act Amendments; IV = independent variable; LUC = land use certificate; MHH = male headed households; NGNB = Nijo Griha, Nijo Bhumi; NGO = nongovernmental organization; RCT = randomized control trial; RDD = regression discontinuity design; QE = quasi-experimental.

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